CHANGE!

CHILDREN'S HEALTH, ACTIVITY AND NUTRITION: GET EDUCATED!

A Cross-curricular Approach for Teaching Year 6 Healthy Eating and Physical Activity

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A Letter to Teachers

Dear Teachers,

Welcome to *CHANGE!*, an innovative, cross-curricular approach to health education. You can use this curriculum to teach pupils about healthy eating and physical activity while building skills and competencies in mathematics, science, physical education, geography, history, and personal, social and health education and citizenship (PSHE & C). Using our lessons will hopefully strengthen connections among academic disciplines for pupils and teachers. Here‟s how it works.

Focussing on Well-being

CHANGE! encourages pupils to think holistically about how health behaviours are interrelated. Exercises in self-reflection and skills-building will empower pupils to choose healthy foods, increase physical activity, and limit TV and other screen time. Acquiring these habits in childhood may increase lifelong health and well-being. Well-being, as we know, makes everything else – including learning – possible.

Achieving Learning Outcomes

The *CHANGE!* curriculum is aligned with the Personal, Social and Health Education and Citizenship curriculum and incorporates aspects of health, mathematics, literacy, P.E., science and technology, history and social science.

Learning Across the Curriculum

Every *CHANGE!* lesson incorporates a range of Key Stage 2 National Curriculum objectives. Specifically, *CHANGE!* draws on a holistic and constructive approach to teaching and learning. Constructive thinking emphasises that pupils learn best when they actively construct meaning for themselves. Pupils come to the classroom with diverse knowledge and experiences. Constructivism encourages teachers to create

learning environments that activate and build on this diversity in a manner that is active, inquiry based, and pupil centred. Therefore, each *CHANGE!* lesson begins by activating and assessing prior knowledge. Lessons proceed to inquiry-based activities in which the pupils read, write, speak, listen, experiment, and reflect, in order to answer health-related questions. *CHANGE!* provides a range of teacher and pupil resources to support this inquiry.

Engaging Discussion & Cooperative Learning

Every *CHANGE!* lesson identifies discussion ideas for small and large groups to cooperatively learn and solve health-related issues. Higher-level thinking and cognition are encouraged by using active discussion, and social development is enhanced by having pupils work with peers in groups.

We hope you enjoy the *CHANGE!* resource and that it does bring about change!

Acknowledgments

The *Planet Health* and *Eat Well Keep Moving* curriculum was first developed and refined by a team headed by Steven Gortmaker, Jean Wiecha, and Karen Peterson. After successful results in the USA, we have adapted these original lessons, with permission from Human Kinetics, and tailored it specifically to Wigan Borough. Further to this we would like to acknowledge Dr Scott Duncan and his team at the Auckland University of Technology, for their work on „Healthy Homework", which has been adapted and incorporated into our lesson plans. In doing this we have produced *CHANGE!*, which has truly been a team effort.

We would like to express our appreciation to Wigan Council Children and Young People"s Services, and Ashton, Leigh and Wigan NHS for their ongoing support and enthusiasm. We also thank all of the teachers involved in our pilot studies. We appreciate their willingness to share ideas and work together to make *CHANGE!* a curriculum developed in partnership.

We began our work by assembling the latest research on healthy eating, physical activity and television viewing to guide these health behaviour goals. We thank a variety of teachers for insightful comments on early drafts of these materials.

SECTION 1

Implementing *CHANGE!* in School

Two of the most important aspects of being healthy are enjoying good food and enjoying physical activity. Not only are these two of the great pleasures of life but they can be life saving – some of the major causes of long term illness and premature death are directly related to a combination of unwise food choice and inactivity. These problems include disorders such as heart disease, high blood pressure and about one third of all cancers are often related to poor diet and lack of physical activity. Successive Governments have stated that it is up to us all to take responsibility for our lifestyles and the consequences of the choices we make. Yet making the best choices does not follow simply from providing information; a deep understanding of the information is required and an ability to apply it to our own circumstances. It is also vital to understand the context in which we make choices and the other influences on these choices. Such factors as advertising and the cost of food and of using the local swimming pool and many, many others contribute to the decisions we make. In addition there are some very important influences on what we do which are beyond our immediate individual influence, such as climate change.

The damage done by poor diet and inactivity can begin at a very early age. For example, more than 1 in 10 teenage boys already have the first signs of coronary heart disease and bone mass accumulation occurs throughout childhood and early adulthood, further highlighting the need for weight-bearing physical activity throughout childhood and adolescence. But coronary heart disease and osteoporosis are not disorders of childhood, they strike us down in middle and old age. Thus if we

are serious about preventing such problems, and there is plenty of evidence that they can be prevented, we must begin in childhood. In addition, well fed and fit children are more likely to be able to take advantage of the learning opportunities provided by schools.

Facts About Children's Health

- Many children spend more time watching TV than in any other activity besides sleeping.
- On average children only eat 2 out of the 5 recommended portions of fruit and vegetables a day.
- Only 8% of children are meeting the recommendation for saturated fat (to be no more than 11% of total energy).
- Only about half of children participate regularly in 1 hour of moderate-to-vigorous physical activity per day.
- Fitness, a product of physical activity, is cardioprotective, but has declined in children in recent years.

About the Curriculum

Through classroom lessons and homework activities, *CHANGE!* aims to improve pupils‟ fitness and nutritional status, by improving eating habits, increasing physical activity, and decreasing sedentary behaviours, such as watching television and playing computer games.

CHANGE!‟s success rests on the availability and interaction of its curriculum components. The *CHANGE!* environment includes classroom lessons and family homework activities. The classroom lessons start with the introductory lesson, Healthy Living, followed by 18 additional classroom lessons addressing healthy eating and physical activity promotion through various aspects of the Key Stage 2 curriculum, and an overall summary lesson.

Health Messages

CHANGE! encourages pupils to “make time and space for physical activity and healthy eating” by reinforcing the following five behaviours:

1. **Be physically active every day.** Children should strive to accumulate 60 minutes or more of moderate to vigorous activity each day. These guidelines are the recommended minimum levels of activity for health.
2. **Limit your screen time to no more than two hours per day.**
3. **Eat five or more portions of fruit or vegetables (combined) per day.**
4. **Eat more whole grains, less added sugar.** A simple way to reduce sugar is to reduce intake of sugar-sweetened drinks.
5. **Eat foods low in saturated fat and trans fat.**

Educational Approach

We use the term cross-curricular to mean that the key curriculum messages are presented using concepts from multiple subject areas. This approach amplifies opportunities to reinforce the health messages through diverse learning approaches. Pupils practice the behavioural skills of developing self-efficacy in making healthy food choices, being physically active, and trading screen time for active time. Self-assessment and goal setting encourages pupils to reflect on their current behaviours and make plans for change. Teaching these concepts across disciplines highlights their importance and establishes peer and teacher support for “lifestyle” changes in behaviour.

Each classroom lesson incorporates subject-specific learning outcomes so that skills and competencies that are required learning for Year 6 pupils are used as vehicles for conveying *CHANGE!*‟s messages. This strategy ensures that teachers will not lose valuable class time in implementing *CHANGE!*

CHANGE! draws on a constructive approach to teaching and learning. The lessons begin with the activation and assessment of prior knowledge and build on what is known as an active, inquiry-based, pupil-centred manner. Pupils read, write, speak, listen, experiment, and reflect to answer health-related questions. They actively engage in „thought showering‟, debates, case studies, classroom

demonstrations, group projects and presentations. The lessons foster critical thinking and responsible decision making, in addition to offering skill-building exercises.

CHANGE! is not about dieting or weight control. It focuses on putting the five *CHANGE!* messages into practice to help everyone, children and adults, improve their current health and well-being and decrease their risks of many chronic conditions and diseases. When talking to pupils about these messages, teachers should emphasise the benefits of a healthy lifestyle and avoid conveying an attitude of restriction. Children don‟t need to give up all high-sugar foods, or watching TV. Moderation is the key! The *CHANGE!* curriculum encourages pupils to think about their choices for healthy eating and physical activity and gives them an opportunity to practice developing strategies for achieving these goals. As pupils gain knowledge and experience with healthy choices in a supportive social setting, these choices will become increasingly easier to maintain.

Creating a Supportive Environment

It‟s easier to make healthy food and physical activity choices when you have a supportive whole school approach - staff and parents/carers and welfare service (food service and lunchtime play supervisors).

Programme Background

There have been many programmes designed to encourage children to take more exercise and eat a better choice of foods. The success rates vary but overall have been disappointing, for example the rates of obesity have soared. Hence the *CHANGE!* project, which is an attempt to better understand this highly complex situation. It is based on an American programme, ‟Planet Health‟, shown to be successful (and also used in the UK) which features three key elements: it is child centred, it is school based and it involves the family. Given the enthusiasm in Wigan for the „Every Child Matters‟ and the „Healthy Schools‟ initiatives it seemed a good time to launch and evaluate „Planet Health‟. This is not just repeating what has already been done. The key differences are in the evaluation tools which will be used to rigorously assess activity, food choice and a range of biological markers of possible disease risk factors. The *CHANGE!* project has been based on a firm theoretical foundation and on tried and tested evaluation methods. It is hoped that the insights gained will give credibility and direction to future developments.

The health of children is the most precious asset which the country possesses. It is hoped that a lasting partnership can be forged between the schools, local authority and NHS in Wigan and Liverpool John Moores University which can make a substantial contribution to the aspirations and lives of the children of Wigan.

SECTION 2

Classroom Lessons

The *CHANGE!* classroom curriculum is composed of an introductory lesson, Healthy Living, followed by 18 additional classroom lessons addressing healthy eating and physical activity promotion through various aspects of the Key Stage 2 curriculum, and an overall summary lesson. Read this section before proceeding to the lesson plans; it provides useful information on how the lessons are structured.

Components of the Classroom Curriculum

Each lesson addresses one of the five *CHANGE!* themes: be physically active every day; limit your screen time to no more than two hours per day; eat more than five portions of fruit and vegetables (combined) per day; and eat more whole grains, less added sugar, and foods low in saturated fat and trans fat.

Lesson Design

All lesson plans provide the following:

- Summary paragraph
- Curriculum Cross-Referencing
- Behavioural Objectives
- Learning Objectives
- Materials
- Lesson Plan (including homework tasks)
- Teacher Resources
- Activity sheets, overhead transparencies, and student resources.

Emphasising Literacy Learning

In addition to encouraging learning standards from many curriculum areas, *CHANGE!*, emphasises literacy learning in each lesson. Literacy should be a component of every lesson, whether the subject area is PSHE, mathematics, science and technology, or history, geography and social science. Every *CHANGE!* lesson integrates a range of curriculum learning objectives, in a manner that will make classroom implementation easy. To assist you with long-term planning, each lesson is cross-referenced to the Curriculum.

Emphasising Discussion & Co-operation

Every *CHANGE!* lesson specifies discussion ideas for small and large groups to cooperatively learn and solve health-related issues. Higher-level thinking is encouraged by using active discussion, and social development is enhanced by having pupils work with peers in groups.

Curriculum Matrix

Lesson Number:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PSHE+C: Breadth of study	1a	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	
	1b	●				●		●	●	●	●	●		●		●				●	
	1c	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	2a				●				●				●	●			●	●			
	2f					●							●	●				●			
	3a	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	4b					●							●	●							●
	4f	●											●	●							
PSHE	5a	●				●				●	●										
	5b					●		●	●	●		●		●			●	●			
	5d	●	●	●		●	●	●	●	●	●	●	●	●	●	●			●	●	
	5i	●				●	●	●	●	●	●	●	●	●	●	●				●	●
Science Sc1	1b									●			●					●			
	2a												●					●			
	2b	●	●	●			●	●		●	●	●	●		●	●		●	●	●	
	2c																	●			
	2d																	●			
	2f	●	●	●			●				●				●	●	●		●		
	2g	●					●				●	●			●	●	●	●	●		
	2h		●	●					●						●	●			●	●	
	2i	●	●	●			●	●	●		●	●			●	●		●	●	●	
	2j	●	●	●			●	●	●	●	●	●			●	●	●	●	●	●	
Science Sc2	1a	●	●	●				●	●	●	●	●			●	●	●	●	●	●	
	2a						●									●					●
	2b	●	●	●			●	●			●	●			●	●			●	●	●
	2c																●	●			
	2d																	●			●
	2e																●				●
	2g																	●			●
	2h	●	●		●	●			●	●	●		●	●	●		●	●		●	●

Lesson Number:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Science: Breadth of study	1a	●		●				●			●	●			●	●		●	●	●	
	1b																●	●			
	1c		●				●					●			●	●			●	●	
	1d		●	●			●					●			●	●			●	●	
Physical education	1a				●	●			●	●			●	●			●				
	1b																●				
	4a																●	●			●
	4b																●				●
	4c				●	●			●	●			●	●			●	●			●
Physical education: Breadth of study	**Intervention activities will complement each of the 6 areas of activity**																				
Mathematics: Ma2	1b			●			●		●	●		●			●	●			●		
	1f			●	●				●	●		●			●	●		●	●	●	
	1h			●			●		●	●		●			●	●		●	●		
	1k								●			●	●	●	●	●		●	●	●	
	2g			●						●					●	●			●		
	3a									●											
	3j			●			●			●		●			●	●		●	●		
	3k									●											
	4a			●			●			●		●			●	●			●		
	4b			●			●			●		●			●	●			●		
Mathematics: Ma3	1a			●			●		●	●		●	●	●	●	●			●		
	1g			●			●		●			●			●	●			●		
	2a												●	●							
	4b								●												

Lesson Number:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Mathematics:	1a								●	●		●	●	●	●	●		●	●	●	
Ma4	1c			●			●		●	●		●	●	●	●	●		●	●		
	1d			●			●			●		●			●	●		●	●		
	1f			●					●	●		●			●	●		●	●	●	
	1g								●	●								●			
	1h								●	●								●			
	2a						●		●	●		●	●	●	●	●		●	●	●	
	2b			●			●		●	●			●	●	●	●			●	●	
	2c			●					●				●	●	●	●			●	●	
	2d									●											
Mathematics:	1d			●			●			●		●			●	●		●	●		
Breadth of study	1e			●			●					●	●	●	●	●		●	●	●	
	1f															●			●		
	1g									●								●			
	1h			●					●	●		●	●	●	●	●		●	●	●	
ICT	1a				●																
	1b				●																
	1c			●	●																
ICT: Breadth of study	5a			●							●										
English En1	1e				●	●			●	●			●	●			●	●			
	2a	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	2b				●	●			●	●			●	●			●	●			●
	2e				●	●			●	●			●	●			●	●			
	3a	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	
	3c	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	3d	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	3f				●	●			●	●			●	●			●	●			
English En1:	9c	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	
Breadth of study	10a	●	●	●	●		●	●		●	●	●			●	●	●	●	●	●	
	10c	●	●	●	●		●	●		●	●	●			●	●	●	●	●	●	

Lesson Number:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
English En2	3a	●	●	●	●		●	●		●	●	●			●	●	●	●	●	●	●
	3c	●	●	●	●		●	●			●	●			●	●			●	●	
	3d	●	●	●	●		●				●	●			●	●			●		
	5a	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	
English En2: Breadth of study	9b	●	●		●										●	●			●	●	
English En3	5a	●	●	●	●	●		●		●	●	●	●	●	●	●			●	●	●
	5b			●	●	●	●			●		●	●	●	●	●			●	●	●
English En3: Breadth of study	9b	●	●	●	●		●	●			●	●			●	●			●	●	
Geography	2c				●	●															
	2f				●																
	3b				●	●															
History	1a				●								●	●							
	1b												●	●							
	2a												●	●							
	2c												●	●							
	2d												●	●							
	4b				●								●	●							
	5a												●	●							
History: Breadth of study	11b												●	●							

Lesson 1

Healthy Living

Use this lesson in the classroom to introduce pupils to *CHANGE!*"s health messages. Pupils will reflect on their own eating habits and level of physical activity, and learn about the concept of healthy living and what they can do to lead a healthier life.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVE

For pupils to be introduced to *CHANGE!*"s health messages and reflect on their own lifestyle.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Understand the concept of healthy living.
2. Learn about the food groups and why eating a variety of foods contributes to a healthy diet.
3. Recognise what they can do to lead a healthier life.

MATERIALS

- Activity 1.1, Help! You"re the Doctor (page 34)
- Activity 1.2, The Doctor Says (page 35)
- Student Resource 1.1, Best-Choice Foods in Each Food Group (page 32)
- Overhead Transparency 1.1, Principles of Healthy Living (page 30)

- Overhead Transparency 1.2, The Eatwell Plate (display and make copies for pupils) (page 31)
- *CHANGE!* Food Availability Checklist (supplied as a separate document)
- Extension Activity 1.1, The Eatwell Plate (page 37)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 10 minutes.

1. (10 minutes) Discuss experiences in the everyday life of a person who lives in a city – buses, trains, cars, restaurants, busy streets, supermarkets, high-rise buildings, noise pollution. Ask pupils how the lifestyle of an office worker in the city can vary (and thus be healthy and unhealthy) depending on his or her choices. Have the pupils discuss the similarities and differences in these lifestyles. Record their answers on the board. Table 1.1 (page 21) provides examples of the possible differences between a healthy and an unhealthy lifestyle.
2. (10 minutes) Discuss with the pupils how people‟s lifestyles greatly vary and how lifestyle can affect a person‟s health. With the help of the pupils, list on the board all the things we can do to stay healthy, such as exercise, play outdoors, social time with family and friends, rest, sleep, eat right, bathe, clean our living and work environments, visit the doctor and dentist for check-ups, try to be safe, and so on. Use overhead transparency 1.1 to discuss the healthy living concept and the key messages for building a foundation of health.
3. (10 minutes) Display and distribute overhead transparency 1.2, the Eatwell Plate (page 31), and discuss which foods fall within each food group. We need to eat foods from four of the groups every day (bread, rice, potatoes, pasta and other starchy foods; fruit and vegetables; milk and dairy foods; meat, fish, eggs, beans and other non-dairy sources of protein). But we do not need the same amount of food from each group. Bread, rice, potatoes, pasta and other starchy foods, and fruit and vegetables are needed in greater proportion than foods from the milk and dairy foods, and meat, fish, eggs, beans and other non-dairy sources of protein groups.
4. (7 minutes) Explain that physical activity and being active is a vital component of a healthy lifestyle. Discuss the different types of physical activities that the pupils enjoy, and remind them that all activities that get your body moving and heart pumping (whether a team sport, something done just for fun, or a day-

to-day activity like walking to school or helping around the house) help build their fitness levels and overall health.

5. (10 minutes) Recap that healthy living involves a balanced and varied lifestyle. Tell pupils that it is important to eat a balanced and varied diet and to engage in a variety of activities in all aspects of life, including social, intellectual, physical and emotional. For example, activities such as spending time with friends, reading, talking with family members, walking, dancing, running, playing sports, and even spending some quiet time alone add to personal well-being. Have pupils illustrate activities they can choose to do that will ensure that their lifestyles are varied and balanced.
6. (10 minutes) Distribute activity 1.1, Help! You‟re the Doctor (page 34). Have pupils read about the people with health concerns and answer the questions in the spaces provided on the activity sheet. Discuss the answers with the class.
7. (10 minutes) Distribute activity 1.2, The Doctor Says (page 35). Have pupils consider the Eatwell Plate, and the recommendation to eat a variety of foods from the food groups bread, rice, potatoes, pasta and other starchy foods; fruit and vegetables; milk and dairy foods, and meat, fish, eggs, beans and other non-dairy sources of protein, and then suggest foods that the people discussed in activity 1.1 should consider including in their diets. (You may assign this activity to small groups who will then present their recommendations to the class). Remind pupils of the five food groups and the healthy choices available in four of those groups (Student Resource 1.1, Best-Choice Foods in Each Food Group, page 32).
8. (3 minutes) Supply each pupil with a copy of the *CHANGE!* Food Availability Checklist (supplied separately). Ask the pupils to take this checklist home and complete it, with the help of their families, and to be returned to school the next day. The researchers will collect the completed checklists, and they will be used to determine the types of foods that people in Wigan tend to have in their homes. If the pupils are still keen or finish in plenty of time, suggest Extension Activity 1.1, The Eatwell Plate (page 37).

EXTENSION ACTIVITY

EXTENSION ACTIVITY 1.1

1. Using the information gathered on the CHANGE! Food Availability Checklist, have the pupils put the foods that are on their checklists, into the correct section of the Eatwell Plate, for example, write or draw a „loaf of brown bread‟ into the starchy carbohydrate foods section.

Table 1.1 Healthy and Unhealthy Lifestyle Choices

	Active and healthy	Inactive and unhealthy
Getting to work	Walks to work (at least part of the way) or rides bike to work	Drives or takes bus to work
Taking breaks during work	Goes for short walk during work breaks	Surfs the Web during work breaks
Eating snacks and lunch	Brings healthy snacks and lunch from home and drinks lots of water	Eats fast food at lunch or grabs snack and energy drink from vending machine
Having fun after work	Walks with friends, plays sports, or plays games with the family during free time	Watches TV or surfs the Web during free time
Eating dinner	Cooks healthy meals at home	Eats out all the time, usually fast food and alcohol
Shopping for food	Buys healthy, fresh food	Buys packaged, processed food

TEACHER RESOURCES

BACKGROUND MATERIAL

- Healthy living involves making lifestyle choices that maximise our physical and mental well-being. Healthy living encompasses more than just eating a nutritious and balanced diet. It also involves getting the exercise and rest our bodies need to stay healthy, as well as engaging in activities that we enjoy and that enhance our mental well-being.

- It is important to recognise that our physical health and our mental health are interrelated. For example, exercising and eating a nutritious and balanced diet can help maintain physical health, boost mental health by increasing energy levels, and improve the ability to cope with stress. Spending time with friends can provide support for the many challenges we face in life as well as provide companions for physical activity. The key to healthy living is a balance of all aspects of life, including the physical, intellectual, social, and emotional.

- Eating a nutritious and balanced diet and getting regular physical activity are the cornerstones of a healthy lifestyle. Eating the right foods provides us with the energy and nutrients our bodies need to stay healthy and helps fight and prevent some infections and diseases. Similarly, regular physical activity helps prevent heart disease, diabetes, cancer, osteoporosis, and a host of other diseases. What

we eat and how much activity we get not only affect how our bodies perform and feel today but also affect our health for the next 10, 20, and 30 years and beyond.

SPECIFIC BACKGROUND MATERIAL

The following guidelines can help you eat well and can keep you moving toward a lifetime of healthy living.

Principles of Healthy Living

- **Eat 5 or more servings of fruit and vegetables each day.** Fruit and vegetables are packed with vitamins, minerals, antioxidants and fibre. They also provide healthy carbohydrate that gives us energy. Choose fruits and vegetables in a rainbow of colours (especially dark green and orange vegetables).

- **Choose whole grain goods and limit foods and beverages with added sugar.** Minimally processed whole grains make better choices than refined grains do. Whole grains contain fibre, vitamins and minerals, and the refining process strips away many of these beneficial nutrients. Even though some refined grains are fortified with vitamins and minerals, fortification does not replace all of the lost nutrients. In addition, refined grains get absorbed very quickly, which can cause sugar levels in the blood to spike. In response, the body quickly takes up sugar from the blood to bring sugar levels down to normal. But it may overshoot things a bit, making the blood sugar levels a bit low, and this can cause feelings of false hunger even after a big meal.

  Choose whole grains whenever possible, making sure that at least half of the grain servings you eat each day are made with whole grains.

  - In addition to selecting whole grain foods, limit your intake of sugary beverages such as soft drinks and limit foods with added sugar. Sweetened drinks are said to be filled with empty Calories because they provide many Calories but few of the nutrients the body needs to stay healthy and grow strong. A growing body of research suggests that consuming sugar-sweetened beverages is associated with excess weight gain in children and adults.

  For more on sugar-sweetened drinks, refer to Lesson 6 Sugar Water: Think About Your Drink.

- **Choose healthy fat, limit saturated fat, and avoid trans fat.** Plant-based foods, including plant oils (such as olive, canola, soybean, corn, sunflower, and peanut oils), nuts, and seeds, are natural sources of healthy fat, as are fish, and shellfish. Healthy fat can help lower the risk of heart disease, stroke,

and possibly diabetes. Unhealthy fat – namely, saturated fat and trans fat – increases the risk of heart disease, stroke, and possibly diabetes. Much of the fat that comes from animals is saturated, including dairy fat, the fat in meat or poultry skin, and lard. Saturated fat should make up no more than 11% of your total Calorie intake. Trans fat is formed when healthy vegetable oils are partially hydrogenated (a process that makes the oil solid or semisolid and makes the fat more stable for use in packaged foods). This is the worst type of fat because it raises the risk of heart disease in a number of different ways, and it may raise the risk of diabetes. For more on choosing healthy fat, refer to Lesson 3 Snack Attack.

- **Eat a nutritious breakfast every morning.** Breakfast is a critical meal since it gives the body the energy it needs to perform at school, work, or home. Studies have shown that breakfast can improve learning, and it helps boost overall nutrition. Many common breakfast foods are rich in whole grains; breakfast is also a great time to get started towards the daily goal of consuming 5 or more servings of fruits and vegetables. For more on eating breakfast, refer to Lesson 7 Brilliant Breakfast.

- **Be physically active every day for at least an hour per day.** Regular physical activity not only improves our physical health (by preventing several chronic diseases) but also benefits our emotional well-being. Children should get at least 60 minutes of physical activity every day. This should include moderate- and vigorous-intensity activities, and it can be accumulated throughout the day in sessions of 15 minutes or longer.

- **Limit TV and other screen time to no more than 2 hours per day.** The more television you watch, the less time you have to engage in physical activity or other healthy pursuits; the same goes for surfing the Web, instant messaging (or text messaging), and playing video games. Watching more television means watching more ads for unhealthy foods, and evidence suggests that this leads to eating extra calories. Such sedentary behaviour combined with poor diet can lead to excess weight gain. Children should watch no more than 2 hours of television or videos each day; watching less is better. Children should limit total screen time, including watching television, playing computer games, watching DVDs, and Web surfing, to no more than 2 hours each day.

Food Groups At A Glance

- There are five basic food groups (see table 1.2, page 25):
  - Fruit and vegetables;
  - Bread, rice, potatoes, pasta and other starchy foods;
  - Milk and dairy foods;
  - Meat, fish, eggs, beans and other non-dairy sources of protein, and
  - Foods and drinks high in fat and/or sugar.
- Foods in the first four food groups provide nutritional benefits, so foods from these groups should be consumed each day. The key to a balanced diet is to recognise that starchy carbohydrates (especially whole grains), fruit and vegetables are needed in greater proportion than are the foods from the milk and dairy, meat, fish, eggs, beans and other non-dairy sources of protein, and foods and drinks high in fat and/or sugar groups. This concept is illustrated by the Eatwell Plate (see figure 1.1, page 27). A healthy and balanced diet also contains a variety of foods from within each food group, since each food group offers different macronutrients (the energy-providing nutrients, namely carbohydrate, protein and fat) and micronutrients (vitamins and minerals). Eating a variety of foods also keeps our meals interesting and flavourful. Note that the Eatwell Plate contains foods and drinks high in fat and/or sugar. These are

  „sometimes" foods, not every-day foods. „Sometimes" foods should be eaten in moderation, and they are depicted as the smallest part of the Eatwell Plate. For more information on food groups and the serving sizes of foods in each food group, visit the Food Standards Agency website, www.food.gov.uk.

Table 1.2 Food Items from Each Food Group

Food group	What's included?	What to do
Bread, rice, potatoes, pasta and other starchy foods	• Bread, including: soda bread, rye bread, pitta, flour tortilla, baguettes, chapatti, bagels • Rice • Potatoes • Breakfast cereals, oats • Pasta, noodles • Maize, cornmeal, polenta • Millet, spelt • Couscous, bulgur wheat, pearl barley • Yams and plantains	**Eat plenty of bread, rice, potatoes, pasta and other starchy foods every day.** Choose wholegrain varieties when you can.
Fruit and vegetables	• All fruit and veg, including: apples, pears, oranges, bananas, grapes, strawberries, mango, pineapple, raisins, broccoli, courgettes, cabbage, peas, sweet corn, lettuce, tomatoes, carrots	**Eat plenty of fruit and vegetables.** Aim for at least five portions of a variety of fruit and veg each day. There is evidence to suggest that people who eat lots of fruit and veg are less likely to develop chronic diseases such as coronary heart disease and some types of cancer.
Milk and dairy foods	• Milk • Cheese • Yoghurt • Fromage frais • Cottage cheese • Cream cheese • Quark	**Eat some milk and dairy foods every day.** Choose lower-fat options when you can or have just a small amount of the high-fat varieties less often.
Meat, fish, eggs, beans and other non-dairy sources of protein	• Meat, poultry and game, including: lamb, beef, pork, chicken, bacon, sausages, burgers • White fish (fresh, frozen or canned), including: haddock, plaice, pollack, coley, cod • Oily fish (fresh, frozen or canned), including: mackerel, sardines, trout, salmon, whitebait • Shellfish (fresh, frozen or	**Eat some meat, fish, eggs, beans and other non-dairy sources of protein every day.** Eat at least two portions of fish a week, including a portion of oily fish.

	canned), including: prawns, mussels, crab, squid, oysters • Eggs • Nuts • Beans and other pulses, including: lentils, chickpeas, baked beans, kidney beans, butter beans	
Foods and drinks high in fat and/or sugar	• Cakes • Sugary drinks • Biscuits • Chocolate • Sweets • Puddings • Pastries and pies • Ice cream • Jam • Honey • Crisps • Butter • Margarine and spreads • Oil • Cream • Mayonnaise • Chips • Milkshakes	**Eat just a small amount of foods and drinks high in fat and/or sugar.** Cutting down on these types of food could help you control your weight because they often contain lots of calories. And don"t forget that sugary foods and drinks can cause tooth decay and erosion, particularly if eaten between meals, so having fewer of these could also protect your teeth.

http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplateguide0310.pdf

Fig 1.1 The Eatwell Plate
(*Find it at*: http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplate0210.pdf)

The key to a balanced diet is to recognise that starchy carbohydrates (especially whole grains), and fruit and vegetables are needed in greater proportion than are the foods from milk and dairy foods; meat, fish, eggs, beans and other non-dairy sources of protein; and foods and drinks high in fat and/or sugar.

ANSWER KEY

ACTIVITY 1.1: HELP! YOU"RE THE DOCTOR

1. Susan should be concerned about her new lifestyle for a number of reasons:
    - She is very inactive because she stopped playing netball and she now spends more than 2 hours on the computer and watching TV at night. While she sits, she snacks on chocolate that probably contains unhealthy fat, many calories, and no healthy nutrients. Susan is not getting the balanced and varied diet that is very important for energy, growth, and health. On top of this, all that chocolate will also greatly increase her chances of dental decay. Her lifestyle is also affecting other aspects of her life: she sees her friends less frequently and is not even cleaning her room.

There are several things that Susan can do to capture a healthy balance:

- Susan can rejoin the netball team or try another team sport or after-school activity. This will give her the opportunity to be active as well as the opportunity to be with friends and learn about teamwork.
- By getting involved in an after-school activity other than spending time at the computer, she will be less likely to snack on chocolate. She can pack an extra piece of fruit or a box of raisins to munch on, or she could get a healthy snack at the after-school programme.
- Susan should pay attention to how much time she spends on the computer and watching TV at night and make sure she is not getting more than 2 hours a day.
- She can also skip the computer time after school or TV at night in order to find more time to spend with friends or clean her room.

2. Michael"s energy levels are low because he skips breakfast and eats unhealthy snacks. To increase his energy levels, Michael should be sure to eat a healthy breakfast that contains a balance of nutrients – ideally a meal that includes whole grains and some protein (such as whole-grain cereal or oatmeal with non-fat or low-fat (1%) milk or whole wheat toast with peanut butter or eggs) and is low in saturated fat, trans fat, and added sugar. Also, packing nutritious snacks (like bananas, raisins, or nuts) to eat during the ride and drinking plenty of water like his friends will give him more energy as the morning of cycling wears on.

ACTIVITY 1.2: THE DOCTOR SAYS

1. Good snack choices include grapes, banana, apple, peach, sparkling water with a splash of 100% fruit juice, low-fat yoghurt, unsalted nuts, whole wheat cereal, peanut butter sandwich, carrot sticks, raisins, and low-fat cheese.
   Less healthful snack choices include crisps, cakes and pastries, biscuits, soft drinks, fizzy drinks, sports and energy drinks.

2. Sample healthy breakfast choices for Michael include the following
   - Bowl of mixed fruit and whole-grain toast.
   - Hot oatmeal or porridge with fruit and 1% or skimmed milk.
   - Melon with yoghurt and granola (made with healthy fat and nuts; look for granola that has little added sugar).
   - Whole-grain cereal with 1% or non-fat milk.
   - Whole wheat toast with peanut butter.

- Hardboiled egg with whole wheat toast.
- Other healthy food choices include fruit, such as bananas, peaches, or oranges; 1% or non-fat milk; 100% tomato juice (a small glass); 100% orange or grapefruit juice (a small glass; limit 100% fruit juice to no more than 150ml per day); nuts or nut spreads (including peanut butter); whole-grain breads or cereals; low-fat yoghurt; a slice of turkey and cheese; and leftover whole wheat pasta or noodles.

Principles of Healthy Living

Go for 5 Fruits and Veggies – More Is Better!

Eat 5 or more servings of fruit and vegetables every day! Eat a variety of colours – try red, orange, yellow, green, blue, and purple.

Get Whole Grains and Sack the Sugar!

Choose healthy whole grains for flavour, fibre, and vitamins. Limit sweets and chocolate. Soft drinks and other sugary drinks have almost nothing in them that is good for you – no vitamins or minerals or other healthy things. They contain just sugar.

Keep the Fat Healthy!

We need fat in our diets, but not all types of fat are good for us. Our bodies like the healthy fat that tends to come from plants and is liquid at room temperature. Examples are olive oil, canola oil, vegetable oil, and peanut oil. Our bodies do not like unhealthy fat, which is solid at room temperature. Examples include saturated fat (usually found in animal products such as meat and whole milk) and trans fat (found in fast food fries and shop-bought biscuits and cookies). Of the unhealthy fat, trans fat is the worst and should rarely, if ever, be eaten.

Start Smart with Breakfast!

Eating breakfast helps you focus on schoolwork and gives you energy to play. Breakfast is a great meal for adding whole grains, fruit, and low-fat or non-fat milk to your day!

Keep Moving!

Being active is a very important part of healthy living. Do what you like the most, and keep your body moving for at least an hour a day!

Power Down!

Watching TV, playing video games, or playing on the computer keeps your body still. Keep screen time as low as it can go, and never let it add up to more than 2 hours per day.

The Eatwell Plate

The key to a balanced diet:

- **Eat a higher proportion of:**
  - starchy carbohydrates (especially whole grains), and
  - fruit and vegetables.

- **Eat a lower proportion of foods from:**
  - milk and dairy foods;
  - meat, fish, eggs, beans, and other non-dairy sources of protein; and
  - foods and drinks high in fat and/or sugar.

Best Choice Foods in Each Food Group

TABLE 1.3 Food Items from Each Food Group

Food group	What's included?	What to do
Bread, rice, potatoes, pasta and other starchy foods	• Bread, including: soda bread, rye bread, pitta, flour tortilla, baguettes, chapatti, bagels • Rice • Potatoes • Breakfast cereals, oats • Pasta, noodles • Maize, cornmeal, polenta • Millet, spelt • Couscous, bulgur wheat, pearl barley • Yams and plantains	**Eat plenty of bread, rice, potatoes, pasta and other starchy foods every day.** Choose wholegrain varieties when you can.
Fruit and vegetables	• All fruit and veg, including: apples, cherries, bananas, blackcurrants, gooseberries, grapefruit, grapes, pears, plums, mango, melon, oranges, peaches, pineapple, strawberries, raisins, rhubarb, beans, broccoli, cabbage, carrots, cauliflower, cucumber, courgettes, leeks, lettuce, mushrooms, onions, peas, peppers, spinach, sprouts, sweet corn, tomatoes.	**Eat plenty of fruit and vegetables.** Aim for at least five portions of a variety of fruit and veg each day. There is evidence to suggest that people who eat lots of fruit and veg are less likely to develop chronic diseases such as coronary heart disease and some types of cancer.
Milk and dairy foods	• Milk • Cheese • Yoghurt • Fromage frais • Cottage cheese • Cream cheese • Quark	**Eat some milk and dairy foods every day.** Choose lower-fat options when you can or have just a small amount of the high-fat varieties less often.

Meat, fish, eggs, beans and other non-dairy sources of protein	• Meat, poultry and game, including: lamb, beef, pork, chicken, bacon, sausages, burgers • White fish (fresh, frozen or canned), including: haddock, plaice, pollack, coley, cod • Oily fish (fresh, frozen or canned), including: mackerel, sardines, trout, salmon, whitebait • Shellfish (fresh, frozen or canned),including: prawns, mussels, crab, squid, oysters • Eggs • Nuts • Beans and other pulses, including: lentils, chickpeas, baked beans, kidney beans, butter beans	**Eat some meat, fish, eggs, beans and other non-dairy sources of protein every day.** Eat at least two portions of fish a week, including a portion of oily fish.
Foods and drinks high in fat and/or sugar	• Cakes • Sugary drinks • Biscuits • Chocolate • Sweets • Puddings • Pastries and pies • Ice cream • Jam • Honey • Crisps • Butter • Margarine and spreads • Oil • Cream • Mayonnaise • Chips • Milkshakes	**Eat just a small amount of foods and drinks high in fat and/or sugar.** Cutting down on these types of food could help you control your weight because they often contain lots of calories. And don"t forget that sugary foods and drinks can cause tooth decay, particularly if eaten between meals, so having fewer of these could also protect your teeth.

Name _____

Activity 1.1

Help! You're The Doctor

Susan is in Year 6 and enjoyed playing netball last year for the school team. This year she has decided not to play because she spends all her free time after school on the computer. She snacks on chocolate while she sits. She‟s becoming less active, and her bedroom is a real mess. She watches TV at night when her homework is done. Her friends are getting annoyed with her because they never see her anymore.

Explain why it is important for Susan to think about her current lifestyle. Give four suggestions that will help Susan change her current lifestyle.

_____

_____

_____

Michael is 14 years old. On Saturday mornings he enjoys cycling with his friends on a bike trail. He never eats breakfast, however, and he brings only unhealthy snacks (like crisps) and no water on the ride. After just 10 minutes of cycling, he‟s usually exhausted. In contrast, his friends eat a healthy breakfast, drink water, and eat nutritious snacks like raisins, wheat crackers, and nuts during the ride. By the end of the morning, they are much less tired than Michael is.

Why do you think Michael‟s energy level is low? What are the two ways Michael can increase his energy level?

_____

_____

_____

Name _____

Activity 1.2

The Doctor Says

Just as you need a variety of activities in your life, you also need a variety of foods to stay healthy. Keep in mind the tips offered on the Eatwell Plate when you plan meals and snacks for your friends.

Directions

Help Susan and Michael learn about foods that will benefit their health by completing the exercises below.

1. Choose five snacks from table 1.4 that Susan could eat that would be better for her than chocolate is:

_____

_____

_____

_____

_____

TABLE 1.4 Susan's Snack Choices

Doughnut	Tortilla chips	Apple
Sparkling water with a splash of 100% fruit juice	Grapes	Chocolate chip cookies
Soft drinks	Unsalted nuts	Plain low-fat yoghurt
Peach	Banana	Low-fat cheese
Peanut butter	Whole wheat cereal	Carrot sticks
Raisins	Energy drink	Packet of crisps

2. List some of the healthy food choices Michael should consider for his weekend breakfast.

_____

_____

_____

_____

_____

3. Now that you know about the foundations of healthy living, what are two things that you can do to be healthier?

_____

_____

_____

_____

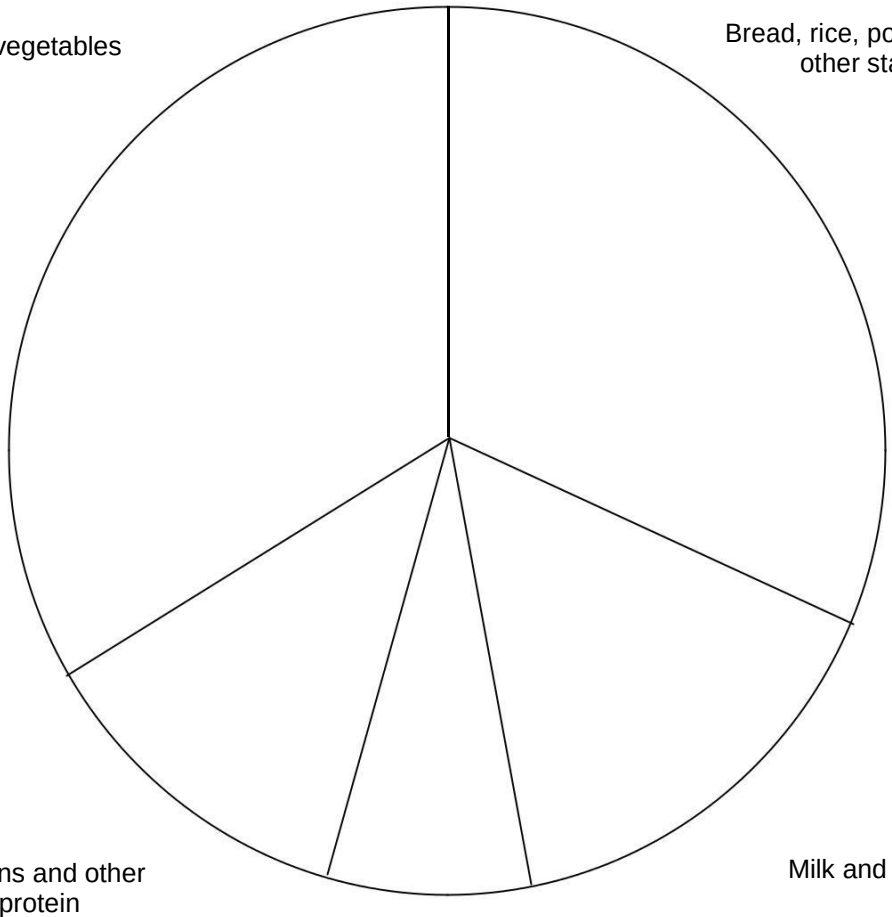
_____

Name _____

Extension Activity 1.1

The Eatwell Plate

Using the information gathered on the CHANGE! Food Availability Checklist, put the foods that are on your checklist into the correct section of the Eatwell Plate. For example, write or draw a „loaf of brown bread" into the starchy carbohydrate foods section.



Lesson 2

Carb Smart

In this lesson, the pupils will learn about the best-choice carbohydrate foods in the context of a varied diet, with particular emphasis on their utilisation for energy. They will apply this knowledge to a physical activity case study to demonstrate the relationship between a healthy diet and fuelling the body for physical activity.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to recognise that some sources of carbohydrate are better for you than others and to make choices accordingly.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Understand the role of carbohydrate in the diet.
2. Understand that the following principles of Healthy Living (particularly the guidelines to choose whole grains and limit foods and drinks with added sugar) will help them select healthy sources of carbohydrate. (For more information on the Principles of Healthy Living, see Lesson 1, Healthy Living, page 18).

MATERIALS

- Student Resources 2.1, Food Group Name Cards (page 50)
- Strong tape
- Food picture cards – cut out pictures from magazines, or draw pictures of foods (be sure to include fruits, vegetables, fruits, whole grain breads and cereals, low fat (1%) or non-fat milk and yoghurt, which are all high in carbohydrate)
- Activity 2.1, Which Group? (page 53)
- Activity 2.2, Fuelling up the Body (page 55)
- Activity 2.3, Going for the Whole Grain (page 56)
- Activity 2.4, Foods at Home Made from Flour (page 57)
- Overhead Transparency 2.1, The Eatwell Plate (page 48)
- Overhead Transparency 2.2, Principles of Healthy Living (page 49)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 10 minutes.

1. (8 minutes) Explain to the pupils that food gives us energy and that this lesson introduces a good energy source: carbohydrate. Carbohydrate is one of three kinds of nutrients found in foods that provide us with energy, and it is used by every cell in the body. Fat and protein are the other two sources of energy. Most foods contain a blend of nutrients, and some foods have more carbohydrate than others have. Whole grain breads and cereals, beans or legumes, fruits, vegetables, and low fat (1%) or non-fat milk and yoghurt are good sources of carbohydrate. Protein foods such as fish, poultry, meat, or eggs and fat sources such as oil, do not provide carbohydrate.

   The Teacher Resources lists foods that are healthy sources of carbohydrate and foods that are not healthy sources of carbohydrate (e.g. foods that contain refined grains, added sugar, saturated fat, or trans fat). Use these lists to ensure that pupils select the healthiest high-carbohydrate foods in their activity sheets and in the classroom activity. There is also a list of foods that are not rich in carbohydrate.
2. (8 minutes) Distribute activity 2.1, Which Group? (page 53). Review the food groups with the pupils, using overhead transparency 2.1, The Eatwell Plate (page 48). Have the pupils identify the food groups for each of the foods listed on activity 2.1, by writing each of the foods in the spaces provided: there are some foods included such as sweets that go in „foods and drinks high in fat and/or sugar".

