Education Support Pack

Living Things and Healthy Lives

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Contents

Introduction

This Pack

Living Things and Healthy Lives for Key Stage 2 provides students with the opportunity to use Kar2ouche to help them develop their knowledge of Science through exploration, discussion and visualization. The work in the virtual world will complement both practical experiments and research in the classroom.

One of the benefits of using Kar2ouche is its versatility. It allows you as a teacher to use it in the ways you consider most appropriate with your students. At its most basic Kar2ouche can be used to create:

- storyboards
- animations
- publications.

However, depending on the tasks set, students can use the program to develop a whole range of thinking skills. The software enables them to:

- make sense of information – understand and visualise text
- reason – interpret, justify, compare, observe and predict
- enquire – investigate multiple meanings and perspectives
- create – respond imaginatively
- evaluate – modify and improve
- communicate ideas to others.

The four suggested units in this pack integrate class, group and pair discussions with a range of computer activities. These will help you work with students as they develop their knowledge and understanding of scientific ideas, processes and skills. In each unit there is a range of suggested activities closely linked to the National Curriculum. It is up to you to decide in which order you ask students to work through these activities. However, as you and your students become more familiar with the potential uses of Kar2ouche, it is likely that you will build on these activities and add to them in order to create differentiated materials for mixed ability classes. In particular you may like to do some work to explore the key words listed in the Teacher Notes for each unit.

Units

Unit 1: Healthy Eating and Teeth The activities in this unit focus on the need for a balanced and varied diet, the importance of dental care and the relationship between teeth and what we eat.

Unit 2: Moving and Growing This unit looks at the functions of bones, how animals can be grouped according to their skeleton and the life cycle of humans.

Unit 3: Blood and Circulation, and Drugs The activities in this unit enable students to learn about the heart and circulatory system and to discover the harmful effects of some drugs on the body.

Unit 4: Micro-organisms This unit allows students to find out about the harmful and beneficial activities of micro-organisms.

Each activity within the units consists of 2 to 4 lessons. Consequently the suggested introduction, development and plenary may need adapting, according to your preferred timings, the length of lessons and your students' age and attention spans. You may also need to consider reshaping work where you have access to only one or two computers at a time. Some of the storyboards can be picked out for students to complete by writing in words. Others work well with small groups. The aim is to provide a flexible tool that can be adapted to individual circumstances.

Most of the work involving Kar2ouche requires students to work in pairs or small groups and ultimately to present ideas and work to larger groups. It is, therefore, worth spending some time with students exploring the skills of good group work and presentation. If they establish the criteria with you, they can then reflect on how well they have done and identify the skills they want to improve.

The product from their work is usually a storyboard, animation or publication and can therefore provide evidence of their achievements. Students can be engaged in self and peer-reviews of these presentations, but will probably need some modelling of constructive criticism. Such self and peer review can inform redrafts and improvements before some work is formally submitted for your assessment. Opportunities for presentation and review are indicated in the Teacher Notes of each unit. Where the product is a storyboard or animation, access to a data projector is useful.

If you would like to share your plans or storyboards with other teachers and so add to this shared resource, you can e-mail them to esp@kar2ouche.com

Assessment

The tables below show how the units in this title cover the required range of work in the National Curriculum.

SC1 Scientific Enquiry

Unit	1		2												
No.	a	b	a	b	c	d	e	f	g	h	i	j	k	l	m
1															
2		•	•	•	•	•	•	•	•	•	•	•	•	•	•
3		•		•	•	•	•	•	•	•	•	•	•	•	•
4		•			•	•				•	•	•	•	•	•

SC2 Life Processes and Living Things

Unit No.	1			2								3				4				5					
	a	b	c	a	b	c	d	e	f	g	h	a	b	c	d	a	b	c	d	a	b	c	d	e	f
1	•			•		•																			
2	•							•																	
3						•	•			•															
4	•																								•

Crossover with QCA Schemes of Work (SoW)

QCA SoW	Units and Activities						
	1.1	1.2	2.1	2.2	3.1	3.2	3.3
1A Ourselves	•			•			
2A Health and Growth	•				•	•	
3A Teeth and Eating	•	•					
4A Moving and Growing			•	•			
5A Keeping Healthy	•				•	•	
6A Micro-organisms							•

What is Kar2ouche?

Kar2ouche is a multimedia authoring tool, and is used in a series of content titles focused on enhancing learning in a number of different subjects. In each instance the application's functions and interface are the same; it is just the backgrounds, characters, props and texts that change. Consequently, once children have learned to use Kar2ouche they are able to use it across a range of subjects.

Enhancing Learning

Not only does Kar2ouche help students develop the skills relevant to particular subject areas, it also facilitates the development of more generic thinking skills. Thus students are encouraged to know *how* as well as *what*.

Information-processing skills	Using Kar2ouche students can be encouraged to: • identify key images, text, ideas – extract what is essential • sort the relevant from the irrelevant • organise and where necessary prioritise ideas • sequence events • compare and contrast their work with the work of others • analyse the relationship between characters • develop cultural awareness.
Reasoning skills	Using Kar2ouche students can be encouraged to: • justify decisions using evidence • make informed choices • work out subtexts • consider alternative perspectives/interpretations • articulate ideas.
Enquiry skills	Using Kar2ouche students can be encouraged to: • work collaboratively to question text • observe events and predict subsequent action • consider consequences • reflect critically on written text, their own work and the work of peers.

Creative thinking skills	Using Kar2ouche students can be encouraged to: • offer interpretations of texts/situations • create multimedia texts • respond imaginatively to texts/situations.
Evaluation skills	Using Kar2ouche students can be encouraged to: • engage in collaborative working and dialogue • review, modify and evaluate work produced.
Communication	Using Kar2ouche students can be encouraged to: • engage in group discussion • present ideas to a group • use visual aids and images to enhance communication • listen, understand and respond critically to others • read for meaning – extract meaning beyond the literal – analyse and discuss alternative interpretations, ambiguity and allusion – explore how ideas, values and emotions are portrayed – consider how meanings are changed when texts are adapted to different media.

To summarise, Kar2ouche encourages students to:

- make sense of information – understand texts
- reason – interpret, justify, compare, observe and predict
- enquire – investigate multiple meanings and perspectives
- create – respond imaginatively
- evaluate – modify and improve
- communicate/articulate ideas.

Making Your Own Activities Using Kar2ouche

You, and your students, can use Kar2ouche in a range of contexts and number of ways. You can devise your own activities in Kar2ouche to introduce texts and ideas to students using one PC and a data projector; alternatively you might want to create partially made storyboards for individuals or pairs to use on a network. When a computer network is not always readily available, you might also use the software to create your own worksheets and handouts for students to use in the classroom.

Roughly, you can use Kar2ouche to create:

- storyboards
- animations
- publications.

Storyboards

These are particularly useful in encouraging students to show their understanding and ability to extract key information. By producing storyboards, students often show their ability to summarise and synthesise key information. They can be asked to create:

- a summary of a particular event or piece of text in a specified number of frames
- witness reconstructions – step by step – as if for the police
- a summary with speech bubbles or captions containing important quotations
- a storyboard with their own commentary or summary in their own words
- alternative beginnings
- alternative endings
- before and after shots
- additional episodes
- alternative interpretations of a key moment where the text is ambiguous
- outlines of structure
- explorations of subtext through the use of thought bubbles
- illustrations of the difference between what people say and what they may think with reference to evidence
- presentations for class

- illustrations of alternative points of view/debate
- imagined meetings between characters
- photographs/freeze frames for a particular moment
- a proposal for a new film/advert/documentary etc to be presented to a board of executives.

In all of these students can add sound, their own digital images, special effects and recordings of their own voices.

If time is limited, you can partially complete storyboards that students complete in the lesson.

Partially completed storyboards may comprise, for example:

- the first and last frame – students make the frames for the central section
- storyboards that contain blank thought bubbles, blank speech bubbles and/or blank text boxes
- storyboards with questions in text boxes or caption windows
- storyboards with text in the caption window – students create the pictures
- storyboards with odd frames missing
- sequencing activities
- a quiz – 'who says what?', 'what happens next?' etc.