3. (10 minutes) Use the five food group name pages and tape them to the wall or board, for all the pupils to see. Get the pupils to cut pictures of foods out of magazines or get them to draw pictures of food and then have the pupils individually select foods that are healthy sources of carbohydrate. Try having pupils take turns at finding a food from each food group (the first student finds a starchy carbohydrate food, the second student finds a fruit, and so on) so that foods from all groups are represented.
4. (4 minutes) Point out that there are carbohydrate-containing foods in each food group. Ask the pupils to tell you whether all foods that are high in carbohydrate are healthy choices. Discuss what might make a food a healthy choice, and talk about which foods are not the best choices. Remind the pupils of the Principles of Healthy Living (particularly the ones related to whole grain foods, added sugars, fruits and vegetables, and healthy fat).
5. (4 minutes) Have the class stand up and do “the wave” (raising and lowering the arms, as you might do at a sporting event). Explain that this is what happens in our bodies when we eat white bread or white rice (or other refined grains): there is a quick rise in blood sugar, giving us energy, but our bodies work quickly to pull that sugar out of the blood and into storage (in our muscles). That is why the quick boost of energy we feel after eating refined grains does not last.
6. (4 minutes) Discuss better ways to get quick energy that lasts for a long time so that the body‟s energy levels do not shoot up and down. Healthy carbohydrate in whole grain foods, fruits, and vegetables provides a longer boost because the sugar and starch in the foods take longer to be digested and enter the bloodstream. These foods also provide fibre and many vitamins and minerals. Low fat and non-fat milk and yoghurt also naturally contain carbohydrate and are a good source of protein and calcium.
7. (4 minutes) Review the list of foods that have been categorised by food group (activity 2.1). Instruct the pupils to circle the foods that contain healthy carbohydrate (remind pupils that these foods will have vitamins, minerals, and fibre with little or no added sugar). The food groups fruit and vegetables; bread, rice, potatoes, pasta and other starchy foods; meat, fish, eggs, beans, and other non-protein sources of protein; and milk and dairy foods, will have some foods circled, since there are healthy, high-carbohydrate choices available in these groups.
8. (3 minutes) Notice that some foods listed in the food and drinks high in fat and/or sugar column, do contain carbohydrate, but none of them make good everyday choices. Explain that sweets, cakes, and sugar-sweetened drinks do contain carbohydrate, and so they do give the body energy. Discuss with the

pupils why these foods do not make the healthiest choices and should be considered “sometimes” choices rather than everyday choices (see the background section at the beginning of this lesson).

9. (10 minutes) Have the pupils form groups and complete activity 2.2, Fuelling up the Body (page 55), which involves planning a menu for a physically active individual of their choice. They can choose an Olympic athlete, a professional dancer, a footballer, a friend who plays a lot of sports, or even themselves.
10. (10 minutes) Distribute activity 2.3, Going for the Grain (page 56). Show pupils the tubes of grain, white flour, granary flour and wholemeal flour. Have pupils write a paragraph explaining why it is important to eat whole grains and naming a few whole grain foods that they like to eat.
11. (3 minutes) Assign activity 2.4, Foods at Home Made from Flour (page 57), as homework. Have the pupils identify items made from flour in the home. Such foods would include all kinds of bread, pasta, cakes, biscuits, pastries and pies.

EXTENSION ACTIVITY

EXTENSION ACTIVITY 2.1

1. Assess the types of snacks available at places you visit e.g. the leisure centre, cinema etc.
2. Is there access to a healthy variety of snack foods? Are they drinking water or some type of sweetened beverage? What recommendations could you make so that the types of snacks served could be healthier? (smaller portions, eating before going to the cinema etc.)

TEACHER RESOURCES

BACKGROUND MATERIAL

- The foods we eat contain many kinds of nutrients. Nutrients are the chemical substances in food that your body uses to keep healthy. Macronutrients (carbohydrate, fat, and protein) are the major food components. Micronutrients (vitamins and minerals) are the nutrients that you need in very small amounts and are present in many foods. Both groups of nutrients are important for a healthy body.

  All foods contain 1, 2, or all 3 or the macronutrients. Let‟s look at the functions of each macronutrient:

  - Protein provides the body with the building blocks for making and repairing tissue (like muscle, bone, hair, and skin) and helps your body

grow. Enzymes that control all the body processes from growth to digestion are also made of protein.

- Fat helps the body transport certain vitamins and is a rich source of energy.
- Carbohydrate provides the body with the quickest source of energy. It is the only nutrient that can be readily used for energy in every single cell in the body, and it is the preferred source of energy for the brain. Carbohydrate is found in all of the five food groups. But not all types of carbohydrate are healthy choices. Some are better than others.

- The healthiest carbohydrate choices are whole grains, the less processed the better. Examples of whole grains include whole wheat, barley, brown rice, millet, whole oats, and whole rye; these grains can be served on their own or made into whole-grain breads, cereals, pasta, and other products. Whole grains contain fibre, vitamins, and minerals; however the refining process strips away many of these beneficial nutrients. Even though refined grains (such as white bread, white rice, and white pasta) are fortified with vitamins and minerals, fortification does not replace all of the lost nutrients. Another problem with refined grains is that they get digested and absorbed very quickly, which can cause sugar levels in the blood to spike. In response, the body quickly takes up sugar from the blood and puts it into storage (initially as „glycogen‟ in the fat tissues and the liver, and some to the muscle; any excess is converted to fat) to bring sugar levels down to normal. Working so quickly, though, the body may overshoot things a bit, making blood sugar levels a bit low; this can cause feelings of false hunger (even after a big meal) and tiredness.

- Fruits and many vegetables are excellent sources of carbohydrate, and they are also rich in fibre, vitamins, and minerals. Other good carbohydrate sources include low fat (1%) or skimmed milk and low fat or non-fat yoghurt from the milk and dairy foods group and dried beans (legumes) from the meat, fish, eggs, beans and other non-dairy sources of protein group. (Other foods in this group are not high in carbohydrate).

- Drinks and foods with added sugar, such as soft drinks, energy drinks, milkshakes, biscuits and chocolate also provide carbohydrate. But unfortunately, these drinks basically contain just sugar and water, and these foods typically have sugar as one of their main ingredients. (For more information on sugar-sweetened drinks, see Sugar Water: Think About Your Drink and Beverage Buzz: Sack the Sugar).These types of foods are said to be filled with empty

Calories because they contain mostly sugar, and they provide many Calories but few of the nutrients the body needs to stay healthy and grow strong. Eating too much of these foods makes it difficult to meet other nutrient needs without eating excessive Calories. Like refined grains, these sugary foods are quickly absorbed by the body and cause blood sugar levels to spike. These foods are not the best carbohydrate choices; they should be eaten only in small amounts and only once in a while. Similarly, whole grain cereals and snack bars, fruited yoghurts, and flavoured milks may contain large amounts of added sugar. On a regular basis, choose whole grain and dairy products that have little or no added sugar.

SUMMARY

In summary, to be carb smart, keep the following tips in mind:

- Choose whole grains whenever possible, making sure that at least half of your servings of grains each day come from whole grains.
- When selecting foods made with whole grains (breads, breakfast cereals, crackers, pasta) choose products that list whole wheat, whole oats, whole rye, or other whole grains as the first ingredient and that have little or no added sugar. Also choose foods that keep the grain as intact as possible (e.g. choose coarsely ground oatmeal rather than instant oatmeal for breakfast).
- Brightly coloured fruits and vegetables make great carbohydrate choices, as do beans (legumes), and plain (unflavoured and unsweetened) low fat (1%) and non-fat milk and yoghurt.
- Make soft drinks, energy drinks, milkshakes, pies, crisps, biscuits, doughnuts and other foods with large amounts of added sugar, saturated fat, and trans fat "sometimes" foods instead of every day foods.

SPECIFIC BACKGROUND MATERIAL

Carbohydrate Foods

- **Best-Choice Carbohydrate Foods**

  Best-choice carbohydrate foods are filled with vitamins, minerals, and often fibre; they have little or no added sugars, little or no saturated fat, and no trans fat. Making healthy carbohydrate choices helps avoid spikes in blood sugar. Examples of these nutritious carbohydrate sources include the following:

  - **Starchy foods**: potatoes, whole grains (the less processed the better) such as barley, brown rice, buckwheat, bulgur, millet, whole oats, quinoa, or whole wheat; whole wheat (or other whole grain) breads,

bagels, rolls, pittas, or tortillas; hot whole grain cereals such as porridge oats (make sure that sugar is not one of the first three ingredients); whole wheat spaghetti or pasta; home-popped or air-popped pop corn; whole grain crackers (make sure to choose products that are low in saturated fat); whole grain pancakes or waffles (without syrup).

- **Fruits**: fresh fruit, frozen fruit, or tinned fruit in its own juice, including oranges, grapefruit, pineapple, blackberries, raspberries, blueberries, melon, kiwi fruit, mango, papaya, raisins, and other dried fruit, peaches, nectarines, bananas, apples, pears.
- **Vegetables**: fresh, frozen, or tinned vegetables without added saturated fat, trans fat, sugar, or salt, including green beans, kale, spinach, carrots, broccoli, peas, cabbage, sweet potatoes, butternut squash, sweet corn and parsnips.
- **Meat, fish, eggs, beans and other non-dairy sources of protein**: beans without added unhealthy saturated fat or trans fat, such as black beans, kidney beans, chickpeas, pinto beans, lentils, black-eyed peas, and baked beans.
- **Milk**: low fat milk such as semi-skimmed or skimmed, plain low fat or non-fat yoghurt.

Refined grains (e.g. white bread, white rice, white pasta, and other products made with white flour) may be fortified with vitamins and minerals, but they are still not as healthy as whole grain foods.

- **"Sometimes" Carbohydrate Foods**

Some carbohydrate-containing foods have few vitamins and minerals, are low in fibre, and contain large amounts of added sugar or added saturated fat and trans fat. While sweetened breakfast cereals and milk products (such as milkshakes) do contain vitamins and minerals, they often have large amounts of added sugar or contain unhealthy fat. These foods should only be eaten once in a while, if at all. Examples of these less nutritious carbohydrate sources include the following:

- Doughnuts, pastries, fruit and cereal bars, sugar-sweetened cereals.
- Fruit tinned in syrup, dried sweetened fruit, fruit squash or fizzy drinks such as cola or lemonade.
- Chocolate milk (or other sweetened, flavoured milk drinks), ice cream, frozen yoghurt, pudding.

- Sweets, biscuits, cakes, soft drinks, sports drinks*, other sweetened beverages.

**During most types of physical activity, children can get adequate hydration and energy by drinking water and having a healthy snack (such as orange slices). Most sports drinks are designed for endurance athletes who compete for more than an hour at high intensity. Save sports drinks for when children are participating in high-intensity, long-duration sports competitions (longer than 1 hour), or for when children are vigorously active for a long time in the heat.*

- **Low Carbohydrate Foods**

  Many protein foods such as meat, poultry, fish, and cheese do not contain carbohydrate, while some vegetables contain only minimal amounts. Examples of foods that are low in carbohydrate include the following:

  - Meat
  - Fish
  - Hamburgers (without the bun)
  - Eggs
  - Hot dogs (without the bun)
  - Cheese
  - Chicken or turkey
  - Nuts
  - Sunflower seeds
  - Greens
  - Lettuce
  - Cucumber
  - Mushrooms
  - Celery

ANSWER KEY

ACTIVITY 2.1: WHICH GROUP?

The foods are correctly sorted in table 2.1

Table 2.1 Serve It Up Solutions

Fruit and Vegetables	Bread, rice, potatoes, pasta and other starchy foods	Milk and dairy products	Meat, fish, eggs, beans and other non-dairy sources of protein	Foods and drinks high in fat and/or sugar
Bananas Apples Raisins Peaches Oranges Blueberries Kiwi fruit Pineapple Grapes Plums Sweet potatoes Broccoli Peas Butternut squash Mashed potatoes Lettuce Kale Spinach Cabbage Carrots Sweet corn Beetroot	Brown rice Whole wheat bread Pancakes Whole wheat spaghetti Macaroni Whole grain rolls	Low fat milk Low fat plain yoghurt Frozen yoghurt Low fat pudding Low fat cottage cheese Non-fat milk Low fat chocolate milk Low fat ricotta cheese String cheese	Peanut butter Black-eyed peas Hummus Black beans Lean roast beef Lentils Baked beans Turkey Walnuts Chicken Eggs Salmon Tuna Tofu	Sweets Jelly beans Fizzy cola Blueberry muffin

ACTIVITY 2.2: FUELLING UP THE BODY

Active person"s name: Steven Gerrard

- **Breakfast**: porridge oats with raisins, 1 banana, 1 slice of whole wheat toast spread with peanut butter, low fat milk.
- **Lunch**: turkey sandwich on whole wheat roll with lettuce, sliced tomato and hummus spread, carrot sticks, plain low fat yogurt with fresh strawberries, apple, water.
- **Snack**: sunflower seeds, water.

- **Dinner**: large plate of whole wheat spaghetti with tomato sauce and small amount of Parmesan cheese, whole wheat French bread, large helping of steamed broccoli, green salad with olive oil dressing, low fat milk.
- **Snack**: cantaloupe melon.

The overall plan provides plenty of whole grains, more than 5 servings of fruits and vegetables (including a variety of colours such as deep green and orange), healthy sources of fat (peanut butter, hummus, olive oil, sunflower seeds), and low fat dairy selections.

The Eatwell Plate

Principles of Healthy Living

Go for 5 Fruits and Veggies – More is Better!

Eat 5 or more servings of fruits and vegetables each day! Eat a variety of colours – try red, orange, yellow, green, blue, and purple.

Get Whole Grains and Sack the Sugar!

Choose healthy whole grains for flavour, fibre, and vitamins. Limit sweets and chocolate. Soft drinks and other sugary drinks have almost nothing in them that is good for you – no vitamins or minerals or other healthy things. They contain just sugar.

Keep the Fat Healthy!

We need fat in our diets, but not all types of fat are good for us. Our bodies like the healthy fat that tends to come from plants and is liquid at room temperature. Examples are olive oil, canola oil, vegetable oil, and peanut oil. Our bodies do not like unhealthy fat, which is solid at room temperature. Examples include saturated fat (usually found in animal products such as meat and whole milk) and trans fat (found in fast-food fries and store-bought biscuits). Of the unhealthy fats, trans fat is the worst and should rarely, if ever, be eaten.

Start Smart with Breakfast!

Eating breakfast helps you focus on schoolwork and gives you energy to play. Breakfast is a great meal for adding whole grains, fruit, and low fat or non-fat milk to your day!

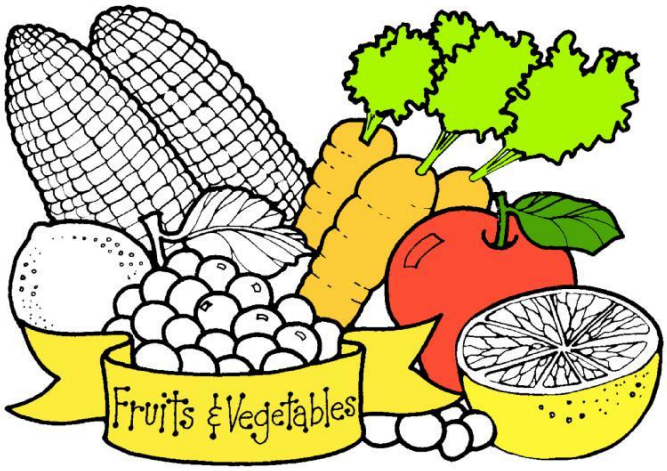
Keep Moving!

Being active is a very important part of healthy living. Do what you like most, and keep your body moving for at least an hour a day!

Power Down!

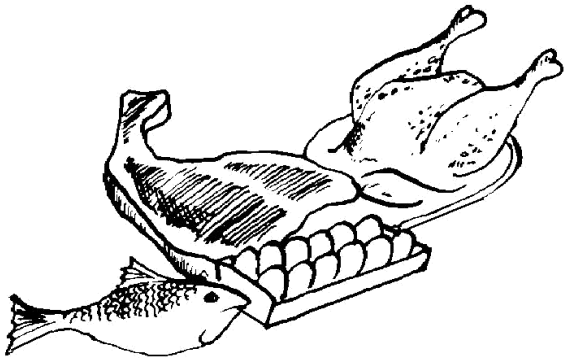
Watching TV, playing video games, or playing on the computer keeps your body still. Keep screen time as low as it can go, and never let it add up to more than 2 hours per day.

Food Group Name Cards

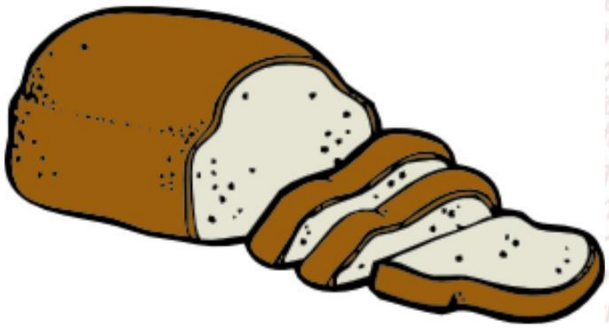


FRUIT AND VEGETABLES

FOODS AND DRINKS HIGH IN FAT AND/OR SUGAR



MEAT, FISH, EGGS, BEANS
and other non-dairy sources of protein



BREAD, RICE, POTATOES, PASTA
and other starchy foods

MILK AND DAIRY FOODS

Name _____

Activity 2.1

Which Group?

Directions

Place each of the foods in the Food List table (table 2.2) into the appropriate food group in the Serve It Up table (table 2.3). You will need to put more than one item in each box, so please write small enough to include many food items.

Table 2.2 Food List

Bananas	Whole wheat spaghetti	Turkey
Apples	Peaches	Lettuce
Brown rice	Salmon	Jelly Beans
Whole wheat bread	Black beans	Walnuts
Pancakes	Oranges	Sunflower Seeds
Low fat milk	Lean roast beef	Whole grain rolls
Tuna	Peaches canned in syrup	Pineapple
Oatmeal	Mashed Potatoes	Low fat chocolate milk
Kiwi Fruit	Lentils	Cabbage
Peanut butter	Macaroni	Low fat milk
Peas	String cheese	Sweets
Low fat yoghurt	Hummus	Grapes
Raisins	Low fat cottage cheese	Chicken
Blueberry muffin	Kale	Carrots
Sweet potatoes	Baked beans	Eggs
Broccoli	Spinach	Beetroot
Butternut squash	Blueberries	Tofu

Table 2.3 Serve It Up

Fruit and Vegetables	Bread, rice, potatoes, pasta and other starchy foods	Milk and dairy products	Meat, fish, eggs, beans and other non-dairy sources of protein	Foods and drinks high in fat and/or sugar

Name _____

Activity 2.2

Fuelling Up the Body

Directions

As a group, pick an athlete or a very active person who needs a lot of energy. You do not have to pick a super-athlete; the person can be someone‟s friend or family member. Next, plan a day‟s menu for the person. Remember to choose a lot of healthy carbohydrate foods as well as a variety of foods from each food group. As someone with an active lifestyle, this person will follow the Principles of Healthy Living.

Active person's name: _____

Breakfast:

Lunch:

Snack:

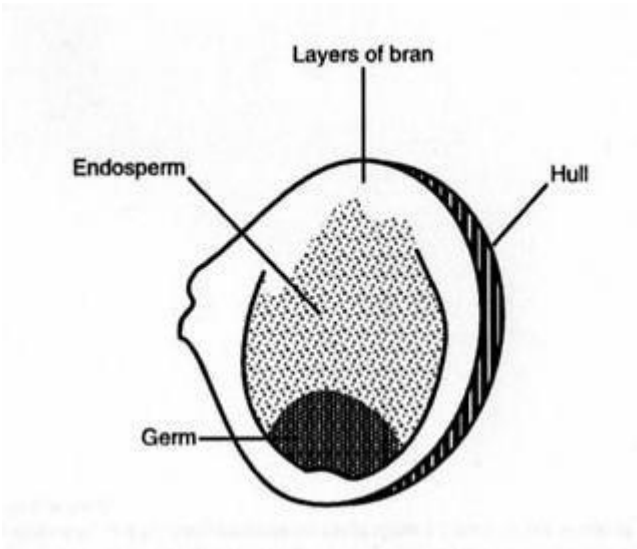
Dinner:

Snack:

Name _____

Activity 2.3

Going for the Whole Grain



Directions

Write a paragraph explaining why it is important to eat whole grains. Name at least two whole grain foods that you like to eat.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name _____

Activity 2.4

Foods at Home Made from Flour

Read the labels of foods that you have at your house, and write in the boxes below those that contain flour as one of the ingredients. Types of flour include white, brown, wholemeal, granary, wheat germ, malted wheat grain, stone ground, and organic.

These are the foods that I have at my house that contain flour:	

Lesson 3

Snack Attack

This lesson focuses on the role of snacks in the diet, with particular emphasis on fat in snacks. It is important for the pupils to gain an understanding of the information provided by food labelling. The activities are directed at reading labels and assessing the amount of fat and sugar in different foods so that they can apply this knowledge when choosing snacks in their everyday lives.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVE

For pupils to make healthful snack choices as part of a varied diet.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Describe why they should select healthful snacks.
2. Learn how to choose healthier snacks by analysing food labels to locate information on unhealthy fat content.

MATERIALS

- Overhead Transparency 3.1, Reading Food Labels (page 65)
- Activity 3.1, Be Snack Wise (page 66)
- Student Resource 3.1, Snack Food Information Cards (for use with activity 3.1) (page 70)

- Activity 3.2, Snacking the Fast Food Way (page 68)
- Activity 3.3, What‟s in a Snack? (page 69)
- A variety of empty snack food packages (pupils may bring these in)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 30 minutes.

1. (15 minutes) Have pupils make a list of their 10 favourite snack foods or drinks, and then have them identify items that meet the Principles of Healthy Living (you may display the overhead transparency 1.1, Principles of Healthy Living (page 30; focus on the guidelines related to healthy fat, whole grains, fruits and vegetables, and added sugars). Discuss the importance of regularly choosing foods that are low in saturated fat and the importance of avoiding trans fat. Eating snacks high in saturated fat is OK every once in a while. But on a regular basis, choose foods that are low in saturated fat and avoid trans fat.
2. (15 minutes) Have pupils complete activity 3.1, Be Snack Wise (page 66), individually, in pairs, or in groups of three. Distribute one Snack Food Information Card to each student, pair, or group of three pupils and instruct pupils to graph the unhealthy fat content (saturated fat) and the sugar content in each of the three food choices. Have them identify the healthiest and unhealthiest snack choices and explain why. Review the answers (see answer key). Discuss what the healthy snack options all have in common and what the unhealthy snack options all have in common.
3. (10 minutes) Distribute activity 3.2, Snacking the Fast Food Way (page 68), and have pupils work in pairs to make an educated guess about which food of the two choices has the lowest amount of saturated fat. Display the solutions as an overhead transparency and discuss them.
4. (10 minutes) Show overhead transparency 3.1, Reading Food Labels (page 65), and explain the labelled information. Highlight that reading labels is the way to determine the saturated fat content of the foods we eat and also to determine whether a food is high in saturated fat (5% or more of GDA) or low in saturated fat (1.5% or less of GDA). Food labels sometimes also tell us about trans fat content although in the UK it is not compulsory to put this information on the label.
5. (10 minutes) Distribute food packages of popular snack foods. Have pupils locate and record on activity 3.3, What‟s in a Snack? (page 69), the serving size, the amount of saturated fat grams per serving and the % GDA for saturated fat, listed on the food label. Have pupils also look at the ingredients list for partially hydrogenated vegetable oils (this ingredient indicates that

there is a small amount of trans fat in the product). Remind pupils that small amounts of trans fat can add up throughout the day, so it is best to choose snacks that do not contain any trans fat or partially hydrogenated oils.

6. (15 minutes) Ask pupils to determine which snacks can be combined to add up to 100% of the recommended daily maximum of saturated fat (the % GDA of the different snacks add up to 100). (Pupils can do this individually or in groups, or this may be done as a class). It may take only 3 to 5 snacks, depending on their saturated fat content. Explain that just those snacks alone contain a person‟s daily maximum allowance of saturated fat (see table 3.1, page 60, for an example).

   Remind pupils of the following: "the % GDA (based on a 2000 Calorie diet) can help you follow nutrition experts‟ advice not to eat more than 11% of your Calories from saturated fat. All you need to do is add up the % GDA for saturated fat in all the foods you eat in a day. Your goal is to eat less than 100% of the GDA for saturated fat".

7. (5 minutes) Explain to pupils that snacks that have a lot of saturated fat can be eaten once in a while and should be considered as "sometimes" foods. Most of the time, however, pupils should choose foods that contain healthy (unsaturated) plant fat (such as peanut butter, nuts, avocados, and olive oil) or whole grains, fruits, and vegetables. Remind pupils that they should avoid foods that have trans fat or partially hydrogenated oils.

TABLE 3.1 Examples of Foods that Total 100% GDA for Saturated Fat

Snack foods	% GDA for saturated fat
Salt and vinegar crisps	**15**
Chocolate bar	**25**
Takeaway milkshake	**26**
Takeaway burger	**38**

EXTENSION ACTIVITIES

1. Have pupils create an Eat Well Snack List (see table 3.2, page 61) that shows healthy snack choices (based on type of fat and considering other aspects such as low in added sugars) in each of the food groups. Display or copy and distribute overhead transparency 1.2, The Eatwell Plate, from Healthy Living (page 31), to illustrate the food groups (optional).
2. Have pupils design a snack food label for a snack food that is low in saturated fat and that would appeal to their peers.
3. Research the link between saturated and trans fat and heart disease. Some useful websites addresses are:
   - http://www.bhf.org.uk/keeping-your-heart-healthy/Default.aspx

- http://www.nhs.uk/Livewell/Healthyhearts/Pages/Lifestylechanges.aspx

4. Have pupils identify snack foods that are high in added sugar (e.g. cakes, chocolate bars, soft drinks) or salt (e.g. crisps, cheese curls). Explain that the amount of sugar (in grams) is listed on the label and that the different types of added sugar are found in the ingredients list (see activity 6.2 (page 99), for a list of commonly added sugars). Salt has a % GDA that follows the rules for saturated fat: if one serving has 1.5% or more of the GDA for salt, it is considered high in salt. Have pupils think of healthier snack alternatives (e.g. combine slices of four favourite fruits in a bowl, toast whole wheat pitta bread strips, or dip tortilla chips free of partially hydrogenated oils in salsa).
5. Have pupils write a formal letter to the school food service director or the manager of their favourite restaurant asking him or her to stop cooking with partially hydrogenated oils and to use healthy vegetable oils (such as olive or canola oil) instead.

TABLE 3.2 Example of Eat Well Snack List

Food group	Eat Well snack examples
Fruits and vegetables	Apples, banana, grapes, orange slices, strawberries, melon wedges, raisins, carrot sticks, celery sticks, pepper slices, cherry tomatoes, slices of cucumber
Bread, rice, potatoes, pasta and other starchy foods	Whole grain varieties of breads, crisp breads and crackers; plain popcorn; porridge; breakfast cereals (where sugar is not one of the first three ingredients)
Milk and dairy foods	Low fat or non-fat plain yoghurt, reduced fat cheese and cheese sticks, low fat cottage cheese
Meat, fish, eggs, beans and other non-dairy sources of protein	Slices of turkey, almonds, walnuts, sunflower seeds, peanut butter, hummus

TEACHER RESOURCES

SPECIFIC BACKGROUND MATERIAL

- For children aged 4-18 years old in the UK, snacks contribute roughly 15% to daily energy intake. Unfortunately, many popular snack foods are high in unhealthy fat (saturated and trans fat), added sugar, and salt. Ideally we should eat only limited amounts of these “sometimes” kinds of foods and regularly eat more nutrient-rich foods such as fruits, vegetables, whole grains, and low fat or non-fat dairy selections.

- This lesson helps pupils make healthier snack choices, primarily by choosing snack foods with more healthy fat and less unhealthy fat. Healthy fat, meaning monounsaturated and polyunsaturated fat, may decrease the risk of heart disease; most plant oils are excellent sources of healthy fat, as are nuts, seeds,

and fish. Unhealthy fat, meaning saturated and trans fat, can increase the risk of heart disease. Saturated fat is found mainly in animal products (such as full-fat dairy products, fatty cuts of meat, poultry skin, and lard) and in tropical oils (palm and coconut oil). Trans fat is formed when polyunsaturated vegetable oils are partially hydrogenated, a process that turns the normally liquid oils into solid or semisolid fat.

- Reading food labels is an effective way to compare the fat and nutrient content of various snack foods. The place to find out whether a food is relatively high or low in a nutrient is the % Guideline Daily Amount (GDA) information on the nutrition information panel. The GDA is based on a diet of 2,000 Calories per day; for each nutrient, it tells us what percentage of the GDA is found in 1 serving of food.

- The GDA for saturated fat is particularly important when selecting snack or other foods. If a food‟s GDA for saturated fat is 1.5% or less, the food is considered low in saturated fat. Foods that have a GDA of 5% or more for saturated fat are considered high in saturated fat. (To learn how to calculate % GDA for saturated fat, see How Is % GDA for Saturated Fat Calculated?, in Fast Food Frenzy, in your copy of „Eat Well and Keep Moving‟). The more foods chosen that have a GDA of 1.5% or less for saturated fat, the easier it is to stay within the healthy fat limits. The overall daily goal is to select foods that when added together contain less than the 100% of the GDA for saturated fat. For vitamins, fibre, calcium, and iron, however, the goal is to get 100% of the GDA.

- There is no % GDA for trans fat because it is unclear if there is any safe level of intake; the consumption of trans fat is strongly associated with increased risk of coronary heart disease, sudden death, and possibly diabetes. The Scientific Advisory Committee on Nutrition (SACN) advised keeping trans fat consumption below 2% of daily food energy intake. For a diet of 2,000 Calories per day, that means limiting trans fat intake from partially hydrogenated oils to roughly 4 grams per day. For practical purposes, that means avoiding trans fat from partially hydrogenated oils. Small amounts of trans fat can add up over the day. So make sure to watch out for the words *partially hydrogenated vegetable oil* in the ingredients list. Switch to an alternative product that does not contain partially hydrogenated oil, especially if it is a product you consume regularly.

- Fast food chains, sit-down restaurants, bakeries, and other commercial food establishments are not required to give nutrition information on the foods they serve. Many large chains offer this information on their Web sites. One strategy for minimising trans fat consumption in restaurants is to avoid deep-fried foods, since many restaurants still use partially hydrogenated oils for deep-frying.

Consumers can also become advocates and ask their favourite restaurants for nutritional information and to switch from partially hydrogenated oils to healthy oils.

ANSWER KEY

ACTIVITY 3.1: BE SNACK WISE

The best and worst choices, along with the total grams of unhealthy fat and comments for discussion, are listed in table 3.3.

Table 3.3 Be Snack Wise Solutions

Group	Best choice (grams of saturated fat)	Worst choice (grams of saturated fat)	Comments
Group 1	Virtually fat free fruit yoghurt (0.1g)	Vanilla ice cream (5g)	The amount of saturated fat in ice cream varies by brand and can be 15g or more per serving.
Group 2	Apple (0g)	Individual fruit pie (5g)	Commercially prepared pies likely contain unhealthy trans fat, but even homemade pie crusts and other flaky pastries often contain unhealthy fat and high amounts of salt per serving.
Group 3	Whole wheat toast with peanut butter (4g)	Snickers chocolate bar (6g)	Whole wheat toast provides fibre and peanut butter provides healthy monounsaturated fat and is low in saturated fat; the chocolate bar is high in saturated fat and sugar.
Group 4	Box of raisins (0.08g)	Jam doughnut (3g)	Raisins are low in saturated fat (choose varieties that do not add sugar). Doughnuts are high in saturated fat and sugar.
Group 5	Rice cakes (0.5g)	Cheese and onion crisps (3.5g)	Rice cakes contain an appreciable amount of fibre and are low in saturated fat. Some crisps, crackers, and other snacks contain partially hydrogenated vegetable oils but in a small enough quantity that it may not be shown on the nutrition label. Even a small amount of trans fat can raise the risk of heart disease, so make sure to read the ingredients list and choose foods that do not contain partially hydrogenated oils. Foods such as crisps and cracker can also contain high amounts of salt.

ACTIVITY 3.2: SNACKING THE FAST FOOD WAY

Put 'X' in box below	
	Apple pie
X	Fruit bag
	Cheeseburger
X	Veggie burger
X	Side salad with vinaigrette
	Medium French fries
X	Chicken sandwich
	Big Mac
X	Low fat chocolate milk
	Chocolate milkshake

Reading Food Labels

Label for 400g tin of soup

Serving size

Typical Values	Per 100g	Per ½ can	GDA*
Energy kJ	189kJ	379kJ	2000
kcal (Calories)	45kcal	89kcal	
Protein	2.3g	4.7g	45g
Carbohydrate	8.5g	16.9g	230g
(of which sugars)	(0.9g)	(1.8g)	90g
Fat	0.2g	0.3g	70g
(of which saturates)	(Trace)	(0.1g)	20g
Fibre	0.7g	1.4g	24g
Sodium	0.2g	0.5g	2.4g
Salt equivalent	0.6g	1.2g	6g

*Guideline Daily Amounts for average adults

Saturated fat per serving

Total GDA per day for saturated fat. A food with 1.5g or less saturated fat per 100g, is considered low in saturated fat.

NB. In the UK, trans fat does not have to be listed on a nutrition information label.

Name _____

Activity 3.1

Be Snack Wise

Directions

Graph the saturated fat and sugar content for each snack food on the list provided by your teacher. Use different coloured pencils to graph the saturated fat and sugar in each food. Then use this information to identify the best and worst snack choices in the group.

1. Which food is the healthiest choice?

   _____

   Why?

   _____

2. Which food is the unhealthiest choice?

   _____

   Why?

   _____

3. Name 3 fatty snacks

   _____

   _____

   _____

4. Name 3 sugary snacks

   _____

   _____

   _____

Grams per 30g bar	Saturated fat, & sugar		Saturated fat, & sugar		Saturated fat, & sugar		Saturated fat, & sugar
15							
14							
13							
12							
11							
10							
9							
8							
7							
6							
5							
4							
3							
2							
1							
	Example: 30g cereal bar		Food 1:		Food 2:		Food 3:

Example: the cereal bar contains 1.5g of saturated fat and 10g of sugar.

KEY

Saturated fat

Sugar

Name _____

Activity 3.2

Snacking the Fast Food Way

Directions

Using what you know about the sources of saturated fat, look at each set of foods below and place an „X" in the box next to the food that you believe contains more saturated fat.

Table 3.3 Snacking the Fast Food Way

Put 'X' in box below	
	Apple pie
	Fruit bag
	Cheeseburger
	Veggie burger
	Side salad with vinaigrette
	Medium French fries
	Chicken sandwich
	Big Mac
	Low fat chocolate milk
	Chocolate milkshake

Name _____

Activity 3.3

What's In A Snack?

Look at the snack food labels to find the serving size, the amount of saturated fat in grams per serving, and the % GDA for saturated fat per serving. Also, calculate the number of servings per container. Record this information in the table.

Look at the ingredients list to see whether the food contains any partially hydrogenated oil or shortening. Record the information in the table.

Table 3.4 What's in a Snack?

Product name	Serving size	Servings per container	Saturated fat (grams)	% GDA for saturated fat	Partially hydrogenated oil (yes or no)

Name _____

Snack Food Information Cards

Group 1

Vanilla ice cream, 1 serving (5g saturated fat, 14g sugar)

Fruit sorbet, 1 serving (0g saturated fat, 22g sugar)

Virtually fat-free fruit yoghurt, 125g pot (0.1g saturated fat, 7.5g sugar)

Group 2

Apple (0g saturated fat, 9g sugar)

Individual fruit pie (3.5g saturated fat, 20g sugar)

Smoothie with apple, 230ml drink (0.3g saturated fat, 28g sugar)

Group 3

Whole wheat toast (1 slice) with peanut butter (1 tbsp) (4g saturated fat, 2.3g sugar)

Salted peanuts, 45g bag (4.3g saturated fat, 1.7g sugar)

Snickers chocolate bar (6g saturated fat, 28g sugar)

Group 4

Individual box of raisins (0.08g saturated fat, 19g sugar)

Jam doughnut (3g saturated fat, 12g sugar)

2 Oatcakes (0.9g saturated fat, 0.5g sugar)

Group 5

Packet of cheese and onion crisps (3.5g saturated fat, 0.2g sugar)

Toffee popcorn, 50g serving (1g saturated fat, 31g sugar)

2 Rice cakes (0.1g saturated fat, 0.3g sugar)

Lessons 4 and 5

Map Maker

This lesson is a mapping exercise that encourages pupils to be aware of the facilities and opportunities for recreation in their school and community. Often children are not familiar with the areas in which they live, and this can restrict the amount of physical activity they get. As children develop into adults, they will realise that being physically fit and healthy requires more of a commitment of time and effort. Therefore, in this lesson pupils will also discuss the benefits of being physically active throughout life. They research one type of "lifetime" physical activity and write an article describing the activity for a health and fitness newsletter.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Geography, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

- For pupils to be physically active every day.
- For pupils to be involved in a lifetime physical activity that will help them maintain an active lifestyle.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Obtain information that draws from a variety of sources (experts, observations, experiments, libraries, online databases).
2. Take notes and summarise information.
3. Write a coherent composition about a lifetime physical activity.
4. Be independent learners.

5. Discuss the importance of being physically active throughout their lives.
6. Locate places on a local map.
7. Give directions to recreation facilities in their neighbourhoods.
8. Discuss the distribution of recreation facilities in and around Wigan.
9. State the physical activity recommendations for children.
10. Discuss the importance of physical activity to people and the community.

MATERIALS

- Large map of the local area in which the school is located (provided). You could also show them a supplementary map showing all of the Borough and point out other areas or locations for physical activity (www.wigan.gov.uk/schooltravel)
- Coloured pens or pencils
- Access to encyclopaedias or books that discuss various physical activities
- *Optional*: Access to the Internet or other electronic research tools

- Activity 4.1, Lifetime Physical Activities (page 82)
- Activity 5.1, Exploring Your Neighbourhood (page 84)
- Activity 5.2, Designing a Fitness Programme (page 85)
- Overhead Transparency 4.1 (page 80)
- Overhead Transparency 5.1 (page 81)

LESSON PLAN

Activity 5.1 (page 84) should be introduced on Week 1 of this double lesson; pupils must complete a homework assignment before completing the activity on Week 2.

ESTIMATED TEACHING TIME: 1 hour.

WEEK 1

1. Point out the goals of this activity:
    - To discuss the benefits of being physically active throughout life.
    - To practice being independent learners.
    - To write a coherent composition describing the lifetime physical activity they researched.
2. (5 minutes) Conduct the following „thought showering" activity. Display a model of the K-T-W chart, overheard transparency 4.1 (page 80). Ask the class what they know, think they know, or want to know about this topic.

    As pupils offer ideas, they should identify the column in which the idea should be placed. After eliciting a number of responses, explain the correct "I Know" and "I think I Know Responses". The materials listed in the Teacher Resources will help you with this task. If you are unsure of the accuracy of some of their comments, you may want to ask pupils to research their

questions, or verify their statements as part of the research and writing activity. If possible, save a copy of the chart to review at the end of the lesson.

3. (5 minutes) Hand out activity 4.1, Lifetime Physical Activities (page 82), and describe the assignment as outlined on the sheet.
4. (Time will vary) Allow pupils to begin their research in the library, computer room, or classroom. Assign a deadline for when their research must be completed. You also may want to ask pupils to record and report their sources of information to you in a standard format of your choosing.
5. (Time will vary) Give pupils time to write their compositions in class or assign them as homework.
6. (5-10 minutes) Review the K-T-W chart. What new information can you add to the “I Know” column?
7. This is this lesson completed, however, next week‟s lesson must be introduced.
8. (5 minutes) Display overhead transparency 5.1 (page 81). Point out the goals of the lesson and the physical activity recommendations for children. Discuss the benefits of physical activity.
9. (5 minutes) Have pupils „thought shower‟ answers to the following questions:
    - What are some reasons people your age give for not doing enough physical activity?
    - What are some reasons adults give for not doing enough physical activity?
    - What suggestions would you make to someone who gave these reasons for not doing enough physical activity? Why should they try to be active?

    Record their responses on the board or overhead transparency.
10. (2 minutes) Make the following points:
    - Physical activity doesn‟t necessarily have to be done at the gym or doing sports. Going for walks, playing outside doing active games, riding bikes, swimming, and visiting the park can all benefit health.
    - Accessibility to recreational facilities can affect the amount of physical activity a person participates in.
11. (1-2 minutes) Hand out activity 5.1, Exploring Your Neighbourhood (page 84), and provide this overview: In this activity each of the pupils will determine the location of recreational facilities in their neighbourhoods. In class pupils will plot the location of the recreational facilities on a map of your local area and Wigan Borough, and discuss the distribution of facilities in your neighbourhood or community. They‟ll also identify safe places to be physically active and discuss improvements that could be made to the local exercise facilities. What facilities are needed, or could be improved?

12. (5 minutes) Put pupils into groups of three or four and ask them to discuss the following questions:
    - Are there a number of recreational facilities within walking or biking distance from your house?
    - Do you think recreational facilities are evenly distributed (spread out) in your community? (You may want to discuss the school neighbourhood or the whole of Wigan Borough). Make an assumption.
13. Pupils should record their assumptions on the sheet for activity 5.1.
14. Have pupils complete activity 5.1 for homework. Try to encourage them to work with their parents/carers as a family activity.

ESTIMATED TEACHING TIME: 1 hour.

WEEK 2

1. Hang a copy of your local map on the wall.
2. (5 minutes) Explain how to find locations on the town map using the lettered and numbered grid system (you might prefer to do this step on Week 1 depending on time).
3. (5 minutes) Ask pupils to name different types of recreational facilities they found in their neighbourhood and in and around Wigan. Make a list of these categories on the whiteboard/SMARTBoard and assign a colour to each category. This legend should be listed next to the map (*Examples: basketball courts, tennis courts, tracks, parks, playgrounds, swimming pools, leisure centres, cycle paths, lakes*).
4. (25 minutes) Prior to starting step 5, introduce activity 5.2, Designing a Fitness Programme (page 85) (see page 79 for guidance) working in small groups or individually to complete this activity.
5. (10-15 minutes) Whilst the pupils are doing activity 5.2, have them take turns (two at a time) locating on the map the recreational facilities they identified in activity 5.1. They should use the appropriate coloured marker/pen to plot the location of the facility on the map.
6. (10 minutes) Discuss the distribution of recreational facilities on the map. Ask pupils the following questions:
    - Are the recreational facilities evenly distributed throughout the town, or are they clustered in certain neighbourhoods?
    - Is there a good variety of facilities to choose from?
    - What are some improvements that could increase access to the exercise facilities for children in your community? What facilities are needed, or could be improved?
7. Ask pupils to implement the fitness programmes they designed in activity 5.2 this week.

8. Ask pupils to share their experiences. Did they meet their goals? What were the barriers to success?

EXTENSION ACTIVITIES

EXTENSION ACTIVITY 4.1

6. Have pupils make a poster that visually reports the findings of their research on lifetime activity.
7. Have pupils give oral reports to share their findings.

EXTENSION ACTIVITY 5.1

1. Have pupils write a letter to the local newspaper or the mayor suggesting ideas to improve the opportunities for recreation in the area, and why that would improve everyone‟s health.
2. Have pupils write a paper describing the experience of implementing the fitness programme pupils created in activity 5.2.

TEACHER RESOURCES

SPECIFIC BACKGROUND MATERIAL

- **What are lifetime physical activities?**

  Unlike many competitive teams, lifetime activities can be done throughout your life. Examples of lifetime activities are running, walking, dancing, hiking, bicycling, swimming, skiing, gardening and canoeing (see activity 4.1 for more examples). Team sports require facilities and a number of people, both of which may be difficult to find. Many lifelong activities can be done alone or with a small group of people. You can walk right out your door to participate in many lifetime activities, such as jogging, bicycling, hiking and swimming. People at various levels of fitness can participate in these types of physical activities by varying how hard the activity is. Finding a lifetime activity that you enjoy will help you maintain an active lifestyle.

- **What changes in society have brought about a decrease in daily physical activity?**

  In the latter part of the 20th century, there was a dramatic reduction in the amount of physical activity performed in daily life. An increase in the number of office jobs has occurred, whereas manual and farming jobs, which require physical work, have decreased. Modern appliances, machinery, and motorised transportation have reduced the amount of activity required to complete household chores and work-related tasks. The growth of technology and inactive leisure activities has been enormous, with computers, videos/DVDs, and TV being major factors. The Internet, CDs, DVDs, video

games, and continued expansion of the TV channel market will help these trends continue.

- **How much time do children spend watching TV?**
  According to data, children spend more time watching TV than they do in engaging in any other activity, except sleeping. In 2005, the average child viewed 21 hours per week of TV, but that number jumps to 28 hours when you include videos, DVDs and pre-recorded shows. This is nearly as much time as spent in school. Add this to one hour per day of computer use (outside of school work), about one hour (50 minutes) a day of video games, and 45 minutes a day of non-school-related reading. Altogether children manage to pack about 8 ½ hours of media content, into about 6 ½ hours of time, but using more than one media at a time. Essentially for many children media consumption has become a full-time job! Although these appear to be high estimates, there is certainly a need to decrease the time children spending watching TV and using other screen-based media. The American Academy of Pediatrics recommends limiting screen time to two hours of less per day.

- **What are the benefits of a more active lifestyle?**
  Activity helps children develop and maintain cardiorespiratory (heart health) fitness, muscular strength, and confidence in their physical ability. Regular activity helps people maintain a healthy weight, build lean muscle, and reduce fat. It can reduce stress and brighten a person‟s mood. Regular exercise helps build and maintain dense bones, which helps prevent osteoporosis. Active adults have a lower risk of dying prematurely and developing diabetes, high blood pressure and colon cancer.