Alternatively students can create their own incomplete storyboards for others to complete – this could be a sort of consequences game – 'what happens next?'

Animations

Students who have access to Kar2ouche out of class time, can enjoy creating animations. As with storyboards, animations enable students to demonstrate their understanding and ability to extract key information. Most of the activities listed below *can also be created as still storyboards*. Students may be told that they have been commissioned to create a:

- news programme
- documentary
- TV chat show
- TV interview
- film trailer
- opening sequence of a film or credits (representing a particular genre)
- advertisement
- musical score
- fashion show, to show fashions of the time.

Publications

As a plenary, students can either present their storyboards to the class using a data projector or on screen. Alternatively, they can use the print facility to create publications in Kar2ouche or copy into a word-processing/desktop publishing program. Within Kar2ouche you can produce a template for students who need the help of a scaffold.

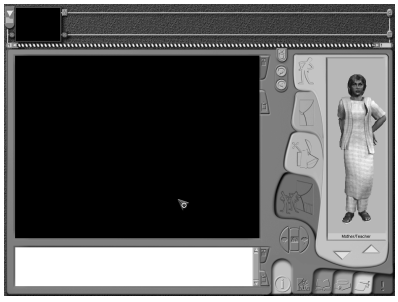
The sorts of publications could include:

- a newspaper front page – using Kar2ouche to compose the pictures (students may choose to create broadsheets and tabloids to compare the differences)
- storybooks – picture above, story below (concentrating on structure/settings etc)
- cartoon strips (or film strips)
- graphic novels
- estate agents' details
- diary entries (with photos/pictures)
- letters (with pictures)
- photo albums
- magazine spreads
- advertising posters
- 'wanted' posters
- guides
- catalogues
- book and magazine covers.

In all of these activities students may be asked to consider audience and purpose. You can stipulate this audience. As you get used to the software you'll find the possibilities almost endless.

If You Haven't Used Kar2ouche Before – A Starter

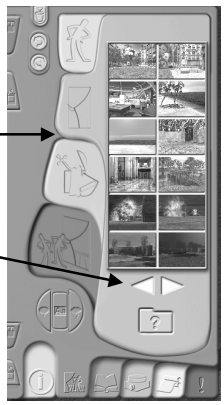
If students have not used Kar2ouche before, they should refer to the QuickStart Guide, or work through the Apprentice Activities in Kar2ouche *Composer*. However, if they haven't had time to do this, a good way of showing them the main functions is to demonstrate how to create a title sheet. This introduces selecting backgrounds, adding and posing characters, introducing text bubbles, as well as adding text and sound. They can pick up other skills as they go.



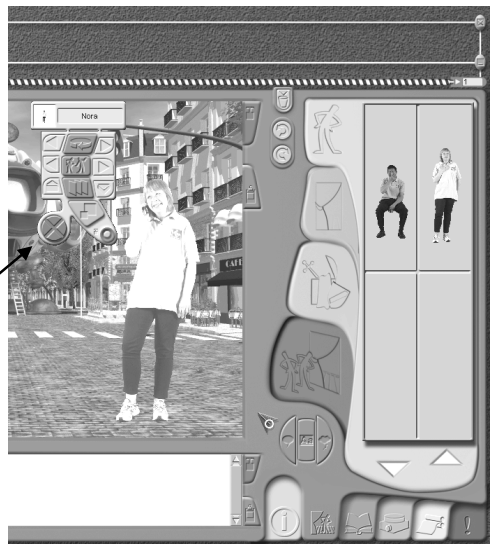
To create a title slide

1 Ask students to open Kar2ouche – the first screen they see is the composition screen.

2 Next ask them to select a background by clicking on the blue background tag. They should click again to see six backgrounds and yet again to see twelve. (Do not click again otherwise they return to a single view.) They can scroll through the backgrounds using the green arrows at the bottom. Once they have browsed the backgrounds they should select one they like by left clicking on it. It will appear in the composition window.

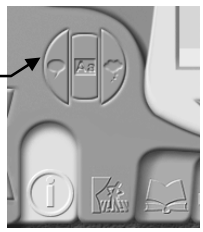


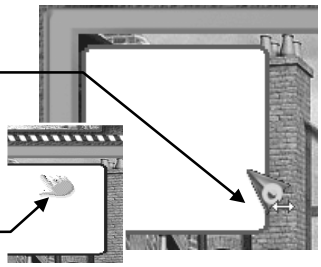
3 Having selected a background, students should choose a character to add to the frame. They do this by clicking on the green character tab (click once more to see four characters, click again to see sixteen) and scrolling through using the green arrows at the bottom. They select the character by left clicking (holding down) and dragging it into the frame. Now for the fun. This character can be resized, posed and rotated by right clicking on it in the frame. This brings up the manipulator tool.



- To rotate the character students click on the left and right facing arrow heads at either side of the top icon.
- To repose the characters they click on the arrow heads either side of the central, characters icon.
- To resize the character students should left click on the blue squares at the bottom of the manipulator tool then drag the mouse towards them to make it bigger or backwards to make the character smaller.
- The bottom icon allows the layering of characters and/or props.
- The character can be moved around by left clicking and dragging.

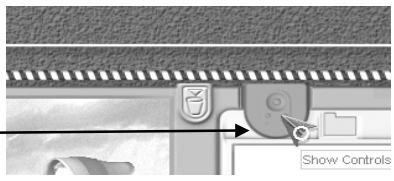
4 Next ask students to add a text bubble. They can do this by left clicking on the text bubble icon. The text bubble will appear in the top left hand portion of the screen. Students can then write in their name, form and the title of the storyboard they are about to complete. If they need to make the bubble bigger they do this by passing the cursor over the right or bottom borders until a double arrowhead appears. They should then click and drag to size. To move the bubble to elsewhere on the screen students should hover over the top of the bubble until the hand appears, left click to grab it and then drag to position.





5 Finally, students could be asked to add some sound, either in the form of a sound effect or a recording of their own voice. In either case they should begin by clicking on the text/audio tab at the bottom of the screen.

Next they should click on the show controls icon at the top of this text audio frame. This will bring up the audio control panel.



To add a sound effect they should click on the orange folder, then select one of the sound effects offered by clicking on it and then on open. If they want to preview these sound effects they should click on the effect and then on play. To record their own voices students press on the red microphone icon and speak into their microphones. To stop the recording they should press the square red button. They will be prompted to give their soundfile a name. They type this into the box and then click on save. The sound is attached to their frame.

Students will now know how to use the main functions of Kar2ouche. Encourage them to play in order to learn what other things it can do. For instance how to attach a soundfile to a frame.

Useful Contacts

Websites	The following websites contain useful information. Please check that the sites are suitable for your students and currently available before recommending them to your class.
Guardian Website	Lots of teaching resources including lesson planning, homework and research. Has a good section for students for revision and practical investigations. **http://www.learn.co.uk**
Educate the Child	The Learning Zone has a useful section aimed at helping children with revision. Lesson plans and worksheets now on Schoolsnet (see below). **http://www.educate.org.uk/learning_zone/revision_science_yr6.htm**
Schools Net	Lesson plans for most of the QCA Science units, including worksheets, teacher fact files and assessment. **http://www.schoolsnet.com**
Nutrition	This provides free on-line resources including posters, flashcards, recipes and worksheets about healthy eating and food hygiene. Produced by the British Nutrition Foundation. **http://nutrition.org.uk**
Health Education	This site offers a fun way of learning about health education through information, activities and quizzes. Aimed at 11-14 year olds (KS3) but may be useful for extension activities. Developed by the Department of Health and Education. **http://www.lifebytes.gov.uk**
Revisewise	Animations, factsheets, worksheets and tests aimed at helping children with revision. **http://www.bbc.co.uk/schools/revisewise/science/**
Learning Zone	Children's section of the Oxford University Museum of Natural History's website. Great range of informative and fun online resources including superb photos, diagrams and animations. **http://www.oum.ox.ac.uk/children.htm**

All web addresses were correct at the time of press, but are subject to change, so please do check before using with a class.