- **What are the risks of a sedentary lifestyle?**
  Activity is required for health. Studies suggest that physically active people enjoy lower risks of developing heart disease, diabetes, colon cancer, osteoporosis, anxiety, and depression, relative to sedentary people. Sedentary habits increase the risk of premature death.

- **Why is television viewing damaging to health?**
  Television viewing is one of the major contributors to overweight (obese) children. Excessive screen time contributes to a sedentary lifestyle and promotes poor nutrition by exposing children to food advertising for high-calorie, low-nutrient foods. TV watching has also been associated with elevated cholesterol levels, cigarette smoking, and poor cardiorespiratory fitness.

- **What are the alternatives to watching TV?**
  Anything that involves movement! Participate in lifetime physical activities that you enjoy (dancing, bicycling, walking, hiking, gardening, swimming). Limiting TV time ensures that you‟ll do other activities that involve more physical activity. Also, you don‟t have to sit still while you watch TV – you can be dancing, cleaning, cooking, and so on.

- **How much activity is needed to obtain health-related benefits?**
  Moderate amounts of daily activity are recommended for people of all ages. However, physical activity need not be strenuous to be beneficial. Just a small increase in physical activity can generate genuine health benefits, such as reduction of body weight and the risk of heart attack, hypertension, and death. For adults, 30 minutes or more of moderately intense physical activity, such as walking, is beneficial for health when performed regularly. Some kind of regular vigorous activity, however, is the best way to improve cardiorespiratory fitness. Children and adolescents should strive for 60 minutes of moderate-to-vigorous activity every day. This is beneficial for physical development, maintaining proper energy balance, and enjoying the feelings of fun and well-being that physical activity provides.

- **What is the difference between 'physical activity' and 'fitness'?**
  If a child is fit it means they have the energy they need to do school work, exercise, play, and get from place to place without easily tiring. To get fit, they need to be physically active. Many kinds of movement can improve a child‟s health and fitness level, such as swimming, skipping and dancing. Essentially, the more active a child is, the fitter they will become! Any physical activity is better than none.

- **How much activity is needed for fitness?**
  Experts recommend that children and adolescents be moderately to vigorously active for 60 minutes every day. At least twice a week this should include weight-bearing activities that produce high physical stresses to improve bone health, muscle strength and flexibility. This amount of physical activity can be achieved in a number of short ten minute (minimum) bouts. How long, how hard, and how often you are active will determine how fit you are! You can improve fitness by increasing the frequency (if you are not exercising regularly), increasing the intensity (doing something faster, doing more repetitions), or increasing the time you spend on each exercise.
  Activities that are likely to improve children‟s fitness are ones which make them slightly out of breath, or sweat slightly, such as running around playing tag, playing football or rounders, and going for a bike ride.

- **What are examples of things you can do to increase your activity and decrease your inactivity?**

  Try a new physical activity; take the stairs; don‟t park next to the building; walk around the shopping centre or neighbourhood with friends; watch only your favourite TV shows; remove or unplug the TV in your bedroom; play catch with a sibling, friend or parent.

- **Why do people become less active as they get older?**

  People explaining why they‟re not physically active give some of the following reasons:

  - "I don‟t have time for fitness. All I do is work and sleep."
  - "There‟s always something else to do. My family is a full-time job."
  - "It‟s too expensive to do sports once you leave school."
  - "I‟d rather spend time with my friends."
  - "I don‟t enjoy hard fitness work."

  Some of these statements have some truth. As you get older, life is more demanding in many ways, you have more responsibilities, and it takes a lot more discipline to remain active and fit once you are studying at a high school, college, working, or raising a family. It can be expensive to play sports or join a gym, but there are always inexpensive ways to be active. Lastly, fitness programmes can seem difficult initially for people who are not used to consistent physical activity.

  However, many of these obstacles can be avoided by establishing an active lifestyle from the time you are very young. For example, children and adolescents who engage in physical activities that they enjoy will be more motivated to continue an active lifestyle as adults. Regular physical activity each day can keep you physically fit and felling good. It‟s also important to keep in mind that there are costs to your health for *not* making space for physical activity and good nutrition. The message here is simple: Fitness and health takes some effort, time, and organisation – but you don‟t need to be a "fitness fanatic" to be fit.

- **What is a fitness programme?**

  A fitness programme doesn‟t have to mean going to the gym to work out.

  Some people like to do team sports or run. However, that‟s not what everyone enjoys doing. You don‟t need to do strenuous exercise to achieve a minimum level of fitness. You can stay fit by simply being active in everyday activities, such as walking briskly to school each day, or cycling to a friend‟s house. *All* active time helps fitness and health.

- **What are some ways to stay active and healthy?**

  Here are several steps towards achieving a more active and healthy lifestyle:

  - Understand the importance of fitness, activity, and nutrition. Many people don‟t realise how important good eating and activity are in their lives. Being fit and eating right will make you feel good about yourself and will give you energy to be active. Also, getting into the habit of fitness as an adolescent will make life easier in years to come and will lower the risk of developing some diseases. In adult life and old age, the benefits of fitness can be dramatic, including decreasing the risk of injury, increasing the ease of daily tasks, reducing stress, and preventing chronic disease.
  - Identify your needs and make some goals. Some people would just like to be able to walk to the local shop; others want to run marathons. You need to decide what you want to achieve or how you would like to feel, and then build up your health progressively towards that goal. Different goals may be appropriate at different stages in life. To increase fitness, create your goals around increasing the following:
    - Endurance – the ability to perform activities, such as running, cycling, and swimming for long periods of time.
    - Strength – the ability to lift or move the body or objects.
    - Flexibility – the ability to bend, stretch, and twist with ease.

INSTRUCTIONS FOR ACTIVITY 5.2, DESIGNING A FITNESS PROGRAMME

For this activity, it is best to first of all get the pupils to think about why it would benefit them being fitter. Then ask them to decide on what activities they could do, and would like to do, to help them be more physically active, and in turn fitter. Suggest a variety of activities, such as going for a bike ride, playing active games outside with friends, and playing sports. Make sure you encourage them to choose a variety of activities so that they don‟t get bored. It is important to emphasise that before and after school, as well as break and lunch times are good times to be active and build up fitness.

Lifetime Physical Activities

Topic: The Benefits of Being Physically Active Throughout Your Life

K: I Know	T: I Think I Know	W: I Want to Know

The Importance of Physical Activity

Lesson goals:

- To discuss the importance of physical activity.
- To research the location of recreational facilities in your neighbourhood and plot them on a classroom map.
- To discuss the distribution of reaction facilities in Wigan Borough.

***CHANGE!*'s physical activity recommendations:**

- Be moderately active for at least 60 minutes every day as part of play, games, chores, work, transportation, and planned exercise.
- Include weight-bearing activities at least twice a week.

What are the benefits of an active lifestyle?

- Develops cardiorespiratory fitness, muscular strength, and confidence in physical ability.
- Maintains a healthy body weight and reduces fat.
- Reduces stress and brightens a person‟s mood.
- Lowers the risk of developing heart disease, diabetes, high blood pressure, and colon cancer, which can lead to premature death.

Name _____

Activity 4.1

Lifetime Physical Activites

What Are Lifetime Physical Activities?

Unlike many competitive team sports, lifetime activities can be done throughout your life. Examples of lifetime activities are running, walking, dancing, hiking, cycling, swimming, skiing, gardening, and canoeing. Team sports require facilities and a number of people, both of which may be difficult to find. Many lifelong activities can be done alone or with a small group of people. You can walk right out your door to participate in many lifetime activities such as jogging, rollerblading, and bicycling. People at various levels of fitness can participate in these types of physical activities by varying how hard the activity is. Finding a lifetime activity that you enjoy will help you maintain an active lifestyle and keep you physically fit.

Directions

1. Look at the following list of lifetime activities. Choose one of the activities that you enjoy or one that you would like to know more about.

Handball, racquetball, squash	Archery
Table tennis	Scuba diving
Skating: in-line, ice, roller	Gardening
Jogging	Horse riding
Judo, karate, taekwondo	Mountain climbing
Fencing	Walking
Tennis	Orienteering
Swimming	Hiking
Canoeing, kayaking, rowing	Cycling: road, mountain
Golf	Skiing: downhill, cross-country
Snorkelling	Dancing: aerobic, jazz, line etc.

2. Research the lifetime activity to find out the answer to part *a* and ***one*** of the other topics of your choosing (*b*, *c*, or *d*).
   a. **Describe the activity.** Where is it done? When is it done? Are there any rules? What equipment or facilities are required?
   b. **History of the activity.** When did people begin doing this activity? In what country did it originate? Where is it currently popular?

c. **Interview someone who does the activity.** Why did he or she choose to do the activity? Why is it fun? How long has the person been doing it? How much does the equipment cost?
d. **Try the activity yourself.** Describe your experience. Where did you do it? Who did you do it with? Did you like it? Would you like to do it regularly?

3. Pretend you are a journalist for a health and fitness magazine. Based on your research, write an article that does the following:
   - Informs people about the activity (be sure to add personal quotes if you research parts *c* or *d* in question 2.
   - Encourages people to participate in lifetime activities by pointing out the benefits of maintaining an active lifestyle throughout life.

   You may want to put your own guidance on this task, such as the number of words, or the length of each section.

Name _____

Activity 5.1

Exploring Your Neighbourhood

Make a Prediction

Do you think recreational facilities are evenly distributed (spread out) in your community (yes or no)? _____

What is there to do in your neighbourhood that would increase your level of fitness?

1. In the following table, make a list of three to five recreational facilities that are within walking or cycling distance from your house. (*Examples: fields, basketball courts, tennis courts, cycle paths, parks, playgrounds, swimming pools, leisure centres, lakes)*.
2. List the street of each facility.
3. Give directions to each location from your home.

If you"re struggling – get your family to help you, and check out Active Travel Wigan on www.activetravelwigan.co.uk

Facility name	Types of activities	Where it's located	Directions from your home
Example: Robin Park Lifestyles Centre	***Basketball, tennis, football, badminton etc.***	***Loire Drive, Newtown, Wigan***	***From Scot Lane then turn left onto Anjou Boulevard, then right onto Loire Drive.***

Name _____

Activity 5.2

Designing a Fitness Programme

Here are several suggestions that will help you design a fitness programme:

1. Set a fitness goal. Why do you want to be more fit?
2. Decide what activities will realistically fit into your daily routine.
3. Try to do a variety of activities.
4. Try to involve your family.
5. Design a programme that keeps you challenged and interested.
6. Encourage friends to join you.

List some fitness goals that will help you stay healthy:

1.

2.

3.

4.

Design an activity schedule for one week. Of course, you have school Monday to Friday, but before school, break and lunch times, after school, and the weekends are good times to be active. You can include sports and other activities that you already do.

Make sure the schedule:

- Includes a variety of activities that you like to do.
- Keeps you challenged.
- Involves your whole family in at least one goal.

Day of week	Activity	Location	Duration	Time of day
Sunday				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				

Keeping muscles moving is important for growth, development, and overall health. This doesn‟t mean that you have to lift weights at a gym. Participating in a variety of sports, dance, or recreational activities keeps the muscles of the body active and moving.

- Decide what is realistic given your daily routine. Everyone has different schedules, and some have more free time than others. Some may have to prioritise to be fit, depending on their goals. For many people, better organisation of their time will be enough to create space to do regular exercise. People with many responsibilities may have a hard time believing that taking time out for fitness is important. Keep in mind that your health and well-being are important to you, your family, and your friends. Start by making just a small space for fitness in your life.
- Try to do a variety of activities. Variety is important to keep up your interest in any part of your life, and fitness is no exception. A variety of activities also works a wide range of muscles and joints.
- Design a schedule that keeps you challenged and motivated. A schedule should keep you active on a regular basis and possibly become more demanding over time. This keeps it challenging and often motivates you to keep going.
- Encourage friends to join you. Doing active things with friends is an excellent way to stay motivated and involved. People often need the help of others to keep their interest and enjoyment up. Many people prefer team sports for this reason.

Lesson 6

Sugar Water: Think About Your Drink

This lesson looks at sugar-sweetened soft drinks and gets the children to consider the amount that they are consuming and whether there are healthier choices that they can make. This is done by introducing alternative names for sugar that appear on drinks labels and by getting the children to calculate how much sugar they are consuming as a result of having different soft drinks in their diet.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to make healthier drinks choices.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Measure the amount of sugar consumed from soft drinks and evaluate the results.
2. Identify the different forms of sugar added to drinks.
3. Demonstrate how the body responds to sugary drinks.
4. Learn to replace soft drinks and other sugar-sweetened drinks with healthy drinks.

MATERIALS

- Sugar (2kg bag)
- Measuring teaspoons
- Small paper cups or clear plastic cups
- Activity 6.1, Sugar Count (page 97)
- Activity 6.2, Find the Sugar (page 99)
- Drink labels that pupils have brought from home (optional)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 15 minutes.

PART I: EVALUATE SUGAR INTAKE

1. (8 minutes) Introduce the lesson by asking pupils to say what they think about the word *sugar*. Ask them to list the foods and drinks that they consume that contain sugar. What is the most common food or drink listed?
2. (15 minutes) Explain that soft drinks represent a major source of sugar intake in the diets of older children and teenagers. Distribute activity 6.1, Sugar Count (page 97), to pupils and instruct them to complete the Soft Drink Count table by recording the number of 330ml cans and 500ml bottles of soft drink they consumed the previous day. Then have the pupils calculate the total number of teaspoons of sugar consumed from the soft drinks.

You may need to assist pupils in estimating the amount of soft drink they consumed if they consumed something other than a can or bottle. This exercise is not meant to be an exact record but rather a rough estimate of the amount of sugar consumed from soft drinks.

Pupils who did not drink soft drinks the previous day may fill out the sheet based on what they drink on a typical day; if several pupils did not drink soft drinks the previous day or some pupils rarely drink soft drinks because of household rules, it may be more effective to conduct this activity in groups.

3. (15 minutes) Have pupils evaluate their sugar intake (part II of activity 6.1). Distribute the paper cups. Instruct the pupils to measure out a teaspoon of sugar for each teaspoon of sugar they consumed from soft drinks the previous day and to pour the sugar into their cups to visualise the amount of sugar consumed. Alternatively, to minimise the amount of sugar used for this activity, choose a few pupils to measure out their sugar intake and demonstrate it to the class.

Discuss the pupils‟ observations – were they surprised at the amount of sugar they consumed?

a. A child who consumes just 1 can of soft drink per day (9 teaspoons of sugar) may consume 63 teaspoons of sugar over 1 week, which translates to just over 1 kilogram of sugar each month (using the simple calculation of 4 weeks in a month) and 12.1 kilograms of sugar each year.
b. To demonstrate what 1 kilogram feels like, pass around the bag of sugar. While not exact, (your bag of sugar will be close to 2 kilograms), it will give pupils an idea about the volume and weight of sugar consumed via soft drinks. Remind pupils that, like many soft drinks, the bag is full of sugar but has no other nutrients. There are no vitamins or minerals in sugar – just empty Calories (meaning energy without any other benefits for the body).
c. Remind pupils that a soft drink is not the only drink that contains added sugars. Review the list created by the pupils at the start of this lesson and point out the other drinks that contain large amounts of added sugar (e.g. sports drinks, energy drinks, fruit squash, lemonade, sweetened iced teas, even tea and coffee can have sugar added to them).

4. (10 minutes) Discuss drinks that provide pupils with a health benefit, such as water, low fat or non-fat milk, and 100% fruit juice (in moderation). Complete part III of activity 6.1 (Calcium Switch) to calculate the amount of calcium each child would consume if she chose low-fat or skimmed milk instead of soft drinks. For this exercise, pupils will calculate the total millilitres (ml) of soft drinks consumed the previous day and determine the amount of calcium that they would have consumed if all of the soft drink was low fat or non-fat milk.

PART II: IDENTIFY SUGAR IN DRINKS

1. (10 minutes) Distribute activity 6.2, Find the Sugar (page 99), so that pupils may identify other words for sugar (in part I of activity 6.2). Next, have pupils find some of these words in the drink ingredients lists provided in part II of activity 6.2. Explain that many drinks that sound healthy actually contain a lot of added sugar (ask pupils to name some fruit drinks or energy drinks that they like, since many fruit drinks and energy drinks have a lot of added sugar; see activity 6.2 for an example). This sugar sometimes hides itself because the ingredient lists on food labels use other names for sugar.
   a. For an optional maths extension, review the drinks nutrition labels from activity 6.2 and ask the pupils, “Where does the label list the amount of sugar?” Explain how to convert grams of sugar to teaspoons of sugar (1 teaspoon for every 4 grams).

b. Calculate the teaspoons of sugar in popular drinks either by using the drinks nutrition labels provided or by asking pupils to bring in labels from drinks they have at home.

2. (3 minutes) Remind pupils of the Healthy Living goal to limit sugary drinks. Soft drinks and other sweet drinks (e.g. sports drinks, energy drinks, fruit squash, milkshakes, lemonade, sweetened iced teas) contain high amounts of sugar and usually nothing else that is good for us – they basically contain just sugar and water. That‟s why we say that sugar-sweetened drinks give us empty Calories.

PART III: APPLICATION AND EXTENSION OF INFORMATION

1. (5 minutes) Ask pupils to describe why we might want or need sugar. Explain that sugar provides the body with a quick source of energy. The problem with consuming sugary drinks or snacks is that the energy boost from these sources does not last.
2. (4 minutes) Have the class stand up and do the wave (raising and lowering their arms, as you might do at a sporting event). Explain that this is what is happening in our bodies when we drink a whole can of sugary drink all at once (or eat sugary foods, like a packet of jelly beans): there is a quick rise in blood sugar, giving us energy, but our bodies work quickly to pull that sugar out of the blood and into storage (initially as „glycogen‟ in the fat tissues and the liver, and some to the muscle; any excess is converted to fat). That is why the quick boost of energy we feel after drinking a sugary drink does not last.
3. (5 minutes) Discuss better ways to get quick energy that lasts for a long time, so that the body‟s energy levels do not shoot up and down. Healthy carbohydrate in whole grain foods, fruits, and vegetables provides a longer boost because the sugar and starch in the foods take longer to be digested and enter the bloodstream. These foods also provide fibre and many vitamins and minerals. Low fat and non-fat milk and low fat or non-fat yoghurt also naturally contain carbohydrate and are a good source of protein and calcium. To sustain energy levels, choose snacks that combine healthy sources of carbohydrate (e.g. whole grains, fruits, and vegetables) with healthy sources of protein (e.g. nuts, hummus, and low-fat cheese). (For more information on choosing healthy carbohydrate, see Lesson 2, Carb Smart, page 38).
4. (Time will vary) If time allows, invite pupils to create a list of healthy drink options and discuss the best choices according to their health benefits. For example, the pupils might list:
   - Plain or sparkling water (alleviates thirst and promotes hydration)
   - Non-fat or low fat milk (provides calcium for strong bones and teeth), and

- 100% fruit juice (offers vitamins and minerals); note that consumption of 100% fruit juice should be limited to no more than 150ml per day.

EXTENSION ACTIVITIES

1. Ask pupils to calculate how much sugar they would consume from soft drinks in a year if they continued to drink as much as they drank yesterday. (Multiply answer 3 from activity 6.1 by 365).
   For example, if one bottle of soft drink had been drunk, then 13 teaspoons of sugar would have been consumed.
   13 teaspoons x 365 = 4,745 teaspoons.
   This equates to *almost 19 kilograms of sugar* (4,745 teaspoons x 0.004 kilograms per teaspoon) *or*
   18,980 grams of sugar! (4,745 teaspoons x 4 grams per teaspoon).
2. Discuss the advertisements that they see on television or in print for sugary drinks. Ask the pupils to pick one ad that is familiar and discuss what they think about the ad. Have them describe the ad, the actors in the ad (for instance, are the children happy or athletic?), and the way the ad makes them feel about the product. (See Beverage Buzz: Sack the Sugar, activity 15.2,
   What‟s Up With This Ad? for an activity sheet that may be used for this activity).
3. Create posters that advertise healthier drink choices and post them near the school dining room.

TEACHER RESOURCES

BACKGROUND MATERIAL

- A major source of sugar in the UK diet is sugar-sweetened drinks such as soft drinks, fruit squash, milkshakes, sweetened iced teas, and energy and sports* drinks. Children‟s consumption of soft drinks is rising. Studies have found that children are starting to consume them in infancy. By the age of 10-11 years old, over a third of a UK child‟s fluid intake is from sugar-sweetened soft drinks.

- The steady climb in children‟s intake of sugar-sweetened drinks is troubling for many reasons. As children‟s soft drink consumption has increased, their milk consumption has decreased. That is a worrisome trend, given that adolescence is a time of rapid bone development and increased calcium needs. Teenagers who do not maximise bone development during these crucial years (by getting enough calcium and regular physical activity) may increase their risk of osteoporosis in late adulthood. More of an immediate concern is that dental caries and erosion of teeth can occur as a result of over-consumption of sugar-sweetened drinks.

- Sugar-sweetened drinks are said to be filled with empty Calories because they basically contain just sugar and water, and they provide many Calories but few of the nutrients the body needs to stay healthy and grow strong. A growing body of research strongly suggests that sugar-sweetened drink consumption is associated with excess weight gain in children and adults. One study found that 11-14 year old pupils who increased their consumption of sugar-sweetened drinks gained excess weight; for each additional 375ml serving of sugar-sweetened drink consumed per day, the odds of becoming obese increased by 60%. Reducing or avoiding empty Calories from sugar-sweetened drinks may help with weight control: another study found that when overweight teenagers reduced their consumption of sugar-sweetened drinks by replacing those drinks with Calorie-free ones, they lost about 0.5kg per month. Other research connects the consumption of sugar-sweetened drinks with a risk for type 2 diabetes.

- A healthy eating plan includes few if any drinks with added sugar.

*During most types of physical activity, children can get adequate hydration and energy by drinking water and having a healthy snack (such as orange slices). Most sports drinks are designed for endurance athletes who compete for more than an hour at high intensity. Save sports drinks for when children are participating in high-intensity, long duration sports competitions (greater than 1 hour) or for when children are vigorously active for a long time in the heat.

- Children should limit consumption of artificially-sweetened drinks, since the long term effects of artificial sweetener consumption are unknown and since artificial sweeteners may encourage a taste for sweetness. Children should be encouraged to select healthier drinks such as water for quenching thirst or low fat and skimmed milk for calcium; calcium-fortified soy drinks (ones that have no more than 12 grams of sugar per 250ml serving) and calcium-fortified 100% orange juice are also good sources of calcium. Consumption of 100% fruit juice should be limited to no more than 150ml per day. Juice contains vitamins and minerals, but it naturally contains a large amount of fruit sugar (fructose) and lacks the fibre found in fresh whole fruit. To make it easier to stay within the 150ml fruit juice limit, dilute a small amount of 100% fruit juice with sparkling water.

ANSWER KEY

ACTIVITY 6.1: FIND THE SUGAR

Part I: Word Search

F	R	U	C	T	O	S	E	J	P	D	M	T	J	M
Y	[redacted]								A	Q	A	W	A	J
[redacted]							R	V	I	N	L	O	O	L
L	S	Z	X	T	J	Y	I	S	U	C	T	R	X	C
P	W	O	F	T	S	M	G	P	L	U	O	A	Z	X
T	T	Q	T	N	R	L	M	P	M	Y	S	G	E	U
H	P	G	R	C	U	O	O	K	K	R	E	U	Z	H
L	O	O	X	C	A	Y	S	H	N	Q	A	S	B	Y
I	C	F	O	X	E	L	L	E	S	O	R	C	U	S
V	A	S	Y	N	J	K	O	N	B	E	R	C	U	X
C	E	G	O	K	E	D	V	T	U	L	S	C	K	E
F	S	H	J	F	M	X	Y	W	L	J	S	P	P	I
B	D	M	M	H	T	A	W	N	A	L	C	I	K	E
T	F	L	F	E	N	E	M	I	O	O	V	B	E	J
S	P	D	H	Z	B	D	E	T	R	Z	U	S	U	Y

Part II: What's in Your Drink?

Apple juice ingredients

Apple juice from concentrate (100%).

Apple juice

Nutrition
Serving size: 200ml

Typical Values	100ml contains
Energy	192kJ
	45kcal
Protein	0.1g
Carbohydrate	11.0g
Of which sugars	11.0g
Fat	0.1g
Of which saturates	Tr
Fibre	Tr
Sodium	Tr
Vitamin A	0µg
Vitamin C	14mg
Calcium	7mg
Iron	0.1mg

Blackcurrant cordial ingredients

Water, fruit juices from concentrate 12% (apple 4.3%, blackcurrant 3.5, lemon, cherry), sugar, natural flavours.

Note: this drink is sold in 200ml cartons.

Blackcurrant cordial Nutrition
Serving size: 200ml

Typical Values	100ml contains
Energy	224kJ
	53kcal
Protein	0g
Carbohydrate	12.8g
Of which sugars	12.8g
Fat	0g
Of which saturates	0g
Fibre	0g
Sodium	0g
Vitamin A	0µg
Vitamin C	23mg
Calcium	6mg
Iron	Trace

Fizzy cola ingredients

Carbonated water, sugar, malt extract (barley), natural flavouring (contains caffeine), phosphoric acid, preservative (potassium sorbate), citric acid, malic acid.

Fizzy cola
Nutrition
Serving size: 250ml

Typical Values	100ml contains
Energy	170kJ
	40kcal
Protein	Tr
Carbohydrate	10.0g
Of which sugars	10.0g
Fat	Tr
Of which saturates	Tr
Fibre	Tr
Sodium	5mg
Vitamin A	0µg
Vitamin C	0mg
Calcium	6mg
Iron	Tr

Sports drink ingredients

Carbonated water, glucose syrup (25%), citric acid, lactic acid, flavouring, preservatives (sodium benzoate, sodium bisulphite), caffeine (0.012%), antioxidant (ascorbic acid), colour (sunset yellow).

Sports drink

Nutrition

Serving size: 380ml

Typical Values	100ml contains
Energy	298kJ
	70kcal
Protein	Tr
Carbohydrate	17.2g
Of which sugars	8.7g
Fat	Nil
Of which saturates	Nil
Fibre	Nil
Sodium	Tr
Vitamin A	-
Vitamin C	-
Calcium	-
Iron	-

Semi skimmed milk ingredients

Pasteurised homogenised semi skimmed milk.

Semi skimmed milk Nutrition

Serving size: 200ml

Typical Values	100ml contains
Energy	209kJ
	50kcal
Protein	3.6g
Carbohydrate	4.8g
Of which sugars	4.8g
Fat	1.8g
Of which saturates	1.1g
Fibre	Nil
Sodium	Tr
Vitamin A	19µg
Vitamin C	2mg
Calcium	120mg
Iron	0.02mg

Water ingredients

Water.

Water

Nutrition
Serving size: 150ml

Typical Values	1000ml contains
Energy	-
	-
Protein	-
Carbohydrate	-
Of which sugars	-
Fat	-
Of which saturates	-
Fibre	-
Sodium	24mg
Vitamin A	-
Vitamin C	-
Calcium	55mg
Iron	0mg

Teacher Notes

- Apple juice from concentrate contains no added sugars. „Fructose" is the naturally occurring sugar found in fruits.
- The blackcurrant juice drink and the fizzy cola both contain added „sugar", but do not specify what type.
- The sports drink contains glucose syrup. Note that sports and energy drinks also contain caffeine (and possibly other additives) that may not be healthy for children.
- Neither the semi skimmed milk nor the water contains any added sugar. Milk contains a naturally occurring sugar called „lactose".

Name _____

Activity 6.1

Sugar Count

Part I: What's Your Soft Drink Count?

Fill in the Soft Drink Count table (table 6.1) with the number of 330ml cans and 500ml bottles of soft drink you drank yesterday.

You may need to estimate the amounts that you drank and round to a whole number. For instance, if you opened a 500ml bottle but only drank half of it, you consumed approximately 250ml of soft drink.

Table 6.1 Soft Drink Count

	330ml can of soft drink (9 teaspoons of sugar)	500ml bottle of soft drink (13 teaspoons of sugar)
How many did you drink yesterday?		

Calculate the total teaspoons of sugar you consumed from soft drinks.

1. How many teaspoons of sugar did you consume from 330ml cans of soft drink?

   ____

   For example, if you drank 2 cans, then 2 cans x 9 teaspoons = 18 teaspoons of sugar.

2. How many teaspoons of sugar did you consume from 500ml bottles of soft drink?

   ____

   For example, if you drank 2 bottles, then 2 bottles x 13 teaspoons = 26 teaspoons of sugar.

3. Add the results (from soft drinks in a can and sugar from soft drinks in a bottle) to determine the total teaspoons of sugar you consumed yesterday from soft drinks (add the answers from question 1 and question 2):

Part II: How Much Sugar Is This?

Using the sugar provided, measure out the amount of sugar that you consumed from soft drinks yesterday. How would you describe the amount of sugar consumed?

_____

_____

_____

_____

_____

Part III: Calcium Switch

Soft drinks and other sweet drinks contain high amounts of sugar and usually nothing else that is good for us – they basically contain just sugar and water. That‟s why we say that sugar-sweetened drinks give us empty Calories. Determine how much calcium you could consume if you drank low fat or skimmed milk in place of the soft drinks you drank yesterday.

1. How much soft drink did you drink yesterday?

Number of cans of soft drink ___ x 330ml per can = ____ml of soft drink from cans.
Number of bottles of soft drink ___ x 500ml per bottle = ____ml of soft drink from bottles.
Add the „ml‟ of soft drink from cans and bottles to get the total millilitres of soft drink consumed: _____.

2. Each 100 ml of low fat or skimmed milk contains 123 mg of calcium.

How much calcium would you have consumed by drinking milk instead of soft drinks yesterday? Note that children need 675mg of calcium each day.

(Total number of „ml‟ of soft drink consumed † 100) x 123 = _____ **mg of calcium.**

Name _____

Activity 6.2

Find the Sugar

Part I: Word Search

Figure 6.2 lists various names for sugar. Find each of these words in the puzzle.

Words may appear forward, backwards, diagonally, horizontally, or vertically.

Figure 6.2 Find the Sugar puzzle

```
F R U C T O S E J P D M T J M
Y D B N D Y L I U A Q A W A J
E T E F B M A R V I N L O O L
L S Z X T J Y I S U C T R X C
P W O F T S M G P L U O A Z X
T T Q T N R L M P M Y S G E U
H P G R C U O O K K R E U Z H
L O O X C A Y S H N Q A S B Y
I C F O X E L L E S O R C U S
V A S Y N J K O N B E R C U X
C E G O K E D V T U L S C K E
F S H J F M X Y W L J S P P I
B D M M H T A W N A L C I K E
T F L F E N E M I O O V B E J
S P D H Z B D E T R Z U S U Y
```

Find these words for sugar in the puzzle:

Fructose	Dextrose	Sugar
Corn syrup	Honey	Maltose
Glucose	Sucrose	Lactose

Part II: What's in Your Drink?

Circle the words for sugar in the ingredient lists that follow. Which drink has the most types of added sugar? Next, circle the grams of sugar in each food label. Which drink has the most grams of sugar? Note which drinks are sold in bottles that contain more than one serving.

Apple juice ingredients

Apple juice from concentrate (100%).

Note: this drink is sold in 200ml cartons.

Apple juice

Nutrition

Serving size: 200ml

Typical Values	100ml contains
Energy	192kJ
	45kcal
Protein	0.1g
Carbohydrate	11.0g
Of which sugars	11.0g
Fat	0.1g
Of which saturates	Trace
Fibre	Trace
Sodium	Trace
Vitamin A	0µg
Vitamin C	14mg
Calcium	7mg
Iron	0.1mg

Blackcurrant juice drink ingredients

Water, fruit juices from concentrate 12% (apple 4.3%, blackcurrant 3.5, lemon, cherry), sugar, natural flavours.

Note: this drink is sold in 200ml cartons.

Blackcurrant juice drink

Nutrition

Serving size: 200ml

Typical Values	100ml contains
Energy	224kJ
	53kcal
Protein	0g
Carbohydrate	12.8g
Of which sugars	12.8g
Fat	0g
Of which saturates	0g
Fibre	0g
Sodium	0g
Vitamin A	0µg
Vitamin C	23mg
Calcium	6mg
Iron	Trace

Fizzy cola ingredients

Carbonated water, sugar, malt extract (barley), natural flavouring (contains caffeine), phosphoric acid, preservative (potassium sorbate), citric acid, malic acid.

Note: this drink is sold in 2 litre bottles.

Fizzy cola

Nutrition
Serving size: 250ml

Typical Values	100ml contains
Energy	170kJ
	40kcal
Protein	Trace
Carbohydrate	10.0g
Of which sugars	10.0g
Fat	Trace
Of which saturates	Trace
Fibre	Trace
Sodium	5mg
Vitamin A	0µg
Vitamin C	0mg
Calcium	6mg
Iron	Trace

Sports drink ingredients

Carbonated water, glucose syrup (25%), citric acid, lactic acid, flavouring, preservatives (sodium benzoate, sodium bisulphite), caffeine (0.012%), antioxidant (ascorbic acid), colour (sunset yellow).

Note: this drink is sold in 380ml bottles.

Sports drink

Nutrition
Serving size: 380ml

Typical Values	100ml contains
Energy	298kJ
	70kcal
Protein	Trace
Carbohydrate	17.2g
Of which sugars	8.7g
Fat	0g
Of which saturates	0g
Fibre	0g
Sodium	Trace
Vitamin A	0µg
Vitamin C	0g
Calcium	0g
Iron	0g

Semi skimmed milk ingredients

Pasteurised homogenised semi skimmed milk.

Note: this drink is sold in bottles of 1.9 litres (4 pints).

Semi skimmed milk

Nutrition
Serving size: 200ml

Typical Values	100ml contains
Energy	209kJ
	50kcal
Protein	3.6g
Carbohydrate	4.8g
Of which sugars	4.8g
Fat	1.8g
Of which saturates	1.1g
Fibre	0g
Sodium	Trace
Vitamin A	19µg
Vitamin C	2mg
Calcium	120mg
Iron	0.02mg

Water ingredients

Water.

Note: this drink is sold in 2 litre bottles.

Water

Nutrition
Serving size: 150ml

Typical Values	1000ml contains
Energy	-
	-
Protein	-
Carbohydrate	-
Of which sugars	-
Fat	-
Of which saturates	-
Fibre	-
Sodium	24mg
Vitamin A	-
Vitamin C	-
Calcium	55mg
Iron	0mg

Lesson 7

Brilliant Breakfast

This lesson aims to encourage children to eat breakfast. Studies have shown that children gain benefits from eating breakfast in areas such as their concentration levels and performance in school. The activity gets the children to consider scenarios where eating breakfast or making healthier breakfast choices, might help them start their day in a healthier way.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to understand the importance of breakfast at the start of the day and to make healthy breakfast choices.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Be able to describe why they should eat a healthful breakfast.
2. Identify the effects of eating a nutritious breakfast and a less-than-nutritious breakfast.
3. Create breakfasts to fit different lifestyles and needs.

MATERIALS

- Activity 7.1, The Breakfast Club (page 109)
- *CHANGE*! Breakfast Time Behaviour Task sheet (provided separately)
- *CHANGE*! Main Meal of the Day Behaviour Task sheet (provided separately)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour.

1. (1 minute) Ask the pupils to raise their hands if they like to eat breakfast.
2. (10 minutes) Ask the pupils if they know what the word *breakfast* means. Tell them that *breakfast* means *breaking the fast* and that a fast is when the body has gone for a long time without food – such as overnight.

   Get the pupils to calculate how long they went overnight without food. Ask them, “What time did you last eat something last night?” and then, “What time did you get up and eat your breakfast this morning?” Calculate the number of hours between these two times.

   For example, Eric had his supper at 8pm last night and then had his breakfast at 7.30 this morning. This means that he „fasted‟ for 11 ½ hours.
3. (5 minutes) Tell the pupils that when they eat breakfast, they are breaking the overnight fast and giving the body what it needs to work until lunchtime. On the other hand, if they skip breakfast in the morning, they may:
   - Be less alert;
   - Feel less energetic;
   - Be less efficient at completing tasks;
   - Experience headaches, stomach cramps, and irritability; or
   - Achieve less.
4. (5 minutes) Ask the pupils what they like to eat for breakfast. Write responses on the board. Tell the pupils that they should try to eat breakfast every morning and that eating any type of nutritious food in the morning is better than eating nothing. Some foods, though, are better than others for breakfast.
5. (5 minutes) Remind the class of the Principles of Healthy Living (introduced in Lesson 1, Healthy Living, page 18), especially the ones that relate to food choices and breakfast:
   - Eat 5 or more servings of fruit and vegetables each day.
   - Choose whole grain foods and limit foods and drinks with added sugar.
   - Choose healthy fat, limit saturated fat, and avoid trans fat.
   - Eat a nutritious breakfast every morning.

   Look at the list of foods written on the board. Circle the ones that fit the healthy living goals and help pupils to start the day off in a healthy way. If appropriate, remind pupils that breakfast is available to them at breakfast club.

6. (5 minutes) Tell the pupils that the ideal breakfast contains carbohydrate (from foods such as whole grain cereal or toast and fruit or a small glass of 100% fruit or vegetable juice – but not from foods made with refined grains or added sugar, such as soft drinks, chocolate, sweetened cereal, pastries, or doughnuts) and some protein (from foods such as peanut butter; low fat or

non-fat milk and yoghurt; eggs; turkey slices; grilled, lean bacon; tofu; hummus). The carbohydrate gives the body energy, and the protein helps stave off a midmorning drop in blood sugar, a drop which can make pupils feel hungry, drowsy, sluggish, and irritable before lunchtime.

7. (5 minutes) Also tell pupils that foods high in added sugar (such as doughnuts, soft drinks, energy drinks, sports drinks, fruit squash, chocolate bars, and desserts) are not ideal for breakfast because they can cause blood sugar levels to rise quickly and then drop below fasting levels within a few hours. These types of foods also tend to contain very few other nutrients like vitamins and minerals. If a student does not like typical breakfast foods, eating fruit, low fat yoghurt or making a sandwich on whole grain bread is better than eating sweets or nothing at all.
8. (10 minutes) Distribute and review activity 7.1, The Breakfast Club (page 109), with the pupils. Discuss the following points:
    - Breakfast #1 (the skipped breakfast) did not provide any food, so energy must come from body storage. Blood sugar levels are low and do not provide enough energy for work.
    - Breakfast #2 provides enough protein to keep Tisha alert and to discourage midmorning hunger pangs, and it provides enough healthy carbohydrate and fibre (from whole grains and fruit) and protein for sustained energy, which means that she will be able to concentrate until it is time for lunch.
    - Breakfast #3 contains too much refined sugar and not enough protein to keep blood sugar levels up until lunch. This quick rise in blood sugar makes the body work just as quickly to get the sugar into the cells. The result is a midmorning slump that makes it hard for Omar to concentrate on his work.
9. (10 minutes) With the class, write several nutritious breakfast menus that address the specific situations of the people in the following list.
    - Breakfasts for people who wake up late:
        - Smoothie
        - A slice of low fat cheese and piece of fruit
        - Low fat yoghurt
        - Peanut butter sandwich on whole grain bread and a juice box of 100% juice
        - Toast
    - Breakfasts for people who do not like typical breakfast foods:
        - Whole wheat crackers with cheese or peanut butter
        - Whole wheat English muffin topped with tomato puree, low fat cheese, and some vegetables, to make a pizza

    - Hummus, lettuce, and tomato sandwich on a whole wheat pitta

- Breakfasts for people who sleep in on the weekend:
    - Omelette with tomatoes, reduced-fat cheese, and peppers
    - Homemade pancakes with low fat milk
    - Turkey sandwich on whole wheat bread and fresh fruit
    - Fruit and low fat frozen yoghurt

10. (5 minutes) Assign the pupils their homework task. Supply the pupils with a copy each of the *CHANGE!* Breakfast Time Behaviour Task sheet and the *CHANGE!* Main Meal of the Day Behaviour Task sheet. Ask the pupils to take these sheets home and complete them both, over 2 week days (Monday, Tuesday, Wednesday, Thursday or Friday) and 1 weekend day (Saturday or Sunday) of the teacher‟s choosing, and return them completed to school, by a deadline set by the teacher. The researchers will collect the completed sheets, and they will be used to determine what happens at peoples‟ breakfast times and main meal times.

TEACHER RESOURCES

BACKGROUND MATERIAL

- Breakfast is the most important meal of the day. Eating breakfast gives the body the energy it needs to start the day and perform the morning‟s tasks, from thinking to doing the dishes to working out. Generally, adults who regularly eat breakfast learned this lifelong good habit when they were children.

- Studies show that children who eat breakfast are better prepared for the school day. They perform better in school, are late less often, and miss fewer days of school. Pupils who eat breakfast have also demonstrated that their ability to concentrate is better, their reaction times are faster, their energy levels are higher, and their scores on tests are better.

- To help make breakfast a lifelong habit, pupils (and adults) should be encouraged to start their day by eating breakfast. Any good, nutritious food can be eaten for breakfast. If people don‟t happen to like typical breakfast foods, such as cereal or toast, they can eat foods, such as fruit, low fat yoghurt, or a sandwich. The most important thing is to eat a nutritious meal in the morning.

- Breakfast is a great time to start the day by eating well. Ideally, breakfast should contain healthy foods such as whole grain cereal or toast and fresh fruit or a small glass of 100% fruit or vegetable juice – and not foods made with refined grains or added sugars, such as sweetened cereal, doughnuts, pastries, soft drinks, or chocolate. The carbohydrate in nutritious breakfast foods gives the body energy, and some added protein helps stave off a midmorning drop in blood sugar that can make children lethargic before lunchtime. Protein foods may come from low fat or non-fat dairy such as 1% milk and low fat plain yoghurt, eggs, nuts (such as peanut butter on whole wheat toast or almonds sprinkled on oatmeal porridge), or even grilled, lean bacon, slices of turkey, cubes of tofu, or hummus.

- Blood sugar levels indicate how much fuel (in the form of glucose) is immediately available to the body. When blood sugar levels drop, children (and adults) may feel drowsy or less energetic and have trouble concentrating. Breakfast can help keep blood sugar levels up throughout the morning until lunchtime.

- Foods such as doughnuts, sweetened cereals, soft drinks, sports drinks, fruit squash, chocolate bars, and desserts contain a lot of added sugar and are not the best choices for breakfast because they can cause blood sugar levels to drop faster than foods containing a mix of healthy carbohydrate (from their fibre-rich whole grains, fruits, and vegetables) and protein.

ANSWER KEY

ACTIVITY 7.1: THE BREAKFAST CLUB

- **Jeremy's Breakfast**

  Jeremy was late for school, so he left without eating breakfast. By midmorning (around 10 a.m.) he was fidgety and had trouble concentrating. His stomach was grumbling before lunchtime, and he had trouble completing his morning maths test.
- **Tisha's Breakfast**

  Tisha was also running late for school; but when she got there, she went to the breakfast club and had a breakfast of a small apple, plain porridge, and 1% milk. She felt great all morning and did very well in her maths test.
- **Omar's Breakfast**

  Omar grabbed two doughnuts and a glass of lemonade as he ran out the door for school. He was full of energy and enthusiasm for a while, but then his mind started to wander and, like Jeremy, he had trouble finishing the maths test.

Why did Jeremy, Tisha, and Omar feel the way they did by lunchtime?

1. Jeremy did not eat anything in the morning. He did not break his overnight fast so his energy needed to come from body storage. This kept his blood sugar levels low, making him hungry, lethargic, and distracted.

2. Tisha ate an excellent breakfast with whole grains (porridge), a small apple, and some protein (primarily from the 1% milk). This breakfast held her blood sugar up at normal levels throughout the morning, keeping her alert and energised until lunchtime.

3. It was good that Omar ate a breakfast. However, his breakfast was not ideal. He ate foods that were too high in sugar. With so much sugar (and no milk to provide some protein), Omar felt tired and restless around midmorning because his blood sugar dropped.

Name _____

Activity 7.1

The Breakfast Club

Breakfast

Jeremy's Breakfast

Jeremy was late for school, so he left without eating breakfast. By midmorning (around 10 a.m.) he was fidgety and had trouble concentrating. His stomach was grumbling before lunchtime, and he had trouble completing his morning maths test.

Tisha's Breakfast

Tisha was also running late for school; but when she got there, she went to the breakfast club and had a breakfast of a small apple, plain porridge, and 1% milk. She felt great all morning and did very well in her maths test.

Omar's Breakfast

Omar grabbed two doughnuts and a glass of lemonade as he ran out the door for school. He was full of energy and enthusiasm for a while, but then his mind started to wander and, like Jeremy, he had trouble finishing the maths test.

Why did Jeremy, Tisha, and Omar feel the way they did by lunchtime?

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

Lessons 8 and 9

Go For Goal

This lesson aims to set physical activity goals using different activities. Pupils will read several case studies and write physical activity goals aimed at increasing the physical activity of the people discussed in the case studies. Pupils will also learn that they can maintain a healthy body weight by balancing the amount of energy they consume with the amount of energy they expend. Pupils examine their own activity patterns and energy expenditure by making co-ordinate graphs of a given day‟s activity intensity. Pupils will assess the amount of time they spend being physically active and use this information to practice calculating means, medians, and ranges.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

- For pupils to increase their physical activity by:
  - learning how to set realistic goals and
  - trading inactive time for time participating in some physical activity.
- For pupils to be more aware of their own activity levels.
- For pupils to be physically active every day.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Read and comprehend case studies.
2. Understand the concept of goal setting and its components, including planning, setting, and evaluation progress toward a goal.