Unit 1 Healthy Eating and Teeth

The activities in this unit focus on the need for a balanced and varied diet, the importance of dental care and the relationship between teeth and what we eat.

Teacher Notes

Unit 1.1 Healthy Eating

Key Stage/Year	Key Stage 2/Years 3-5
Group Organisation	Students work mainly in pairs with some small group and whole class discussion.
Suggested Timing	One to two lessons

Overview of Task

Students begin this activity by learning how doctors in the eighteenth century tested ideas about diet and health and were able to draw conclusions from them. They learn about the need for a balanced and varied diet, which can be achieved by eating foods from four main groups.

Objectives

All students will: identify some foods needed for a healthy and varied diet.

Most students will: understand that foods can be placed in groups and that a balanced diet contains food from each group and is needed for us to grow and be active and healthy.

Some students will: explain some early evidence for the effect of diet on health.

Curriculum References

Key Stage 2 Science

Sc2 Life processes and living things 1a that the life processes common to humans and other animals include nutrition, movement, growth and reproduction; **2c** about the need for food for activity and growth, and about the importance of an adequate and varied diet for health.

Outcomes

By the end of this activity students will have:

- completed a storyboard demonstrating their knowledge of scurvy and how doctors began to draw links between diet and health
- grouped foods into four main groups using a storyboard
- created meals for a number of specific dietary requirements and presented these in a storyboard.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Doctors Order's** storyboard
- **Scurvy** storyboard
- **Food Groups** storyboard
- **Diets 1** and **2** storyboards

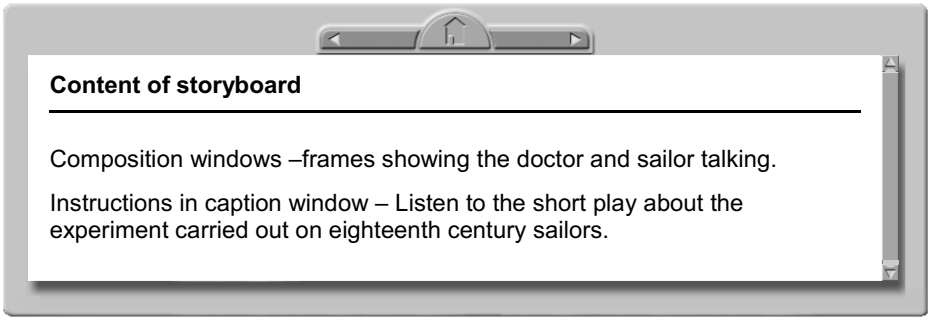
Sheet 1.1 *Healthy Meals*

Key Words: protein, carbohydrate, vitamin, starch, fat

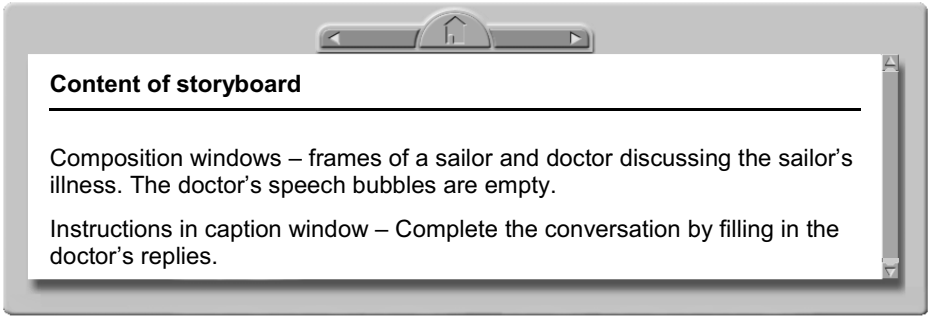
Activities

Introduction

1. Students listen to the short **Doctor's Orders** play about the experiment carried out on eighteenth century sailors to establish what was causing their ill health.

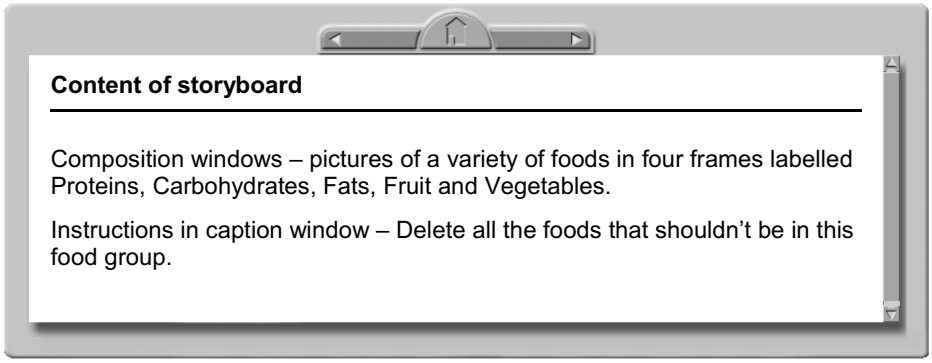


2. Students open the **Scurvy** storyboard and complete it by filling in the blank speech bubbles with the doctor's replies.



3. Students share some of their conversations with the class. Go on to discuss the need for a varied and balanced diet.

4. Students open the **Food Groups** storyboard and complete by deleting the foods that are in the wrong food groups.



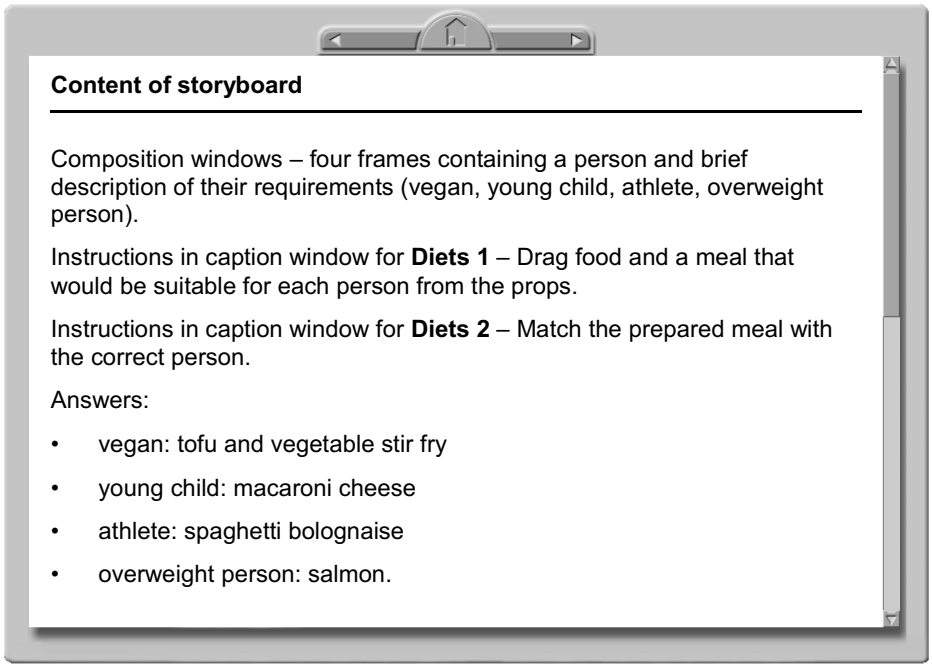
Content of storyboard

Composition windows – pictures of a variety of foods in four frames labelled Proteins, Carbohydrates, Fats, Fruit and Vegetables.

Instructions in caption window – Delete all the foods that shouldn't be in this food group.

Development

5. Students open the **Diets 1** storyboard and complete by dragging food into each frame to provide a suitable balanced meal for each of the four people. Those who need more support can open the **Diets 2** storyboard and match up the prepared meals with each person. Students explain their choices in the caption window below each frame.



Content of storyboard

Composition windows – four frames containing a person and brief description of their requirements (vegan, young child, athlete, overweight person).

Instructions in caption window for **Diets 1** – Drag food and a meal that would be suitable for each person from the props.

Instructions in caption window for **Diets 2** – Match the prepared meal with the correct person.

Answers:

- vegan: tofu and vegetable stir fry
- young child: macaroni cheese
- athlete: spaghetti bolognaise
- overweight person: salmon.

Plenary

6. Students print out their storyboards and in small groups compare their plates.

7. To consolidate learning, students should complete Sheet 1.1 *Healthy Meals* by choosing some favourite foods to create a healthy breakfast, lunch and evening meal for themselves.

Extension/ Homework

8. Using a supermarket till receipt, ask students to group the food items into the four main groups: proteins, carbohydrates, fats, fruit and vegetables.

Student Notes

Unit 1.1 Healthy Eating

Objectives

During this activity you will find out how doctors in the eighteenth century tested ideas about diet and health. You will learn that food can be placed into groups and that food from each group is needed for a balanced and varied diet to keep you healthy.

Outcomes

By working through this activity you will:

- complete a storyboard to show your knowledge of scurvy and how doctors began to make links between diet and health
- group foods into four main groups using a storyboard
- complete a storyboard by creating meals for a number of people who have different diets.

Resources

To complete this activity you will need:

Kar2ouche *Living Things and Healthy Lives*

Sheet 1.1 *Healthy Meals*

Activities

Introduction

1. Listen to the short play about the experiment carried out on eighteenth century sailors. This was to find out what was causing their ill health.

   click here to listen to the **Doctor's Orders** play.

2. Open the **Scurvy** storyboard. Complete it by filling in what you think the doctor might say to the sailor's questions.

   click here to open the **Scurvy** storyboard.

3. Share some of these conversations in a small group. Do you agree that the doctor has replied correctly? Think why it is important to eat a varied and balanced diet. What does your body use food for? What would happen to your body if you just ate your favourite food every day? Be ready to discuss this with the class.
4. Open the **Food Groups** storyboard and complete it by dragging any food that is in the wrong food group to the waste bin.

   click here to open the **Food Groups** storyboard.

Student Notes

Development

5. Open the **Diets 1** storyboard and complete it by dragging food into each frame to provide a suitable, balanced meal for each of the four people. Alternatively, open the **Diets 2** storyboard and match up the prepared meals with each person. Your teacher will tell you which storyboard to choose. Explain why you have chosen each meal in the caption window below the frame.

to open the **Diets 1** storyboard.

to open the **Diets 2** storyboard.

Plenary

6. Print out your storyboards and show them to another pair of students. Are all the meals suitable for the intended person? Could you improve any of your meals now?
7. Now complete Sheet 1.1 *Healthy Meals* by choosing some of your favourite foods to create a healthy breakfast, lunch and evening meal for yourself. Don't forget drinks.

Extension/Homework

8. Using a till receipt from a supermarket, put food items into the four main groups. Is there food from every group on the list? Which food group has the most items? Why do you think this is?

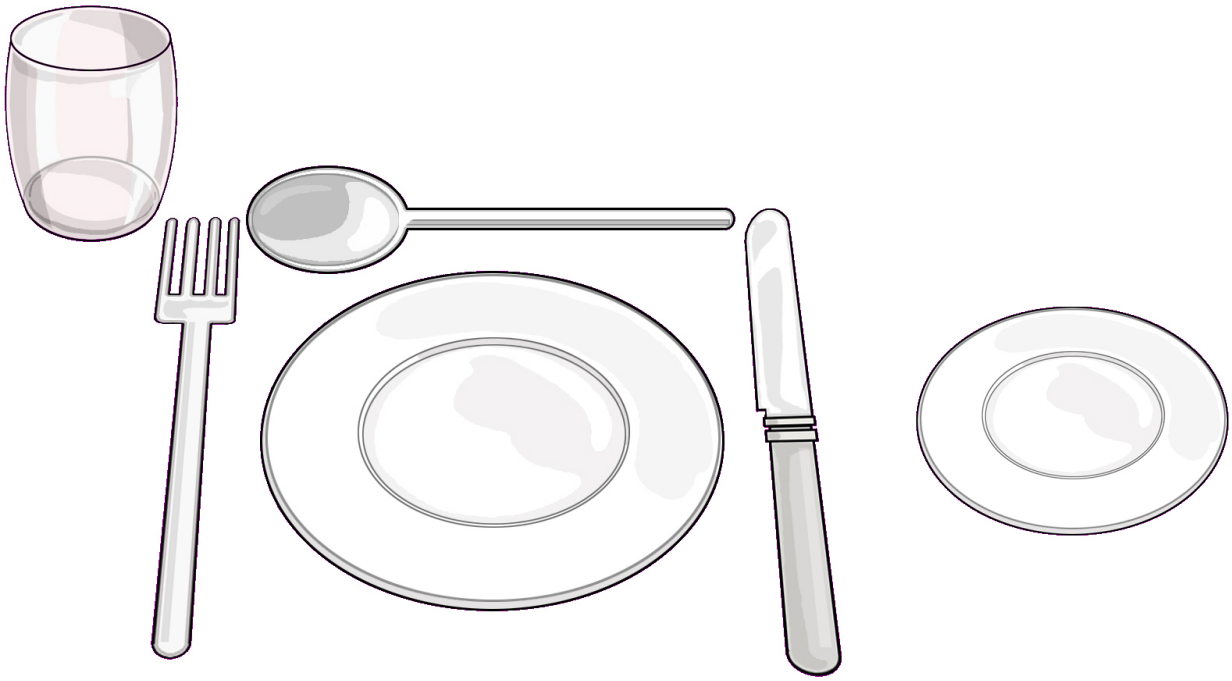
Healthy Eating Sheet 1.1

Healthy Meals

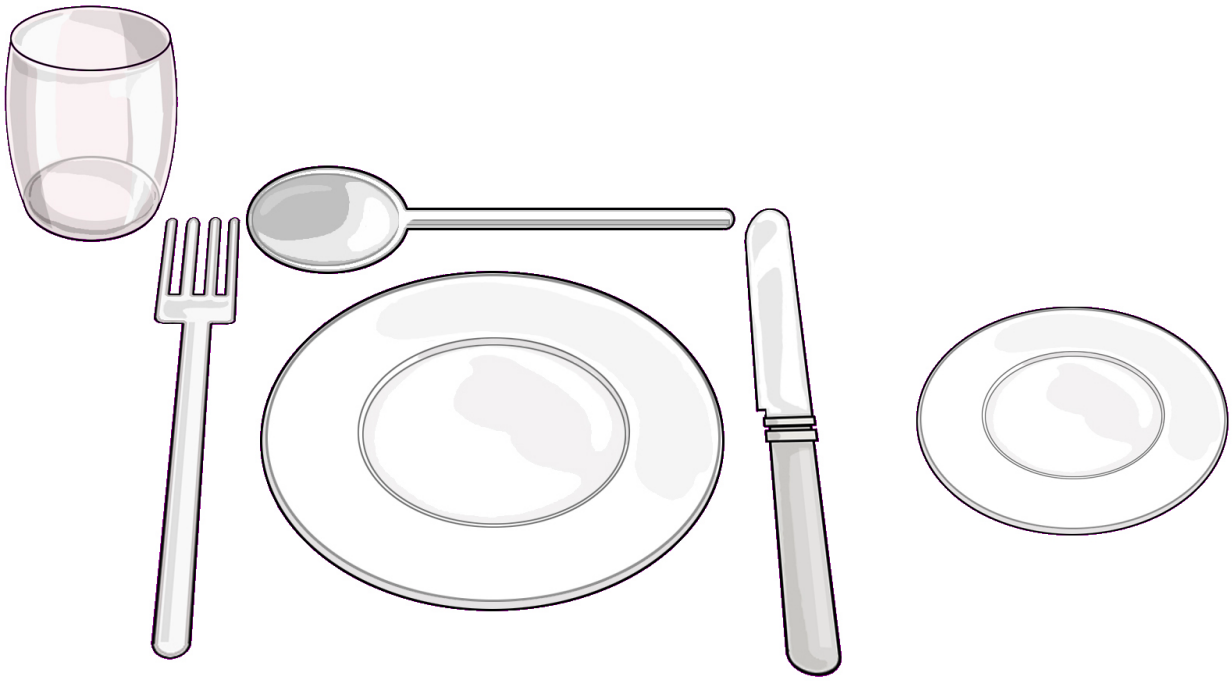
Using some of your favourite foods, create a healthy breakfast, lunch and evening meal. Write what would be on your plate and in your glass.