3. Write clear and realistic physical activity goals.
4. Construct a co-ordinate system with a labelled *x*-axis and *y*-axis.
5. Graph ordered pairs on a co-ordinate system.
6. Draw inferences and reason with tables and graphs that summarise personal activity.
7. Discuss the role physical activity plays in maintaining a healthy body weight.
8. Describe the physical activity recommendations for children.
9. Review and characterise the types and frequency of physical activity for individuals.
10. Calculate statistics and apply basic concepts of statistical analysis to survey data.

MATERIALS

- Activity 8.1, Making Time to Stay Fit (page 121)
- Activity 8.2, Choosing a Lifestyle That Helps You Stay Fit (page 124)
- Activity 8.3, What Does Your Day Look Like? (page 125)
- Overhead Transparency 8.4 (page 111)
- Overhead Transparency 8.5 (page 119)
- Overhead Transparency 8.6 (page 120)
- Graph paper
- Ruler
- Activity 9.1, Personal Data Record (page 129)
- Activity 9.2, Group Data Record (page 130)
- Activity 9.3, Analysing Class Data (page 131)
- Activity 9.4, Walking for Health (page 133)

LESSON PLAN

This lesson asks pupils to set and try to achieve a goal for next week‟s lesson.
ESTIMATED TEACHING TIME: 1 hour 30 minutes.

WEEK 1

1. (Up to 5 minutes) Write “goal” on the board and have pupils „thought shower‟ what the word means to them. Write each response on the board.
2. (5 minutes) Give examples of a few simple goals, especially goals related to physical activity, such as walking to school every day. Ask pupils to give examples of goals they‟ve set and achieved in the past and to explain why they were successful. What motivated them to achieve their goals in those cases? Ask pupils to also think of goals they failed to achieve and to explain why they failed.

3. (5 minutes) Review the acronym GoAL (***Go*** for an ***A***ctivity you ***Li***ke!) and the concept of “trading time”.
4. (7-10 minutes) Distribute activity 8.1, Making Time to Stay Fit (page 121). Have the pupils complete the activity, and instruct them *not* to fill in section D. They will reflect on their progress next week in class. Explain that they should create goals for themselves that they can complete by class next week. Make sure pupils understand that their homework is to pursue their goals over the next week. They need to be goals they can realistically reach in a week, and should involve the whole family where possible.
5. (3 minutes) Distribute activity 8.2, Choosing a Lifestyle That Helps You Stay Fit (page 124). Inform the class that this will be homework to complete for next week. Have pupils write solutions to the problems, and the solutions will be discussed next lesson.
6. (2 minutes) Get pupils thinking about why physical activity is important by displaying overhead transparency 8.4 (page 111).
7. (2 minutes) Point out the goals of this activity:
    a. To discuss the role physical activity plays in maintaining a healthy body weight.
    b. To discuss the physical activity recommendations.
    c. To graph physical activity intensity for yesterday.
8. (5-7 minutes) Use overhead transparency 8.5 (page 119) to explain the concept of energy balance and the role physical activity plays in maintaining a healthy body weight. Elicit pupil responses to fill in the blanks on the transparency. Test their understanding of your explanation by asking selected pupils to complete the sentences on overhead transparency 8.6 (page 120).

9. (3 minutes) Display the activity recommendations for children listed at the bottom of overhead transparency 8.6. Discuss some examples of activities that require moderate to vigorous levels of effort.
10. (3 minutes) Hand out activity 8.3, What Does Your Day Look Like? (page 125). Review the definition of MET units described at the top of activity 8.3.
11. (25-45 minutes) Have pupils complete the activity sheets and the corresponding co-ordinate graphs of their activity data. (Note: In part 2 do not have pupils estimate the average METs expended over half-hour intervals. Have pupils record what they were doing).
12. (5 minutes) Discuss pupil responses to the discussion questions at the end of activity 8.3.

ESTIMATED TEACHING TIME: 1 hour.

WEEK 2

1. (7 minutes) Pass out the activity 8.1 worksheets and have pupils fill in section D to reflect on their progress. Discuss the goals and evaluation with the class. Were the goals realistic, or would they like to change them? What things get in the way of being more physically active?
2. (5 minutes) Ask pupils to get out activity 8.2 worksheets that they have completed for homework. Develop and discuss solutions for the problems presented as a class.
3. (3 minutes) Briefly review the importance of physical activity and its benefits. Give examples of physical activity (e.g., walking, cleaning, football, rounders).
4. (8-10 minutes) Distribute and review activity 9.1, Personal Data Record (page 129). This activity asks pupils to record (a) physical activities that they have done over the past seven days and (b) the amount of time (in hours) that they have spent doing these activities over the past seven days. Have pupils‟ complete activity 9.1. While pupils are working on activity 9.1, pass out activity 9.3, Analysing Class Data. Have pupils complete the questions under Personal Data.
5. (10-15 minutes) Distribute and review activity 9.2, Group Data Record (page 130), which summarises data for the group. Divide the class into several groups with approximately four pupils per group. Using activity 9.2, tally data from the group and answer questions under Group Data on activity 9.3 (page 131).
6. (5-8 minutes) Select a pupil representative from each group to describe the group‟s findings. You may assist by charting the group‟s findings (using the chart from activity 9.2) to summarise the findings of the entire class.
7. (5-8 minutes) Compare the class findings with the recommended daily physical activity guidelines (see Teacher Resources, page 114). Pupils may also be interested in comparing individual physical activity with the recommended guidelines. Are pupils moderately active every day for *at least* 60 minutes?
8. (2-3 minutes) Assign activity 9.4, Walking for Health (page 133), as their homework task this week.

EXTENSION ACTIVITIES

1. Have pupils ask a member of their family whether they have any goals for themselves (e.g., to be more physically active, to go to college, to get a promotion).
2. Have pupils design and implement a plan for increasing their daily activity. Ask them to keep a diary of their activity for one, two, or three days during

their time and graph their data. How has their energy expenditure changed as a result of their increase in activity?

3. Have pupils review activity 9.1, Personal Data Record, and write a data report. The report should consist of one paragraph that describes their personal activity choices and time spent being active over the past seven days. They should incorporate answers from questions 1 through to 4 from activity 9.3 in their reports.

TEACHER RESOURCES

BACKGROUND MATERIAL

- ***CHANGE!'*s Activity Message**

  Physical activity promotes health and well-being and offers opportunities to socialise and have fun. Children should be moderately to vigorously active for at least 60 minutes every day as part of play, games, sports, chores, transportation, and planned exercise. Moderate activities are equal in intensity to brisk walking and include cycling for pleasure, playing volleyball, dancing, or skateboarding. Vigorous activities are greater in intensity to brisk walking, and they make you breathe hard and sweat. At least twice a week this should include weight-bearing activities that produce high physical stresses to improve bone health, muscle strength and flexibility. This amount of physical activity can be achieved in a number of short ten minute (minimum) bouts.

SPECIFIC BACKGROUND MATERIAL

- **Goal Setting**
  - A goal is defined as a purpose to which an endeavour is directed.
  - A goal is something you are trying to achieve, and the strategy is the plan for how to get there. People set goals and carry out plans all the time. You can remind pupils that friends, parents, teachers, and other adults all set goals too.
  - Some examples of goals are getting to school on time or reaching the top of Mount Everest on a climbing expedition.
  - It feels good to achieve a goal.
  - Pupils may find it difficult to set realistic goals. Setting goals involves a process of refining and defining. A goal that initially seems realistic may later need adjustment. For example, you may think that you will be able to run a mile three times a week by the end of the month, but come to realise that you need to change your goal to half a mile three times a week.
  - Difficult goals can be achieved with patience and diligence. Focusing on and achieving goals takes mental discipline.
  - The most important part of a goal is to ***Go*** for an ***A***ctivity that you ***L***ike!

- **Inactivity and Trading Time**
  - Strive to decrease inactivity. On average, many children watch three to four hours of TV a day; they spend additional time on the computer, playing video games, or both.
  - Some amount of physical activity is required for health. Children need activity to develop and retain cardiorespiratory fitness, muscular strength, flexibility, and confidence in their physical ability.
  - Physical activity builds fitness, is fun, and helps release energy! Just a small increase in physical activity can generate genuine health benefits.
  - To prevent disease, it is important for pupils to create lifestyle patterns now that they will carry into adulthood.
  - Encourage pupils to think about trading some time they currently spend on activities, such as TV, computer games, and video games for some moderately intense or vigorous activity that they like. This is one way to help set achievable fitness goals and to make space for fitness. Physical activity is a cure for boredom.

- **Maintaining an Energy Balance**
  - The human body requires energy for physical activity, growth, digestion, respiration, and many other body functions. Food provides us with our energy supply as well as other essential minerals and vitamins. Energy is stored in the carbohydrate, fat, and protein contained in food. The amount of energy stored in foods is measured in calories. Fat provides 9 Calories per gram, whereas carbohydrate and protein each provide 4 Calories per gram. To maintain an energy balance, the amount of Calories consumed (*energy input*) in food must equal the amount of calories expended (*energy output*). If more Calories are taken in than are expended, they are stored by the body primarily as fat and a person could gain excess weight.
  - In children, excess fat stores would be evident from weight gain greater than that expected for healthy growth. The amount of energy required to contract muscles during physical activity accounts for the second largest component (20% to 50%) of total energy expenditure (the largest component being metabolic processes) and the largest component that we have control over. Growth adds only 1% to daily energy requirements. We can use, or “burn”, more of the Calories that we consume by increasing our physical activity. More vigorous activities require more energy expenditure and therefore burn more calories than less vigorous activities over the same time periods.

- **What is a MET value?**
  - *(Note: pupils do not need to understand how METs related to calories to complete this activity. They only need to understand that a MET is a unit used to compare the exercise intensities or energy expenditures of various activities).* A MET is an intensity unit assigned to all activities and is based on the rate of energy expenditure required for a given activity. Vigorous activities require more energy, or METs, than less intense activities. Sitting quietly requires 1 MET of energy expenditure and is define as your resting metabolic rate (RMR). For the average adult, the RMR is approximately 1 kcal per kilogram (kg) of body weight per hour. Activities are classified as multiples of one MET or the ratio. Dancing requires five times as much energy as sitting, or 5 METs of energy expenditure. Moderate activity has been defined as 3-6 METs, and vigorous activity as more than 6 METs.
  - By multiplying the body weight in kilograms by the MET value and duration of an activity, a person can estimate his or her energy expenditure (kcal). For example, bicycling at a MET value expends 4 kcal/kg of body weight per hour. A child weighing 45 kg bicycling for 40 minutes expends the following:

    4 METs X (45 kg body weight) X (40 min / 60 min) = 120 kcal

- **What are the risks of a sedentary lifestyle?**
  Activity is required for health. Studies suggest that physically active people enjoy lower risks of developing heart disease, diabetes, colon cancer, osteoporosis, anxiety, and depression, relative to sedentary people. Sedentary habits increase the risk of premature death.

- **What are the benefits of a more active lifestyle?**
  Activity helps children develop and maintain cardiorespiratory fitness, muscular strength, and confidence in their physical ability. Regular activity helps people maintain a healthy weight, build lean muscle, and reduce fat. It can reduce stress and brighten a person‟s mood. Regular exercise helps build and maintain dense bones, which helps prevent osteoporosis. Active adults have a lower risk of dying prematurely and developing diabetes, high blood pressure and colon cancer.

- **What are examples of things you can do to increase your activity and decrease your inactivity?**
  Try a new physical activity; take the stairs; don‟t park next to the building; walk around the shopping centre or neighbourhood with friends; watch only your favourite TV shows; remove or unplug the TV in your bedroom; play catch with a sibling, friend or parent.

ANSWER KEY

ANSWERS TO BLANKS ON OVERHEAD TRANSPARENCIES

- Overhead transparency 8.3: Increases, decreases.
- Overhead transparency 8.4: Decreases, increases, increases, decreases.
- Overhead transparency 8.5: Physical activity.

1. B, 1.5 METs
2. C, 10 METs
3. D, 4 METs
4. A, 2.5 METs
5. E, 1 METs

Energy Balance

Energy input = Food

Energy output = Physical activity + Growing + Other body functions

Energy input at recommended levels = Energy output
This maintains a healthy body weight

Energy input > Energy output
Excess energy is stored as fat and weight _____

Energy input < Energy output
Body weight _____

Energy Balance

Choose the word *increases* or *decreases* to complete each of the following sentences.

Watching TV _____ energy output.

Climbing stairs _____ energy output.

Growing _____ energy output.

Physical Activity Recommendations

- **Be moderately active for at least 60 minutes every day as part of play, games, chores, work, transportation, and planned exercise.**

- **Include weight-bearing activities at least twice a week.**

Benefits

What two words can be used to start each of these sentences?

_____ _____ **is fun!!!**

_____ _____ **puts you in a better mood.**

_____ _____ **helps your heart get stronger.**

_____ _____ **builds strong muscles and bones.**

_____ _____ **uses energy which helps you maintain a healthy body weight.**

Name _____

Activity 8.1

Making Time to Stay Fit

Physical activity builds fitness! It‟s good for your health, and it‟s fun! To improve your physical fitness, you need to be more active. There are many ways to do this. You could:

- Trade some screen time for active time, such as riding your bike instead of watching TV, or simply walk and visit a friend.
- Do more of what you‟re already doing, such as rollerblading for 30 minutes instead of 15 minutes.
- Add new activities, such as walking to school instead of getting a lift.

A. Using the strategies above, come up with three ways you could be more active, and one way you could be more active with your family. Write them below. Remember to choose activities you like!

For example: My goal is to be more active.

I could *ride my bike instead of watching TV* (for how long?) *for 30 minutes* (when?) *after school on Mondays, Wednesdays, and Fridays* My goal is to be more active. Here are some of my options:

1. I could _____
   (for how long?) _____
   (when?) _____

2. I could _____
   (for how long?) _____
   (when?) _____

3. I could _____
   (for how long?) _____
   (when?) _____

4. We could _____
(for how long?) _____
(when?) _____

B. Which of your options do you think you would actually do? Why?
Now that you know your options, write a physical activity goal for yourself and your family.

C. My goal is to be more active.

I could _____
(for how long?) _____
(when?) _____

We could _____
(for how long?) _____
(when?) _____

Example of physical activities:

- Chores: cleaning, vacuuming, washing the dishes
- Fitness activities: running, skipping, sit-ups
- Recreation: dancing, boys chase girls, stuck in the mud, tag
- Sports: football, swimming, high 5, tennis
- Transportation: walking, cycling, rollerblading, climbing stairs

D. Now that you"ve tried to meet your goal, reflect on your progress.

- Did your meet your goal?

_____

_____

_____

- How did your family reach your goal, or what kept you all from reaching it?

_____

_____

_____

- Did you meet your own personal goal?

_____

_____

_____

- How did you reach your own personal goal, or what kept you from reaching it?

_____

_____

_____

- Was your goal realistic?

_____

_____

_____

- What things get in the way of being more physically active?

_____

_____

_____

- What is your next goal?

_____

_____

_____

Name _____

Activity 8.2

Choosing a Lifestyle That Helps You Stay Fit

Case Study 1

Julie spends her weekends hanging out with her friends. Her favourite activities include going to the cinema, going shopping, and watching her little brothers play football. When she is at home she does not watch very much TV. She prefers to read mystery books instead. Julie often feels tired and does not have much energy.

List at least one activity goal for Julie.

Case Study 2

John is in Year 6. Every day at school he plays cards with his friends after lunch. After school he comes home and turns on the TV. His parents let him eat in front of the TV, and he has also convinced them that he can do a good job on his homework if he does it while watching TV. John‟s father has recently asked him to keep track of the number of hours he spends in front of the TV each day. On weekdays, John watches TV from 3:30 until 10:00 p.m., and on the weekends, when he is not playing computer games, John spends about six hours per day in front of the TV.

List at least one activity goal for John.

Case Study 3

David lives three streets away from school. His mother has offered to drive him to school, but David prefers to walk, even in the rain. David participates in after-school sports, such as football and basketball every day except Friday. He relaxes each night by watching about one hour of TV. On the weekends, David plays in a football league. Do you have any suggestions for David regarding his level of physical activity?

List at least one activity goal for David.

Name _____

Activity 8.3

What Does Your Day Look Like?

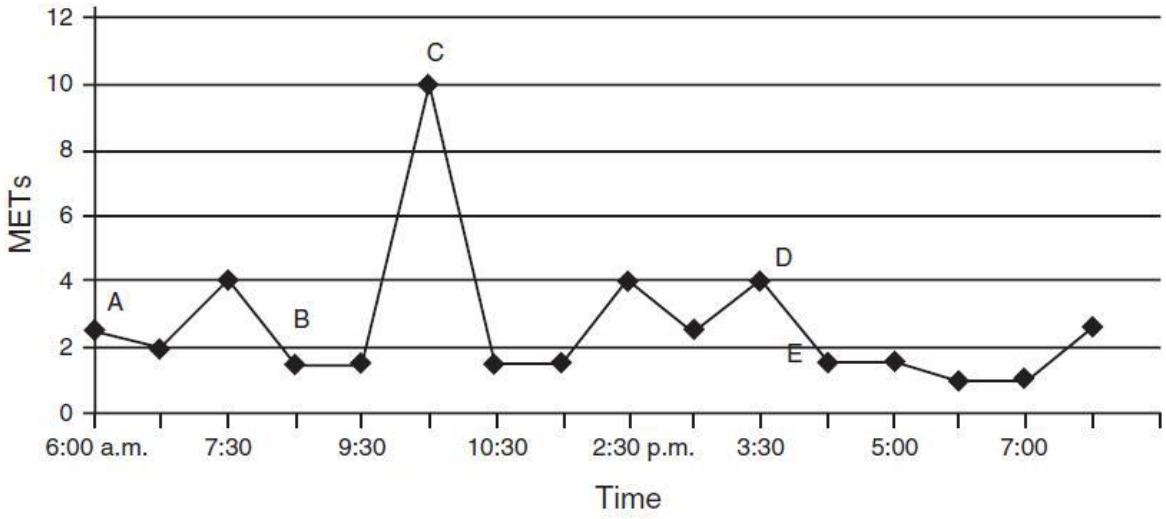
Definition

A MET is a unit used to compare the amount of energy needed for different activities to the amount needed to sit quietly. Vigorous activities require more energy or METs than less intense activities. Sitting quietly requires 1 MET of energy expenditure. Dancing requires five times as much energy as sitting, or 5 METs of energy expenditure.

Part 1: Interpreting Line Graphs

Sometimes a graph is used to describe a series of events. Emma, a Year 6 girl, wore an activity monitor that recorded her activity during a typical school day. Below is a graph illustrating her activity intensity (METs) for the day. When did the 5 events listed below occur? Record the letter that corresponds to each event and the MET value for this activity.

1. Emma listened intently to her teachers.
2. She participated in a football game during P.E.
3. She quickly walked to the shop for her Mum.
4. She got dressed.
5. She watched TV.



Part 2: Constructing Co-ordinate Graphs

What did you do yesterday? In this activity you will make a co-ordinate graph to illustrate your activity intensity (METs) yesterday. Be as accurate as possible. Complete table 1 as follows:

1. List the even or activity you were engaged in at each of the times listed. If you were involved in more than one activity for a given time interval, list the one activity that took ***most*** of the interval.
2. Use table 2 to estimate the number of METs you were using at each time point.

Table 8.1 What Did You Do Yesterday?

Time	Event	METs
6:00 a.m.		
6:30		
7:00		
7:30		
8:00		
8:30		
9:00		
9:30		
10:00		
10:30		
11:00		
11:30		
12:00 p.m.		
12:30		
1:00		
1:30		

Time	Event	METs
2:00		
2:30		
3:00		
3:30		
4:00		
4:30		
5:00		
5:30		
6:00		
6:30		
7:00		
7:30		
8:00		
8:30		
9:00		
9:30		

Table 8.2 Examples of MET Scores

Inactivity or light activities		Moderate activities		Vigorous activities	
Activity	**METs**	**Activity**	**METs**	**Activity**	**METs**
Sleeping	0.9	Walking at a moderate pace	3.5	Fast cycling	6.0
Watching TV, Reading	1.0	Walking at a brisk pace, cycling for pleasure	4.0	Rollerblading	7.0
Sitting in class, eating, doing homework	1.5	Dancing, carrying heavy objects, skateboarding, scootering	5.0	Jogging, swimming lengths, walking upstairs, tennis	8.0
Getting dressed, cooking, washing dishes, slow walking	2.5			Team sports, like football, netball etc.	10.0
				Running	12.5

Use graph paper to make a co-ordinate graph of your activity.

1. Label the *x*-axis “Time (hours)” and the *y*-axis “MET score”.
2. Number both axes as follows: *x*-axis (6 a.m. – 10 p.m.); *y*-axis (0 – 13)
3. Graph each ordered pair from table 1.
4. Use your ruler to draw a line connecting adjacent data points.

Interpreting Your Activity Patterns

1. During what part of the day were you most active?

   _____

   _____

   _____

2. During what part of the day were you least active?

   _____

   _____

   _____

Discussion Questions

1. What fun things could you do to break up the periods of inactivity?

   _____

   _____

   _____

2. What lifestyle changes could you make to increase the amount of energy you expend doing moderate physical activity? (For example: Take the stairs instead of the escalator).

   _____

   _____

   _____

3. What are the benefits of a very active lifestyle?

   _____

   _____

   _____

4. What are the health risks of a sedentary lifestyle?

   _____

   _____

   _____

Name _____

Activity 9.1

Personal Data Record

In this table, record the physical activities that you have performed over the past seven days.

1. Under column 1, list the activities you have done over the past seven days. Use the FitScore activities list to help you remember.
2. Under columns 2-8, note how many hours you have spent doing each activity for each day that week.
3. When you are finished, sum the total time for each activity under column 9 and complete the row labelled "Total activity for the week".
4. Use these data to answer questions on activity 9.3, Analysing Class Data.

	Hours spent per day							
Physical activity	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Total time**
Example: swimming	*1/2 hour*			*1/2 hour*				*1 hour*
Total activity time for the week								

FitScore Activities

Cleaning	Skateboarding	Football
Vacuuming	Swimming	Running
High 5	Walking	Jogging
Cycling	Rollerblading	Climbing stairs
Playing Tag	Skiing	Rugby
Skipping	Basketball	Frisbee
Netball	Dance	Gymnastics

Name _____

Activity 9.2

Group Data Record

Use activity 9.1 to complete the following chart.

1. Under column 1, list the activities that each pupil has done over the past seven days. List each activity once.
2. Under columns 2-5, write the number of hours that pupils in your group spent doing each physical activity over the past seven days.
3. Sum the "Total time spent by group" for each activity listed.
4. Complete the row at the bottom of the chart "Total time group spent active over the past seven days" by summing the totals in the column "Total time spent by group on each activity".

	Hours spent per week				
Physical activity	**Student 1**	**Student 2**	**Student 3**	**Student 4**	**Total time spent by group**
Example: swimming	*2*	*1*	*1/2*	*0*	*3.5 hours*
Total time the group spent active over the past seven days					

Name _____

Activity 9.3

Analysing Class Data

Personal Data (From Activity 9.1)

1. Rank the three physical activities that you spent the most time doing:
   Highest time 1. _____
   Second-highest time 2. _____
   Third-highest time 3. _____

2. What percentage of your total physical activity time did you spend on each one? (Time spent on activity / total activity time X 100 = % of total activity time).
   Example: 5 hours walking / 10 hours total activity = 0.5 X 100 = 50% of activity time was spent walking.

3. What is the mean number of hours you spent doing physical activity per day? (Mean = total activity time / 7 days per week). Does this answer surprise you? In what way?
   Example: 10 hours of total activity / 7 = 1.43 hours per day spent on physical activity.

4. Review your physical activity list. Is there one activity that you did on more days than you did any other activity? (Example: If you walked every day for half an hour and you swam four days a week for an hour, the answer would be walking). The answer to that question is also called the mode (most commonly occurring response).

5. What was the range in hours spent in individual physical activities over the past seven days?

Group Data (From Activity 9.2)

6. What is the total number of hours that the group participated in physical activity?

7. What is the mean number of hours the group spent doing physical activity per day? (See the formula from question 3).

8. What is the mean number of hours each person spent being active in the last seven days? (Mean = total active time (for group) / total number is group).

9. Rank the three physical activities the group spent the most time doing:

Highest time	1. _____
Second-highest time	2. _____
Third-highest time	3. _____

10. What percentage of their time did the group spend doing each physical activity? Calculate this for the three activities listed in number 9. (See the formula for determining the percentage in question 2).

Name _____

Activity 9.4

Walking for Health

OPTION A:

Task: Go for at least TWO family walks this week, including at least one at the weekend. Even if it is just around the block, any time you get outside with your family will help you to be healthy and have fun. You can walk and talk with a parent/carer, take your dog for a walk (if you have one), or you can try and get all of your family to come with you for a group walk. If you do this already, try time how long it takes you to walk a certain route and then beat that time each time you walk it.

Question: How could regular family walks affect your relationship with your family members?

_____

_____

_____

_____

OPTION B:

Task: Walk to or from school at least THREE days this week. If you live too far away to walk, you could always walk the last three or four streets as it would be easier for the person who looks after you to park there. You could organise this with your friends too so that you have someone to walk with each day.

Question: What safety issues do you need to be aware of when walking to or from school?

_____

_____

_____

_____

OPTION C:

Task: Not including getting to or from school, choose at least TWO trips this weeks that you and your family would normally take the car, such as going to the shops or to a friends house, and walk instead. If you live too far away from these places to walk all the way, you could always walk the last three or four streets.

Question: What health benefits could you receive by replacing some car trips with walking?

_____

_____

_____

_____

I have completed one, two or three of the options above (tick which ones you"ve done).

Option A ☐

Option B ☐

Option C ☐

Your Signature: _____

Parent/Carer Signature: _____

Lesson 10

Healthy Living, Healthy Eating

This lesson aims to reinforce *CHANGE!*"s health messages which were first taught in Lesson 1, Healthy Living. Pupils will reflect on the eating habits described in three everyday scenarios and contribute towards helping them make changes to their diet and so lead a healthier life.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to consider making changes to aspects of their diet to enable healthier choices to be made.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Review the concepts of wellness, balanced lifestyle, and the role of carbohydrate in the diet.
2. Gain a further understanding of the food groups and the healthy eating guidelines.
3. Learn the roles of vitamin A and calcium in the diet.

MATERIALS

- Activity 10.1, Help! You‟re the Doctor (page 151)
- Activity 10.2, Menu Planning (153)
- Food picture cards, or pictures of food cut out from magazines (be sure to include vegetables, fruit, whole grain breads, whole grain cereals, and dairy products that are high in carbohydrate)
- Overhead Transparency 10.1, Principles of Healthy Living (page 149)
- Overhead Transparency 10.2, The Eatwell Plate (page 150)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour, 35 minutes.

1. (10 minutes) Provide each student with activity 10.1, Help! You‟re the Doctor (page 151). Use overhead transparency 10.1 (page 149) to discuss the details of the six healthy living messages. Explain how a balanced diet and balanced lifestyle keep individuals healthy.
2. (5 minutes) Discuss the role of carbohydrate and how some carbohydrate foods are healthier than others (see background information and teacher resources).
3. (10 minutes) Explain that to stay healthy, our bodies need special nutrients called *vitamins* and *minerals*. Small amounts of these nutrients are found in healthy foods from all of the food groups. Discuss the roles of vitamin A and calcium in the diet and list foods that are good sources of these nutrients (see background information).
4. (10 minutes) From the food picture cards (or foods cut out of magazines), select several foods that contain carbohydrate, vitamin A, and calcium (see background information for examples of such foods). Place these cards on the board and select pupils to identify a food and then explain the benefits of eating that particular food. The student should also name a nutrient that is found in that food and describe its role in the body.
5. (25 minutes) Activity 10.1, Help! You‟re the Doctor. Have pupils read the three cases about people who have health concerns and answer the questions in the spaces provided on the worksheet.
6. (5 minutes) Explain to pupils that healthy living involves a lifestyle that is balanced and varied. It is important to eat a balanced and varied diet and to engage in a variety of activities in all aspects of life, including the social, intellectual, physical, and emotional. Possible activities include spending time with friends, talking with family members, walking, dancing, running, playing sports, and even spending quiet time reading or listening to music.

7. (5 minutes) Distribute activity 10.2, Menu Planning . Review the healthy living concepts and the Eatwell Plate (overhead transparency 10.2, page 150) with pupils, distributing a copy of overhead transparency 10.2.
8. (25 minutes) Have pupils complete activity 10.2, The Eatwell Plate (page 153), as instructed. Invite the pupils to share and discuss their menu ideas.

TEACHER RESOURCES

BACKGROUND MATERIAL

- Healthy living involves making lifestyle choices that maximize our physical and mental well-being. Healthy living encompasses more than just eating a balanced diet. It also involves getting the exercise and rest our bodies need, staying away from harmful substances (such as tobacco and drugs), and engaging in activities that we enjoy and that enhance our mental well-being.

- It is important to recognise that our physical health and our mental health are interrelated. For example, eating a balanced diet and exercising not only helps maintain good physical health but also boosts mental health by increasing energy levels, and improving our ability to cope with stress. Spending time with friends can provide support for the many challenges in life as well as provide companions for physical activity. The key to healthy living is a balance of all aspects of life, including the physical, intellectual, social, and emotional.

- Again, eating a balanced diet and exercising are the cornerstones of a healthy lifestyle. Eating the right foods (plenty of fruits, vegetables, and whole grains without excess saturated and trans fat) provides us with the energy and nutrients our bodies need to stay healthy and helps us fight and prevent some infections and diseases.

- Similarly, regular physical activity helps prevent heart disease, diabetes, osteoporosis, and a host of other disorders. What we eat and how much activity we get not only affect how our bodies perform and feel today but also affect our health for the next 10, 20, and 30 years and beyond.

- *Healthy living* means being aware of and making an effort to enhance those aspects of our lives that keep us healthy, make us feel good, and help us lead active, full lives.

SPECIFIC BACKGROUND MATERIAL

BUILDNG A HEALTHY FOUNDATION

- The following guidelines can help you eat well and can keep you moving toward a lifetime of healthy living.
  - **Eat 5 or more servings of fruit and vegetables each day.** Fruit and vegetables are packed with vitamins, minerals, antioxidants and fibre, and they provide healthy carbohydrate that gives us energy. Choose fruits and vegetables in a rainbow of colours (especially dark green and orange vegetables).
  - **Choose whole-grain goods and limit foods and drinks with added sugar.** Minimally processed whole-grains make better choices than refined grains do. Whole grains contain fibre, vitamins and minerals, and the refining process strips away many of these beneficial nutrients. Even though some refined grains are fortified with vitamins and minerals, fortification does not replace all of the lost nutrients. In addition, refined grains get absorbed very quickly, which causes sugar levels in the blood to spike. In response, the body quickly takes up sugar from the blood to bring sugar levels down to normal; but it can overshoot things a bit, making the blood sugar levels a bit low, and this can cause feelings of false hunger even after a big meal. Choose whole grains whenever possible, making sure that at least half of the grain servings you eat each day are made with whole grains. For more on whole grains and healthy carbohydrate, refer to Carb Smart and Brilliant Breakfast.

    In addition to selecting whole grain foods, limit your intake of sugary drinks such as soft drinks and limit foods with added sugar. Sweetened drinks are said to be filled with empty Calories because they provide many Calories but few of the nutrients the body needs to stay healthy and grow strong. A growing body of research suggests that consuming sugar-sweetened drinks is associated with excess weight gain in children and adults. For more on sugar-sweetened beverages, refer to Sugar Water: Think About Your Drink, and Beverage Buzz: Sack the Sugar.
  - **Choose healthy fat, limit saturated fat, and avoid trans fat.** Plant-based foods, including plant oils (such as olive, canola, soybean, corn, sunflower, and peanut oils), nuts, and seeds, are natural sources of healthy fat, as are fish, and shellfish. Healthy fat can help lower the risk of heart disease, stroke, and possibly diabetes. Unhealthy fat – namely, saturated fat and trans fat – increases the risk of heart disease, stroke, and possibly diabetes. Much of the fat that comes from animals, including dairy fat, the fat in meat or poultry skin, and lard, is saturated. Saturated fat should make up no more than 11% of your total Calorie intake. Trans fat is formed when healthy vegetable oils are partially hydrogenated (a

process that makes the oil solid or semisolid and makes the fat more stable for use in packaged foods). This is the worst type of fat because it raises the risk of heart disease in a number of different ways, and it may possibly raise the risk of diabetes. For more on choosing healthy fat, refer to Snack Attack.

- **Eat a nutritious breakfast every morning.** Breakfast is a critical meal since it gives the body the energy it needs to perform at school, work, or home. Studies have shown that breakfast can improve learning, and it helps boost overall nutrition. Many common breakfast foods are rich in whole grains; breakfast is also a great time to get started towards the daily goal of consuming 5 or more servings of fruits and vegetables. For more on eating breakfast, refer to Brilliant Breakfast.
- **Be physically active every day for at least an hour per day.** Regular physical activity not only improves our physical health (it helps maintain a healthy weight and prevents several chronic diseases) but also benefits our emotional well-being. Children should get at least 60 minutes of physical activity every day. This should include moderate- and vigorous-intensity activities, and it can be accumulated throughout the day in sessions of 15 minutes or longer.
- **Limit TV and other screen time to no more than 2 hours per day.** The more television you watch, the less time you have to engage in physical activity or other healthy pursuits; the same goes for surfing the Web, text messaging, and playing video games. Watching more television means watching more ads for unhealthy foods, and evidence suggests that this leads to eating extra Calories. Such sedentary behaviour combined with poor diet can lead to excess weight gain. Children should limit total screen time, including watching television, playing computer games, watching DVDs, and Web surfing, to no more than 2 hours each day, watching less is better.

FOOD GROUPS AT A GLANCE

- There are five basic food groups:
  - fruit and vegetables;
  - bread, rice, potatoes, pasta and other starchy foods;
  - milk and dairy foods;
  - meat, fish, eggs, beans and other non-dairy sources of protein,
  - foods and drinks high in fat and/or sugar.
- Each food group except the group “foods and drinks high in fat and/or sugar” provides nutritional benefits, so foods from the first four groups should be consumed each day. The key to a balanced diet is to recognise that whole grains (found in the starchy foods group), vegetables, and fruits are needed in

greater proportion than are the foods from the milk and dairy, meat, fish, eggs, beans and other non-dairy sources of protein, and foods and drinks high in fat and/or sugar groups. This concept is illustrated by the Eatwell Plate (see figure 10.1). A healthy and balanced diet also contains a variety of foods from within each food group (except the group "foods and drinks high in fat and/or sugar"), since each food group offers different nutrients. Note that the Eatwell Plate contains foods and drinks high in fat and/or sugar. These are "sometimes" foods, not every-day foods. "Sometimes" foods should be eaten in moderation, and they are depicted as the smallest part of the Eatwell Plate. For more information on food groups and the serving sizes of foods in each food group, visit the Food Standards Agency website, www.food.gov.uk.

Table 10.1 Food Items from Each Food Group

Food group	Food items	Best choices, that contribute to overall health
Bread, rice, potatoes, pasta and other starchy foods	• Bread, including: soda bread, rye bread, pitta, flour tortilla, baguettes, chapatti, bagels • Rice • Potatoes • Breakfast cereals, oats • Pasta, noodles • Maize, cornmeal, polenta • Millet, spelt • Couscous, bulgur wheat, pearl barley • Yams and plantains	**Eat plenty of bread, rice, potatoes, pasta and other starchy foods every day.** Choose wholegrain varieties when you can.
Fruit and vegetables	• All fruit and veg, including: apples, pears, oranges, bananas, grapes, strawberries, mango, pineapple, raisins, broccoli, courgettes, cabbage, peas, sweet corn, lettuce, tomatoes, carrots	**Eat plenty of fruit and vegetables.** Aim for at least five portions of a variety of fruit and veg each day. There is evidence to suggest that people who eat lots of fruit and veg are less likely to develop chronic diseases such as coronary heart disease and some types of cancer.
Milk and dairy foods	• Milk • Cheese • Yoghurt • Fromage frais • Cottage cheese • Cream cheese	**Eat some milk and dairy foods every day.** Choose lower-fat options when you can or have just a small

	• Quark	amount of the high-fat varieties less often.
Meat, fish, eggs, beans and other non-dairy sources of protein	• Meat, poultry and game, including: lamb, beef, pork, chicken, bacon, sausages, burgers • White fish (fresh, frozen or canned), including: haddock, plaice, pollack, coley, cod • Oily fish (fresh, frozen or tinned), including: mackerel, sardines, trout, salmon, whitebait • Shellfish (fresh, frozen or tinned), including: prawns, mussels, crab, squid, oysters • Eggs • Nuts • Beans and other pulses, including: lentils, chickpeas, baked beans, kidney beans, butter beans	**Eat some meat, fish, eggs, beans and other non-dairy sources of protein every day.** Eat at least two portions of fish a week, including a portion of oily fish.
Foods and drinks high in fat and/or sugar	• Cakes • Sugary drinks • Biscuits • Chocolate • Sweets • Puddings • Pastries and pies • Ice cream • Jam • Honey • Crisps • Butter • Margarine and spreads • Oil • Cream • Mayonnaise • Chips • Milkshakes	**Eat just a small amount of foods and drinks high in fat and/or sugar.** Cutting down on these types of food could help you control your weight because they often contain lots of calories. And don"t forget that sugary foods and drinks can cause tooth decay and erosion, particularly if eaten between meals, so having fewer of these could also protect your teeth.

http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplateguide0310.pdf

Fig 10.1 The Eatwell Plate
(*Find it at*: http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplate0210.pdf)

- The key to a balanced diet is to recognise that starchy carbohydrates (especially whole grains), vegetables, and fruits are needed in greater proportion than are the foods from milk and dairy foods; meat, fish, eggs, beans and other non-dairy sources of protein; and foods and drinks high in fat and/or sugar.

ENERGY NUTRIENTS: CARBOHYDRATE, PROTEIN AND FAT

- The foods that we eat contain many kinds of nutrients. Nutrients are the chemical substances in food that the body uses to maintain health. Macronutrients (carbohydrate, fat, and protein) are the major food components, and they all provide the body with energy. Micronutrients (vitamins and minerals) are the nutrients that we need in very small amounts and that are present in many foods. Both groups of nutrients are important for a healthy body.
- All foods contain 1, 2, or all 3 of the macronutrients. Protein provides the body with the building blocks for making and repairing tissue (like muscle and skin). Foods from animals, such as fish, lean meats, poultry, eggs, and low fat or non-fat dairy foods, are good sources of protein, as are nuts, seeds, and beans or legumes. Fat helps the body transport certain vitamins. Healthy unsaturated fat is found in plant foods like vegetables and vegetable oils (olive, canola, and soybean oils), nuts, seeds, and whole grains, as well as in fish. Carbohydrate (starches and sugars) provides the body with the quickest

source of energy, and this energy can be readily used in every single cell in the body. But not all types of carbohydrate are healthy choices. Some are better than others.

- Whole grains are preferable over refined grains since they contain more vitamins, minerals, and fibre. Fruits and vegetables also contain vitamins, minerals, and fibre, and they provide antioxidants. Other good sources of carbohydrate include beans (legumes) and low fat (1%) or non-fat milk and yoghurt. Foods and drinks with added sugar (such as soft drinks, energy drinks, fruit squash, biscuits, and chocolate) also provide carbohydrate. But unfortunately, these foods typically have sugar as one of their main ingredients (and may also be high in saturated and trans fat), and the drinks basically contain just sugar and water. Sugary foods and drinks also usually contain very few micronutrients (vitamins and minerals). These foods should be eaten only in small amounts or once in a while.

VITAMINS AND MINERALS

- Vitamins and minerals are nutrients (micronutrients, specifically) needed to keep the body healthy. There are many vitamins and minerals in the foods that we eat. Table 10.2 (page 144) lists some of the vitamins and minerals many Britons do not get enough of. It is important to eat a variety of food every day so that we get all the vitamins and minerals we need.

Table 10.2 Selected Vitamins and Minerals

Nutrients	Healthy sources	Role
VITAMINS		
Vitamin A	Dark green, yellow, and orange vegetables and fruits (such as kale, spinach, broccoli, peas, cabbage, lettuce, carrots, cantaloupe, apricots)	Helps with night vision, bone growth, and tissue maintenance
Vitamin C	Oranges, grapefruit, tangerines, cantaloupe, mangoes, papaya, strawberries, broccoli, peas, potatoes, tomatoes, peppers	Keeps skin and tissue healthy
Vitamin E	Almonds, sunflower seeds, sunflower oil, safflower oil, peanut butter, corn oil, soybean oil, canola oil, spinach, broccoli, tomato sauce	Helps protect cells from damage (antioxidant)
MINERALS		
Calcium	Low fat or non-fat milk, low fat cheese, low fat or non-fat yoghurt, low fat or non-fat cottage cheese, cereals and bread, kale, broccoli, dark green leafy vegetables, tofu, calcium-fortified 100% juice, calcium-fortified soya milks	Helps keep bones and teeth strong
Iron	Lean meat, whole wheat bread and products made with wheat flour, lentils, kidney beans, tofu, liver	Helps blood carry oxygen to all parts of our bodies

CARBOHYDRATE FOODS

- **Best-Choice Carbohydrate Foods**

  Best-choice carbohydrate foods are filled with vitamins, minerals, and often fibre; they have little or no added sugar, little or no saturated fat, and no trans fat. Making healthy carbohydrate choices helps avoid spikes in blood sugar. Examples of these nutritious carbohydrate sources include the following:

Food group	What's included?
Bread, rice, potatoes, pasta and other starchy foods	Bread, including: soda bread, rye bread, pitta, flour tortilla, baguettes, chapatti, bagels; rice; potatoes; breakfast cereals (make sure that sugar is not one of the first three ingredients); oats; pasta; noodles; maize; cornmeal; couscous; bulgur wheat; pearl barley; and yams
Fruit and vegetables	All fruit and veg, including: apples, pears, oranges, bananas, grapes, strawberries, mango, pineapple, raisins, broccoli, courgettes, cabbage, peas, sweet corn, lettuce, tomatoes, carrots
Milk and dairy foods	Milk; cheese; yoghurt; fromage frais; cottage cheese; cream cheese; Quark
Meat, fish, eggs, beans and other non-dairy sources of protein	Meat, poultry and game, including: lamb, beef, pork; chicken, grilled bacon, sausages and burgers; white fish (fresh, frozen or tinned), including: haddock, plaice, pollack, coley, cod; oily fish (fresh, frozen or tinned), including: mackerel, sardines, trout, salmon, whitebait; shellfish (fresh, frozen or tinned), including: prawns, mussels, crab, squid, oysters; eggs; nuts; beans and other pulses, including: lentils, chickpeas, baked beans, kidney beans, butter beans

http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplateguide0310.pdf

- **"Sometimes" Carbohydrate Foods**

  Some carbohydrate-containing foods have few vitamins and minerals, are low in fibre, and contain large amounts of added sugar or added saturated and trans fat. While sweetened breakfast cereals and milk products do contain vitamins and minerals, they often have large amounts of added sugar or contain unhealthy fat. These foods should only be eaten once in a while, if at all. Examples of these less nutritious carbohydrate sources include the following:

Foods and drinks high in fat and/or sugar	Cakes; sugary drinks; biscuits; chocolate; sweets; puddings; pastries and pies; ice cream; jam; honey; crisps; butter; margarine and spreads; oil; cream; mayonnaise; chips; milkshakes

- **Low Carbohydrate Foods**
  Many protein foods such as meat, poultry, fish, and cheese do not contain carbohydrate, while some vegetables contain only minimal amounts. Examples of foods that are low in carbohydrate include the following:
  - Mea
    t ○
    Fish
  - Hamburgers (without the bun)
  - Eggs
  - Hot dogs (without the bun)
  - Cheese
  - Chicken or turkey
  - Nuts
  - Sunflower seeds
  - Greens
  - Lettuce
  - Cucumber
  - Mushrooms
  - Celery
  - Tomatoes

ANSWER KEY

ACTIVITY 10.1: HELP YOU"RE THE DOCTOR

1. The Lee family needs to eat more fruits and vegetables. Fruits and vegetables are a wonderful source of vitamins and minerals, and so eating at least 5 servings of these each day would be a great improvement to the Lee family diet. Eating even more servings would be better. Lee family members should include dark green and orange vegetables for vitamin A, and citrus fruits are a great way to get vitamin C. They should also include more whole grain breads and whole grain side dishes (brown rice, barley, bulgur wheat, millet, quinoa) in place of white rolls or pasta to add nutrients as well as fibre. They like milk, but they should switch to a lower fat type (1% or non-fat). Finally, they could replace foods that provide unhealthy fat (such as butter) with foods that provide healthy fat (such as polyunsaturated margarine for spreading on bread or boiled vegetables and fish instead of steak).

2. James is missing foods from the milk and dairy foods group. He should add low fat or fat-free foods from the milk and dairy group along with 1% or skimmed milk to his diet. Dairy products provide the calcium his body needs to build and maintain strong bones and teeth, and he needs 3 servings each day. If James cannot drink milk, non-dairy calcium-fortified milks (such as unflavoured rice milk or soy milk) are a good substitute; calcium is also available in fortified 100% orange juice (limit juice to no more than 150ml a day). James would also benefit from more fruit (especially different types of fruit) and vegetables. He also needs to find ways to exercise during the week.