Remember to provide a balanced meal by using food from each of the four main food groups – proteins, carbohydrates, fats, fruit and vegetables.

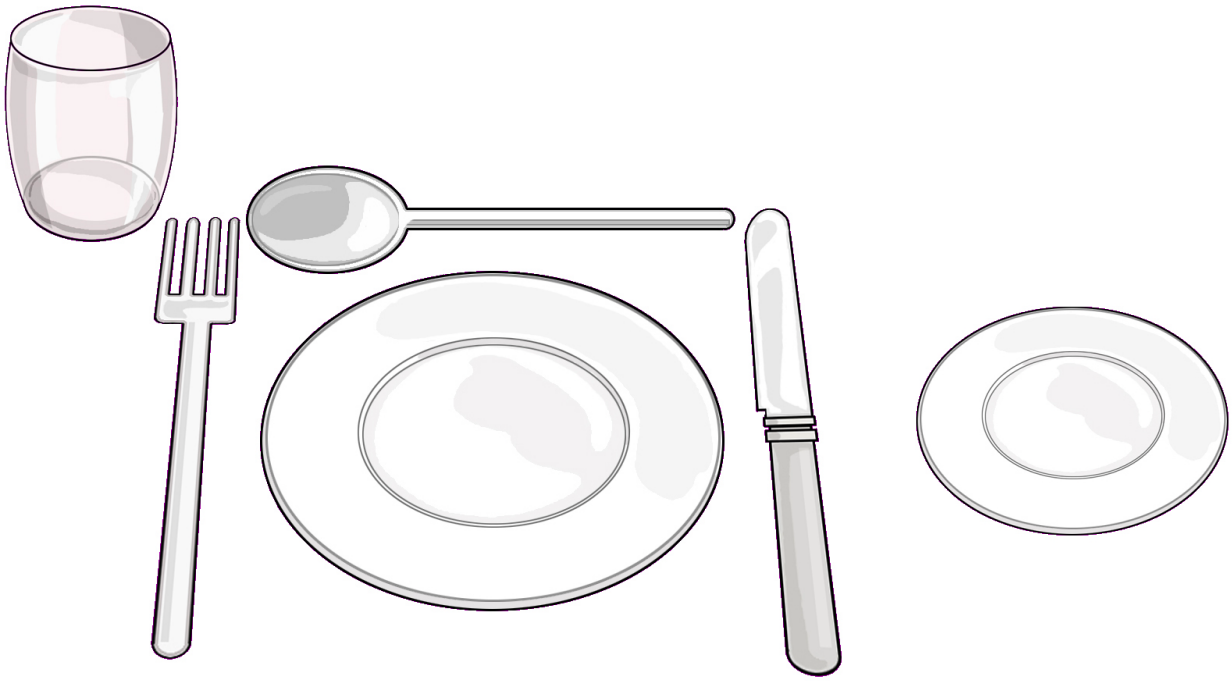
Breakfast



Lunch



Evening Meal



Teacher Notes

Unit 1.2 Teeth

Key Stage/Year	Key Stage 2/ Year 3
Group Organisation	Students begin the activity in small groups that come together for class discussion. They then work mainly in groups of 2 or 3 when using the computers, with opportunities to join others to compare ideas.
Suggested Timing	One to two lessons, with more time required if they carry out the work in the extension section.

Overview of Task

Students develop their knowledge of personal health by recognising the importance of dental care. They learn about how teeth are related to diet in humans and other animals.

Objectives

All students will: understand that they need to take care of their teeth and name the four types of human teeth.

Most students will: know how and why they should look after their teeth.

Some students will: understand that animals have different kinds of teeth appropriate to their diets.

Curriculum References

Key Stage 2 Science **Sc2 Life processes and living things 1a** that the life processes common to humans and other animals include nutrition, movement, growth and reproduction; **2a** about the functions and care of teeth; **2c** about the need for food for activity and growth, and about the importance of an adequate and varied diet for health.

Outcomes

By the end of this activity students will have:

- listened to a storyboard describing the job descriptions of each type of tooth in the human mouth

- matched the four types of teeth with a description of the job they do
- completed a storyboard showing where each of the four types of teeth fit into the mouth
- produced a leaflet to encourage children to look after their teeth
- used a storyboard to group animals according to their teeth and the types of food they eat
- played a game matching clues to animals using a storyboard
- written a set of instructions to explain how to clean teeth correctly.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Talking Teeth** storyboard
- **Mouth** storyboard
- **Healthy Teeth** storyboard
- **Animal Teeth** storyboard
- **Guess Who I Am** storyboard

Sheet 1.2 *Types of Teeth*

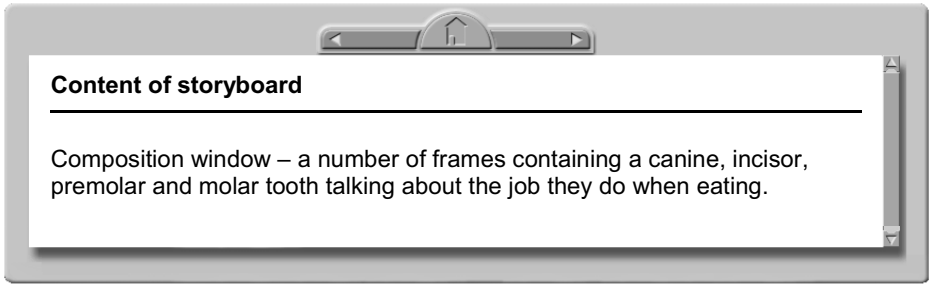
Mirrors for inspecting teeth

Key Words: incisor, molar, premolar, canine, carnivore, herbivore, omnivore, plaque

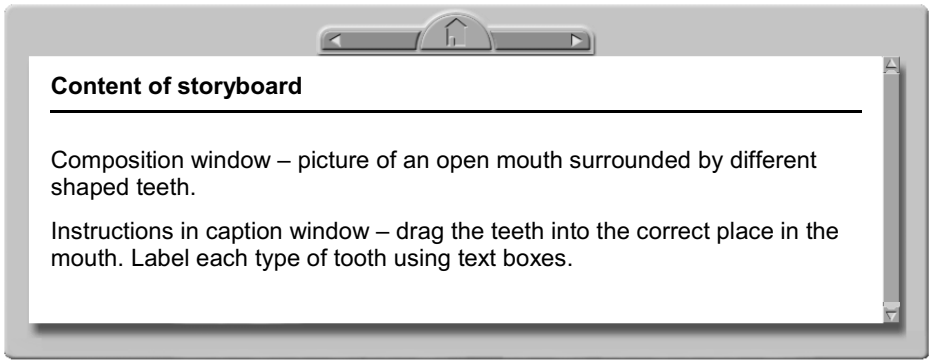
Activities

Introduction

1. In small groups students use mirrors to examine their teeth. Encourage them to discuss the different types and shapes of teeth, and what job each does when eating. Share these ideas with the whole class. Students then open the **Talking Teeth** storyboard and listen to each tooth's job description.

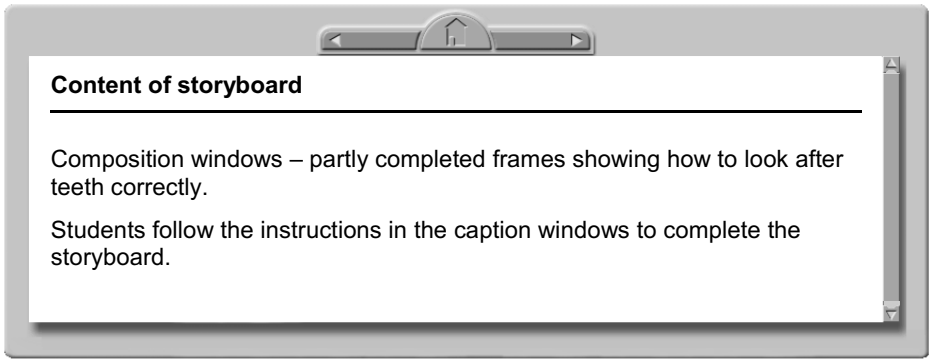


2. Students use this information to complete Sheet 1.2 *Types of Teeth* by matching each tooth with the correct name and description of what it does.
3. Students open the **Mouth** storyboard and complete by dragging teeth into the correct place in the mouth. Using text boxes they label each type of tooth.

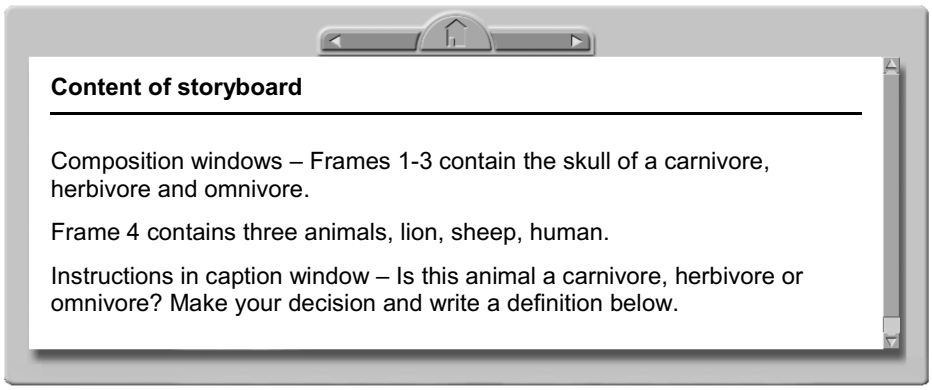


Development

4. Students open the **Healthy Teeth** storyboard and fill in the partly completed storyboard using the prompts to help them. This can be printed out to produce a leaflet to go in a dentist's waiting room to encourage children to look after their teeth.

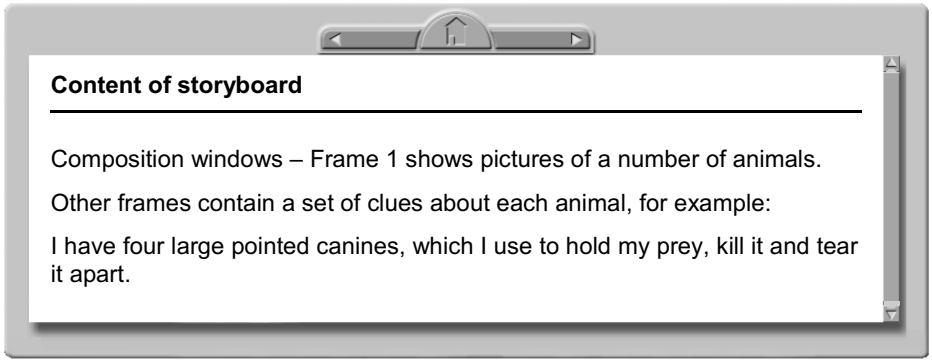


5. Students open the **Animal Teeth** storyboard. In small groups they discuss the types of teeth belonging to the three different animal skulls in the first three frames and the type of job they do. Ask whether the teeth appear to be related to the food that each animal eats. Complete by dragging the animals to which the skulls belong into the correct frame. Students can write a simple definition of carnivore, herbivore and omnivore in the caption windows below the corresponding frame.



Plenary

6. Open the **Guess Who I Am** storyboard and complete by dragging the correct animal to match the set of clues. If there is time students can make up their own set of clues for another pair to guess the animal.



Extension/ Homework

7. Students produce a set of illustrated instructions to demonstrate how to clean teeth correctly.

Student Notes

Unit 1.2 Teeth

Objectives

During this activity you will realise how important it is to look after your teeth and how you can do this. You will find out about the different types of teeth and the jobs they do when you eat. Finally you will learn about how teeth are related to diet in humans and other animals.

Outcomes

By working through this activity you will:

- listen to a storyboard describing the job each type of tooth in the human mouth carries out
- match the four types of teeth with a description of the job they do
- complete a storyboard showing where each of the four types of teeth fit into your mouth
- produce a leaflet encouraging children to look after their teeth
- use a storyboard to group animals according to their teeth and the types of food they eat
- play a game matching clues to animals
- write a set of instructions to explain how to clean your teeth correctly.

Resources

To complete this activity you will need:
Kar2ouche *Living Things and Healthy Lives*
Sheet 1.2 *Types of Teeth*
Mirrors

Activities

Introduction

1. In small groups use mirrors to examine your teeth. Can you find different shaped teeth? What might these different types of teeth do when you eat? Be ready to share what you have discussed with the rest of the class. Open the **Talking Teeth** storyboard and listen to the teeth telling you their names and the job each plays when you eat.

   to open the **Talking Teeth** storyboard.

2. Use this information to complete Sheet 1.2 *Types of Teeth* by matching each tooth with the correct name and description of what it does.
3. Open the **Mouth** storyboard and complete it by dragging teeth into the correct place in the mouth. Use text boxes to label each type of tooth.

   to open the **Mouth** storyboard.

Student Notes

Development

4. Open the **Healthy Teeth** storyboard. Follow the instructions to complete the storyboard. Print it out to produce a leaflet to go in a dentist's waiting room encouraging children to look after their teeth.

   click here to open the **Healthy Teeth** storyboard.

5. Open the **Animal Teeth** storyboard. In small groups discuss the types of teeth that belong to the three different animal skulls in the frames. What do you think each type of tooth does? Think about the type of food that each animal eats. Complete by dragging the animals that own the skulls into the correct frame. Write a simple definition of carnivore, herbivore and omnivore in the caption windows below each.

   click here to open the **Animal Teeth** storyboard.

Plenary

6. Open the **Guess Who I Am** storyboard and complete it by dragging the correct animal to match the set of clues. If there is time, make up your own set of clues for another pair to guess the animal.

   click here to open the **Guess Who I Am** storyboard.

Extension/Homework

7. Produce a set of illustrated instructions to show how you should clean your teeth correctly.

Teeth Sheet 1.2

Types of Teeth

Draw arrows to match each tooth with the correct name and function.

Canine Grip and hold food

Incisor Grind and chew food

Premolar Cut and snip food

Molar Crush and grind food

Unit 2 Moving and Growing

This unit looks at the functions of bones, how animals can be grouped according to their skeleton and the life cycle of humans.

Teacher Notes

Unit 2.1 Moving

Key Stage/Year	Key Stage 2/Year 4
Group Organisation	Students work mainly in pairs with some whole class discussion and an opportunity for small group work in the extension activity.
Suggested Timing	One to two lessons

Overview of Task

Students discuss the functions of the skeleton and go on to compare human and animal skeletons, naming the most important bones and those that they have in common. They group animals according to whether they have backbones or not and then look in more detail at how the skeleton enables humans and animals to move. They can test their understanding of the unit by carrying out a multiple-choice type quiz.

Objectives

All students will: know that they have a skeleton and name some important bones in the body.

Most students will: understand the main functions of the skeleton and that movement depends on both skeleton and muscles. Also that some animals have internal skeletons like humans.

Some students will: understand that muscles work in pairs and when one muscle contracts another relaxes.

Curriculum References

Key Stage 2 Science

Sc2 Life processes and living things 1a that the life processes common to humans and other animals include nutrition, movement, growth and reproduction; **2e** that humans and some other animals have skeletons and muscles to support and protect their bodies and to help them to move.