3. The reason why Maria doesn‟t have enough energy to play netball for more than an hour is likely a combination of factors. By staying up late and waking early, Maria is not getting enough sleep, which makes her feel tired and less energetic throughout the day. This may be especially true on the days that she skips breakfast. In addition, she may not be eating foods that provide her body with energy, such as carbohydrate foods. Carbohydrate is an important fuel for the muscles. Foods that are excellent sources of carbohydrate can be found in all food groups, but Maria should focus on foods that pack many vitamins and minerals such as whole grains, fruits, vegetables, low fat or fat-free dairy, and legumes. Turning off the TV at night to get more sleep and start the day refreshed, eating a balanced breakfast, and choosing some healthy carbohydrate snacks can all give her the energy she need to play netball all afternoon. Grabbing a chocolate bar, sweet, or soft drink may give her a quick shot of sugar, but it won‟t keep her energy levels high for an entire afternoon of play.

ACTIVITY 10.2: MENU PLANNING

1. Following is a sample snack menu for the Lee family:
   Monday: raw carrots and whole wheat crackers (made with healthy fat, not with partially hydrogenated oils) with salsa dip.
   Tuesday: fruit smoothie (blend fresh or frozen berries and bananas with 1% milk and ice).
   Wednesday: melon with low fat plain yoghurt.
   Thursday: whole wheat pitta crisps and raw carrot sticks dipped in hummus.
   Friday: ants on a log (celery sticks spread with peanut butter and topped with raisins) and apple slices.

2. Two healthy dinner menus for the Lee family may include the following:
   a. Whole wheat spaghetti with tomato sauce, whole wheat rolls spread with low fat polyunsaturated margarine, tossed green salad drizzled with olive oil vinaigrette, low fat (1%) milk, strawberries.
   b. Grilled salmon, brown rice, green beans, cucumber salad, low fat (1%) milk, mandarin orange slices.

3. Drink and snack suggestions for James include the following:
   Glass of low fat (1%) milk or plain calcium-fortified non-dairy milk and grapes. Low fat cheese (such as string cheese or reduced-fat cheese).
   Cucumber sticks with low fat yoghurt dip.
   Whole grain cereal with low fat milk, a banana, and strawberries.
   Plain low fat yoghurt with tinned peaches.
   Fruit smoothie made with plain low fat yoghurt and 1% or non-fat milk.

4. Fun activities for James might include the following: **Sunday:** playing Frisbee at the park.
   Monday: roller skating.
   Tuesday: bike riding.
   Wednesday: playing rounders or tennis.
   Thursday: playing basketball.
   Friday: kicking a football about.
   Saturday: playing football at the park.

5. Examples of snacks that are high in carbohydrate, low in unhealthy saturated or trans fat, and convenient to eat include the following: oranges, pears, plums, grapes, apples, bananas, whole wheat bread sticks, whole wheat bagels with low fat cheese, whole grain cereal, low fat milk and whole grain crackers (check the label to make sure that these do not include partially hydrogenated oils), trail mix or a handful of nuts and raisins, low fat yoghurt, and whole wheat pitta breads with hummus.

Principles of Healthy Living

Go for 5 Fruits and Veggies – More Is Better!

Eat 5 or more servings of fruit and vegetables every day! Eat a variety of colours – try red, orange, yellow, green, blue, and purple.

Get Whole Grains and Sack the Sugar!

Choose healthy whole grains for flavour, fibre, and vitamins. Limit sweets and chocolate. Soft drinks and other sugary drinks have almost nothing in them that is good for you – no vitamins or minerals or other healthy things. They contain just sugar.

Keep the Fat Healthy!

We need fat in our diets, but not all types of fat are good for us. Our bodies like the healthy fat that tends to come from plants and is liquid at room temperature. Examples are olive oil, canola oil, vegetable oil, and peanut oil. Our bodies do not like unhealthy fat, which is solid at room temperature. Examples include saturated fat (usually found in animal products such as meat and whole milk) and trans fat (found in fast food fries and shop-bought biscuits and cookies). Of the unhealthy fat, trans fat is the worst and should rarely, if ever, be eaten.

Start Smart with Breakfast!

Eating breakfast helps you focus on schoolwork and gives you energy to play. Breakfast is a great meal for adding whole grains, fruit, and low-fat or non-fat milk to your day!

Keep Moving!

Being active is a very important part of healthy living. Do what you like the most, and keep your body moving for at least an hour a day!

Power Down!

Watching TV, playing video games, or playing on the computer keeps your body still. Keep screen time as low as it can go, and never let it add up to more than 2 hours per day.

The Eatwell Plate

The key to a balanced diet:

- **Eat a higher proportion of:**
  - starchy carbohydrates (especially whole grains), and
  - fruit and vegetables.

- **Eat a lower proportion of foods from:**
  - milk and dairy foods;
  - meat, fish, eggs, beans, and other non-dairy sources of protein; and
  - foods and drinks high in fat and/or sugar.

Name _____

Activity 10.1

Help! You're The Doctor

Directions

Read the following paragraphs and complete the exercises.

1. Members of the Lee family have been told by a doctor that they should eat more foods that contain lots of vitamins and minerals. The family eats a lot of foods from the starchy carbohydrate, dairy, and protein food groups. Popular family dinners include spaghetti Bolognese, garlic bread, and semi-skimmed milk and steak, mashed potatoes, and white rolls. The family members need a greater variety of foods in their daily diet.

   List some foods that would help the Lee family improve its diet. List five foods that contain lots of vitamins and minerals.

   _____

   _____

   _____

   _____

2. James, a Year 6 student, eats toast for breakfast, and a meat sandwich for lunch. He eats an apple or orange every day, and he always has one type of vegetable for his evening meal along with meat, chicken, or fish. He goes to the park or beach with his family on weekends, but during the week his only exercise is walking a short distance (150 metres) from his home to his school.

   Which food group (or groups) is missing from James"s diet? Why is this food group important? What else could James do to improve his health?

   _____

   _____

   _____

   _____

3. Maria plays netball for 2 hours each afternoon at her school. Recently she noticed that she has no energy after the first hour, which is something that never used to happen. She has been watching a lot of television and staying up late at night, and her alarm goes off at 6 a.m. each morning to go to school. Sometimes she skips breakfast because she slept through her alarm.

   List two reasons why Maria may not have enough energy. How can she improve her energy level?

   _____

   _____

   _____

   _____

   _____

   Name the food groups that give us energy for action sports.

   _____

   _____

   _____

   _____

   _____

   _____

Name _____

Activity 10.2

Menu Planning

Directions

Complete the following exercises, providing suggestions for improving the diets of the Lee family, James, and Maria (discussed in activity 10.1, Help! You"re the Doctor). Remember to choose a variety of foods from each of the food groups. Keep in mind the tips offered on the Eatwell Plate when you plan meals and snacks for our friends.

1. Create an afternoon snack menu for the Lee family for the next school week. Refer to activity 10.1 to see what they need.

   Monday _____

   Tuesday _____

   Wednesday _____

   Thursday _____

   Friday _____

2. Suggest two healthy dinners that the Lee family can enjoy in place of their usual selections.

   _____

   _____

   _____

   _____

   _____

3. Suggest drinks and snacks that would help James eat from the one food group he is missing (remember, this group provides him with calcium, which is good for his bones and teeth).

_____

_____

_____

_____

_____

4. List fun activities that James could do during the week to keep him active. Pick a different activity for each day of the week:

Sunday _____

Monday _____

Tuesday _____

Wednesday _____

Thursday _____

Friday _____

Saturday _____

5. Suggest some carbohydrate foods (including whole grains) that are low in added sugar that Maria should consider eating before playing netball.

_____

_____

_____

_____

_____

Lesson 11

Keeping the Balance

This lesson explains why it is important to maintain balance and variety in the foods we eat; „no single food can supply all the nutrients the body needs‟. The benefits of different nutrients are explained. It recognises that variety is needed for energy to assist with growth and to supply fuel for physical activity. The body‟s requirement of Calories is put to practical use in an maths activity which looks at how Calories are used in physical activity.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to enjoy a balanced and varied diet and gain benefits from it particularly with reference to physical activity.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Discuss the importance of a balanced diet containing all six types of nutrients.
2. Learn ways to balance the food they eat with physical activity.

MATERIALS

- Activity 11.1, Keeping the Balance (page 163)
- Activity 11.2, How Is My Balance? (page 165)
- Overhead Transparency 11.1, Food, Nutrients, and You (page 161)
- Overhead Transparency 11.2, Energy Balance (page 162)
- Jug of water (add food colouring for visibility)
- Low-sided baking dish

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour.

PART I:

1. (3 minutes) Set up the following demonstration so that all pupils can see it. Place the drinking glass in the baking dish (the dish is for catching any overflow of water) and fill the glass to the top with coloured water. Explain that this full glass represents a person who is full of the nutrients needed to remain healthy and active.
2. (2 minutes) Ask the pupils what happens to the level of nutrients in the person‟s body throughout the day. (The level goes down). Pour some of the water back into the jug to show a partially empty glass.
3. (2 minutes) Ask the pupils what the person needs to do to get back to the right level of nutrients. (Eat nutritious foods). Fill the glass up to the top again.
4. (2 minutes) Ask the pupils what happens when a person regularly eats more than he needs for his daily energy requirements for body growth and maintenance. (He will put on excess weight). Pour extra water into the already full glass, allowing it to overflow. Explain that the overflowing water represents extra energy that the body will need to store, usually in the form of extra fat.
5. (2 minutes) Explain that in today‟s lesson the pupils will take a closer look at how they can get the nutrients their bodies need without getting too many Calories beyond their requirements for growth and maintenance.

PART II:

1. (3 minutes) Ask the pupils, “What are nutrients and why are they important?” The answer is nutrients are the parts of foods that give you energy and allow your body to grow and repair itself.
2. (3 minutes) Project overhead transparency 11.1, Food, Nutrients, and You (page 161), and discuss the six types of nutrients, their functions, and their food sources. Explain that we must eat a variety of foods in order to get all the nutrients the body needs.

You may want to make an extra laminated copy of the Food, Nutrients, and You transparency (for increased durability) and create a game that allows pupils to review the contents of the transparency with each other.

3. (10 minutes) Write the word *Calorie* on the board. Explain that a Calorie is a measure of how much energy a food provides. Some foods, such as fruits and vegetables, are full of nutrients and are also low in Calories. Other foods, such as junk foods, can have many Calories and very few nutrients.

   Tell the pupils, “If a food contains 100 Calories, it gives you 100 units of energy. Most women need 1,800 to 2,000 Calories a day and most men need 2,200 to 2,400 Calories a day. Active men and women need more Calories than average men and women need. Girls probably need about 1,740 Calories a day and boys need 1,970 Calories a day; girls and boys who are very physically active may need more than that, up to 2,000 Calories a day for girls and 2,200 Calories per day for boys”.

4. (8 minutes) Project overhead transparency 11.2, Energy Balance (page 150), and explain that if the nutrients and Calories taken into the body do not equal the nutrients and energy used by the body, the body can have problems. Point to the box at the top of the transparency and review how balances work (the lighter side goes up and the heavier side goes down). Point to the picture labelled “not enough nutrients and Calories” and ask, “What can happen if the nutrients and energy used are greater than the nutrients and Calories taken in?” (Answer: the body gets tired, can‟t grow or repair tissue, begins to break down lean body tissue and fat stores, and loses weight). Ask, “What can a person do to fix the imbalance?” (Answer: eat more nutrients and Calories).

5. (3 minutes) Point to the picture labelled “too many nutrients and Calories” and ask, “What might happen if the amount of Calories taken in is consistently greater than the amount of energy used?” (Answer: excess energy will be stored as fat, and the body will put on weight). Ask, “What can this person do to fix the imbalance?” (Answer: eat fewer Calories; exercise more).

6. (3 minutes) Point to the picture labelled “nutrient and Calorie balance” and explain that eating the right amount of nutrients and Calories for body size and activity level means that the body creates an energy and nutrient balance. This is the way to maintain a healthy body.

7. (15 minutes) Have the pupils form pairs, and then distribute activity 11.1, Keeping the Balance (page 163). Explain that everything a person does, even sleeping, requires the body to use Calories for energy. Some activities require a lot more units of energy than others do. The chart shows approximately how many Calories a 45 kilogram person requires to do various activities. Instruct each pair of pupils to use the chart and their combined knowledge to answer the questions on the worksheet.

8. (5 minutes) Once the pupils have completed the activity, discuss their answers. Encourage them to think about how they might use this information to improve their own energy balance.
9. (Time will vary) For an optional activity, distribute activity 11.2, How Is My Balance? (page 165), and have pupils fill it out for a day. You may want to repeat this activity more than once.

TEACHER RESOURCES

BACKGROUND MATERIAL

- A balanced diet is important because different foods contain different combinations of nutrients. No single food can supply all the nutrients the body needs to maintain good health. This is why balance and variety go hand in hand. For example, oranges provide vitamin C but not vitamin B_{12}, while cheese provides vitamin B_{12} but not vitamin C. Remember that foods in one food group cannot replace those in another. Choosing a variety of foods among groups and within groups will make your diet more interesting as well as balanced.

- The carbohydrate, fat, and protein in food supply energy, which is measured in Calories. Carbohydrate and protein provide 4 Calories per gram. Fat provides 9 Calories per gram. People must balance the amount of energy in food eaten with the amount of energy the body uses. Achieving this balance does not need to occur absolutely every day, but it should be achieved generally, such as over a few days.

- Physical activity is an important way to use up food energy. Most Britons spend much of their working day in activities that require little energy. In addition, many Britons of all ages now spend a lot of daily leisure time being inactive - watching television, surfing the Web, or playing computer games or video games. To use up dietary energy, people must spend less time doing sedentary activities like sitting and spend more time doing activities, such as walking to the shops or around the block and climbing stairs rather than using lifts or escalators. Less sedentary activity and more moderate and vigorous activity help reduce body fat and the risk of disease.

- The kinds and amounts of food people eat affect their ability to maintain a healthy weight. Soft drinks, energy drinks, fruit squash, biscuits, chocolate bars, and other foods with lots of added sugar are said to be filled with empty Calories because they provide many Calories but few of the nutrients the body needs to stay healthy and grow strong. Eating too much of these foods

makes it difficult to meet other nutrient needs without eating excessive Calories, and this can contribute to excess weight gain. However, even when people eat nutrient-filled foods, they can gain weight from eating too much of them. One key way to avoid eating too much is to choose sensible portion sizes at meals, but choosing the right sizes can be a big challenge these days given the dramatic growth in portion sizes over the past 20 years.

- The pattern of eating is also important. Snacks provide a large percentage of daily Calories for many Britons; around 15% of total energy for children aged 4-18 years old. Unless nutritious snacks are part of the daily meal plan, snacking may lead to the intake of lots of unhealthy foods.

- Children need enough food for proper growth. To promote growth, development, and good health and to prevent kids from becoming overweight, teach children to choose whole grains, vegetables, fruits, and healthy fat as well as low fat dairy and other protein-rich foods. Also teach them to participate in at least an hour of physical activity every day. Limiting television and other screen time and encouraging children to play actively in a safe environment are helpful steps.

ANSWER KEY

ACTIVITY 11.1: KEEPING THE BALANCE

1. How many Calories would you use watching television from 4.00 p.m. to 6.30 p.m.?
   Answer:
   Step 1: resting or sitting = 40 Calories per 30 minutes
   Step 2: 4.00 to 6.30 p.m. = 2.5 hours or 5 30-minute periods
   Step 3: 5 30-minute periods x 40 Calories per 30 minutes = **200 Calories**

2. How many *more* Calories would you use if you rode your bike for an hour compared to watching TV for an hour?
   Answer:
   Step 1: 186 Calories – 80 Calories = **106 Calories**

3. How many *extra* Calories would you use over a week if you substituted an hour of bike riding for an hour of TV each day?
   Answer:
   Step 1: 106 Calories per day x 7 days = **742 Calories**

4. How about for a month (30 days)?
   Answer:

Step 1: 106 Calories per day x 30 days = **3,180 Calories**

5. Jason spends the day in school and then takes the bus home. He makes himself a snack (usually crisps and a soft drink) and then does his homework. After dinner, Jason is allowed 1 ½ hours of television or computer games. He sometimes reads a book or talks with friends on the phone. Jason is a little overweight. What can he do to improve his weight and overall health?
   Possible answers:
   Jason could walk or ride his bike to school. Jason could do something active in the evening. Jason could eat fruit instead of crisps and a soft drink.

6. How many Calories would you use if you ran laps around the playground for 10 minutes and then rode your bicycle home for 10 minutes?
   Answer:
   Step 1: (183 Calories per ½ hour of running) ÷ (3 10-minute periods in ½ hour) = 61 Calories for each 10-minute period of running

   Step 2: (93 Calories per ½ hour of bike riding) ÷ (3 10-minute periods in ½ hour) = 31 Calories for each 10-minute period of bike riding

   Step 3: 61 Calories for 10 minutes of running + 31 Calories for 10 minutes of bike riding = **92 Calories**

7. Extra credit: assume you weigh 45 kilograms. How many Calories would you use walking 20 minutes to your friend‟s house and 20 minutes back each day?
   Answer:
   Step 1: walking 20 minutes to friend‟s house + 20 minutes walking home = 40 minutes of walking or 4 10-minute periods

   Step 2: (81 Calories per ½ hour of walking) ÷ (3 10-minute periods in ½ hour) = 27 Calories for every 10 minutes of walking

   Step 3: (27 Calories for every 10 minutes of walking) x (4 10-minute periods of walking) = **108 Calories**

Foods, Nutrients, and You

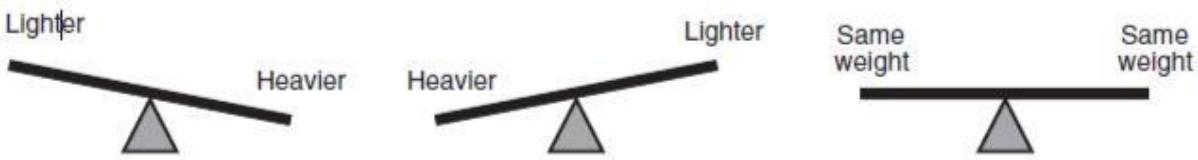
Table 11.1 Food, Nutrients, and You

Nutrients and their functions	Food sources
Water • Helps cool your body when it is working hard • Helps you digest your food • Helps nutrients get to different parts of the body	• Water, other drinks* such as tea and coffee, fruit, vegetables, soup.
Carbohydrate • Gives you energy quickly • Can be stored as energy for later use • Gives sweetness and texture to foods • Provides a good source of vitamins, minerals, and fibre	• Whole grains, fruit, starchy and root vegetables (like sweet potatoes), potatoes, rice, legumes and beans (like kidney beans or black-eyed peas), low fat or non-fat milk, low fat or fat-free yoghurt.
Protein • Builds and repairs muscles • Helps your body grow • Gives you energy	• Lean meat, poultry, fish, beans, nuts, low fat and skimmed milk and milk products, eggs, tofu, cheese (preferably reduced fat).
Fat • Gives you energy, especially for long-term use • Makes you feel less hungry • Makes food taste good • Helps keep your skin smooth	• Vegetable oil, olive oil, canola oil, peanut oil, nuts, seeds, and fish are rich in healthy fat • Fatty meats and dairy products are high in unhealthy fat; choose lean meats and low fat or non-fat milk products instead.
Minerals • Help your blood carry oxygen and nutrients to your muscles and other body parts (iron) • Help build strong bones and teeth (calcium)	• Lean meat, dark green vegetables, peas, cabbage, whole grains and fortified cereals, legumes (beans) (iron) • Low fat or skimmed milk, low fat cheese, low fat or fat-free yoghurt, dark green vegetables (cabbage), tofu, fortified 100% orange juice, soya milk (calcium)
Vitamins • Help you to see better at night (vitamin A) • Help your body get energy from the food you eat (B vitamins) • Help your body heal cuts and bruises (vitamin C) • Help you fight off infections (vitamin C)	• Vegetables (especially dark green and orange), fruit, low fat or non-fat milk (vitamin A) • Whole grains, fish, poultry, lean meat, low fat or skimmed milk (B vitamins) • Fruit (especially citrus), and lightly cooked vegetables (vitamin C)

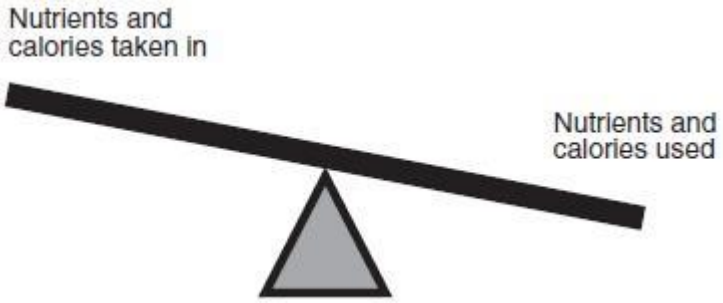
*best choices do not have caffeine or sugar

Energy Balance

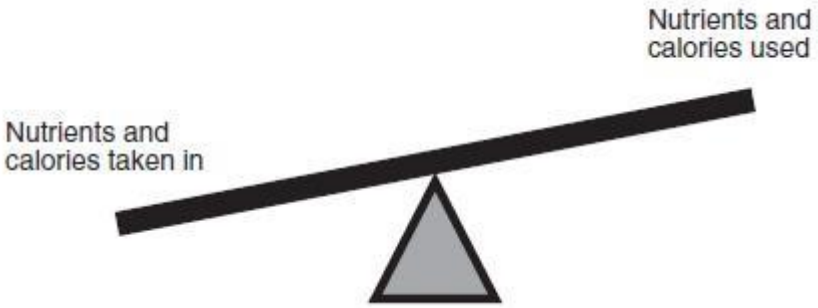
On a balance, the lighter side goes up and the heavier side goes down.
When both sides are equal, the board is level.



Not enough nutrients and Calories



Too many nutrients and Calories



Nutrient and Calorie balance

Name _____

Activity 11.1

Keeping the Balance

Everything you do, even sleeping and growing, requires your body to use Calories

Almost everything you eat or drink, except water, contains Calories

Activity	Calories used in ½ hour by a 45kg person
Bike riding	93
Running	183
Swimming	150
Resting/sitting	40
Walking	81

Answer the following questions, assuming that you weigh 45 kilograms:

1. How many Calories would you use watching television from 4.00 p.m. to 6.30 p.m.?

   _____

   _____

2. How many *more* Calories would you use if you rode your bike for an hour compared to watching TV for an hour?

   _____

   _____

3. How many *extra* Calories would you use over a week if you substituted an hour of bike riding for an hour of TV each day?

_____

_____

4. How about for a month (30 days)?

_____

_____

5. Jason spends the day in school and then takes the bus home. He makes himself a snack (usually crisps and a soft drink) and then does his homework. After dinner, Jason is allowed 1 ½ hours of television or computer games. He sometimes reads a book or talks with friends on the phone. Jason is a little overweight. What can he do to improve his weight and overall health?

_____

_____

_____

_____

6. How many Calories would you use if you ran laps around the playground for 10 minutes and then rode your bicycle home for 10 minutes?

_____

_____

7. *For extra marks*: assume you weigh 45 kilograms. How many Calories would you use walking 20 minutes to your friend‟s house and 20 minutes back each day?

_____

_____

Name _____

Activity 11.2

How Is My Balance?

Draw a picture of the balance to show how you think you balanced your nutrients and Calories with the energy you used today. (Remember that growing takes energy too, probably less than 100 Calories a day). Then think of ways you can improve your balance.

Here are the changes I want to make tomorrow to create a better nutrition and energy balance:

_____

_____

_____

_____

_____

_____

Lessons 12 and 13

Power Down Screen Time

This lesson is designed to encourage pupils to examine the impact of technological advances on the lifestyles of people living in the 20th century and the present. For much of the world, everyday existence now requires far less physical energy because modes of transportation and food gathering have generally improved. Similarly, new technologies, such as TV, computers, and video games, encourage inactive leisure-time interests. Physical fitness now requires people to set aside time for physical pursuits. An understanding of the historical developments in technology generates an awareness of this phenomenon.

Specifically, the aim of this lesson is to encourage pupils to keep TV, video, and computer game time to less than two hours per day. Pupils track and graph their own viewing time and try to decrease it for one week. This lesson is designed to infuse information about increasing physical activity and decreasing screen time into a maths, science, or health class. Optional activities are also included for other subject areas.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses History, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

- For pupils to limit screen time to no more than two hours per day.
- For pupils to be physically active every day.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Discuss the influence of technology and inventions on society (the economy, geography, transportation, education, communication, medicine, politics, food production, social changes) and daily life in the UK.
2. Discuss the effects of technology on the availability and uses of free time.
3. Give examples of inventions that have brought world advances, but resulted in unintended health consequences.
4. Discuss the importance of making time for physical activity.
5. Chart TV watching and video game playing for a two week period.
6. Create bar graphs of their screen time and video game playing time.
7. Discuss the advantages and disadvantages of using various types of graphs to represent data.
8. Discuss the important of accurate gathering and reporting of data.
9. Calculate the amount of time they have spent watching TV and playing video games in their lifetime.
10. Discuss the importance of increasing activity and decreasing screen time and video game playing to no more than two hours per day.

MATERIALS

- Graph paper, rulers and pencils
- Activity 12.1, Screen Time Charts (weeks 1 and 2) (page 181)
- Activity 12.2, Relating the Past to the Present (page 183)
- Activity 12.3, Interpreting Week 1 Data (page 185)
- Activity 13.1, Interpreting Week 2 Data (page 188)
- Overhead Transparency 12.1 (page 177)
- Student Resource 12.1, Graphing Data (page 178)
- Optional class: Class Data charts for extension activity 12.1 (weeks 1 and 2) (page 190)

The lesson can also be implemented using a computer. Enter data into spreadsheets; then create charts and graphs.

LESSON PLAN

Activity 12.2 (page 183) will be handed out in Week 1 to complete as homework.

ESTIMATED TEACHING TIME: 20 minutes.

WEEK 1 (DAY 1)

1. (3 minutes) Ask pupils to estimate how many hours per day they spend watching TV and videos and playing video games. What is their hypothesis; how much TV do they think they watch? (Throughout this activity when we refer to „screen time‟, we mean watching TV or videos or playing computer and TV video games). Perhaps it may be worth mentioning that if it‟s an active game (i.e., one that requires a lot of energy to play and not just minimal arm or thumb movements, such as the more active games on the Nintendo Wii), then not to include this in the time.
2. (5 minutes) Show overhead transparency 12.1 (page 177). Point out the variables plotted on the x-axis and the y-axis. Ask pupils the following:
    - In 1967 through 1970, how much TV was the largest group of children watching?
    - What about in 1990?
    - Where do you think you fall on this graph compared with children in 1990?
3. (2 minutes) Explain the following:
    - During the next two weeks you will record the actual time you spend on screen time: watching TV, films (including at the cinema) and DVD‟s, and playing computer games.
    - During the first week you should track your regular viewing pattern.
    - During the second week you will try to decrease your viewing time.
    - The purpose of this activity is for you to become aware of the time you spend watching TV and playing video games, and then to decrease that time. This will be a lot easier if you do a family-based activity to replace the time spent watching TV etc. Perhaps you could go for a walk, go to the park or go swimming?
    - You have an exciting opportunity to participate in a scientific study, and accurate, honest reporting is as important as decreasing screen time. Statistics involve collecting, analysing, and presenting data in an accurate manner. If you do not give honest information, the results won‟t be accurate.
4. (5 minutes) Hand out the screen time charts (page 181). Have pupils record their estimated viewing hours at the top of the chart for week 1. Explain that they should record their viewing daily for the next seven days on the top half of the chart. Remind them to round to the nearest half hour and to express numbers as fractions (e.g., 2 ½ hours). We highly recommend that extension activity 12.1, Class Data (page 190), should be included during this week. Mention the first of the 10 Power Down Tips (page 175). You may choose to write a different one on the whiteboard/SMARTBoard etc every day or show them on an overhead.

5. (5 minutes) Hand out Homework Activity 12.2, Relating the Past to the Present (page 183). Explain that they are trying to investigate how their lifestyle is different from that of their grandparents when they were their age. Have them interview a grandparent, great aunt or uncle, neighbour, or friend of the family who was 10-11 years old during the 1930‟s, 1940‟s, or 1950‟s.

   Pupils should ask their interviewee what their lives were like as children, how they spent their free time, and what kind of jobs they did. *Another option would be to have children prepare their own interview questions.*

ESTIMATED TEACHING TIME: 50 minutes.

END OF WEEK 1

1. (5-10 minutes) Conduct a summary discussion with the class about „Relating the Past to the Present‟ (Activity 12.2). This activity will likely generate a lot of discussion and various responses. You will want to direct the discussion to emphasise the impact of technology on our decreased physical activity during leisure time and its unintended health consequences. End by reminding pupils of *CHANGE!*‟s activity message and encouraging them to limit their screen time and other recreational screen time to two hours or less per day. (See Teacher Resources; Homework Answers).
2. (5 minutes) At the end of the first week, ask pupils to calculate their total number of viewing hours for the week as well as their daily average.
3. (20 minutes) Have pupils graph their data. Student Resource 12.1, Graphing Data (page 178), gives examples of types of graphs they might choose to construct. However, you may want to (a) ask pupils to „thought shower‟ what types of graphs they think would best represent their data, or (b) assign pupils different types of graphs so that they can compare the advantages and disadvantages of representing data using pie charts, bar graphs and line graphs.
4. (10 minutes) Have pupils complete activity 12.3, Interpreting Week 1 Data (page 185). This activity asks them to estimate the amount of time they have spent watching TV in their lifetime. It also asks them to interpret their graphs and „thought shower‟ some activities they might do in Week 2 to replace some of their screen time. You could assign this for homework.
5. (5 minutes) Explain that during the second Power Down week, pupils should try to limit their viewing to a maximum of two hours per day, as recommended by the American Academy of Pediatrics. Ask pupil why they think reducing viewing time is important. Refer them to their responses on activity 12.1.
6. After eliciting pupil ideas, emphasize the following:
   - Pupils should be active every day. Decreasing viewing time may encourage an increase in more active forms of entertainment.

- Activity is required for health. Children need activity to develop cardiovascular fitness, muscular strength, flexibility, and confidence in their physical ability.
- Just a small increase in physical activity can generate genuine health benefits. Refer to Teacher Resources for a further discussion of this topic.

ESTIMATED TEACHING TIME: 5 minutes.

WEEK 2

1. During Week 2 have pupils record their viewing time on the bottom half of their screen time charts.
2. (5 minutes) Have the class „thought shower" some alternative activities to replace watching TV (they should refer to the ideas they generated in activity 12.3). Record their suggestions on a large piece of paper that can be displayed in the classroom. We strongly recommend that extension activity 12.1, Class Data (page 190), be included during Week 2.

ESTIMATED TEACHING TIME: 50 minutes.

END OF WEEK 2

1. (15 minutes) At the end of the second week, have pupils calculate the number of hours watched per day and per week and graph their data.
2. (10 minutes) Pupils should compare their Week 1 and Week 2 graphs and use activity 13.1, Interpreting Week 2 Data (page 188), to help them analyse their results.
3. (5 minutes) Put pupils into groups of four. Have pupils share their graphs and results. Pupils should calculate the average change in screen time for their group and report their findings to the class. If pupils used different types of graphs to display their data, they should discuss and record the advantages and disadvantages of each type of graphic representation.
4. (10 minutes) Have the groups report their findings to the class.
5. Ask pupils the following:
    - What conclusions can you draw from the class findings?
    - Did the class as a whole meet the goal of watching TV and playing computer games for two hours or less per day?
    - What recommendations about screen time patterns can you make?

EXTENSION ACTIVITIES

EXTENSION ACTIVITY 12.1

1. During Week 1 and Week 2, pupils should record their daily total viewing time on the Class Data charts. Having pupil record their data as they enter the classroom each day will help remind them of their assignment. (Consider making this an anonymous activity by assigning each pupil a number, so that they don‟t feel inclined to fabricate their data).
2. At the end of Week 1, ask several volunteers to calculate the class daily average for Week 1 and to construct a bar graph of the results.
3. At the end of Week 2, ask several volunteers to calculate the class daily average for Week 2 and to add this information to last week‟s bar graph.

1. Ask the pupils how their life would be different if they had no TV.
2. Ask pupils how much technology there is in their school and community. Have them make a list of the inventions that have helped their town, school, or home.
3. Have pupils write a story or essay explaining why technology has brought the world many advances, but has not necessarily been good for health. They should give examples.
4. Ask pupils to identify which areas of the world have the least and the most technology. Are the people less or more active than people in industrialised nations? Which countries have health problems related to eating too much and being too inactive?

WRITING ACTIVITIES

WRITING ACTIVITY 12.1

Write an essay about what life would be like without TV.

TEACHER RESOURCES

BACKGROUND MATERIAL

CHANGE! endorses the American Academy of Pediatrics‟ recommendation to limit screen time to no more than two hours per day.

CHANGE!'s activity message: Physical activity promotes health and well-being and offers opportunities to socialise and have fun. Children should be moderately to vigorously active for at least 60 minutes every day as part of play, games, sports, chores, transportation, and planned exercise. At least twice a week this should include weight-bearing activities that produce high physical stresses to improve bone health, muscle strength and flexibility. This amount of physical activity can be achieved in a number of short ten minute (minimum) bouts. How long, how hard, and how often you are active will determine how fit you are! You can improve fitness by increasing the frequency (if you are not exercising regularly), increasing

the intensity (doing something faster, doing more repetitions), or increasing the time you spend on each exercise.

Included in the concept of TV time are the following: TV shows, videos/DVDs, films at the cinema, and computer and video games. Perhaps it would be wise to ensure that the type of video games this includes isn‟t active ones, such as some games promoted on the Nintendo Wii. Please ensure that this means only the truly active games (i.e., ones that involve more than arm/thumb movement, such as the more active games on the Wii). Pupils should aim for a daily average of two hours or less for all of these sources of "screen time" combined. Computer time spent doing homework is not targeted for reduction by Power Down.

SPECIFIC BACKGROUND MATERIAL

- **How much activity is needed to obtain health-related benefits?**
  Moderate amounts of daily activity are recommended for people of all ages. However, physical activity need not be strenuous to be beneficial. Just a small increase in physical activity can generate genuine health benefits, such as a reduction of body weight and the risk of heart attack, hypertension, and death. For adults, 30 minutes or more of moderately intense activity, such as walking, on most days of the week is beneficial for health. Some kind of regular vigorous activity, however, is the best way to improve cardiorespiratory fitness. Children and adolescents should aim for 60 minutes of moderate to vigorous activity every day. This is beneficial for physical development, maintaining proper energy balance, and enjoying the feelings of fun and well-being that physical activity provides. At least twice a week this should include weight-bearing activities that produce high physical stresses to improve bone health, muscle strength and flexibility. This amount of physical activity can be achieved in a number of short ten minute (minimum) bouts.

  CHANGE!‟s inactivity message: Limit screen time and other recreational screen time to two hours or less per day. The American Academy of Pediatrics makes a similar recommendation for limiting screen time.

- **Why is it important for adolescents to understand the changing lifestyles of the world?**
  Technology is greatly affecting the play and leisure interests of children. Data shows that some children spend more time watching TV than they do engaging in any other activity except sleeping. In 2005 the average adolescent viewed approximately 21 hours per week, but that number jumps to 28 hours when you include videos, DVDs, and pre-recorded shows. This is nearly as much time as spent in school. Add this to computer, video games, and other media that might be in use simultaneously, and altogether children

manage to pack about 8 ½ hours of media content into about 6 ½ hours of time every day. Essentially, for many children media consumption has become a full-time job! Despite the trend for using multiple media formats, television still remains the primary media format consumed by children. However, as television content expands to other formats (iPods, computers, mobile phones), so too will children‟s vulnerability to the harmful effects of advertising. These appear to be high estimates, however, The American Academy of Pediatrics recommends limiting screen time to two hours or less per day.

Television viewing is significantly associated with overweight and obesity in children. Excessive screen time contributes to a sedentary lifestyle and promotes poor nutrition by exposing children to food advertising for high-calorie, low-nutrient foods. Food marketing on television directly influences what children eat and what they ask their parents to buy. TV watching is associated with increased calorie intake as a result of the increase of foods advertised on television, overweight, elevated cholesterol levels, cigarette smoking, and poor cardiorespiratory fitness. TV watching also leads to less time spent reading. It has been found that lack of parental control over TV time, having a television in the bedroom, and an absence of family dinners are all associated with increased viewing.

Children who are aware that their parents‟ and grandparents‟ lives were very different in their childhood may better appreciate the need for activity. Inactivity is dangerous to health. It increased the risk of developing heart disease, diabetes, colon cancer, obesity, and osteoporosis.

- **In what way have leisure pursuits changed in recent years?**

  Today, TV and computers hold great fascination and interest for most children. These technologies, along with a rise in crime, a dramatic decline in the number of park keepers, parents‟ changing work patterns, more single-parent families, and an erosion of the sense of community have all been cited as reasons for the decline in outdoor play. This is unfortunate because outdoor play is something that has been a part of growing up since the beginning of time. Children are less active now than were children in the past. Those who are active spend more of their activity time in supervised, structured school and community programmes.

- **In what way have occupations and lifestyles changed?**

  When hunting, gathering, and farming were required for food, activity was a central part of life. Adults and even children were required to work 12 to 16 hours a day during certain times of the year. Before motorised transportation, people also expended more energy walking and running from place to place.

Even early factory, mill and mining jobs required long hours of moderately intense to vigorous activity. Working 12 to 13+ hours a day, six days a week (72 hours per week or more), was common for even women and children. However, as we developed machinery and technology, occupational work, housework, and transportation have required less overall physical activity, and shorter working hours. Jobs that used to require moving around now can be accomplished by sitting in front of a computer. Even many construction and farming jobs have become less active because machinery is available that achieves higher rates of production and efficiency than manual labour. Children likewise spend less time in physical activity, particularly in urban areas where facilities for recreation are often limited.

- **How have these changes affected lifestyle and health in the UK?**
  Jobs and leisure-time activities have both become less active. Inactivity in children and adults has increased, and as a result obesity is on the rise in both groups. For many people being physically fit means making an effort each day to be active and moving. The increase in gyms and fitness studios has led many children to misunderstand the requirements of fitness and health. Many have been discouraged from exercising because they think they need to be athletes to be fit. Excessive exercise is not required to maintain good health – merely regular movement and muscular use is sufficient. Of course, higher levels of fitness will result only from more rigorous training.

- **What are the recreational opportunities for children?**
  Funding for recreation both in schools and towns is a constant battle. The expense of joining or using many facilities is also a hindrance to participation for many. Youth clubs, sport clubs, and gyms, however, are great ways for children to get regular activity. However, free play is an important source of physical activity, which comes at no expense! Local parks are underused for recreation, as are swimming pools, which are free for family-use in Wigan, and the seaside. This links well to Lessons 4 and 5, which map activity opportunities in the pupils‟ local area.

- **How do we encourage children to be active?**
  Organised sport teams and recreation help some children become involved in physical activity. Moderating screen time to two hours or less per day will encourage other more physically active uses of their free time. Moving TVs out of the main activity areas or bedrooms helps children forget about the TV. If pupils are surrounded by educators and families who are active themselves, they will also develop an understanding of the benefits of movement and fitness and seek ways to be active. Role modelling at school and home are

both important to pupils. What came out of the focus groups conducted as part of informing this intervention was that pupils tend to favour same sex roles models.

Providing opportunity and encouragement for unstructured play outside, where possible, is also important. Psychologists and others say unstructured outdoor play fosters a deep appreciation for nature and a sense of independence, creativity, and serenity.

HOMEWORK ANSWERS

- In the 1800s most children were required to spend a large portion of their day doing chores or working in factories. They also had to walk long distances to school or work. Wealthy children had more time for leisure activities and therefore engaged in less physical activity. Children today are required to do fewer chores and are frequently transported by car, train or bus. Most of their day is spent doing schoolwork. They also engage in a lot of inactive leisure activities. Advances in technology and the passing of child labour laws, as well as interest in TV, have done much to decrease the physical activity of children.

POWER DOWN TIPS

These are 10 simple messages focused on decreasing screen time. You can write a different one on the whiteboard every day, or use an overhead transparency or SMARTBoard.

Did you know?

1. The average child spends more time watching TV than any other activity except sleeping.
2. Kicking the TV habits gets easier as time passes.
3. You don‟t have to sit still while watching TV – you can be dancing, cleaning, cooking, or doing something else.

Strive to Decrease TV Time

1. In 2005 the average child viewed TV approximately 21 hours per week, but that number jumps to 28 hours when you include videos, DVDs, and pre-recorded shows.
2. One easy way to cut down on TV time is to take the TV out of the room where you sleep (if applicable). If you don‟t want to physically take it out of the room, you can just unplug it.
3. During Power Down week, post TV tracking reminders on refrigerators, bulletin boards, and near TV sets.

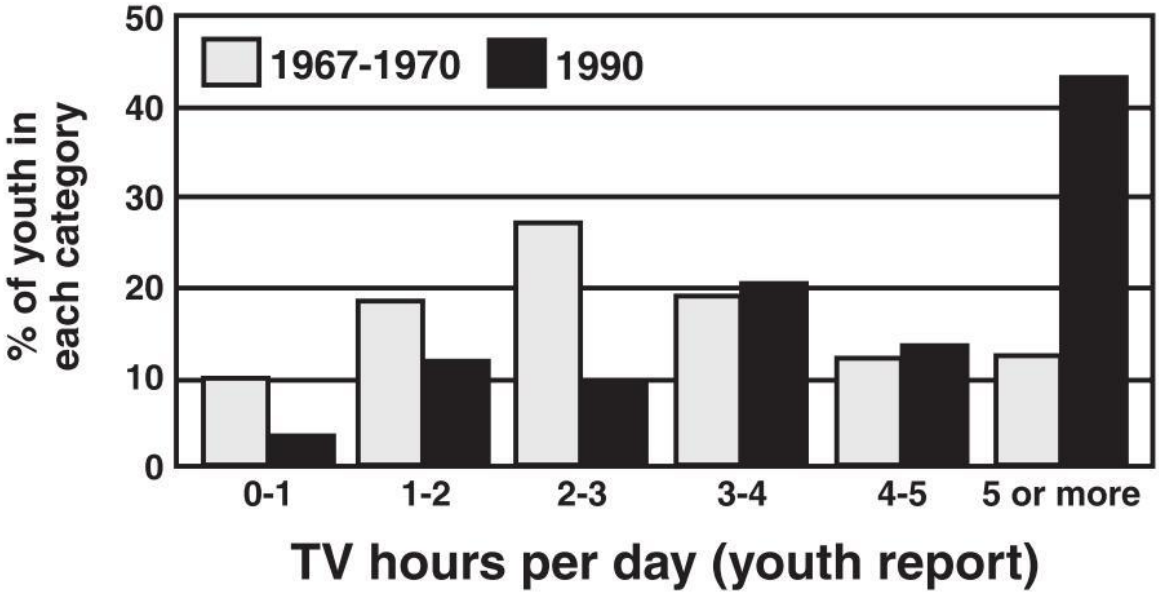
4. Watch TV only when your favourite show is on.

Trade TV Time for Active Time

1. Watching less than two hours of TV each day can help you get fit!
2. Take note of the times when you watch TV but you aren‟t really interested – when you channel surf or watch repeats. Take this as an opportunity to be physically active instead.
3. Physical activity builds fitness, is fun, and helps release energy! Just a small increase in physical activity can generate real benefits.

TV Hours Per Day

Hours of TV viewed per day in children aged 12-17 in 1967-1970, vs. 1990



Name _____

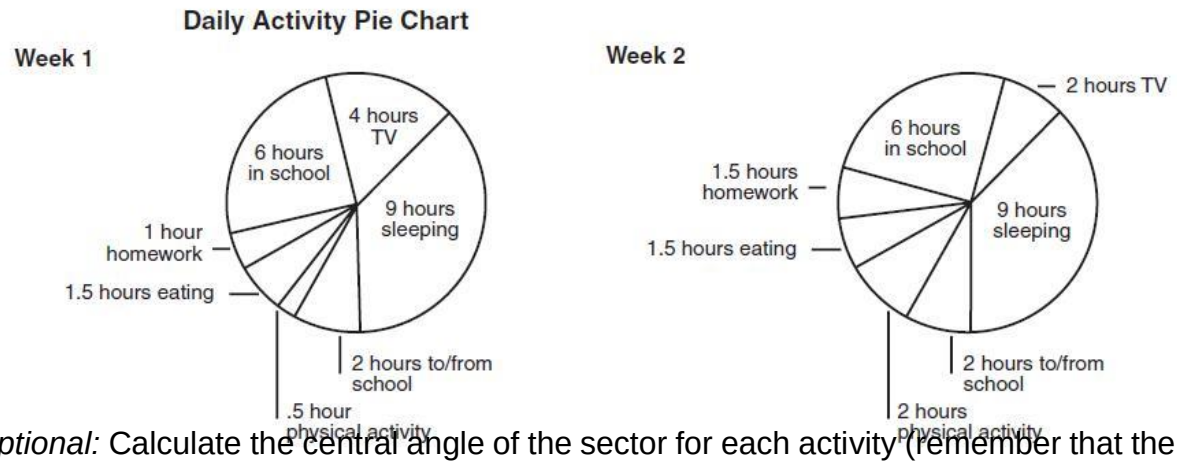
Graphing Data

Choose one of the following types of graphs (pie chart, line graph or histogram/bar chart) to represent your screen time hours.

Pie Chart

How much time do you spend watching TV and videos/DVDs and playing computer games?

- Take a *typical* day from Week 1 and a *typical* day from Week 2 (Power Down week).
- Create a pie chart for each week with the following categories:
  - School
  - TV, videos/DVDs and computer/video games
  - Sleeping
  - Eating
  - Homework
  - Physical activity
  - Going to and from school
  - Other
- Round to the nearest half hour.
- Use a different colour for each sector.
- Remember to label each sector.