Outcomes

By the end of this activity students will have:

- used a storyboard to label the main bones in the human skeleton and compared them with those of two animal skeletons
- grouped animals according to whether they have a backbone or not, using a storyboard
- watched a storyboard of the forearm moving up and down and explained what is happening
- carried out a multiple-choice quiz to test their understanding
- produced an illustrated poster describing animals' movements.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Skeleton** storyboard
- **Animals** storyboard
- **Joints** storyboard
- **Quiz** storyboard

Sheet 2.1 *Animal Movement*

Key Words: contract, relax, protection, internal, external, vertebrate, invertebrate

Activities

Introduction

1. Discuss with students what we would look like without a skeleton and what the three main functions of a skeleton are (movement, protection, support).
2. Students open the **Skeleton** storyboard and complete by dragging the correct labels to the bones. In the caption windows students make a note of the bones that all the skeletons have in common. They then label which animals they think the skeletons in frames 2 and 3 belong to and why. They can check their answers by dragging up the hidden text box to reveal the correct name.
3. To complete frame 4, students need to drag the organs of the body that are protected by the skeleton to the correct position on the skeleton.

Content of storyboard

Composition windows – Frame 1: Human skeleton surrounded by labels.

Frame 2 and 3: Animal skeleton surrounded by labels.

Instructions in caption windows – Drag the correct labels to the bones and make a note of the bones that all the creatures have in common.

Frame 4: Parts of the human skeleton surrounded by body organs.

Instructions in caption window – Drag the correct organ to the part of the skeleton that protects it.

Development

4. Students open the **Animals** storyboard and complete by dragging animals into either the 'backbone' or 'no backbone' frames. They group the 'no backbone' animals further by dragging them into the frames labelled 'external skeleton' or 'no skeleton'. In the caption window underneath the final frame, students explain how animals with no skeletons support their bodies.

Content of storyboard

Composition windows – Frames 1 and 2 contain pictures of various animals with and without backbones.

Frames 3 and 4 empty, labelled backbone and no backbone.

Frames 5 and 6 empty, labelled external skeleton and no skeleton.

Instructions in caption window – Drag the animals into the correct group in either frame three – *backbone* or four – *no backbone*.

Instructions in caption window of Frame 4 – Group these animals by dragging into the correct group in either Frame 5 – *external skeleton* or 6 – *no skeleton*.

Answers:

- Backbone: bird, fish, snake, frog, badger
- No backbone – external skeleton: cockroach, spider, lobster, crab, grasshopper and – no skeleton: slug, jellyfish, earthworm, leech, snail, octopus

5. Students open the **Joints** storyboard and run the animation of the forearm moving up and down at the elbow. Encourage them to look carefully at the muscles contracting and relaxing and then write a description of what is happening in the caption windows below the frames.

Content of storyboard

Composition windows – series of pictures showing the forearm moving up and down.

Instructions in caption window – Write a description of what is happening in the caption windows.

Plenary

6. Students listen to further information about bones and joints in the text/audio screen.
7. Students open the **Quiz** storyboard and test their understanding of the unit by clicking on the correct multiple-choice answer.

Content of storyboard

Composition windows – multiple-choice questions about the skeleton and joints. Correct answers are shown in **bold** for reference.

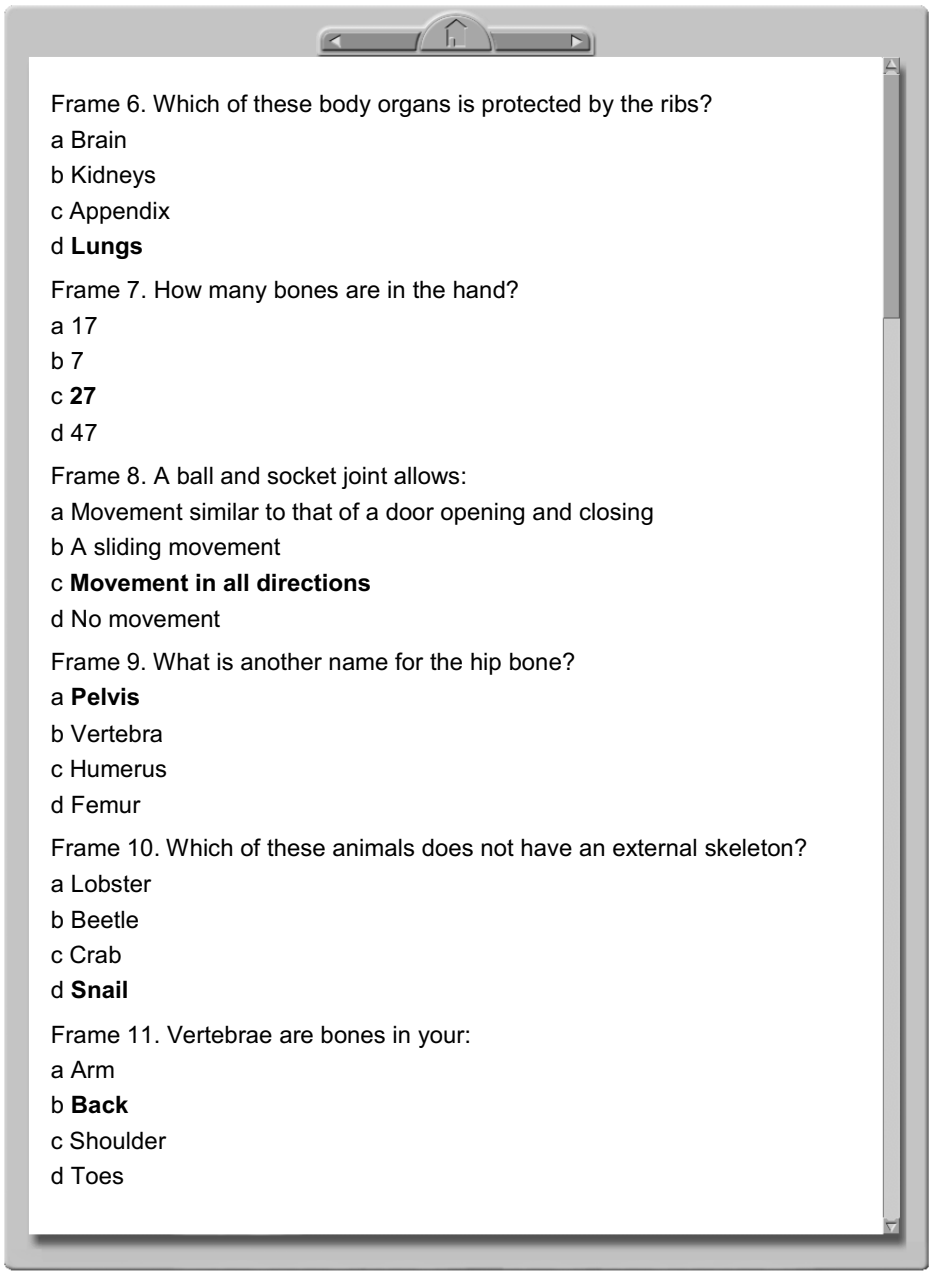
Frame 1. The smallest bone in the body is in the:
a Foot
b **Ear**
c Neck
d Finger

Frame 2. A jellyfish's body is supported by:
a Jelly
b Skeleton
c **Sea**
d Air

Frame 3. Muscles move the bones in your body by:
a Pushing and pulling
b Relaxing and lengthening
c **Contracting and relaxing**
d Contracting and shortening

Frame 4. Which of these does the skeleton *not* do?
a Protect organs
b Support the body
c Help us to move
d **Keep us warm**

Frame 5. Which of these is important for healthy bones?
a **Calcium**
b Vitamins
c Carbohydrates
d Protein



Frame 6. Which of these body organs is protected by the ribs?
a Brain
b Kidneys
c Appendix
d **Lungs**

Frame 7. How many bones are in the hand?
a 17
b 7
c **27**
d 47

Frame 8. A ball and socket joint allows:
a Movement similar to that of a door opening and closing
b A sliding movement
c **Movement in all directions**
d No movement

Frame 9. What is another name for the hip bone?
a **Pelvis**
b Vertebra
c Humerus
d Femur

Frame 10. Which of these animals does not have an external skeleton?
a Lobster
b Beetle
c Crab
d **Snail**

Frame 11. Vertebrae are bones in your:
a Arm
b **Back**
c Shoulder
d Toes

Extension/ Homework

8. Divide the students into groups and give each group a different animal. Students research how the animal moves and make a list of simple words to describe the movement. At home/school they produce an illustrated poster aimed at younger children using these words. Pictures could be printed out from Kar2ouche. Those who need more support can use Sheet 2.1 *Animal Movement*.