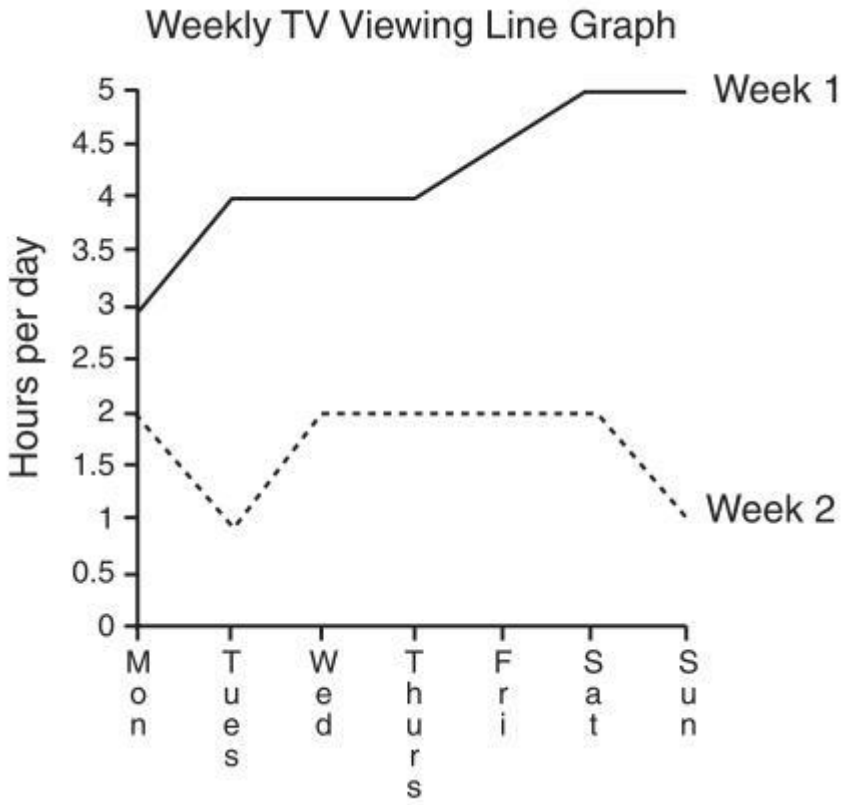


Optional: Calculate the central angle of the sector for each activity (remember that the whole pie has 360 degrees). Calculate the circumference and the area of your circle. Record your findings next to the pie charts.

Line Graph

Create a line graph (or co-ordinate graph) comparing screen time in Week 1 and Week 2 (Power Down week).

- Put the number of hours of TV watched on the vertical axis and the days of the week on the horizontal axis.
- Plot the hours per day you spent watching TV and videos/DVDs and playing computer games.
- Use a solid line to connect Week 1 data points and a dashed line to connect Week 2 data points (or you could use different colours for Week 1 and Week 2).
- Don"t forget to use a Key.

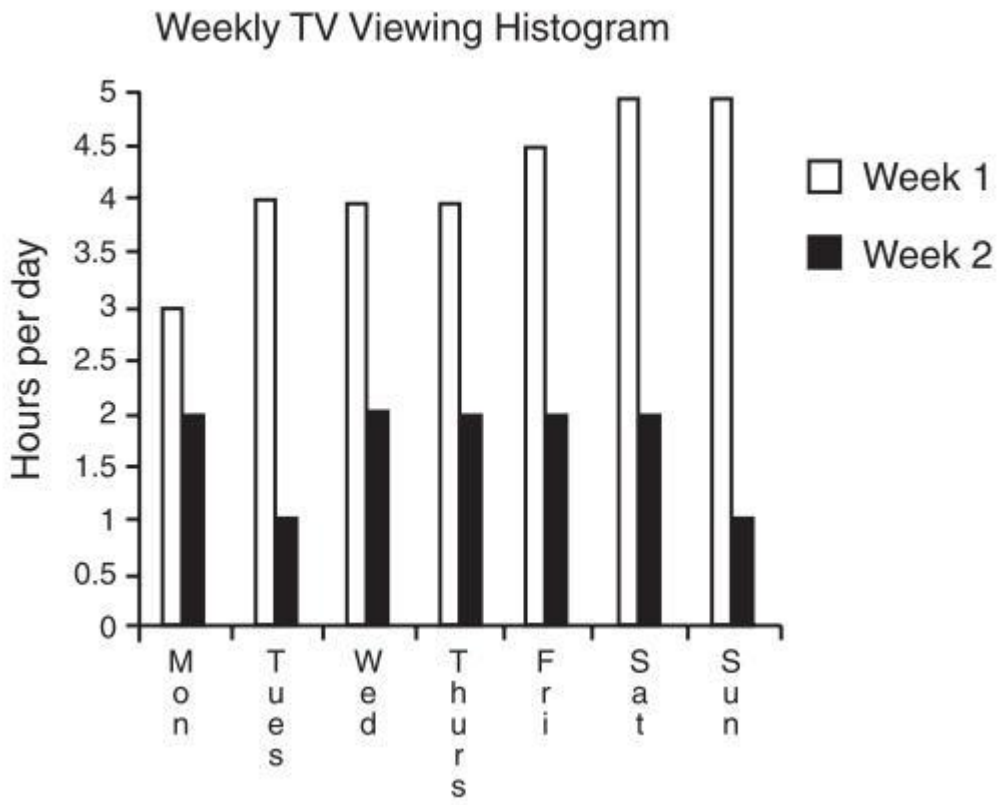


Histogram

Create a histogram (bar chart) that compares the number of hours you spent watching TV, watching DVDs/videos or playing computer/video games, during Week 1 to the number of hours spent during Week 2.

- Put the number of hours of TV watched per day on the vertical axis and the days of the week on the horizontal axis.
- Create one bar for each day you spent watching TV and videos and playing computer games.

- Add a different coloured bar next to each of your Week 1 bars to represent your screen time for Week 2 (see example).
- At the far right of the horizontal axis graph your Week 1 and Week 2 averages.



Optional: Chart the Week 2 weekly averages as individuals and as a class.

Name _____

Start date _____

Activity 12.1

Screen Time Charts

Screen Time Chart Week 1				
Estimated daily average prior to doing this activity:				
Day of Week	**TV and DVDs**	**Films at the Cinema**	**Computer/Video Games**	**Total Time**
(write in day of the week)	(list time spent in each activity, rounded to the nearest half hour)			(add times across)
Daily Average:		**Weekly Total:**		

Screen Time Chart Week 2				
Estimated daily average prior to doing this activity:				
Day of Week	**TV and DVDs**	**Films at the Cinema**	**Computer/Video Games**	**Total Time**
(write in day of the week)	(list time spent in each activity, rounded to the nearest half hour)			(add times across)
Daily Average:		**Weekly Total:**		

Task:. It is important to watch less than two hours per day watching a screen. **During week 2** try to replace some time spent watching TV and playing video/computer games with doing some physical activity with your family.

Question: What family activities did you do instead of watching TV? Were these activities fun?

_____

_____

_____

_____

Your Signature: **Parent/Carer Signature:**

_____ _____

Name _____

Activity 12.2

Relating the Past to the Present

How is your lifestyle different from that of your grandparents when they were your age? Interview a grandparent, great-aunt or great-uncle, neighbour, or a friend of the family who was 10-11 years old during the 1930"s, 1940"s, or 1950"s. Ask the following questions, or think of some extra ones of your own. Record the answers and your answer to the same questions in the table.

Question: When you were 10-11 years old...	**Adult Response** Name:	**Your Response**
During what years were you this age?		
Did you walk to school? If yes, how far did you walk?		
Did you walk home for lunch?		
What time did school finish?		
How much free time did you have?		
What did you do after school?		
What did you do for the fun in summer?		
What kind of chores did you have to do?		
Did your family own a car? How did you get around?		
Did school offer competitive sports? What kinds? Were there any competitive girls teams?		
Did you have a job? What was it?		
What kinds of games did you play? Where did you play them?		
How old were you the first time you watched TV? Owned a TV?		
How much TV do you currently watch on a typical day?		

1. Compare your responses to those of the adult you interviewed. Which of you had (has) a more active lifestyle at 10-11 years old? Why do you think this is?

_____

_____

_____

2. Compare your free time (amount and uses of it) to the free time of children living in the early 1800s. How do you account for this difference?

_____

_____

_____

3. Compare your physical activity (amount and type) to the physical activity of children living in the early 1800s. Give several details to support your answer. How do you account for the difference?

_____

_____

_____

4. How do computers, TV, the Internet, and DVDs affect the daily physical activity of children your age?

_____

_____

_____

Your Signature: **Parent/Carer Signature:**

_____ _____

Name _____

Activity 12.3

Interpreting Week 1 Data

Answer the following questions based on the results of your Week 1 screen time charts and graphs.

GRAPH INTERPREATION

1. On which days did you spend the most time in front of a TV, cinema screen, or computer?

_____

_____

_____

2. On which of those days did you spend the least time on these activities? Why did you watch less on those days?

_____

_____

_____

_____

3. How did your daily *estimate* compare to your *actual* daily average?

_____

_____

_____

_____

4. How much higher or lower was your average daily viewing compared to the national recommendations (two hours or less per day)?

_____

_____

_____

5. Using your Week 1 total viewing time as a weekly average, how much time have you spent on these activities in your lifetime? Explain how you came up with this answer.

_____

_____

_____

_____

_____

_____

_____

QUESTIONS FOR REFLECTION

1. What is the role of TV and computers in your life?

_____

_____

_____

_____

2. Why is it important to limit your screen time and other screen time?

_____

_____

_____

_____

_____

3. Compared to last year this time, are you more or less active? Why do you think that your activity level went up or down?

_____

_____

_____

_____

_____

4. „Thought shower" five activities you enjoy doing that could replace screen time.

Name _____

Activity 13.1

Interpreting Week 2 Data

Answer the following questions based on the result of your week 1 and week 2 screen time charts and graphs.

GRAPH INTERPRETATIONS

1. Describe how your viewing pattern changed during Week 2.

_____

_____

_____

_____

2. How much higher or lower was your average daily viewing in Week 2 compared to the national recommendations (two hours or less per day)?

_____

_____

_____

_____

_____

3. Using your Week 2 total viewing time as a weekly average, how much time have you spent on these activities in your lifetime? Explain how you came up with this answer.

_____

_____

_____

_____

_____

_____

4. What is the difference between the total lifetime viewing calculated above and the total you calculated using Week 1 data?

_____

_____

_____

_____

Name _____

Extension Activity 12.1

Class Data

Week 1

Student name	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Weekly total
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								

Week 2

Student name	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Weekly total
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								

Lesson 14

Hunting for Hidden Fat

This lesson aims to teach the children about the different types of fat that are found in foods and why some fat is better for us than others. To support this information the activities are based around reading food labels and graphing the total and saturated fat that is found in different foods relative to serving size – something that can be overlooked when foods are often packaged in „bags to share" or family-sized packs.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to be able to recognise the different types of fat found in foods and those listed on food labels, to make healthier choices.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Explain why fat is an important part of the diet.
2. Examine food labels to identify foods that contain unhealthy saturated and trans fat.
3. Discriminate between solid and liquid fat.

MATERIALS

- Activity 14.1, Can You Find It? (page 204)
- Activity 14.2, Graphing Fat (page 205)
- Whiteboard
- Food wrappers (including nutrition wrappers) from tinned fruits and vegetables, soups, chocolate bars, desserts, and baked goods (collect some on your own and ask pupils to bring some from home; you may want to assign foods form different food groups to ensure a variety of food labels)
- Small opaque container and a small object (such as a cotton ball, a piece of paper, or a feather) to place in the container
- Overhead Transparency 14.1, Reading the Food Label (page 200)
- Overhead Transparency 14.2, Food Examples (page 201)
- Student Resource 14.1, Food Labels (select a sample from the food labels provided to copy to round out the collection of labels brought in by the pupils) (page 202)
- Student Resource 14.2, Reading the Food Label (page 203)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour, 30 minutes.

PART I:

1. (Preparation Time) Before class, place a cotton ball, a piece of paper, a feather, or another small object in a small, covered, opaque container.
2. (3 minutes) During class, ask the pupils to guess the contents of the container (provide a few clues). Have them give reasons for their answers.
3. (2 minutes) After several guesses have been given, say to the pupils, “Some of the foods we eat are like this container. They contain hidden ingredients that cannot be seen. Today, we‟re going to go on a hunt for foods that contain fat, particularly saturated fat”.

PART II:

1. (3 minutes) Ask the pupils to tell you where they might find fat in foods. Write the names of each food group (fruits and vegetables; bread, rice, potatoes, pasta and other starchy foods; meat, fish, eggs, beans and other non-dairy sources of protein; milk and dairy products; foods and drinks high in fat and/or sugar) on the board (or use the cards from Lesson 2, Carb Smart, page 38) and have the pupils name some foods from each group that contain fat. List fats such as butter, margarine, oil, and salad dressing separately.
2. (3 minutes) Discuss with pupils the reasons why fat is an important part of their diets (see background material).

3. (3 minutes) Stress the fact that there are different types of fat (saturated, unsaturated, and trans) that not only look differently but also behave differently in the body:
    - Healthy fat – monounsaturated and polyunsaturated fat – is usually liquid at room temperature; it comes primarily from plant sources, such as olive oil, canola oil, peanut oil, corn oil and safflower oil. Healthy fat is also found in nuts, peanut butter, avocados, and fish. Healthy fat can help reduce the risk of heart disease.
    - Unhealthy fat – saturated fat and trans fat – is solid at room temperature; it often comes from animal sources or from oils that have been partially hydrogenated, a chemical process that turns liquid oil into a solid. Unhealthy fat increases the risk of heart disease.
    - Discuss why a person should pay attention to the types of fat eaten.
4. (2 minutes) Tell pupils that they will investigate all of the food groups to find foods that contain healthy fat as well as foods that contain unhealthy fat.

PART III:

1. (2 minutes) Distribute activity 14.1, Food Labels (page 204), and actual food labels or food containers or copies of food labels to pupils. If possible, hand out a wide variety of labels, including labels from tinned and frozen fruits and vegetables, desserts, and ready meals.
2. (3 minutes) Explain to pupils that food labels contain information that can help a person make smart decisions about whether a particular food fits into the healthful and balanced diet he or she is trying to eat.
3. (4 minutes) Display overhead transparency 14.1 (page 200) and distribute student resource 14.2 (page 203) (both are entitled Reading the Food Label) to the pupils. Explain that one specific thing food labels address is the amount and type of unhealthy fat (saturated fat) contained in a food. Food labels also present other information, such as the number of Calories a food provides, certain vitamins and minerals a food contains, and a list of ingredients in the food (with the most abundant ingredient listed first).
4. (5 minutes) Name one of the foods for which there is a label, and before examining the label, have pupils decide if they think the food contains fat and, if so, what type of fat it contains. Record pupils‟ answers on the board before investigations begin.
5. (5 minutes) Have pupils find the following information on one of the food labels:

    Food name: _____

    Serving size: _____

    Saturated fat per serving: _____

    % GDA of saturated fat: _____

Explain that the % GDA of saturated fat can help pupils figure out how much 1 serving of food contributes to their daily maximum allowance of saturated fat. If they add together the % GDA of saturated fat of all the foods they eat in a day, it should total no more than 100%. Ask for volunteers and to stand and state the % GDA of saturated fat found on their food labels. As each student stands, record the food on the board and add the percentages until the total reaches 100%. Try different combinations of foods to see how quickly it can take to reach 100% or how long it can take when eating foods with little saturated fat. From this information, ask pupils to identify foods and food groups that contain foods that are low in saturated fat.

Also explain that it is recommended that trans fat consumption should not exceed 2% of food energy per day; trans fat should preferably be avoided.

6. (8 minutes) Display overhead transparency 14.2, Food Examples:

Bacon	Avocado	Chocolate Bars
Steak	Peanut Butter	Hot Dogs
Chicken	Almonds	Pies
Fish	Peanuts	Cheese
Butter	Cashews	Cakes
Muffins	Guacamole	Doughnuts
Olive Oil	Lunch Meats	Puddings
Canola Oil	Ice Cream	Biscuits
Shortening	Margarine	Salad dressing made with vegetable oil

- Discuss foods that contain *visible fat* (fat that can be seen before, during, and after preparation).
- Have the pupils identify the foods with *visible, unhealthy fat* (bacon, steak, butter, shortening, margarine) and the foods with *visible, healthy fat* (olive oil, canola oil, salad dressing made with vegetable oil).
- Point out that some foods may not appear to have fat in them but actually do have fat hidden inside (chicken, fish, and muffins).
- Have pupils identify the foods with *hidden unhealthy fat* (chicken with skin, lunch meats, chocolate bars, hot dogs, pies, crisps, cheese, cakes, doughnuts, puddings, ice cream, biscuits) and the foods with *hidden healthy fat* (almonds, peanuts, cashews, avocado, guacamole).

7. (3 minutes) Ask the pupils, “What are some foods that you know are prepared with fat or oils?”

   Responses may include chips, doughnuts, pies, cakes, fried fish, fried chicken, stir-fries, and so on.

8. (3 minutes) Have pupils describe food preparation processes involving fat. As each type of fat (butter, oil, lard, margarine, etc.) is mentioned, list it on the board (see sample in table 14.1, page 196).

9. (5 minutes) Have pupils distinguish between fat sources that are solid at room temperature and fat sources that are liquid at room temperature. (Butter, lard, shortening, and partially hydrogenated vegetable oil are solid at room temperature; most vegetable oils, including olive oil, are liquid at room temperature).
10. (4 minutes) Have pupils tell what happens to solid fat when it is heated. (It becomes liquid). Explain to pupils that most of the time they should choose fat (and foods prepared with fat) that is liquid at room temperature over fat that is solid at room temperature. Liquid fat is usually unsaturated and is better for the body.
11. (10 minutes) Distribute activity 14.1, Can You Find It? (page 204). Have pupils (in pairs or small groups) examine various food labels and ingredients lists (using the labels they brought from home) and record the amount of total fat and saturated fat in each food selection on the activity sheet. Have pupils make bar graphs to compare the amounts of total fat and saturated fat in various foods (use activity 14.2, Graphing Fat, as a guide; page 205).

Table 14.1 Food Preparation Processes

What?	How prepared?	Using what?
Chips	Deep fried	Partially hydrogenated vegetable oil, lard
Cake	Baked	Butter, vegetable oil
Fish	Fried	Vegetable oil (in restaurants, partially hydrogenated oil), lard
Chicken	Stir-fried	Canola oil, peanut oil
Onions	Sautéed	Butter, olive oil, peanut oil

PART III:

1. (4 minutes) Have the pupils identify foods low in saturated fat – foods they should choose to reduce the amount of saturated fat in their diet. Use the results from the activity 14.1 as a basis for this discussion.
2. (3 minutes) Stress that pupils should not be fearful of fat. Remind the pupils to enjoy foods with healthy fat, such as olive, canola, and other plant oils; nuts and peanut butter; avocados; and fish. It is okay to occasionally eat a small serving of a food that is high in saturated fat (also known as a “sometimes” food). But on a regular basis, they should choose foods that are low in saturated fat and avoid trans fat.

PART V:

1. (Not in Class Time) Have pupils look in their refrigerators, freezers and cupboards at home and make a list of the foods they find that contain less than 1.5% of the GDA for saturated fat per serving (they can use activity 14.2 for this assignment), and contain no partially hydrogenated oils or shortening

in the ingredients list (indicates that there may be trans fat present in the food). A food with less than 1.5% of the GDA for saturated fat is considered to be low in saturated fat.

2. (15 minutes) Have pupils collect and make a collage of labels from foods with less than 1.5% of the GDA for saturated fat, and no partially hydrogenated oils. Encourage them to be creative in designing their collage and to add a message about nutrition and foods low in saturated fat appropriate for other pupils in their class or school. Display the collages for others to view.

EXTENSION ACTIVITY

1. Play a game of 20 questions by taping a food label on each player‟s back. Instruct the pupils to walk around the room and ask yes or no questions to determine which foods are posted on their backs. Pupils should only ask one question at a time and then move to another player. Sample questions may include the following:
    - Does my food contain fat?
    - Is the fat visible?
    - Does the food contain saturated fat?
    - Does the food contain a high amount of saturated fat?
    - Is the food from the milk and dairy group?
    - Is the food fried?

TEACHER RESOURCES

BACKGROUND MATERIAL

- Some fat is a necessary part of our diets. Fat makes food taste good, and it helps in the absorption and transportation of fat-soluble vitamins, such as vitamins A, D, E, and K. Fat is the primary way energy is stored in the body, and body fat cushions and protects our internal organs. In addition, components of fat are also involved in other important body functions such as maintaining healthy skin and hair.

- The problem is that most people in the UK consume too much fat, of the wrong type (namely, saturated fat and trans fat). This is one of the main reasons why so many people die of or are disabled by heart attacks in the UK. Every year, over 90,000 people die from heart disease in the UK; heart disease is the leading cause of early death and disability in the UK. Research suggests that the type of fat consumed is more indicative of disease risk. High intakes of saturated and trans fat increase the risk of heart disease. The good news is

that both decreasing the intake of unhealthy fat and including healthy fat in the diet can reduce the risk of heart disease.

SPECIFIC BACKGROUND MATERIAL

FAT FACTS

- Healthy fat, meaning monounsaturated and polyunsaturated fat, can decrease the risk of heart disease. It is usually liquid at room temperature. Examples of foods high in monounsaturated fat include olive, canola, and peanut oils; almonds; and avocados. Nuts (such as walnuts) and soybean, and corn oils are rich in polyunsaturated fat. Fatty fish contain a special type of polyunsaturated fat (omega-3 fat) that is also very healthy.

- Unhealthy fat, meaning saturated and trans fat, can increase the risk of heart disease. Saturated fat is solid at room temperature and comes mainly from animal-based foods. Examples include full-fat dairy products (such as whole milk, cream, butter, and ice cream), fatty cuts of meat, poultry skin, and lard, as well as palm oil and coconut oil. One way to minimise intake of unhealthy fat is to choose lean meats, remove poultry skin, select low fat or non-fat dairy products, and replace saturated fat with unsaturated fat in food preparation or grilling food instead of frying.

- Trans fat is formed when polyunsaturated vegetable fat is partially hydrogenated. This process turns the normally liquid oils into solid or semisolid fat. Trans fat is found in fast foods (such as chips, chicken nuggets, or onion rings), packaged snacks (biscuits, some crackers etc.), baked goods (such as biscuits, piecrusts, doughnuts, pastries, and cakes), hard margarines, vegetable shortening, and other foods made with partially hydrogenated vegetable oil. The consumption of trans fat is strongly associated with an increased risk of coronary heart disease, sudden death, and possibly diabetes.

- The *Dietary Reference Values* (DRV) recognise the importance of reducing saturated fat intake and sets a daily limit of 11% of total daily Calories from saturated fat. The Scientific Advisory Committee on Nutrition (SACN) also advises keeping trans fat consumption as low as possible. Research suggests it may be prudent to limit trans fat consumption from partially hydrogenated oils to no more than 2% of total energy intake per day. For a diet based on 2,000 Calories per day, that means limiting trans fat intake from partially hydrogenated oils to roughly 4 grams per day. For practical purposes, that means avoiding trans fat.

- While the milk and dairy foods, and meat, fish, eggs, beans and other non-dairy sources of protein food groups contain some foods that are high in saturated fat, there are many healthy options in these groups from which to choose. Low fat or non-fat milk, yoghurt, and cheeses are available in many schools and supermarkets; fish, skinless poultry, and beans provide protein without a lot of saturated fat.

- The same goes for grain-based, carbohydrate foods. While there are many healthy options, some grain-based foods contain high amounts of saturated fat or trans fat. Examples include biscuits, cakes, muffins and pastries (these foods are often high in sugar as well). Food preparation is another way unhealthy fat can sneak into food. Frying fish in partially hydrogenated oil or frying vegetables in butter, for example, can add unhealthy fat to a dish. Choosing healthy fat sources (like olive, vegetable, or canola oil) for frying is an easy way to avoid adding unhealthy fat.

- Reading food labels is an effective way to compare the fat and nutrient content of various foods. The place to find out whether a food is relatively high or low in a nutrient is the Guideline Daily Amount (GDA) on the nutrition label. The GDA for saturated fat is particularly important when making food decisions. If the GDA for saturated fat in an individual food is 1.5% or less, the food is considered low in saturated fat. Foods that have a GDA of 5% or more for saturated fat are considered high in saturated fat. The more foods chosen that have a GDA of 1.5% or less for saturated fat, the easier it is to stay within the saturated fat limit. The overall daily goal is to select foods that when added together contain less than the 100% of the GDA for saturated fat. The GDA is based on a diet of 2,000 Calories per day. A person‟s actual daily Caloric needs vary depending on age, gender, and level of activity; for more information on Caloric needs, see Keeping the Balance.

- There is no % GDA for trans fat because it is unclear if there is any safe level of intake. Food labels sometimes list the number of grams of trans fat per 100g and sometimes per serving, although it is not compulsory in the UK for trans fat content to be on the label. Keep in mind that products made with partially hydrogenated oils can still claim “0 grams trans fat” if the product contains less than 0.5 grams of trans fat per serving. These small amounts of trans fat can add up over the day. So make sure to watch out for the words *partially hydrogenated vegetable oil* in the ingredients list. Switch to an alternative product that does not contain partially hydrogenated oil, especially if it is a product you consume regularly.

Reading the Food Label

Label for 400g tin of soup

Serving size

Typical Values	Per 100g	Per ½ can	GDA*
Energy kJ	189kJ	379kJ	2000
kcal (Calories)	45kcal	89kcal	
Protein	2.3g	4.7g	45g
Carbohydrate	8.5g	16.9g	230g
(of which sugars)	(0.9g)	(1.8g)	90g
Fat	0.2g	0.3g	70g
(of which saturates)	(Trace)	(0.1g)	20g
Fibre	0.7g	1.4g	24g
Sodium	0.2g	0.5g	2.4g
Salt equivalent	0.6g	1.2g	6g

*Guideline Daily Amounts for average adults

Saturated fat per serving

Total GDA per day for saturated fat. A food with 1.5g or less saturated fat per 100g, is considered low in saturated fat.

NB. In the UK, trans fat does not have to be listed on a nutrition information label.

Food Examples

Bacon	**Cashews**
Steak	**Guacamole**
Chicken	**Salad dressing made**
Fish	**with vegetable oil**
Butter	**Lunch meats**
Muffins	**Chocolate bars**
Olive oil	**Hot dogs**
Canola oil	**Pies**
Shortening	**Cheese**
Margarine	**Cakes**
Avocado	**Doughnuts**
Peanut butter	**Puddings**
Almonds	**Ice cream**
Peanuts	**Biscuits**

Food Labels

Shortbread

Nutrition

Serving size: 20g/biscuit

Typical Values	100g contains	
Energy	2133kJ	
	509kcal	
Protein	6.0g	
Carbohydrate	63.3g	
Of which sugars	15.7g	
Fat	27.5g	
Of which saturates	18.2	GDA 15%
Fibre	1.9g	
Sodium	270mg	
Vitamin A	149µg	
Vitamin C	0mg	
Calcium	89mg	
Iron	1.5mg	

Muffin, American-style Choc Chip

Nutrition

Serving size: 85g

Typical Values	100g contains	
Energy	1617kJ	
	385kcal	
Protein	6.3g	
Carbohydrate	52.3g	
Of which sugars	28.4g	
Fat	18.2g	
Of which saturates	10.7	GDA 39%
Fibre	1.6g	
Sodium	254mg	
Vitamin A	72µg	
Vitamin C	0mg	
Calcium	161mg	
Iron	1.45mg	

Milk chocolate bar

Nutrition

Serving size: 50g

Typical Values	100g contains	
Energy	2177kJ	
	520kcal	
Protein	7.7g	
Carbohydrate	56.9g	
Of which sugars	56.9g	
Fat	30.7g	
Of which saturates	18.3	GDA 38%
Fibre	0.8g	
Sodium	85mg	
Vitamin A	11µg	
Vitamin C	0mg	
Calcium	220mg	
Iron	1.4mg	

Sausage roll

Nutrition

Serving size: 130g

Typical Values	100g contains	
Energy	1596kJ	
	383kcal	
Protein	9.9g	
Carbohydrate	25.4g	
Of which sugars	0.9g	
Fat	27.9g	
Of which saturates	11.2	GDA 61%
Fibre	(1.0g)	
Sodium	600mg	
Vitamin A	N	
Vitamin C	N	
Calcium	N	
Iron	N	

Reading the Food Label

Label for 400g tin of soup

Serving size

Typical Values	Per 100g	Per ½ can	GDA*
Energy kJ kcal (Calories)	189kJ 45kcal	379kJ 89kcal	2000
Protein	2.3g	4.7g	45g
Carbohydrate	8.5g	16.9g	230g
(of which sugars)	(0.9g)	(1.8g)	90g
Fat	0.2g	0.3g	70g
(of which saturates)	(Trace)	(0.1g)	20g
Fibre	0.7g	1.4g	24g
Sodium	0.2g	0.5g	2.4g
Salt equivalent	0.6g	1.2g	6g

*Guideline Daily Amounts for average adults

Saturated fat per serving

Total GDA per day for saturated fat. A food with 1.5g or less saturated fat per 100g, is considered low in saturated fat.

NB. In the UK, trans fat does not have to be listed on a nutrition information label.

Name ______________________________

Activity 14.1

Can You Find It?

Nutrition facts Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________	**Nutrition facts** Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________
Nutrition facts Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________	**Nutrition facts** Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________
Nutrition facts Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________	**Nutrition facts** Name of product: __________________ Serving size: _____________________ Total fat per serving: _______________ Saturated fat per serving: ____________ % GDA of saturated fat: _____________

Figure 14.1 Nutrition facts

Name _____

Activity 14.2

Graphing Fat

Instructions

Use different coloured pencils to graph the total fat and saturated fat, *per serving*, in your food.

15		
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		
	Total fat	Grams of saturated fat

15		
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		
	Total fat	Grams of saturated fat

Lesson 15

Beverage Buzz: Sack the Sugar

This lesson reinforces the objectives introduced in Lesson 6, Sugar Water: Think About Your Drink. The children are again asked to calculate the amount of sugar they consume from sugar-sweetened drinks and in a further activity, to reconsider their choices. The advertising of sugar-sweetened drinks is also covered with the children investigating a drinks advert of their choosing.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to consider their drinks choices in the context of a varied diet.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Measure the amount of sugar they consume from soft drinks and other sugar-sweetened drinks and evaluate the results.
2. Recognise how the media entices people to consume sweetened beverages.
3. Learn about the body"s response to sugar.
4. Identify the health benefits of different drinks.
5. Learn to replace soft drinks and other sugar-sweetened drinks with healthy drinks

MATERIALS

- Activity 15.1, Where‟s the Sugar? (page 218)
- Activity 15.2, What‟s Up With This Ad? (page 222)
- Activity 15. 3, Beverage Buzz (page 223)
- Activity 15.4, Your Top Three (optional) (page 224)
- Student resource 15.1, Beverage Facts (page 214)
- Sugar (1-2kg bag)
- Measuring teaspoons
- Plain paper cups or clear plastic cups

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour, 30 minutes.

PART I: EVALUATION OF SUGAR INTAKE

1. (10 minutes) Ask the pupils to name the drink they had last night at supper. Create a histogram on the board (combine similar drinks such as fizzy colas and lemonade, fruit squashes and fruit cordials). Calculate the percentage of pupils consuming the various drinks. What percentage had milk? What percentage had soft drinks or other sugary drinks? Explain that children aged 4-18 years derive over 35% of their total energy intake from soft drinks, sugary beverages, and other types of sweets.
2. (15 minutes) Explain to the pupils that they will be analysing their intake of drinks from the past 2 days. Distribute activity 15.1, Where‟s the Sugar? (page 218), to the pupils and instruct them to complete the table by recording the cans of soft drink, bottles of sports drink, and cartons of fruit squash that they consumed over the previous 2 days. Then ask the pupils to calculate the number of teaspoons of sugar consumed from soft drinks, sports drinks, and fruit squashes and to sum these amounts to determine the total amount of sugar they consumed from sugar-sweetened drinks over the past 2 days.

> You may need to assist pupils in estimating the amount of soft drink they consumed if they consumed something other than a can or bottle. This exercise is not meant to be an exact record but rather a rough estimate of the amount of sugar consumed from soft drinks.

> Pupils who did not drink soft drinks the previous day may fill out the sheet based on what they drink on a typical day; if several pupils did not drink soft drinks the previous day or some pupils rarely drink soft drinks because of household rules, it may be more effective to conduct this activity in groups.

3. (10 minutes) Have the pupils evaluate their total intake of sugar. Distribute the cups and instruct the pupils to measure out the teaspoons of sugar they consumed over the past 2 days. Have them pour their sugar into the cups to visualise the amount. Discuss student observations – were the pupils surprised at the amount of sugar they consumed?
4. (Not class time) For a homework assignment, have pupils complete parts II and III of activity 15.1 at home.
   a. In part II (How Much Sugar Is This?), pupils will assess their sugar intake by converting teaspoons to grams, calculating their average intake of sugar and projecting their intake of sugar over time. A child who consumes just 1 can of soft drink and 1 individual carton of a sweetened drink per day (a total of 16 teaspoons, or 64g of sugar) may consume 112 teaspoons (448g) of sugar over a week, which translates to 1792 grams of sugar each month (using the simple calculation of 4 weeks in 1 month) and 21.5 kilograms of sugar each year.
   b. In part III (Calcium Switch), pupils will calculate the amount of calcium they would consume if they drank low fat or non-fat milk instead of soft drinks. Pupils will first calculate the amount of soft drinks they consumed in grams, and they will then use that number to determine the amount of calcium contained in the same amount of low fat or non-fat milk.
   c. In part IV (What Can You Say About Your Drinks?), pupils will write a paragraph that describes their current beverage intake and make recommendations for improvement.

PART II: SUGAR AND THE MEDIA

1. (4 minutes) Soft drink packaging has changed over time. Explain how the change in serving size has made it more likely for people to drink more soft drinks when they eat out or when they buy a bottle from a vending machine or a shop.
2. (4 minutes) Discuss other ways that companies encourage the consumption of their products. Instruct pupils to think about the advertisements that they see on television. Can they recall any ads for healthy beverages? Ask them to name some of the advertisements for sugar-sweetened drinks.
3. (10 minutes) Divide the class into small groups and give each group one copy of activity 15.2, What"s Up With This Ad? (page 222). Instruct the groups to select one beverage advertisement to consider. Read the five questions and have each group answer the questions about its selected advertisement. Discuss the group responses as a class (see teacher resources, page 210).

PART III: IDENTIFICATION OF SUGAR

1. (8 minutes) Distribute activity 15.3, Beverage Buzz (page 223) and student resource 15.1, Beverage Facts (page 214), to help pupils identify alternate words for sugar and sources of healthy nutrients. Pupils may work on the crossword individually or in groups. Display the solutions as an overhead and discuss the answers with the class.
2. (8 minutes) Invite pupils to create a list of healthy drink options, and discuss the best choices according to their health benefits. For example, the pupils might list
   - Plain or sparkling water (alleviates thirst and promotes hydration).
   - Non-fat or low fat milk (provides calcium for strong bones and teeth), and
   - 100% fruit juice (offers vitamins and minerals); note that consumption of 100% fruit juice should be limited to no more than 150ml per day.

PART IV: APPLICATION AND EXTENSION OF INFORMATION

1. (4 minutes) Ask pupils to describe why we might want or need sugar (it tastes good; it gives us energy). In what foods and drinks do we find sugar? We find sugar naturally in fruits and vegetables; these foods are healthy because they provide fibre and many vitamins and minerals. Low fat and non-fat milk and some dairy foods also contain sugar. Other foods and drinks have sugar added to them.
2. (4 minutes) Remind pupils that soft drinks and other sweet drinks contain high amounts of sugar and usually nothing else that is good for us – they basically contain just sugar and water. And the energy boost from sugary drinks does not last. Remind pupils that consuming sugary drinks before bedtime can cause damage to teeth, even after brushing and that sipping a sugar-sweetened drink over a period of time causes acid erosion to the teeth.
3. (4 minutes) Have the class stand up and do the wave (raising and lowering the arms as you might do at a sporting event). Explain that this is what happens in our bodies when we drink a whole can of sugary drink all at once (or eat sugary foods, like a pack of jelly beans): there is a quick rise in blood sugar, giving us energy, but our bodies work quickly to pull that sugar out of the blood and into storage (initially as „glycogen" in the fat tissues and the liver, and some to the muscle; any excess is converted to fat). That is why the quick boost of energy we feel after drinking a sugary drink does not last.
4. (8 minutes) Read the following scenario to the class.
   - Michael is playing chess as part of the chess club at school. During a break, the chess club coach gives Michael and other club members fruit squash to drink. Michael starts playing chess again, and at first he is feeling great, but he starts to feel sluggish before the end of the afternoon and has a hard time concentrating on his final match.

a. Ask the pupils to discuss (in small groups or as a class) what happened. How could Michael and his coach have prevented the late-afternoon slump?

b. Possible solutions may include the following: the coach can provide water to quench the players‟ thirst and fruit such as orange wedges, bananas, or unsweetened dried fruit to provide energy (without causing the quick rise and fall in blood sugar that occurs with a sugary fruit squash).

EXTENSION ACTIVITY

1. Evaluate top beverage choices using option activity 15.4, Your Top Three (page 224). Instruct pupils to pretend that they just got back from break time or PE and to choose their top three drink choices from the list provided. Pupils can use student resource 15.1, Beverage Facts (page 214) to determine the grams of sugar in each drink, whether the drink contains vitamins or minerals, and whether the drink contains added sugars. Then the pupils can determine which one is the healthiest.

TEACHER RESOURCES

BACKGROUND MATERIAL

- A major source of sugar in the UK diet is sugar-sweetened drinks such as soft drinks, fruit squash, energy drinks, sweetened iced teas, and sports drinks. Children‟s consumption of soft drinks is rising. In fact soft drink consumption in England has quadrupled since 1980, with the average person consuming almost 1 litre of soft drink per week.

- The steady climb in children‟s intake of sugar-sweetened drinks is troubling for many reasons. As children‟s soft drink consumption has increased, their milk consumption has decreased. That is a worrisome trend, given that adolescence is a time of rapid bone development and increased calcium needs. Teenagers who do not maximise bone development during these crucial years (by getting enough calcium and regular physical activity) may increase their risk of osteoporosis in late adulthood.

- Sugar-sweetened drinks are considered a source of empty Calories because they basically contain just sugar and water, and they do not provide vitamins, minerals, or other key nutrients. A growing body of research strongly suggests that sugar-sweetened drink consumption is associated with excess weight gain in children and adults. One study found that 11 to 14 year old pupils who

increased their sugar-sweetened drinks consumption gained excess weight; for each additional 375ml serving of sugar-sweetened drink consumed per day, the odds of becoming obese increased by 60%. Reducing or avoiding empty Calories from sugar-sweetened drinks may help with weight control: another study found that when overweight teenagers reduced their consumption of sugar-sweetened drinks by replacing those drinks with Calorie-free ones, they lost about 0.5kg per month. More of an immediate concern is that dental caries and erosion of teeth can occur as a result of over-consumption of sugar-sweetened drinks. Other research connects the consumption of sugar-sweetened drinks with a risk for type 2 diabetes.

- Over the years, little by little, packaging sizes of drinks have increased. In the 1950"s, a typical bottle of soft drink held 195ml; in 2005, the typical bottle held 500ml. Some restaurants and convenience stores offer supersized drink cups that hold up to 1.9 litres of soft drink. Some experts believe that the supersizing of sugar-sweetened drinks, combined with creative marketing, has increased the likelihood that children and adults will consume even greater amounts of soft drink. This lesson helps make children informed consumers by teaching them to assess their own drinks consumption and to consider the nutritional consequences of their choices. Children will also discuss popular ads for sweetened drinks and will be encouraged to select healthier drinks such as water for quenching thirst or low fat and skimmed milk for calcium; calcium-fortified soy drinks (choose soy or other non-dairy drinks that have no more than 12 grams of sugar per 250ml serving) and calcium-fortified 100% orange juice are also good sources of calcium.

- A healthy eating plan includes few if any drinks with added sugar. This includes soft drinks, fruit punches, sweetened iced teas, and sports drinks.* Children should also limit their consumption of artificially-sweetened drinks, since the long term effects of artificial sweetener consumption are unknown and since artificial sweeteners may encourage a taste for sweetness. The consumption of 100% fruit juice should be limited to no more than 150ml per day. Juice contains vitamins and minerals, but it naturally contains a large amount of fruit sugar (fructose) and it lacks the fibre found in fresh whole fruit. To make it easier to stay within the 150ml fruit juice limit, dilute a small amount of 100% fruit juice with sparkling water.

Source of background material in part from Center for Science in the Public Interest. (2005) *Liquid Candy: How Soft Drinks are Harming America's Health.* Washington, DC: Center for Science in the Public Interest.

*During most types of physical activity, children can get adequate hydration and energy by drinking water and having a healthy snack (such as orange slices). Most sports drinks are designed for endurance athletes who compete for more than an hour at high intensity. Save sports drinks for when children are participating in high-intensity, long duration sports competitions (greater than 1 hour) or for when children are vigorously active for a long time in the heat.

SPECIFIC BACKGROUND MATERIAL

Evaluating Media Advertising

Media messages can be evaluated by considering five key questions and five core concepts.

Five Key Questions

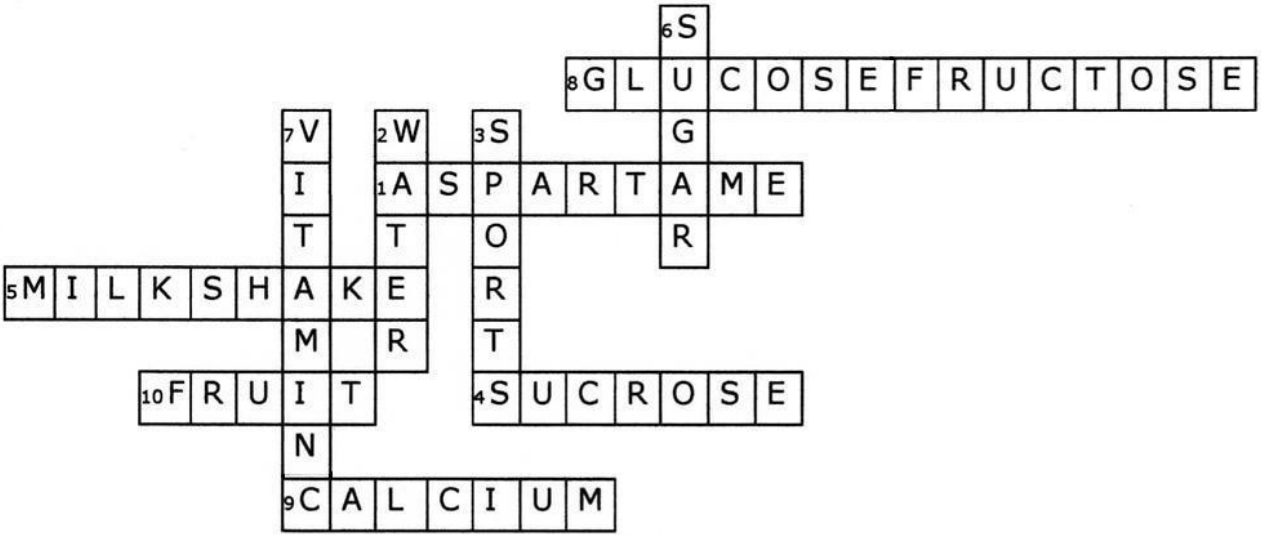
1. Who created this message?
2. What creative techniques are used to attract my attention?
3. How might different people understand this message differently from me?
4. What values, lifestyles, and points of view are represented in, or omitted, from this message?
5. Why is this message being sent?

Five Core Concepts

1. All media messages are constructed.
2. Media messages are constructed using a creative language with its own rules.
3. Different people experience the same media message differently.
4. Media messages have embedded values and points of view.
5. Most media messages are organised to gain profit or power (or both).

ANSWER KEY

ACTIVITY 15.3: BEVARAGE BUZZ



Across:

1. A type of artificial sweetener (9) (ASPARTAME)
4. The scientific name for table sugar (7) (SUCROSE)
5. This drink contains 2 types of sugar (9) (MILKSHAKE)
8. A type of sugar (syrup) used in some soft drinks (7-8) (GLUCOSE FRUCTOSE)
9. A mineral in milk (7) (CALCIUM)
10. Fructose is the natural sugar in this food (5) (FRUIT)

Down:

2. The best thirst quencher (5) (WATER)
3. Sounds healthy but this type of drink contains a lot of sugar (6) (SPORTS)
6. 9 teaspoons of this are found in some soft drinks (5) (SUGAR)
7. A micronutrient found in orange juice (7,1) (VITAMIN C)

Beverage Facts

Orange juice ingredients

Orange juice from concentrate (100%).

Orange juice

Nutrition

Serving size: 200ml

Typical Values	100ml contains
Energy	177kJ
	42kcal
Protein	0.5g
Carbohydrate	10.0g
Of which sugars	10.0g
Fat	0.1g
Of which saturates	Trace
Fibre	0.1g
Sodium	Trace
Vitamin A	0µg
Vitamin C	39mg
Calcium	10mg
Iron	0.2mg

Citrus juice drink ingredients

Water, sugar, fruit juices from concentrates 5% (orange, tangerine, lemon), citric acid, flavourings, acidity regulator (E331), stabilisers (E452, modified starch, E445), preservatives (E202, E211), sweeteners (aspartame, acesulfame K), colour (E104), contains a source of phenylalanine.

Citrus cordial drink

Nutrition

Serving size: 500ml

Typical Values	100ml contains
Energy	77kJ
	18kcal
Protein	Trace
Carbohydrate	4.1g
Of which sugars	4.1g
Fat	0g
Of which saturates	0g
Fibre	Trace
Sodium	0g
Vitamin A	0µg
Vitamin C	14mg
Calcium	0.5mg
Iron	0mg

Lemonade ingredients

Carbonated water, sugar, lemon juice from concentrate (2%), citric acid, flavourings, acidity regulator (E331), sweeteners (aspartame, sodium saccharin), preservative (E202), antioxidant (ascorbic acid), contains a source of phenylalanine.

Lemonade

Nutrition
Serving size: 250ml

Typical Values	100ml contains
Energy	78kJ
	18kcal
Protein	Trace
Carbohydrate	4.2g
Of which sugars	4.2g
Fat	0g
Of which saturates	0g
Fibre	Trace
Sodium	0.01g
Vitamin A	0µg
Vitamin C	Trace
Calcium	5mg
Iron	Trace

Energy drink ingredients

Carbonated water, sugar, glucose-fructose Syrup, citric acid, taurine (0.4%), glucuronolatone, acidity regulator (sodium citrates), natural flavourings, fruit and vegetable extracts (apple, hibiscus), caffeine, inositol, vitamins (niacin, pantothenic acid, B_6, riboflavin, B_{12},), preservative (potassium sorbate).

Energy drink

Nutrition
Serving size: 250ml

Typical Values	100ml contains
Energy	195kJ
	46kcal
Protein	0.4g
Carbohydrate	10.6g
Of which sugars	10.6g
Fat	Trace
Of which saturates	Trace
Fibre	Trace
Sodium	Trace
Vitamin A	0µg
Vitamin C	0mg
Calcium	0mg
Iron	0mg

Skimmed milk ingredients

Pasteurised skimmed milk.

Skimmed milk

Nutrition

Serving size: 200ml

Typical Values	100ml contains
Energy	144kJ
	34kcal
Protein	3.5g
Carbohydrate	4.8g
Of which sugars	4.8g
Fat	0.3g
Of which saturates	0.1g
Fibre	0g
Sodium	44mg
Vitamin A	1µg
Vitamin C	1mg
Calcium	125mg
Iron	0.03mg

Chocolate milkshake ingredients

Semi skimmed milk, glucose-fructose syrup, sugar, fat-reduced cocoa powder (1.1%), stabilisers (cellulose, carrageenan), caramel, vanilla flavourings.

Chocolate milkshake

Nutrition

Serving size: 500ml

Typical Values	100ml contains
Energy	300kJ
	70kcal
Protein	3.2g
Carbohydrate	11.1g
Of which sugars	9.6g
Fat	1.5g
Of which saturates	1.0g
Fibre	0.7g
Sodium	0.05g
Vitamin A	20µg
Vitamin C	Trace
Calcium	120mg
Iron	0.62mg

Water ingredients

Water

Nutrition
Serving size: 150ml

Typical Values	1000ml contains
Energy	-
	-
Protein	-
Carbohydrate	-
Of which sugars	-
Fat	-
Of which saturates	-
Fibre	-
Sodium	24mg
Vitamin A	-
Vitamin C	-
Calcium	55mg
Iron	0mg

Name _____

Activity 15.1

Where's the Sugar

Part I: What Did You Drink?

Fill in the Soft Drink Count table (table 15.1) with the number of 330ml cans of soft drink, bottles of sports drink, and cartons of juice drink you drank yesterday and the day before yesterday.

You may need to estimate the amounts that you drank and round to a whole number. For instance, if you opened a 500ml bottle but only drank half of it, you consumed approximately 250ml of soft drink.

Table 15.1 Soft Drink Count

	330ml can of soft drink **(9 teaspoons of sugar)**	**380ml energy/sports drink** or **500ml bottle of soft drink (13 teaspoons of sugar each)**	**200ml carton of soft drink** **(6 teaspoons of sugar)**
How many did you drink yesterday?			
How many did you drink the day before yesterday?			
Total drinks			

1. How many teaspoons of sugar did you consume from soft drinks over the past 2 days?

   _____ teaspoons.

   For example, if you drank 2 cans, then 2 cans x 9 teaspoons = 18 teaspoons of sugar.

2. How many teaspoons of sugar did you consume from energy and sports drinks or bottles of soft drinks over the past 2 days?

   _____ teaspoons.

   For example, if you drank 1 bottle, then 1 more bottle x 13 teaspoons = 26 teaspoons of sugar.

3. How many teaspoons of sugar did you consume from 200ml cartons of soft drinks over the past 2 days?

   _____ teaspoons.

   For example, if you drank 1 carton, then 1 more carton x 6 teaspoons = 12 teaspoons of sugar.

4. Add it all up: How many teaspoons of sugar did you consume from cans of soft drinks, energy and sports drinks, and cartons of drink over the past 2 days?

   Teaspoons of sugar from cans of soft drinks: _____
   + teaspoons of sugar from energy and sports drinks: _____
   + teaspoons of sugar from cartons of soft drink: _____
   = total teaspoons of sugar: _____

Part II: How Much Sugar Is This?

1. There are 4.2g of sugar in 1 teaspoon. How many grams of sugar did you consume in the past 2 days by drinking sugary drinks?

2. What is your average intake of sugar per day from soft drinks and other sweet drinks? (Hint: Divide the total number of teaspoons from the past 2 days by 2).

3. If you continue drinking the same amount of soft drinks and other sweet drinks, how many teaspoons of sugar will you consume over 1 week? (Hint: Use the average teaspoons of sugar consumed each day to calculate the teaspoons of sugar consumed over 1 week).

4. If 63 teaspoons of sugar (equals 265 grams) are consumed over a week (7 days), then how many grams of sugar might you consume from soft drinks and other sweet drinks over a month (use the average of 4 weeks in a month)? Over a year?

Part III: Calcium Switch

Soft drinks and other sweet drinks contain high amounts of sugar and usually nothing else that is good for us – they basically contain just sugar and water. That"s why we say that sugar-sweetened drinks give us empty Calories. Determine how much calcium you could consume if you drank low fat or skimmed milk in place of the soft drinks you have drunk over the past 2 days.

1. How much soft drink did you drink?

- Number of cans of soft drink ___ x 330ml per can = ____ml of soft drink from cans.
- Number of bottles of energy and sports drink ___ x 380ml per bottle = ____ml of soft drink from energy and sports drinks.
- Number of cartons of soft drink ___ x 200ml per carton = ____ml of soft drink from cartons.
- Add the „ml" of soft drink from cans and bottles to get the total millilitres of soft drink consumed: _____.

3. Each 100 ml of low fat or skimmed milk contains 123 mg of calcium.
   How much calcium would you have consumed by drinking milk instead of soft drinks? Note that children need 675mg of calcium each day.

   (Total number of „ml" of soft drink consumed † 100) x 123 = _____ **mg of calcium.**

Part IV: What Can You Say About Your Drinks?

Write a statement that describes your drinks over the past 2 days. Describe at least one health effect of your drinks. Do you need to make healthier choices? What could you do to improve your drink choices?

_____

_____

_____

_____

_____

_____

_____

_____

Name _____

Activity 15.2

What's Up With This Ad?

As a group, select one drink product for which you can recall a television advertisement. Use the ad for that product to answer the following questions. If you need more space, write on the back of this worksheet. Remember, members of your group may have different opinions, and that is okay.

Name of product:

1. Which company is sending the message?

2. What do you like about the ad? Think about how the ad catches your attention. What do you dislike about the ad?

3. Who is this ad for? Consider how you feel about the ad and how others (maybe someone older or younger or of a different gender) might feel about the ad.

4. What does this ad tell you about how people live? Can you relate to the ideas or lifestyles depicted in the message? Is anything left out?

5. What is the message trying to tell you or sell you?

Name _____

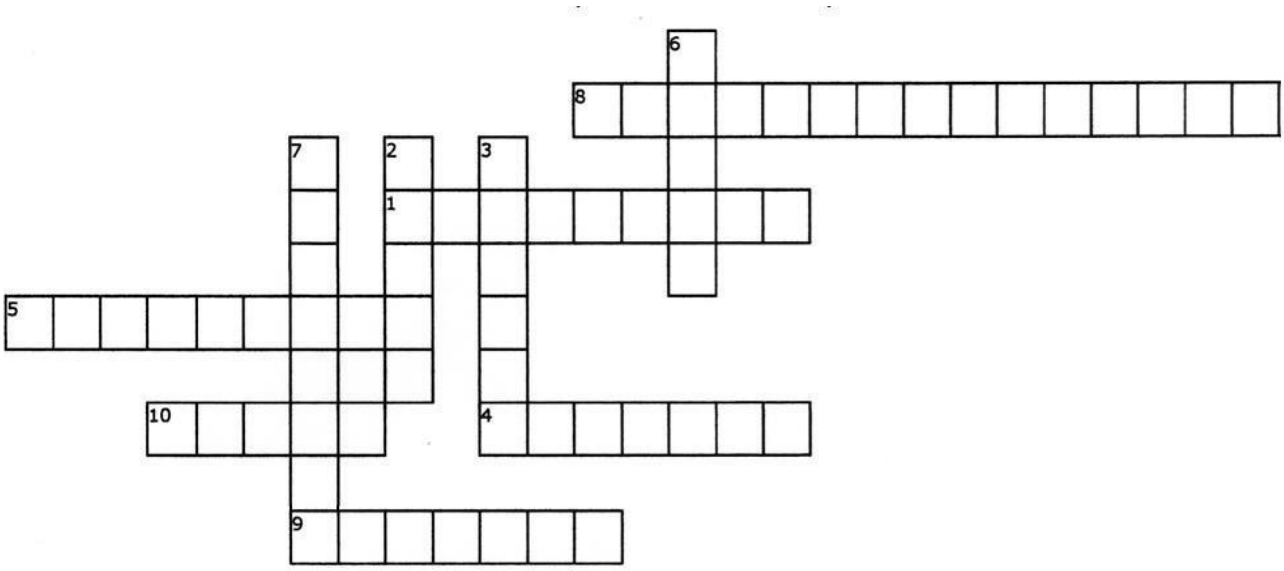
Activity 15.3

Beverage Buzz

Complete the crossword puzzle using the words in the following list. For help with the clues, look at the nutrition information on the Beverage Facts sheet that your teacher gives you.

Words:

water	glucose fructose	fruit	vitamin C	sugar
calcium	milkshake	sucrose	sports	aspartame



Across:

1. A type of artificial sweetener (9)
4. The scientific name for table sugar (7)
5. This drink contains 2 types of sugar (9)
8. A type of sugar (syrup) used in some soft drinks (7-8)
9. A mineral in milk (7)
10. Fructose is the natural sugar in this food (5)

Down:

2. The best thirst quencher (5)
3. Sounds healthy but this type of drink contains a lot of sugar (6)
6. 9 teaspoons of this are found in some soft drinks (5)
7. A micronutrient found in orange juice (7,1)

Name _____

Activity 15.4

Your Top Three

Pretend that you have just got back from PE or break time and you are thirsty. Out of the drinks in the following list, what would you want to drink?

- Water
- Sports drink
- Orange squash
- Soft drink
- Skimmed milk
- Milkshake
- Orange juice
- Lemonade
- Fizzy cola

Pick your top three choices and list them in table 15.2. For each drink, use the Beverage Facts sheet to fill in the number of grams of sugar, the names of the vitamins and minerals (if any), and the names of the added sugars (if any). Remember that there are many names for added sugar: corn syrup, dextrose, fructose, glucose, high fructose corn syrup, honey, maltose, sucrose, and sugar.

Table 15.2 Your Top Three

What are your three favourite drinks?	Sugar (grams)	Vitamins and minerals	Added sugars
1.			
2.			
3.			

Which one do you think is the healthiest drink and why?

_____

_____

_____

_____

Lesson 16

Muscle Mysteries

This lesson is designed to be infused into a classroom unit on the muscular system. In activity 16.1, pupils perform prescribed motions, observe which muscles are involved, and make conclusions as to the type of fitness that the motions contribute to when done as exercise. The activity reinforces the “three components of physical fitness” concept while giving pupils an opportunity to hone their anatomy skills and their powers of observation. In activity 16.2, pupils discuss ways that muscular, cardiovascular, and respiratory systems interact during exercise and how exercise training changes these systems, thus improving fitness. Pupils should be familiar with the functions of the human body systems prior to doing this activity.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

- For pupils to be physically active every day.
- For pupils to learn exercises they can practice every day.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Indentify the major muscles of the body and the motions they produce when they contract.
2. Describe the three types of fitness: muscular strength (anaerobic fitness), cardiorespiratory (aerobic) fitness, and flexibility.

3. Describe ways that the muscular, cardiovascular, and respiratory systems interact with each other.
4. Explain how exercise training affects these systems – improving fitness.

MATERIALS

- Student Resource 16.1, Muscles (page 241)
- Station cards (page 231)
- Activity 16.1, Solving the Muscle Mysteries (page 243)
- Activity 16.2, The Mystery of Training (page 244)
- Activity 16.3, Moving Muscles (page 245)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 30 minutes.

ACTIVITY 16.1: SOLVING THE MUSCLE MYSTERIES

(Note: This is not a workout – it is a series of activities to show pupils how muscles are used in various ways). Arrange your classroom into 10 workstations to accommodate the activities listed on the station cards. Some stations require a wall; others need some floor space. Post the activity description and illustration (station card) at each station. Ideally, divide the class into pairs of pupils. Adjust group sizes as necessary. This activity may require more than 45 minutes. Moving through the workstations takes approximately 25 minutes.

1. (5 minutes) Distribute Student Resource 16.1, Muscles (page 241), to the class. Discuss the function of the major muscle groups by generating discussion with pupils and writing answers on the board. Tell pupils that they do not need to memorise the muscle groups.
2. (3-5 minutes) Discuss the three types of fitness – muscular strength (anaerobic fitness), cardiorespiratory (aerobic) fitness, and flexibility – each of which uses muscles in a different way (see Teacher Resources).
3. (2-3 minutes) Distribute activity 16.1, Solving Muscle Mysteries (page 243), to pupils. On the worksheets, pupils are asked to identify the following:
    - Which type of fitness the activity would improve if done regularly.
    - Which muscles were used in the activity (using Student Resource 16.1 as a reference).
4. (10 minutes) Divide the class into pairs or small groups and move them to assigned areas. Review each activity with the class by having pupils at each station demonstrate the activity.
5. (25 minutes) Move pupils through the stations until each pair or group has completed all 10 activities. One pupil in each group will perform the activity at each station. Members of the group should take turns in this role. Have the

pupils spend 45 seconds doing each activity. They have another minute to complete the worksheet. One pupil can act as a timer and can read the station card to assist the pupil doing the activity.

(Note: Keep track of the time and move groups around the room in a clockwise fashion. The stations can be completed in any order. With 10 stations, the activity should be completed in 25 minutes).

6. (5-7 minutes) Ask pupils to return to their seats. Help pupils review their experiences by drawing a chart similar to the worksheet on the board and filling in and discussing answers.

ACTIVITY 16.2: THE MYSTERY OF TRAINING

In this activity pupils learn that training changes the anatomy and physiology of the cardiovascular, respiratory, and muscular system. They apply their understanding of these systems and how they"re integrated to explain the benefits of these changes.

13. (5-10 minutes) Use the following discussion questions to review the functions of the cardiovascular, respiratory, and muscular systems.
    a. What are the primary functions of each of the systems?
    b. How do they work together?
    c. What happens to each system during a bout of exercise (not long-term training)? (*Answer: The heart beats faster and harder. You breathe deeper and faster. You breathe deeper and faster. Your muscles repeatedly contract and relax).*
    d. How do these changes help a person meet the demands of exercise? (*Answer: The cardiovascular and respiratory system adjustments result in more oxygen being transported to the muscles*).
    e. Why do working muscles need more oxygen? (*Answer: To make energy for exercise*).
14. (15 minutes) Distribute activity 16.2, The Mystery of Training (page 244). Explain that pupils will learn how training changes some of the major organ systems and that they will need to apply what they know about the organ systems to explain the benefits of these changes. Have pupils work in pairs to read and complete the diagram and question.
15. (10 minutes) Ask several groups to present and explain their diagrams. Ask other groups to share their responses to the question. Help pupils understand how regular training affects the major organ systems and how this benefits the body during exercise and rest. (See the Teacher Resources and the Answer Key to help with this discussion).
16. (3 minutes) Inform the pupils that the should complete activity 16.3, Moving Muscles (page 245), with their family at home this week.

TEACHER RESOURCES

- ***CHANGE!*'s ACTIVITY MESSAGE**

  Physical activity promotes health and well-being and offers opportunities to socialise and have fun. Children should strive to accumulate at least 60 minutes of moderate to vigorous activity every day as part of play, games, sports, chores, transportation, and planned exercise. At least twice a week this should include weight-bearing activities that produce high physical stresses to improve bone health, muscle strength and flexibility. This amount of physical activity can be achieved in a number of short ten minute (minimum) bouts.

SPECIFIC BACKGROUND MATERIAL

- **Three Components of Fitness**

  There are many ways to look at fitness. *CHANGE!* focuses on three: cardiorespiratory (aerobic) endurance, muscular strength (anaerobic fitness), and flexibility.

  1. Cardiorespiratory (aerobic) endurance is defined as follows:
     - The heart‟s ability to get enough oxygen to the muscles to let the body maintain a certain level of activity for a long period of time.
     - The ability to perform activities, such as running, cycling, and swimming for long periods of time.
     - The ability of the heart, lungs, and muscles to carry and use oxygen to perform continuous and rhythmic exercises.
       - Long-term aerobic exercise increases the size and strength of the heart – a muscle. As a result, a trained heart can pump more blood per beat, and therefore beat more slowly at rest and during exercise. Regular aerobic exercise also increases blood volume and breathing volume. All these adaptations enable trained people to transport more oxygen to working muscles.
       - Aerobic exercise also changes muscles. It increases the number of muscle capillaries, which carry oxygen to the muscles. It also increases the number and size of the muscles, which increase the muscles ability to generate energy, improving muscle endurance. **(*Note*: The pupils do not need to know about muscles in this much detail).**
  2. Muscular strength (anaerobic fitness) is defined as follows:
     - The ability to lift or move the body or objects.
     - The ability of muscles to produce force at high intensities over short intervals of time.

- The ability to perform high-force exercises such as sit-ups for short periods of time (10 to 20 repetitions). Repetition means performing a movement without rest. Doing 10 to 20 “reps” means doing an activity such as sit-ups 10 to 20 times.
- Muscles get bigger with strength training mainly because they make more muscle cells. With more muscle cells, trained muscles can generate larger forces and therefore lift heavier objects.

3. Flexibility is defined as follows:
   - The ability to bend, stretch, and twist with ease.
   - The ability to move muscles and joints through their range of motion.
   - Flexibility exercises are muscle specific and can be done for all the major muscles. Instruct pupils to stretch to the point where muscles are taut, but not beyond that point. They should hold the stretch for at least 10 seconds to obtain any benefit from the stretch. Children should be warm before stretching, so do some gentle aerobic exercise for a few minutes before carrying out stretches.

- **Improving Fitness**

  You can improve fitness by doing the following:
  - Increasing frequency (if you are not already exercising regularly).
  - Increasing intensity (doing something faster, doing more repetitions or sets, or using heavier weights).
  - Increasing the time you spend on exercise.
  - Choosing new types of exercise to try. Different types of exercise involve different muscle groups and can work on different components of fitness.

- **Training Recommendations**

  Strength training should be done at least two times per week. Gradually build this up.

ANSWER KEY

ACTIVITY 16.1: SOLVING THE MUSCLE MYSTERIES

Station name	Type of fitness (flexibility, aerobic, or strength)	Muscles used
1. Up and down swings	Flexibility	Upper arm, shoulder, and upper back (deltoid group), and chest (pectoralis group)
2. Thigh stretch	Flexibility	Quadriceps in thigh
3. Calf stretch	Flexibility	Calf (gastrocnemius) and Achilles tendon
4. Wall push	Strength	Upper arms, shoulders, and upper back (deltoid group, brachialis, trapezius), and chest (pectoralis group)
5. Side hops	Aerobic	Calf (gastrocnemius and soleus), Achilles tendon, thigh (quadriceps and hamstrings), and heart
6. Jogging in place	Aerobic	Thigh (quadriceps and hamstrings), calf (gastrocnemius and soleus), and heart
7. Half knee bends	Strength	Thigh (quadriceps), calf (gastrocnemius and soleus), hips and buttocks (gluteus maximus), lower back (latissimus dorsi), and shoulders (pectoralis group, deltoids, and trapezius)
8. Toe raises	Strength	Calf (gastrocnemius and soleus)
9. Arm curls	Strength	Upper arm (biceps)
10. Head rotation	Flexibility	Neck and upper back (sternocleidomastoid and trapezius)

ACTIVITY 16.2: THE MYSTERY OF TRAINING

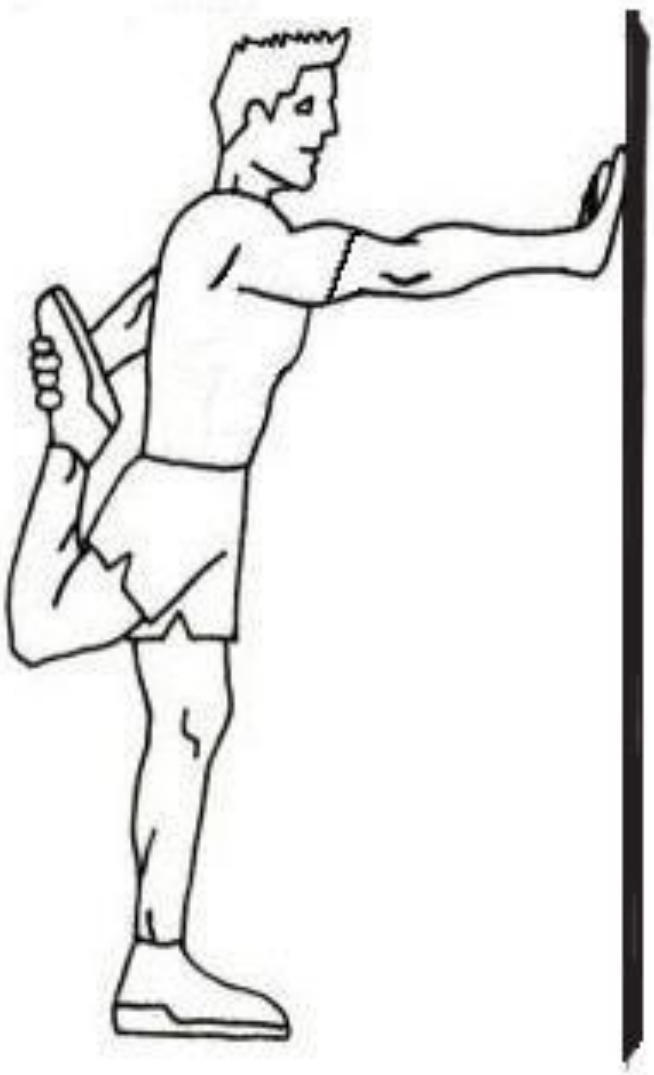
1. How training affects organs:
   Heart: Can pump more blood per beat, and pump fewer beats per minute.
   Skeletal muscles:
   - Get bigger from more muscle cells, so can work harder.
   - Get more capillaries to deliver blood to and from the muscles.
   - Increased ability to generate more energy during exercise. This results in greater strength and endurance.
2. Training made Lance"s heart larger and stronger, which allowed him to pump more blood to his working muscles. Training also enhanced energy production in Lance"s muscles so that he was able to cycle faster and for a longer period of time than his competitors. This carried him up mountains faster and over thousands of miles of roads with more endurance, therefore leading to victory.

Station 1: Up and Down Swings

Stand upright with feet shoulder-width apart and arms hanging loosely at your sides. Raise and stretch your arms over your head until your wrists touch. Move your arms in a circle downward until your wrists touch in front of your abdomen. Repeat for 45 seconds.

Station 2: Thigh Stretch

Lean against a wall for balance. Bend your knee and grasp your ankle with your hand. Pull gently until you feel tension. Hold for 20 seconds. Repeat with other leg.



Station 3: Calf Stretch

Stand about 60 cm from a wall with both hands pressed flat on the wall at shoulder level. Press your heels to the ground. Keeping your knees and hips straight, lean into the wall until you feel a pull behind your knee or leg. Increase the tension gradually. Hold for 30 seconds. Repeat with other leg.

Station 4: Wall Push

Place your palms flat against the wall. Make sure your arms are straight with your elbows locked and your back and legs straight. Slowly bend your elbows until your nose and chest touch the surface. Slowly push back up and lock your elbows again, making sure to keep your back and legs straight. Repeat continuously for 45 seconds.

Station 5: Side Jumps

Stand upright with your feet together and your hands on your hips. Jump about 30 cm to the left. Jump back to your starting position. Repeat jumping from side to side for 45 seconds.

Station 6: Jogging in Place

Stand upright with your feet about 5 cm apart. Jog in place, lifting your feet 10 to 15 cm off the floor. Hold your arms at your sides at a 90˚ angle. Continue for 45 seconds.

Station 7: Half Knee Bends

Stand upright with your feet shoulder-width apart. Place your hands on your hips. Bend your knees halfway, bringing your heels off the ground, while extending your arms forward at shoulder level with your palms down. Return to your standing position. Repeat for 45 seconds.

Station 8: Toe Raises

Stand straight with your weight on the balls of your feet. Lift your heels and push your body toward the ceiling repeatedly, each time lowering your heels back to the ground. Continue for 45 seconds.

Station 9: Arm Curls

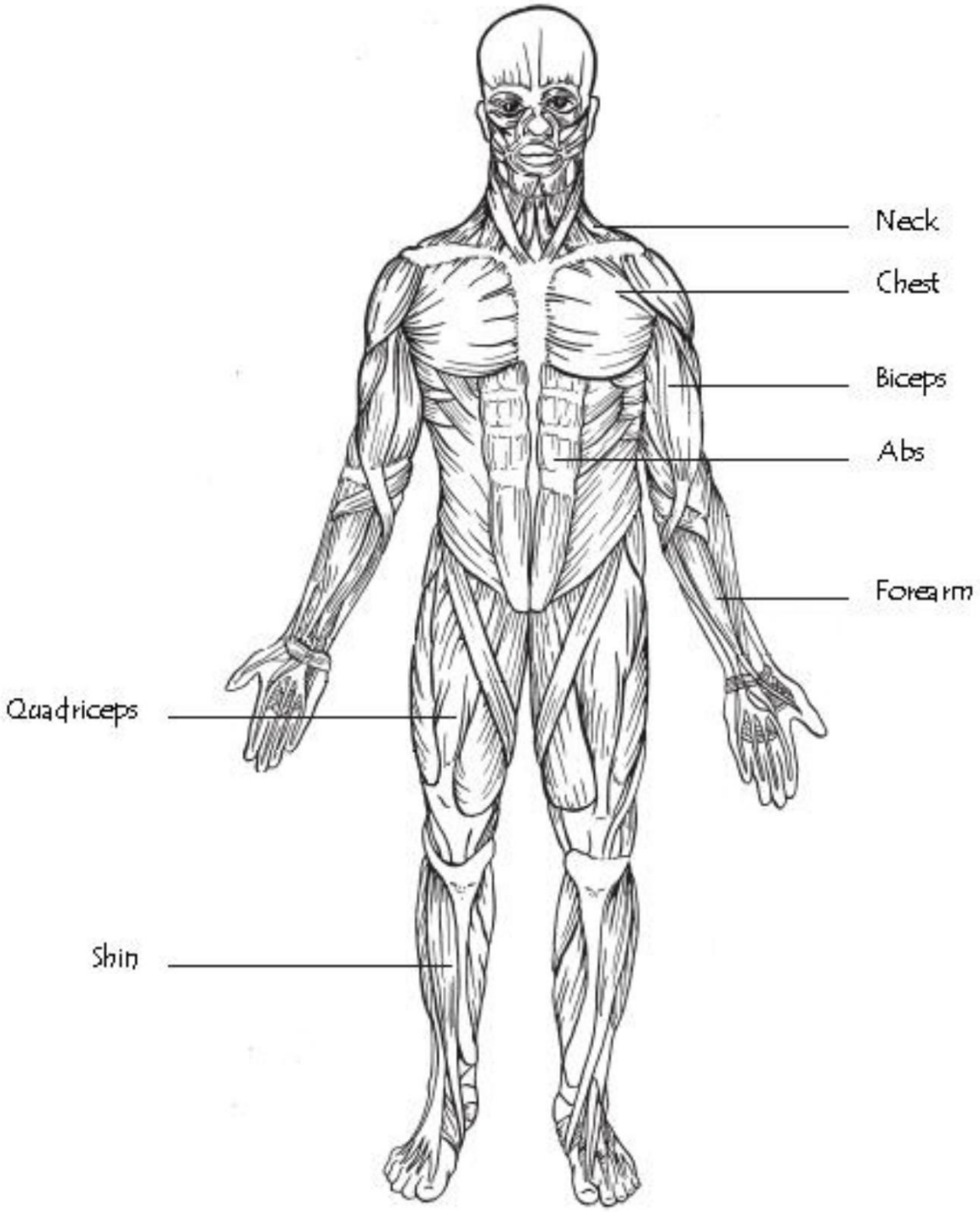
Stand straight with your arms hanging by your sides. Make a fist with your fingers facing forward. Bending your arms at the elbow, lift your fists to nearly touch your upper arm; lower slowly to your starting position. Repeat for 45 seconds.

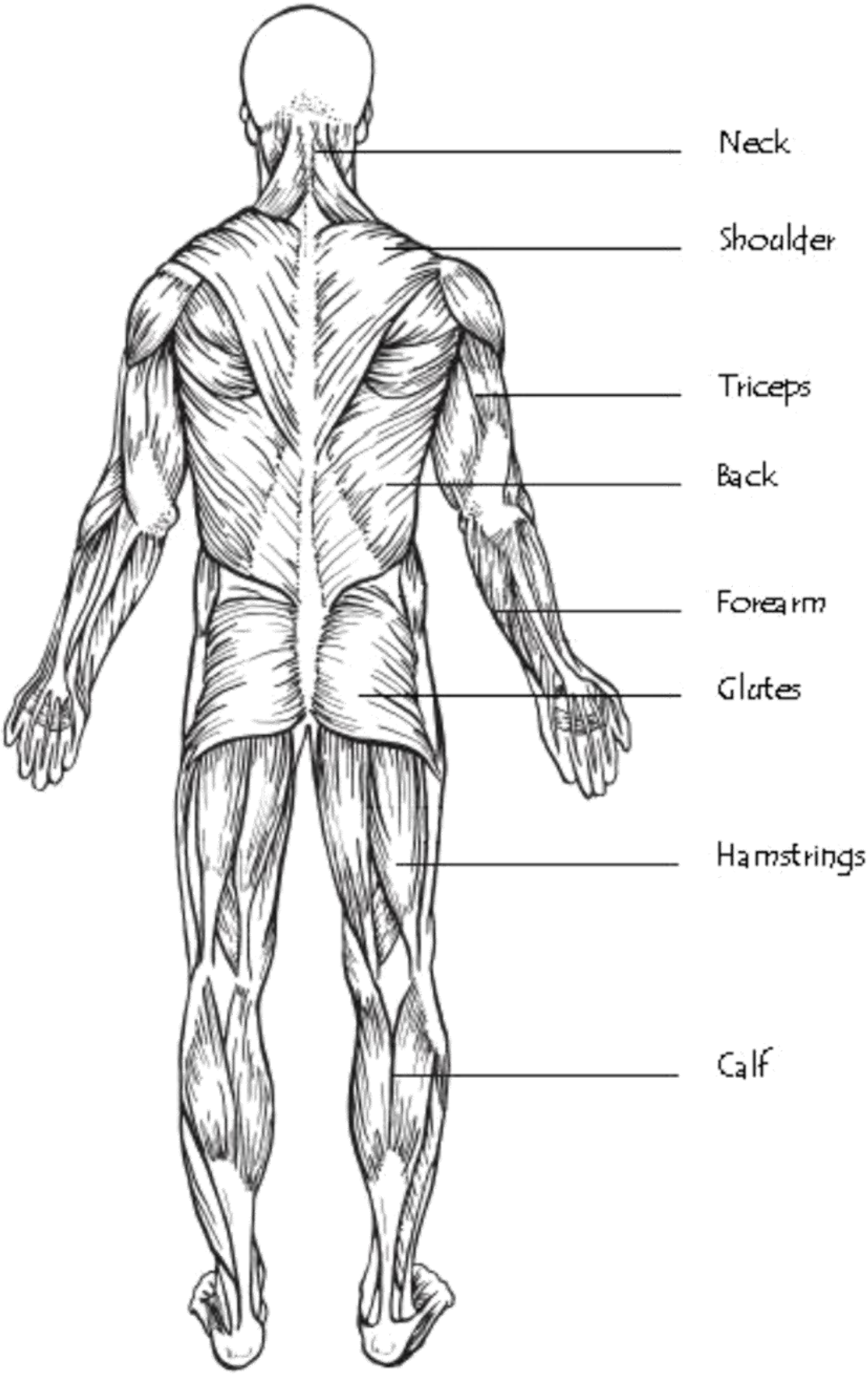
Station 10: Head Rotation

Stand upright, but relaxed, with your feet shoulder-width apart and your arms behind your back. Look straight ahead. Let your head fall forward and then far to the right in one smooth motion until you can look at the floor behind your right shoulder. Reverse the motion and return to the starting position. Let your head fall forward and to the left in one smooth motion until you can look at the floor behind your left shoulder. Reverse the motion and return to the staring position. Continue moving from right to left for 45 seconds.

Name _____ **Muscles**

Muscles




Neck
Shoulder
Triceps
Back
Forearm
Glutes
Hamstrings
Calf

Name _____

Activity 16.1

Solving the Muscle Mysteries

Station name	Type of fitness (flexibility, aerobic, or strength)	Muscles used
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Name _____

Activity 16.2

The Mystery of Training

Have you ever wondered how exercise training works? What changes take place in your body to improve your endurance and make you stronger and faster? Regular exercise affects many of the body"s organ systems, especially the cardiovascular, respiratory, and musculoskeletal systems.

Long-term aerobic exercise increases the size and strength of the **heart** – a muscle. As a result, a trained heart can pump more blood per beat and beat more slowly at rest and during exercise. Regular aerobic exercise also increases **blood volume** and **breathing volume**. All these adaptations enable trained people to transport more oxygen to working muscles.

Exercise also changes **muscles**. Muscles get bigger with strength training mainly because they make more **muscle cells**. Aerobic training, such as running and cycling, also increases the **blood flow** to the muscles, and the **number** and **size** of muscles.

Seven-time Tour de France champion Lance Armstrong had a competitive edge, something that gave him an advantage over his competitors. Much of his competitive edge had to do with his training schedule, which included months of gruelling workouts on the actual 2,000+ mile race course. Knowing how training can improve the heart, lungs, and muscles, **explain what changes in Lance's body allowed him to outperform his competitors to achieve victory in the Tour de France**.

_____

_____

_____

_____

_____

_____

_____

_____

Name _____

Activity 16.3

Moving Muscles

Can you remember the different muscle exercises you did in class? Try to show your family as many as you can remember and get them all doing them. Try to come up with your own stretches and movements with your family and write down which muscles these movements work.

Movement Name	**Type of Fitness** (Flexiblity, aerobic or strength)	**Muscles Used**

Your Signature: _____

Parent/Carer Signature: _____

Lesson 17

The Human Heart

This lesson teaches pupils about the effect of exercise on the heart and the importance of exercise to general health. Pupils design and conduct an experiment to examine the effect of exercise, or another variable, on the heart.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Science, Mathematics, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVE

- For pupils to be physically active every day.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Describe the importance of activity to the health and strength of the heart.
2. Measure their resting pulse rate.
3. Make a hypothesis about the impact of exercise (or another variable of their choice) on heart rate.
4. Design and conduct an experiment to determine the impact of exercise (or another variable) on resting pulse rate.
5. Draw conclusions from their experimental findings.

MATERIALS

- Clock or watch with a second hand
- Activity 17.1, How Much Do You Know About The Heart? (page 252)

- Activity 17.2, The Double-Barrelled Pumper (page 253)
- Activity 17.3, Designing an Experiment (page 255)
- Activity 17.4, Beat It Together (page 256)
- *Optional:* Tennis balls, overhead transparencies.

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour 15 minutes.

1. Point out the goals of the lesson:
   a. Describe the importance of activity to the health and strength of the heart.
   b. Measure resting pulse rate.
   c. Design and conduct an experiment to determine the impact of exercise (or another variable) on resting pulse rate.
2. (10 minutes) Hand out activity 17.1, How Much Do You Know About The Heart (page 252), to pupils (or display it as an overhead transparency or on a SMARTBoard).Use this short introductory activity to spark pupils‟ interest and to point out that the heart is an amazing organ. Then call on pupils to share their responses. Review the answers (see Answer Key, page 251). Next, discuss the critical thinking portion of the transparency. Give pupils time to formulate their own theories. Ask for their ideas before you discuss the conclusions.
3. (5 minute *optional* activity) To give pupils an idea of how hard the heart must work, even at rest, have them try to squeeze a tennis ball 70 times per minute. The force needed to squeeze a tennis ball is similar to the force needed to squeeze blood out of the heart. Can anyone do it?
4. (10 minutes) Have pupils read activity 17.2, The Double-Barrelled Pumper (page 253), and determine their resting pulse rate. Check for understanding by asking pupils: How does exercise strengthen the heart and lower a person‟s resting pulse rate?
5. (2-3 minutes) Ask pupils to „thought shower‟ or list of conditions or variables that might increase or decrease a person‟s resting heart rate. Examples can include exercise, body position (lying down versus standing up), smoking, temperature, and stress.
6. (5-10 minutes) Discuss activity 17.3, Designing an Experiment (page 255), with pupils. In this activity, pupils choose one variable and test its impact on resting heart rate. They work in pairs to make a hypothesis, write the procedure, record their heart rate under different conditions, record their results, and draw conclusions based on their findings. Ask them for some examples of experiments they might conduct or describe one of the following examples. Try not to provide too many ideas. *Encourage them to be creative and curious*. This is an opportunity to do what scientists do. Be prepared: This

type of open-ended experiment will excite some pupils but frustrate others. You may want to give pupils who seem frustrated questions to choose from, but let them design the experiment. Emphasize that they need to have you check their procedures before they begin the actual experiment.

Possible experimental questions and designs:

a) What effect does physical activity have on heart rate? There are many possible strategies for answering this question, but encourage pupils to try more than one intensity exercise. For example:
   - Measure resting pulse rate.
   - Jog in place for two minutes.
   - Measure pulse rate.
   - Run in place more energetically than before, raising your knees to your chest for two minutes.
   - Measure pulse rate.

b) Do different types of physical activity affect heart rate differently?
   - Measure resting pulse rate.
   - Do 25 sit-ups.
   - Measure pulse rate.
   - Rest
   - Do 25 jumping jacks.
   - Measure pulse rate.
   - Rest.
   - Run in pace for two minutes (or about the same time it took you to do the other activities).
   - Measure pulse rate.

c) How does exercise duration affect heart rate? What happens to your heartbeat as you do more work?
   - Measure resting pulse rate.
   - Step up and down on a chair for one minute.
   - Measure pulse rate.
   - Continue stepping up and down at the same rate for three more minutes.
   - Measure pulse rate.

d) How does body position affect heart rate? Which requires more work: sitting, lying down, or standing?
   - Sit in a chair for two minutes, then measure pulse rate.
   - Lie down for two minutes, then measure pulse rate.
   - Stand up, then measure pulse rate.

e) How does stress affect heart rate?
   - Measure resting pulse rate.

- Give the person a small amount of time to finish a written task or puzzle.
- Measure the person‟s pulse rate immediately after the person finishes racing through the task.

f) How does cold and pain affect heart rate?
- Measure resting pulse rate.
- Stick hand in ice water for one minute.
- Measure pulse rate at the end of the minute.

7. (30 minutes) Have pupils‟ complete activity 17.3, Designing the Experiment (page 255).
8. (5-10 minutes) Ask several groups to share their results. Pupils are likely to have difficulty drawing conclusions and explaining why the observed results occurred. You may want to have pupils record their results on the board and have the whole class interpret and discuss the results. Encourage all pupils to „thought shower‟ possible explanations for why the results occurred. Place less emphasis on the "right" explanation. Emphasize the process of thinking like a scientist. (See Teacher Resources for results you might expect).
9. (3 minutes) Assign activity 17.4, Beat It Together (page 256), as their family homework task. Ask pupils to take the resting pulse rates of each member of their families. What differences could explain variations in resting heart rate? (*Answer: Fitness level, stress, caffeine intake, age*).

EXTENSION ACTIVITY

1. Determine the average resting heart rate for the pupils in your class. What differences could explain variations in resting heart rate? (*Answer: Age, stress, caffeine, medication, active or sedentary lifestyle)*.

TEACHER RESOURCES

SPECIFIC BACKGROUND MATERIAL

See activity 17.2, the Double-Barrelled Pumper (page 253).

- **How Strong is the Heart?**

  The force needed to squeeze a tennis ball is similar to the force needed to squeeze blood out of the heart. Although this four-chambered organ weighs less than half a kilogram, it beats so steadily and powerfully that the force generated during its 40 million beats per year could lift its owner 100 miles above the earth!

- **Disorders of the Circulatory System**
  - **Heart attack:** The artery carrying blood to the heart becomes blocked by fatty deposits or blood clots. An area of the heart muscle is deprived of oxygen and dies.
  - **Stroke:** The artery carrying blood to the brain becomes blocked. Brain cells do not get enough oxygen and die.
  - **Atherosclerosis:** Arteries become narrower as a result of a build-up of fatty deposits on artery walls.
  - **Hypertension:** Constant high blood pressure that can lead to a heart attack or stroke.
  - **Varicose veins:** Valves in the veins do not work properly. Veins become swollen from the accumulation of blood. Varicose veins are most common in leg veins.

- **What Effect Does ___*(variable)*___ Have on Heart Rate?**

  The following are possible experimental results for activity 17.3, Designing an Experiment.
  - **Physical activity:** Increases heart rate. The more intense the exercise, the higher the heart rate. Exercise that uses large muscle groups and works against gravity results in the greatest increase in heart rate. Heart rate increases rapidly at the onset of exercise and levels off after three to five minutes of exercise at a steady state. Through training (regular exercise), the heart increases in efficiency and pumps more blood per beat, so resting heart rate declines.
  - **Stress:** May increase heart rate. Stressful situations increase nerve impulses from the brain that stimulate the heart to beat faster.
  - **Smoking:** May increase heart rate in some people..
  - **Pain:** Generally increases heart rate.
  - **Temperature:** Long-term exposure to the cold lowers heart rate.
  - **Posture:** Lying down lowers heart rate. Upright posture raises heart rate. The heart must work harder to pump blood against gravity from the lower extremities back to the heart and up to the brain. Standing perfectly still for an extending period of time results in blood pooling in the veins and cause fainting as a result of insufficient cerebral (brain) blood supply.

ANSWER KEY

ACTIVITY 17.1: HOW MUCH DO YOU KNOW ABOUT YOUR HEART?

1. At rest your heart beats about **60 to 80** beats per minute.
2. Your heart weighs about **half** a kilogram and is the size of a **clenched fist**.
3. Heart disease is the leading cause of death in England (true of false). **True.**
4. An athlete‟s resting heart rate is higher than the resting heart rate of a person who does little exercise (true or false). **False (it's lower).**

CRITICAL THINKING

Conclusion: Animals with **slower** heart rates live **longer.**

So what is one way that physical activity can help you live longer? (*Answer: Through regular physical activity the heart increases in efficiency and pumps more blood per beat [contraction], so resting heart rate declines*).

Name _____

Activity 17.1

How Much Do You Know About The Heart?

1. At rest your heart beats about _____ beats per minute.

2. Your heart weighs about _____ kg(s) and is the size of a _____ .

3. Heart disease is the leading cause of death in England (true or false). _____.

4. An athlete‟s resting heart rate is higher than the resting heart rate of a person who does little exercise (true or false). _____ .

CRITICAL THINKING

What conclusions can you draw from the following data?

Animal	Heart rate (beats/minute)	Average life span
Shrew	1,000	Up to 1 1/2 years
Mouse	500	1 to 2 years
Rabbit	200	6 years
Elephant	25	60 years
Human	70	70 years

Conclusion: Animals with _____ heart rates live _____ .

- These mammals‟ hearts are good for about 1 billion beats, except for humans.
- Humans have a high-performance heart that averages about 2.5 billion beats per life-time.
- If you could slow down your heart rate, you would have a good change of spreading those 2.5 billion beats over more years.

So, what is one way that physical activity can help you live longer?

Name _____

Activity 17.2

The Double-Barrelled Pumper

What is the role of the Heart?

The heart is a muscular organ that controls the flow of the body‟s blood. It is the equivalent of an engine room, because it pumps blood through the body continuously, transporting **oxygen** to all the muscles of the body. The heart therefore controls the body‟s **circulatory system**, which includes arteries and veins, the tubes that carry the blood away from and back to the heart.

How Does Your Diet Affect the Heart?

In England, circulatory system problems are the leading cause of death. There is good evidence to suggest that high saturated and trans fat consumption increases the risk of heart diseases. An excessive intake of unhealthy fat can lead to the build-up of fatty deposits in arteries – **atherosclerosis**. As arteries narrow and harden, blood flow may be blocked to surrounding cells. If an artery supplying blood to the heart is blocked, some heart muscles may die from lack of oxygen; this is called a **heart attack**. For this reason, experts recommend that no more than 11 percent of our total Calories come from saturated fat and that we avoid foods that contain trans fat (partially hydrogenated vegetable oil). One special type of unsaturated fat (omega-3 fat) is actually good for heart health and can be found in fatty fish (e.g., salmon and sardines) as well as some nuts and vegetable oils. (You may have learnt this in Lesson 14, page 192).

How Does Physical Activity Improve Your Heart?

With physical fitness and aerobic training, the heart will function more efficiently, beating at a slower rate and pumping more blood with each beat. It is only over time that good aerobic fitness can be developed, and training the body to function at more active levels makes it stronger and more productive during vigorous activity.

How Much Physical Activity Do I Need to Do to Make my Heart Stronger?

Do some moderate to vigorous physical activity for at least 60 minutes every day, or nearly every day, as part of play, games, sports, chores, transportation, and planned exercise. Any activity that raises the heart rate above the resting heart rate can be beneficial to your overall health and can reduce the risk of heart disease. Strive to

include vigorous activity as this type of continuous exercise is best for strengthening you heart. Moderate physical activity includes walking, rounders, softball, dancing, heavy chores, skateboarding, cycling, and other activities of a similar level. Vigorous physical activity includes tennis, fast cycling, jogging or running, swimming laps, hockey, rollerblading, and other activities that make you breathe hard. How long, how hard, and how often you are active will determine how fit you are! Aim for a total of 60 minutes or more of activity every day.

How Do You Measure Your Resting Pulse?

Each time the left side of the heart contracts (or beats), it forces blood into your arteries. Your pulse is caused by blood stopping and starting as it rushes through your arteries. Your pulse rate equals your heart rate. An average resting pulse is around 60 to 80 beats per minute. However, trained athletes can have resting pulse rates as low as 35 beats per minute. You can take a resting pulse at any time of the day, but the most accurate time to record it is when you first wake up in the morning. The easiest way to find your pulse is either in your neck, to the left of the Adam‟s apple, or on your wrist below your thumb. Sit still for at least 1 minute, find your pulse, and record the number of times your heart beats in 15 seconds.

Number of beats in 15 seconds: _____

Multiply by 4 (x 4): _____

Resting heart rate beats per minute: _____

Name _____

Activity 17.3

Designing an Experiment

What effect does (variable) have on heart rate? _____

Research Question

Come up with a research question that you hope to answer with this experiment.

Hypothesis

What effect do you think this variable will have on heart rate?

Procedure

Design an experiment to test your hypothesis. List and number the steps in your experiment. Have your teacher look over your procedure and sign this sheet before you do the experiment.

_____

(Teacher"s signature)

Results

Record your results in the following table.

Condition	Heart rate: Student 1 (beats/minute)	Heart rate: Student 2 (beats/minute)
Example: Resting for 1 minute	*65*	*70*

Conclusions

What do your results tell you about heart rate? Do your conclusions support your hypothesis? Explain why you think these results occurred.

Name _____

Activity 17.4

Beat It Together

1. Practice taking the heart rate of each of your family members. Get one member of your family to time 15 seconds while you count how many beats there are. Take it in turns on each other, making sure that each persons heart rate has been measured twice. Remember to multiply how many beats there are by 4 to get the number of beats per minute.

Number of beats in 15 seconds: _____

Multiply by 4 (x 4): _____

Resting heart rate beats per minute: _____

Name	**Beats per minute (1st time)**	**Beats per minute (2nd time)**	**Difference between the 1st and 2nd time**

i. Is there any difference between the first and second measurement of heart rate?

_____

ii. Why do you think this is?

_____

_____

_____

2. Repeat the experiment you did in class with your family.

What effect does _____ (variable) have on heart

Research Question

Come up with a research question that you hope to answer with this experiment.

Hypothesis

What effect do you think this variable will have on heart rate?

Procedure

Design an experiment with your family to test your hypothesis. List and number the steps in your experiment.

Results

Record your results in the following table.

Condition	**Heart rate: Family member 1** *Name:*	**Heart rate: Family member 2** *Name:*
Example: Jumping for 1 minute	101	123

Conclusions

What do your results tell you about heart rate? Do your conclusions support your hypothesis? Explain why you think these results occurred.

_____

_____

_____

_____

_____

Your Signature:

_____

Parent/Carer Signature:

_____

Lesson 18

Snack Decisions

This lesson reinforces the role of snacks in the diet initiated in Lesson 3, Snack Attack. It lets the children consider healthy snack choices using the Collect-Consider-Compare-Decide method. Additionally the children are asked to view some advertisements on television to determine what percentages of adverts are for snack foods. Some in-depth study of nutritional information charts and assessing the amount of fat and sugar in them is required, with the intention that they can apply this knowledge when choosing snacks in their everyday lives.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to make healthy snack choices using the Collect-Consider-Compare-Decide method to do this.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Examine a list of food selections to identify those with high nutritional value.
2. Apply the Collect-Consider-Compare-Decide model when choosing snack foods.

MATERIALS

- Decision-making steps written on a large poster board:
  - Collect information
  - Consider nutrients
  - Compare to other choices
  - Decide what to choose
- Overhead Transparency 18.1, Reading Food Labels (page 265)
- Activity 18.1, Healthy Snacks Vending Machine Company (page 266)
- Activity 18.2, Investigating TV Ads (for extension activity) (page 267)
- Student Resource 18.1, Common Snacks Nutrient Chart (page 269)
- Student Resource 18.2, Snack Food Comparison Labels Sample snack food labels (have a variety of available plus ask pupils to bring some from home) (page 271)

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour, 10 minutes.

PART I:

1. (1 minute) Tell the pupils that sometimes during work or school hours, people take a break. This break may be called *break time*, *rest break,* or *time out*.
2. (4 minutes) Have the pupils say what they think happens during a break from work or play. List the pupils‟ suggestions on the board.
3. (5 minutes) Have the pupils tell why a pause or break is a healthy practice. Emphasise that the body‟s needs – such as rest and food – may be addressed during breaks.
4. (5 minutes) Have pupils name some snacks they might enjoy during a work or play break. Write down the pupils‟ choices on the board.

PART II:

1. (9 minutes) Explain to the pupils that they will be in charge of choosing snacks for the snack machines of the Healthy Snacks Vending Machine Company. Tell the pupils, “The workers need snacks that will strengthen their bones and muscles and give them lots of vitamins A, B, and C. Since the workers do a lot of lifting and have to work for long hours, they want snacks that will also give them energy”.
2. (1 minute) Display the decision-making steps (on poster board).
3. (10 minutes) Show overhead transparency 18.1, Reading Food Labels (page 265). Discuss GDA with pupils and tell them that it can help in choosing healthy snacks.

   The GDA that appears on food labels lets people find out whether a food is high or low in a nutrient. Regarding saturated fat, if the % GDA is 1.5 or less

for a portion of an individual food, then the food is considered low in saturated fat. The more foods chosen that have a % GDA of 1.5 or less for saturated fat, the easier it is to eat a heart-healthy diet. The overall daily goal (for all the foods eaten in 1 day) is to select foods that add up to less than 100% of the GDA for saturated fat.

The GDA also lets people find out whether a food is high or low in other nutrients, like vitamins A and C, calcium, and iron. The overall daily goal (for all the foods eaten in 1 day) is to select foods that together reach 100% of the GDA for these beneficial nutrients.

4. (10 minutes) Distribute student resource 18.1, Common Snacks Nutrient Chart (page 269). Select one of the snacks from the list and lead the pupils in applying the following step-by-step process to determine if the snack is a healthy choice:

- **Collect** information: study the label or read the nutrient chart (handout 1).
- **Consider** nutrients: think about the nutrient content. Healthful snacks need to be (1) low in saturated fat and free of trans fat, (2) good sources of vitamins and minerals, (3) moderate to low in added sugar, and (4) moderate to low in salt (foods with a % GDA of 1.5 or less are considered low in salt).
- **Compare** other choices: what other choices do I have? Is there a better selection?
- **Decide** what to choose: what is best for the body? Is this selection low in saturated and trans fat? Does it have added sugars? Does it contain whole grains? Is it a fruit or vegetable or a low fat or non-fat dairy product? How much salt does it contain?

5. (15 minutes) Distribute activity 18.1, Healthy Snacks Vending Machine Company (page 266), and refer pupils to student resource 18.1, Common Snacks Nutrient Chart (page 269), or to sample labels of snack foods (or to both). Have the pupils work in pairs or small groups to examine selections from the list of snacks. Ask the pupils to apply the decision-making process to come up with several healthy snacks for the vending machine, along with some snacks that should stay out. Pupils should be able to explain why they decided certain snacks were healthy and others were not.
6. (10 minutes) After the pairs or groups have decided which snacks will be in their vending machines, have them share some of their findings with the rest of the class, referring to the steps of the decision-making model to explain their choices.

For example, pupils might say, “One of the snacks we analysed was an orange. We consider this a good choice because we want something that is loaded with nutrients. We found that an orange has a lot of vitamin C. An orange can help workers meet the Principles of Healthy Living goal to eat 5 or

more servings of fruits and vegetables each day, and it is a natural source of sugar that provides a quick but healthy boost of energy".

Pupils might also say, "We examined sweets as a snack. Sweets have a lot of added sugar, so they do provide energy, but the energy probably won‟t last long. Also, they have no vitamins or minerals, so they won‟t give our bodies any healthy nutrients. We decided that sweets wouldn‟t be a healthy choice".

EXTENSION ACTIVITIES

1. Distribute activity 18.2, Investigating TV Ads (page 267), and have pupils record the number of snacks advertised on television during a 30-minute programme, for example, from 7.30pm until 8pm. (This activity needs to be carried out after children‟s programmes have finished, due to the restrictions placed on advertising to children).
    a. Discuss the types of unhealthy snacks advertised. Were any healthy snacks advertised? For additional ideas on discussing advertisements with pupils, refer to Evaluating Media Advertising in the Teacher Resource section of Lesson 15, Beverage Buzz: Sack the Sugar (page 210).
    b. Group the pupils and have them create an advertisement for one of the healthy snack choices they selected while completing activity 18.1 (page 266). The advertisement may be a poster (for a magazine or billboard) or a skit, rap, or song (for radio or television).
    c. Write a letter to the school cook (this may be done as a class) requesting permission to display the healthy snack posters in the dining room. For groups who created a television ad, provide a time for them to put on their skits for the class. Groups that created a radio ad may also write a letter to the head teacher requesting permission to deliver their radio message in the school assembly.
2. Have pupils create a nutrition crossword puzzle that reinforces the important aspects of choosing healthful snacks. The puzzle may also contain nutrition and physical activity information learned in previous lessons.
3. Distribute Student Resource 18.2, Snack Food Comparison Labels (page 271), or present two actual food labels (one should be high in saturated fat, and one low in saturated fat). Have the pupils write a paragraph explaining why one is a better choice than the other for a person trying to eat a diet low in saturated fat.

TEACHER RESOURCES

BACKGROUND MATERIAL

- There are no „bad‟ foods that should never been eaten. But most Britons eat too many foods that are high in saturated fat, salt, and added sugar, but do not

eat enough fruits, vegetables, and whole grains. Snack foods tend to have a lot of saturated and trans fat, salt, added sugars and few vitamins or minerals. The purpose of this lesson is to help pupils make better snack choices by teaching them to recognise sources of unhealthy fat – namely, sources of saturated fat (which is solid at room temperature) and trans fat (partially hydrogenated vegetables oils and shortening). Remember that most saturated fat comes from animal sources (including beef, chicken, pork, and dairy products). The few exceptions are coconut oil and palm oil, which are also rich in saturated fat. Since many commercial baked or fried foods are prepared with partially hydrogenated vegetable oils, they also are sources of trans fat. Reading food labels and ingredient lists is an effective way to compare the fat and nutrient content of various snack foods.

- The column on the Nutrition Facts labels headed Guideline Daily Amount (GDA) can quickly tell you if a food is high or low in the nutrients listed. If the % GDA for a nutrient is 1.5% or less, the food is considered low in that nutrient. If the % GDA is 5% or more, the food is high in that nutrient.

- Whether or not a food fits into your diet depends on what other foods you eat. For most people, the daily goal is to choose foods that add up to 100% of the GDA for total dietary fibre, vitamins and minerals (especially vitamins A and C, calcium, and iron). For saturated fat and sodium, the goal is to choose foods that add up to less than 100% of the GDA. (To calculate the % GDA for saturated fat, see Fast Food Frenzy in your copy of Eat Well and Keep Moving). The GDA is based on a diet of 2,000 Calories per day.

- There is no % GDA for trans fat because it is unclear if there is any safe level of intake. Some food labels list the number of grams of trans fat per serving or sometimes per 100g (although it is not compulsory in the UK to list trans fat on a food label). It is best to avoid foods that contain trans fat. Keep in mind that products made with partially hydrogenated oils can still claim “0 grams trans fat” if the product contains less than 0.5 grams of trans fat per serving. These small amounts of trans fat can add up over the day. So make sure to watch out for the words *partially hydrogenated vegetable oil;* or *partially hydrogenated soybean,* or other oils; or *shortening* in the ingredients list. Choose an alternative product that does not contain partially hydrogenated oil, especially if it is a product you consume regularly.

- Added sugar comes in many forms – sugar (or sucrose), high fructose corn syrup, dextrose, and honey are all examples of added sugar (see activity 6.2 in Sugar Water: Think About Your Drink, for a list of the various names for sugar).

The ingredients list on the food package can be used to identify added sugars; since ingredients are listed in descending order of quantity (by weight), we can get an idea of the quantity of added sugars from their relative position on the ingredients list. A good rule of thumb is to avoid snacks and other food that list sugar (in some form) as one of the first three ingredients. Regular consumption of sugar, whether in snacks or sugar-sweetened drinks for instance, can cause tooth erosion and decay, in a short amount of time.

Reading Food Labels

Label for 400g tin of soup

Serving size

Typical Values	Per 100g	Per ½ can	GDA*
Energy kJ	189kJ	379kJ	2000
kcal (Calories)	45kcal	89kcal	
Protein	2.3g	4.7g	45g
Carbohydrate	8.5g	16.9g	230g
(of which sugars)	(0.9g)	(1.8g)	90g
Fat	0.2g	0.3g	70g
(of which saturates)	(Trace)	(0.1g)	20g
Fibre	0.7g	1.4g	24g
Sodium	0.2g	0.5g	2.4g
Salt equivalent	0.6g	1.2g	6g

*Guideline Daily Amounts for average adults

Saturated fat per serving

Total GDA per day for saturated fat. A food with 1.5g or less saturated fat per 100g, is considered low in saturated fat.

NB. In the UK, trans fat does not have to be listed on a nutrition information label.

Name _____

Activity 18.1

Healthy Snacks Vending Machine Company

You need to stock snacks in a company for workers who need snacks that will strengthen their bones and muscles and give them lots of vitamins A, B, and C. Since workers need to do a lot of lifting and have to work for long hours, they want snacks that will also give them lasting energy.

Directions

Review the list of snack options and use the Collect-Consider-Compare-Decide method to come up with four healthy snacks to put in the vending machines and two snacks to leave out. Write your final snack choices on the Healthy Vending Machine Company Order Form. Explain why or why not you included each food in the vending machine.

Table 18.1 Healthy Vending Machine Company Order Form

YES! Put these healthy snacks in!
NO! Keep these snacks out!

Name _____

Activity 18.2

Investigating TV Ads

The next time you watch television, use table 18.2, TV Ad Tracking Chart, to record the food advertisements that are shown in the early evening during a 30-minute programme. Each time you see a food or drink advertisement, mark the appropriate column (healthy drinks, sugary drinks, healthy snacks, and other foods, unhealthy snacks or fast foods). At the end of the show, write the number of ads that you saw in each category and the total number of food ads that you viewed during the 30-minute television show. You will need to watch and record the adverts that appear at the start of the programme, in the middle, and at the end.

Name of show: _____ Day: _____ Time: ____

Table 18.2 TV Ad Tracking Chart

Healthy drinks	Sugary drinks
Examples: milk, 100% fruit juice, water	Examples: soft drinks, fruit squash, sports drinks, energy drinks
Healthy snacks and other foods	**Unhealthy snacks or fast foods**
Examples: fruits, vegetables, whole grain crackers or cereal, yoghurt	Examples: crisps, chocolate bars, fast food restaurants or meals

Record in the table below the total number of advertisements you watched and the number of each type of advertisement you saw.

		As a percentage of total number of advertisements
Total number of advertisements		**100%**
Number of advertisements for healthy drinks		
Number of advertisements for sugary drinks		
Number of advertisements for healthy snacks and other foods		
Number of advertisements for unhealthy snacks or fast foods		

In the column marked „As a percentage of total number of advertisements", calculate the percentage out of 100% for each type of advertisement shown. For example, if there were 16 advertisements in total shown over the 30-minute slot, and 0 advertisements were for healthy drinks, 3 advertisements for sugary drinks and 1 advertisement each for healthy snacks and unhealthy snacks or fast food, then:

16 advertisements (in this example) equal 100%

Therefore, 100% ÷ 16 advertisements = **6.25% for each advertisement.**

So for healthy drinks, there were no advertisements so write **0%** in the box.

For sugary drinks, there were 3 advertisements so, 3 x 6.25% = **18.75%**, and so on for all categories.

Which category had the highest number of advertisements shown?

_____

Which category had the lowest number of advertisements shown?

_____

Student Resource 18.1

Beverage Facts

Snack	Total Calories (kcal)	Added sugars (g) & (% GDA)	Total fat (g)	Saturated fat (g) & (%GDA)	Vitamin A (mg)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Sodium (mg)
Ready salted crisps (25g bag)	133	0 (0%)	9	3.5g (14.6%)	0	9	7	0.4	200
Corn snack (27g bag)	140	0 (0%)	8.6	3.2 (13.3%)	0	Tr	18.4	0.2	305.1
Chocolate chip muffin (85g)	327	27 (45%)	15	9 (37.5%)	112	0	137	1.2	216
Popcorn, plain (30g bag)	178	0 (0%)	13	1.3 (5.4%)	0	0	3	0.3	1.2
Mixed nuts, unsalted (50g)	304	0 (0%)	27	4.2 (17.5%)	0	0	39	1	150
Pear (100g)	40	0 (0%)	0.1	Tr (0%)	0	6	11	0.2	3
Chocolate digestive biscuits (18g each)	89	6 (10%)	4.3	2.2 (9.2%)	Tr	0	15	0.4	81
Peanut butter on wholemeal toast (51g)	200	2.3 (4%)	11.3	2.7 (11.3%)	0	0	45.8	1.3	246.7
Fizzy cola (330ml)	135	30 (50%)	0	0 (0%)	0	0	19.8	Tr	16.5
Water (500ml)	0	0 (0%)	0	0	0	0	8.3	0	3.6
Flapjack (90g)	444	24 (40%)	24.3	4.4 (18.3%)	173.7	0	32.4	2.1	237.6
Fruit gums (40g)	130	23.6 (39%)	0	0 (0%)	0	0	2	0.04	12

Snack	Total Calories (kcal)	Added sugars (g) & (% GDA)	Total fat (g)	Saturated fat (g) & %GDA	Vitamin A (mg)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Sodium (mg)
Sunflower seeds (16g)	93	0 (0%)	7.6	0.7 (2.9%)	0	0	17.6	1.0	0.5
Orange (80g)	30	0 (0%)	0.08	Tr (0%)	0	43	38	0.08	4
Orange juice (150ml)	54	2.1 (3.5%)	0.15	Tr (0%)	0	58.5	15	0.3	15
Carrot sticks (100g)	35	0 (0%)	0.3	0.1 (0.4%)	0	6	25	0.3	25
Pork sausage (40g)	118	0 (0%)	8.8	3.2 (13.3%)	Tr	2	44	0.4	432
Celery stick (30g)	2.1	0 (0%)	0.06	Tr (0%)	0	2.4	12	0.12	18
Jam doughnut (75g)	252	14 (23%)	10.9	3.2 (13.3%)	0	0	54	0.9	135
Banana (100g)	95	0 (0%)	0.3	Tr (0%)	0	11	6	0.3	1
Apple (80g)	38	0 (0%)	0.08	Tr (0%)	0	5	3	0.08	2.4
Semi skimmed milk (200ml)	92	0 (0%)	3.4	2.2 (9.2%)	38	4	240	0.04	86
Grapes (70g)	48	0 (0%)	0.08	Tr (0%)	0	2.4	10.4	0.2	1.6
Hamburger (105g)	255	6 (10%)	10	4 (16.7%)	0	0	42	1.3	651

KEY:
Tr = Trace

Snack Food Comparison Labels

Crisps, ready salted

Nutrition

Serving size: 25g

Typical Values	100g contains
Energy	2215kJ
	530kcal
Protein	5.7g
Carbohydrate	53.3g
Of which sugars	0.7g
Fat	34.2g
Of which saturates	14g
Of which trans fat	N
Fibre	5.3g
Sodium	800mg

Ingredients: potatoes, sunflower oil (34%), salt.

Rice cake

Nutrition

Serving size: 13g

Typical Values	100g contains
Energy	1591kJ
	374kcal
Protein	9.4g
Carbohydrate	81.1g
Of which sugars	1.9g
Fat	3.6g
Of which saturates	0.6g
Of which trans fat	N
Fibre	5.1g
Sodium	100mg

Ingredients: whole grain brown rice, salt.

Lesson 19

Menu Monitoring

This lesson emphasises the importance of consuming at least 5 fruits and vegetables every day in a varied diet. It allows the children to design a menu and consider when they could introduce a portion of fruit or vegetables into their meals or as a healthy snack, to increase their intake of certain vitamins and minerals. The Principles of Healthy Living are reiterated.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses Mathematics, Science, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

For pupils to consider opportunities for introducing further portions of fruits and vegetables into their diet.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Design a day"s menu of fruits and vegetables, making sure that their menu choices include at least 5 servings of fruits and vegetables.
2. Identify the nutritional values of certain fruits and vegetables.

MATERIALS

- Student Resource 19.1, What They Do for Me (page 280)
- Activity 19.1, Plan a Menu (page 281)
- Activity 19.2, Create a Frozen Food (page 282)
- Overhead Transparency 19.1, Principles of Healthy Living (page 278)
- Overhead Transparency 19.2, Vegetables and Fruits (page 279)
- Green and orange crayons or markers
- Tape recorder or digital recorder (optional, to record pupils‟ songs and raps about the fruits and vegetables)
- *CHANGE*! Till Receipt Task sheet (provided separately)

LESSON PLAN

ESTIMATED TEACHING TIME: 50 minutes.

PART I:

1. (2 minutes) Have the pupils form pairs. Distribute activity 19.1, Plan a Menu (page 281), and explain to the pupils that each pair will plan a healthful, full day‟s menu of fruits and vegetables.
2. (3 minutes) Display overhead transparency 19.1, Principles of Healthy Living (page 278), to the class. Review the recommendation to eat daily at least 5 servings of fruits and vegetables in a rainbow of colours; remind the pupils that more is better. Explain that they will evaluate their menu to determine if they are reaching their goal.
3. (3 minutes) Ask pupils why potatoes are not the best choice for reaching this goal. (Answer: potatoes are not the best choice because, like white bread and white rice, potatoes are digested quickly and give us a quick boost of energy that does not last. Most other fruits and vegetables provide a longer energy boost because the sugar and starches in the food take longer to be digested and enter the blood stream. Potatoes should only be eaten, at most, a few times a week, and in small portions, preferably in their skins).
4. (2 minutes) Display overhead transparency 19.2, Vegetables and Fruits (page 279), to the class. Encourage the pupils to think of creative ways to include several fruit and vegetable servings in their menus. Encourage pupils to pick whole fruit rather than juice, since whole fruit contains more fibre and is easy to grab on the go. Note that pupils should limit 100% fruit juice consumption to no more than 150ml per day, since juice is high in natural sugars.
5. (3 minutes) Explain to the pupils that some dishes are mixed dishes – dishes that contain fruits or vegetables along with other foods. Mixed dishes may

include stir-fries, vegetable pizza, and chicken salad. The fruits and vegetables in mixed dishes can add up to a serving (or more). For example, the vegetables on two slices of vegetable pizza are likely to equal 1 serving of cooked vegetables (about 100g).

6. (10-15 minutes) Give the pairs 10 to 15 minutes to design their menus and record their selections on activity 19.1, Plan a Menu. If desired, pupils can plan an entire week‟s menu on a separate sheet.
7. (10-15 minutes) After 10 to 15 minutes have passed, distribute student resource 19.1, What They Do for Me (page 280), which lists the benefits of some of the vitamins and minerals found in fruits and vegetables (iron, calcium, vitamins A and C). Go over the chart with the class and discuss why we need these vitamins and minerals.

PART II:

1. (7 minutes) Have the pupils score their menu selections by using the How Do You Rate? evaluation scale on the Plan a Menu worksheet. Have the pupils colour in the Vita-Miner Meter, using green crayons or markers to represent the number of vegetable points and orange crayons or markers to represent the number of fruit points.
2. (5 minutes) Have the pupils review and discuss their rating and decide whether they need to increase the number of fruits and vegetables in their menu. Have the pupils set a goal for increasing (or maintaining if they already eat at least 5 servings a day) the number of fruits and vegetables they eat daily.

PART III:

1. (5 minutes) Distribute and review activity 19.2, Create a Frozen Food (page 282).
2. (5 minutes) Supply the pupils with a copy each of the *CHANGE!* Till Receipt Task sheet.
    - Ask the pupils to take the sheet home and using a till receipt issued from where the food shopping is done for the household, fill in the spaces with the food items that are on that till receipt.
    - Ask them to put a description of the food item, and any other details that appear such as the weight of the food bought, the packet size etc.; even where two of the same product might have been bought such as „buy one get one free‟ offers.
    - If possible, attach the actual till receipt to the Till Receipt Task sheet (ensuring that all personal and financial details are removed first).

- The researchers will collect the completed Till Receipt Task sheets, and they will be used to determine the types of food that people in Wigan like to buy.

EXTENSION ACTIVITY

1. Have the pupils write their own songs or raps about fruits and vegetables. Ask the music teacher to suggest well-known songs that children can write new lyrics to, or to help come up with new melodies. If possible, record the songs or raps so they can be played in the dining room during lunchtime.

TEACHER RESOURCES

BACKGROUND MATERIAL

- Whole grain products, vegetables, and fruits are key parts of a varied and healthful diet. They provide vitamins, minerals, fibre, and other substances that are vital for good health. They are also generally low in saturated and trans fat, depending on how they are prepared and what is added to them at the table. Most Britons eat fewer than the recommended number of servings of whole grain products, vegetables, and fruits, even though the consumption of these foods is associated with a substantially lower risk for many chronic diseases, including heart disease, high blood pressure, and possibly some cancers.

- Fruits and vegetables are naturally low in unhealthy fat and provide many essential nutrients and other food components important for health. These foods are excellent sources of vitamin C, vitamin B_6, carotenoids (including those that form vitamin A), and folate. The antioxidants found in plant foods (e.g. vitamin C, carotenoids, vitamin E, and certain minerals) are of great interest to scientists and the public because of their potentially beneficial role in reducing the risk for some cancers and other chronic diseases. Scientists are also trying to determine if other substances in plant foods (phytochemicals*)* protect against high blood pressure, heart disease, and possibly some cancers.

SPECIFIC BACKGROUND MATERIAL

- **What are the main benefits of fruits and vegetables?** ○
  They are major sources of vitamins and minerals.
  - They are important sources of fibre.
  - They are low in saturated and trans fat.

- They are low in salt.
- Research has shown that they reduce the risk of heart disease, stroke, and possibly certain forms of cancer.

- The availability of fresh fruits and vegetables varies by season and by region of the country, but frozen and tinned fruits and vegetables ensure a plentiful supply of these healthful foods throughout the year.

- The Principles of Healthy Living promote the consumption of at least 5 servings of fruits and vegetables every day; more is better. In this lesson, encourage pupils to choose vegetables other than potatoes to meet this goal. Potatoes contain vitamins and minerals, but depending on how they are cooked, they are often digested quickly and are similar to refined grains in their effect on blood sugar. They should only be eaten, at most, a few times a week, and in small portions. For more information on potatoes and refined carbohydrates, see the background section of Carb Smart, Lesson 2).

ANSWER KEY

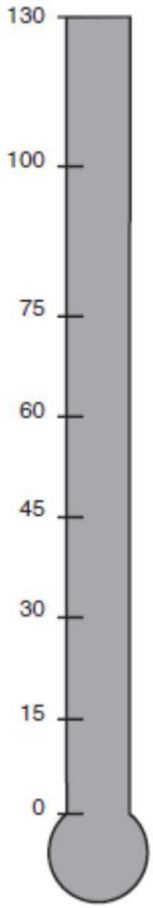
ACTIVITY 19.1: PLAN A MENU

Table 19.1 Spotlight on Fruits and Vegetables Example

	Breakfast	**Lunch**	**Dinner**
Day 1 Fruits	Orange	Banana	Cherries
Day 1 Vegetables		Celery Carrot sticks	Peas Sweet corn

Vegetable	
Peas	15 points
Sweet corn	15 points
Celery	15 points
Carrot sticks	15 points
Total	**60 points**

Fruit	
Orange	15 points
Cherries	15 points
Banana	15 points
-	15 points
Total	**45 points**



Total vegetable	60 points
Total fruit	45 points
Subtotal	105 points
If subtotal is ≥ 75, add 25 bonus points	25 points
Grand total	**130 points**

Chart this on the Vita-Miner Meter

Principles of Healthy Living

Go for 5 Fruits and Veggies – More Is Better!

Eat 5 or more servings of fruit and vegetables every day! Eat a variety of colours – try red, orange, yellow, green, blue, and purple.

Get Whole Grains and Sack the Sugar!

Choose healthy whole grains for flavour, fibre, and vitamins. Limit sweets and chocolate. Soft drinks and other sugary drinks have almost nothing in them that is good for you – no vitamins or minerals or other healthy things. They contain just sugar.

Keep the Fat Healthy!

We need fat in our diets, but not all types of fat are good for us. Our bodies like the healthy fat that tends to come from plants and is liquid at room temperature. Examples are olive oil, canola oil, vegetable oil, and peanut oil. Our bodies do not like unhealthy fat, which is solid at room temperature. Examples include saturated fat (usually found in animal products such as meat and whole milk) and trans fat (found in fast food fries and shop-bought biscuits and cookies). Of the unhealthy fat, trans fat is the worst and should rarely, if ever, be eaten.

Start Smart with Breakfast!

Eating breakfast helps you focus on schoolwork and gives you energy to play. Breakfast is a great meal for adding whole grains, fruit, and low-fat or non-fat milk to your day!

Keep Moving!

Being active is a very important part of healthy living. Do what you like the most, and keep your body moving for at least an hour a day!

Power Down!

Watching TV, playing video games, or playing on the computer keeps your body still. Keep screen time as low as it can go, and never let it add up to more than 2 hours per day.

Vegetables and Fruits

Fresh or frozen are the best, but tinned and dried are fine!

Vegetables

Artichokes
Asparagus
Aubergine
Beans
Bean sprouts
Broccoli
Brussels sprouts
Cabbage
Cauliflower
Carrots
Celery
Courgette
Cucumber
Kale
Leeks
Lettuce
Onions
Okra
Peas
Peppers
Potatoes
Radishes
Spinach
Sweet corn
Squash
Sweet potatoes
Tomatoes
Turnips
Yams

Fruits

Apples
Avocados
Bananas
Blueberries
Cherries
Figs
Grapes
Grapefruit
Kiwi fruit
Lemons
Mango
Melon
Nectarines
Oranges
Pears
Pineapple
Peaches
Raspberries
Rhubarb
Satsuma
Strawberries
Tangerines
Watermelon

What They Do for Me

Table 22.1 Vitamins and Minerals

Nutrient	Healthy sources	Role
VITAMINS		
Vitamin A	Dark green, yellow, and orange vegetables and fruits such as lettuce, carrots, cantaloupe melon, apricots, peas, peppers, peaches	Helps with night vision, bone growth, and tissue maintenance
Vitamin C	Oranges, grapefruit, tangerines, cantaloupe melon, mangoes, papaya, strawberries, peas, dark green vegetables, tomatoes, peppers, apples	Keeps skin and tissue healthy
Vitamin E	Almonds, sunflower seeds, sunflower oil, safflower oil, peanut butter, corn oil, soybean oil, canola oil, spinach, broccoli, tomato sauce	Helps protect cells from damage (antioxidant)
MINERALS		
Calcium	Low fat or skimmed milk, low fat cheese, low fat or fat-free yoghurt, low fat or fat-free cottage cheese, dark green vegetables, tofu, fortified 100% juice, fortified non-dairy milks	Helps keep bones and teeth strong
Iron	Lean red meat, whole wheat bread, spinach, liver, fortified breakfast cereals	Allows blood to carry oxygen to all parts of the body

Name _____

Activity 19.1

Plan A Menu

Directions

Design a fruit and vegetable menu that allows you to get 5 or more servings of fruits and vegetables each day. Be sure to write down fruits and vegetables you could eat for breakfast, lunch, and dinner.

Table 19.3 Spotlight on Fruits and Vegetables

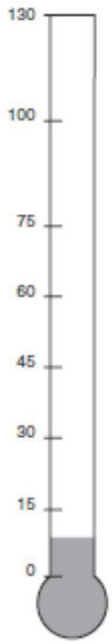
	Breakfast	Lunch	Dinner
Day 1 Fruits			
Day 1 Vegetables			

How do you rate?

Add up your points on the *Vita-Miner Meter*

Vegetable	
_____	15 points
_____	15 points
_____	15 points
_____	15 points
Total	_____

Fruit	
_____	15 points
_____	15 points
_____	15 points
_____	15 points
Total	_____



Total vegetable	_____
Total fruit	_____
Subtotal	_____
If subtotal is ≥ 75, add 25 bonus points	_____
Grand total	_____

Chart this on the Vita-Miner Meter

Name _____

Activity 19.2

Create A Frozen Food

You are the cook in charge of creating a new frozen food. Your assignment is to make the new food product with ingredients that will help your body build strong bones, help you have healthy skin, and help your body get the oxygen it needs. (Use handout 1, What They Do for Me, for guidance).

1. Give your food product a name.
2. Write a short description of your new food product.
3. Write down the different types of ingredients you used (fruits, vegetables, and grains) and what each of these foods does for your body (for example, builds strong bones and healthy skin).
4. On the back of this page, design the packaging for your product.
5. Also on the back of this page, create a food label that describes the ingredients and nutrients in your food product.

New Product Name

_____

Description

_____

_____

_____

_____

_____

_____

_____

_____

_____

Lesson 20

Have You 'CHANGE!'d?

This lesson is designed to reinforce the healthy eating and physical activity messages promoted throughout this *CHANGE!* curriculum. It is anticipated that children will have realised that being physically active and eating healthily is very important. Pupils will reflect on the concept of healthy living and what they can do to lead a healthier life.

CURRICULUM CROSS-REFERENCING

This lesson mainly addresses PE, PSHE+C and English attainment targets.

BEHAVIOURAL OBJECTIVES

- For pupils to consider what they"ve learned.
- For pupils to be physically active every day.
- For pupils to eat healthily.

LEARNING OBJECTIVES

Pupils will be able to do the following:

1. Co-operate as part of a group.
2. Summarise information.
3. State the physical activity recommendations for children.
4. Understand the principles of healthy living.
5. Understand the different food groups and why eating a variety of foods contributes to a healthy diet.

MATERIALS

- Activity 20.1, Knowing Knowledge (page 292)
- Overhead Transparency 20.1, Question of Health (page 286)
- Overhead Transparency 20.2, Principles of Healthy Living (page 291)
- PE Kit

LESSON PLAN

ESTIMATED TEACHING TIME: 1 hour.

1. (4 minutes) Mark off four areas of the playground/hall and assign a colour or number to each one (e.g red, blue, green and yellow), or even your school houses (if you have them). Tell the pupils which area is which, and get them to all tell you which one is which as you run or point to each of them.
2. (3 minutes) Tell the pupils that they are about to take part in an interactive health and well-being quiz. There will be four choices of answers (either in the colours or whatever you have assigned to each corner/space). They must run to the colour/number/house that they think is the correct answer.
3. (20 minutes) Ask the questions shown on overhead transparency 20.1, Question of Health (page 286) (you could just have a copy of this printed out). The answers are shown in the answer key in the Teacher Resources section. Once all the pupils have decided which answer they"ve chosen, inform them of the correct one and get them all to move into that area.
4. (3 minutes) Ask the pupils to return to the classroom.
5. (15 minutes) Project overhead transparency 20.1, Question of Health (page 286), and ask the pupils to work in groups to complete activity 20.1, Knowing Knowledge (page 292). They should hopefully remember from the running activity they"ve just done.
6. (5 minutes) Go over the answers for activity 20.1, Knowing Knowledge, ensuring that the pupils understand them all.
7. (10 minutes) Project overhead transparency 20.2, Principles of Healthy Living (page 291), and recap every point with them as a summary of the key points from the 19 previous lessons.

TEACHER RESOURCES

BACKGROUND MATERIAL

This is just a summary lesson, so any questions the pupils may bring up should be covered in the rest of the lessons.

ANSWER KEY

ACTIVITY 20.1, KNOWING KNOWLEDGE, OVERHEAD TRANSPARENCY 20.1, QUESTION OF HEALTH:

1. 60 minutes
2. Boiled potatoes
3. 2 hours
4. Whole grains
5. 70%
6. Healthy fat
7. All of the above
8. Water
9. Increases
10. All of the above statements
11. Twice
12. Peas
13. Running
14. Eat the same amount of Calories as you use up
15. Walking
16. Calcium
17. All of the above
18. All of the above
19. Make it realistic
20. Cod

Question of Health

1) How many minutes per day should you be physically active for?

- 30 minutes
- 60 minutes
- 25 minutes
- 1 hour 30 minutes

2) Which of these does NOT count towards your 5-a-day?

- Boiled potatoes
- Oranges
- Cabbage
- Tinned sweet corn

3) You should watch TV and play computer games less than ____ hours per day:

- 1 hour
- 2 hours
- 3 hours
- 4 hours

4) Best-choice carbohydrates usually contain:

- Refined grains
- Sugar
- Whole grains
- Sweeteners

5) Wigan Borough is ____% green space?

- 10%
- 20%
- 50%
- 70%

6) „Polyunsaturated‟ and „monounsaturated‟ are types of:

- Carbohydrate
- Vitamins
- Healthy fat
- Unhealthy fat

7) What are the benefits of an active lifestyle?

- Develops cardiorespiratory fitness, muscular strength, and confidence in physical ability
- Maintains a healthy body weight and reduces fat
- Reduces stress and brightens a person‟s mood
- All of the above

8) The best-choice drink for quenching your thirst is:

- Sports drink
- Water
- Fizzy pop
- Milkshake

9) When you are physically active your pulse rate _____.

- Increases
- Decreases
- Stays the same
- Can increase or decrease

10) The „% GDA" is useful on a label because:

- It tells you if a food is high in a particular nutrient
- It tells you if a food is low in a particular nutrient
- Is based on 1 serving of a particular food product
- All of the above statements

11) How often should you include weight-bearing activities a week?

- Once
- Twice
- 3 times
- 4 times

12) The best source of vitamin C is:

- Fizzy pop
- Sausage roll
- Peas
- A packet of crisps

13) Which activity do you use up more energy doing?

- Running
- Sleeping
- Walking
- Cleaning

14) To keep an „energy balance" in your body you need to:

- Eat more Calories from food than you use up
- Eat fewer Calories from food than you use up
- Eat the same amount of Calories as you use up
- Not sure

15) Which is the healthiest way to travel to and from school?

- Walking
- By Car
- By Bus
- They"re all healthy

16) Complete this sentence: _____ helps you build strong bones and teeth

- Iron
- Calcium
- Vitamin B
- Fibre

17) What lifestyle changes could you make to increase the amount of energy you expend?

- Take the stairs instead of the escalator
- Walk to school instead of going by car
- Go out and play with friends instead of watching TV
- All of the above

18) Drinking too many fizzy drinks can cause:

- Erosion of teeth
- Dental decay
- Weight gain
- All of the above

19) In setting a physical goal it is important to…

- Make it really hard
- Make it easy
- Make it realistic
- None of the above

20) Which of these fish is NOT an oily fish?

- Mackerel
- Cod
- Salmon
- Sardines

Principles of Healthy Living

Go for 5 Fruits and Veggies – More Is Better!

Eat 5 or more servings of fruit and vegetables every day! Eat a variety of colours – try red, orange, yellow, green, blue, and purple.

Get Whole Grains and Sack the Sugar!

Choose healthy whole grains for flavour, fibre, and vitamins. Limit sweets and chocolate. Soft drinks and other sugary drinks have almost nothing in them that is good for you – no vitamins or minerals or other healthy things. They contain just sugar.

Keep the Fat Healthy!

We need fat in our diets, but not all types of fat are good for us. Our bodies like the healthy fat that tends to come from plants and is liquid at room temperature. Examples are olive oil, canola oil, vegetable oil, and peanut oil. Our bodies do not like unhealthy fat, which is solid at room temperature. Examples include saturated fat (usually found in animal products such as meat and whole milk) and trans fat (found in fast food fries and shop-bought biscuits and cookies). Of the unhealthy fat, trans fat is the worst and should rarely, if ever, be eaten.

Start Smart with Breakfast!

Eating breakfast helps you focus on schoolwork and gives you energy to play. Breakfast is a great meal for adding whole grains, fruit, and low-fat or non-fat milk to your day!

Keep Moving!

Being active is a very important part of healthy living. Do what you like the most, and keep your body moving for at least an hour a day!

Power Down!

Watching TV, playing video games, or playing on the computer keeps your body still. Keep screen time as low as it can go, and never let it add up to more than 2 hours per day.

Name _____

Activity 20.1

Knowing Knowledge

Directions

Please circle the correct answers.

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- 1 hour 30 minutes

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- Cod
- Salmon
- Sardines

About the Authors

Lynne Boddy, PhD, is a Research Officer at Liverpool John Moores University for the REACH (Research into Exercise, Activity and Children‟s Health) group based at the Research Institute for Sport and Exercise Sciences. Lynne‟s research focuses on the fitness, physical activity and body composition of children. She has been involved in several studies examining CVD risk, fitness, physical activity and body composition in children, publishing several research articles within this area.

Ian Davies, PhD, is a senior lecturer in the Faculty of Education, Community and Leisure at Liverpool John Moores University. He is a co-investigator involved in the supervision of the measurement of cardiovascular health, particularly the involvement of blood biomarkers. Ian has previous experience in the design and conduction of nutrition related randomised controlled trials, with several peer reviewed journal articles on how nutrition can effect risk of cardiovascular disease and other metabolic disease states.

Stuart Fairclough, PhD, is a reader in Physical Activity Education in the Faculty of Education, Community and Leisure at Liverpool John Moores University. Research role involves the development and evaluation of interventions to promote child health and well-being through physical activity. Worked closely with Wigan Council and primary schools in the last three years with the PEPASS Physical Activity Project. Involved in the project since its inception being central to the design, researcher recruitment, implementation, and evaluation.

Rebecca Gobbi, BSc, is a current PhD student within Liverpool John Moores University. Her research interests tailor around how lifestyle changes can positively impact children‟s health, and reduce risk for modifiable diseases, such as cardiovascular disease. She earned her Bachelor of Science in Sport and Exercise Science at Liverpool John Moores University. With experience in various cardiovascular measurement techniques, her main role within this project is measuring the effects of the intervention.

Allan Hackett, PhD, is a reader in Community Nutrition in the Faculty of Education, Community and Leisure at Liverpool John Moores University. Research role involves the roles of the physical environment (and how we use it) and health literacy on food choice and its interrelationship to physical activity patterns, and he has published more than 100 research articles in this area. He earned his doctorate in the role of diet in the management of children with diabetes mellitus from the department of Child Health at Newcastle.

Kelly Mackintosh, MSc, is a current PhD student at Liverpool John Moores University. Research role involves physical activity and health promotion in children. She earned her Bachelor of Science degree at the University of Bath, and her Master of Science degree in Sports Science at Loughborough University. Previous research has investigated the impact of technology on children‟s physical activity and sedentary behaviour. Her primary role within this project is physical activity measurement.

Genevieve Warburton, MSc, is a current PhD student within the Faculty of Education, Community and Leisure at Liverpool John Moores University. Her research role combines nutrition and health promotion in children. She earned her Bachelor of Science degree in Nutrition at Liverpool John Moores University, and her Master of Science degree in Nutrition and Food Sciences at the University of Huddersfield. Previous research has included assessing the contribution of breakfast cereal to micronutrient intakes in adults.

Wigan Council Partnership

Alexandra Jones, is a Health Improvement Commissioning Officer for Wigan Council‟s Children and Young People‟s Services. Her work involves the commissioning of services that will improve the outcomes of children, young people and their families within the Borough. Her key areas of work include healthy weight, school health and universal prevention. Her hope is that the research in Wigan will support children to be healthy in the body and mind throughout their lives.

Helen Roberts, BSc, is a strategic lead for children‟s physical activity and manager of the children‟s weight management service at Wigan Council. Ensured Wigan‟s health and education priorities were at the core of the *CHANGE!* project. She earned her Bachelor of Science degree in Sports Science and her Certificate in Education at Liverpool John Moores University. Currently completing an MSc in Weight Management at the University of Chester, where she gain her Post Graduate Certificate in Weight Management.

Feedback Log

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
1						
2						
3						
4						

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
5						
6						
7						
8						

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
5						
6						
7						
8						

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
9						
10						
11						
12						

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
13						
14						
15						
16						

Lesson Number	Percentage of children on task	Preparation Time	Delivery Time	Strengths	Challenges	Overall
17						
18						
19						
20						