Student Notes

Unit 2.1 Moving

Objectives

During this activity you will learn the names of the main bones and the functions the skeleton performs. You will group animals according to their type of skeleton or support and then look more closely at how the skeleton enables humans and animals to move.

Outcomes

By working through this activity you will:

- use a storyboard to label the main bones in the human skeleton and compare them with those of two animal skeletons
- group animals according to whether they have a backbone or not, using a storyboard
- watch a storyboard of the forearm moving up and down and explain what is happening
- test your understanding by using a multiple-choice quiz
- produce an illustrated poster describing animals' movements.

Resources

To complete this activity you will need:

Kar2ouche *Living Things and Healthy Lives*

Sheet 2.1 *Animal Movement*

Activities

Introduction

1. Think about what your body would look like if you did not have a skeleton. What would you be unable to do? What do you think the three main functions of the skeleton are? Discuss your ideas with the rest of the class.
2. Open the **Skeleton** storyboard and complete it by labelling the bones in the first three frames. Which bones do all the skeletons have? List them in the caption windows. Name the animals you think the skeletons in frame 2 and 3 belong to and explain why you think this. You can check your answers by dragging up the hidden text box to reveal the correct name. To complete frame 4, drag the organs to the correct position to show how they are protected by the skeleton.

   to open the **Skeleton** storyboard.

Development

3. Open the **Animals** storyboard and complete by dragging animals into the correct groups. In the caption window underneath the final frame, explain how you think animals with no skeletons support their bodies.

   to open the **Animals** storyboard.

Student Notes

4. Open the **Joints** storyboard and run the animation of the forearm moving up and down at the elbow. Look carefully at the muscles contracting and relaxing and then write a description of what is happening in the caption windows below the frames.

   click here to open the **Joints** storyboard.

Plenary

5. Listen to the further information about bones and joints in the text/audio screen.
6. Open the **Quiz** storyboard and test how much you have understood about the skeleton and movement. Read each question and click on the correct answer. If you are not sure of the answer, look back at your work or listen to the information in the text/audio screen again.

   click here to open the **Quiz** storyboard.

Extension/Homework

7. Your teacher will divide you into groups and give you the name of an animal. Using the Internet or books, research how the animal moves and make a list of simple words to describe the movement. At home or school produce an illustrated poster aimed at younger children using these words. You could print out some pictures from Kar2ouche if it is available. You may want to use Sheet 2.1 *Animal Movement* to help.

Moving Sheet 2.1

Animal Movement

These questions may help you to think about how your animal moves.

Does it have legs? If so, how many? Does it use these legs to move?

If it doesn't use its legs to move or doesn't have legs, what part of its body does it use?

Does it move on land, in water or in the air?

Can it move in several different ways?

How does it move to catch its prey?

These words may help you.

Can you think of any more?

Teacher Notes

Unit 2.2 Growing

Key Stage/Year	Key Stage 2/Years 4-5
Group Organisation	Students spend most of this activity in small groups or pairs.
Suggested Timing	Three to four lessons

Overview of Task

Students learn that humans have a life cycle and need to reproduce and that a human baby depends on its parents for a long time. They design and carry out an experiment to find out if their skeleton grows as they do.

Objectives

All students will: understand some stages in the development of humans.

Most students will: know that their skeletons grow as they do and realise that living things need to reproduce if the species is to survive. Recognise stages in the growth and development of humans.

Some students will: recognise that all living things have a life cycle and understand that human children depend on their parents for a long time.

Curriculum References

Key Stage 2 Science

Sc1 Scientific enquiry 1b that it is important to test ideas using evidence from observation and measurement; **2a** ask questions that can be investigated scientifically and decide how to find answers; **2b** consider what sources of information, including firsthand experience and a range of other sources they will use to answer questions; **2c** think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and what equipment and materials to use; **2d** make a fair test or comparison by changing one factor and observing or measuring the effect while keeping other factors the same; **2e** use simple equipment and materials appropriately and take action to control risks; **2f** make systematic observations and measurements, including use of ICT for datalogging; **2g** check observations and measurements by repeating

them where appropriate; **2h** use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner; **2i** make comparisons and identify simple patterns or associations in their own observations and measurements or other data; **2j** use observations, measurements or other data to draw conclusions; **2k** decide whether these conclusions agree with any prediction made and/or whether they enable further predictions to be made; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 1a that the life processes common to humans and other animals include nutrition, movement, growth and reproduction; **2f** about the main stages of the human life cycle.

Outcomes

By the end of this activity students will have:

- produced a timeline showing what skills are achieved at different ages
- completed a storyboard to show a day in the life of a baby and mother
- ordered the stages of the human life cycle using a storyboard
- devised and carried out an experiment to find out if skeletons grow as we do
- reorganised a storyboard to put the stages of a butterfly's life in the correct order
- matched information about gestation times and offspring to the correct animals.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Baby's Day** storyboard
- **Human Life Cycle** storyboard
- **Do Bones Grow?** storyboard
- **Life Cycle of a Butterfly** storyboard
- **Young Animals** storyboard

Sheet 2.2a *Timeline*

Sheet 2.2b *Young Animals*

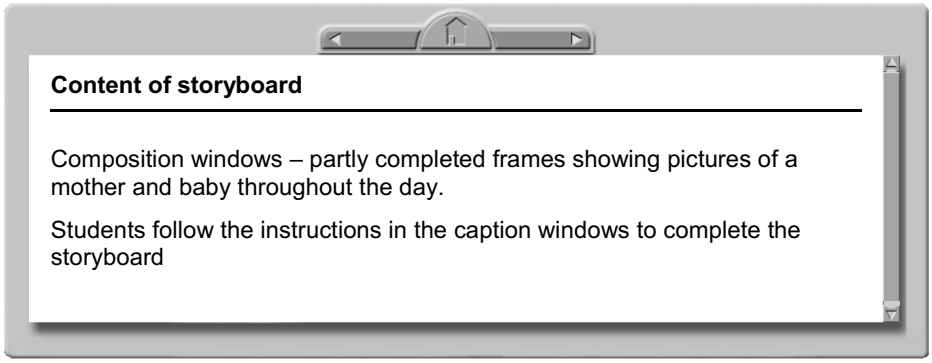
Key Words: life cycle, reproduction, gestation

Activities

Introduction

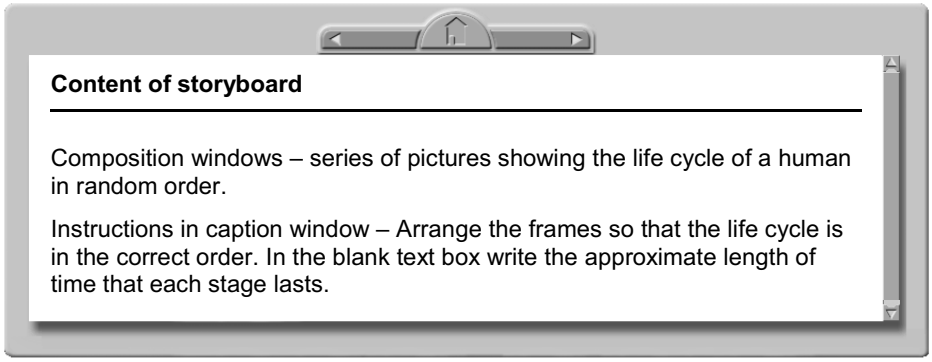
1. Discuss what skills the students had when they were babies and toddlers and what they can do now. What will they be able to do when they are teenagers and adults? Students fill in the Sheet 2.2a *Timeline* by matching the activities to the correct part of the timeline.

2. Students open the **Baby's Day** storyboard and complete by filling in the empty frames and thought bubbles. They use the prompts in the caption windows to help them.



Development

3. Students open the **Human Life Cycle** storyboard and order the stages. Students write the approximate time that each stage lasts in the blank text box.

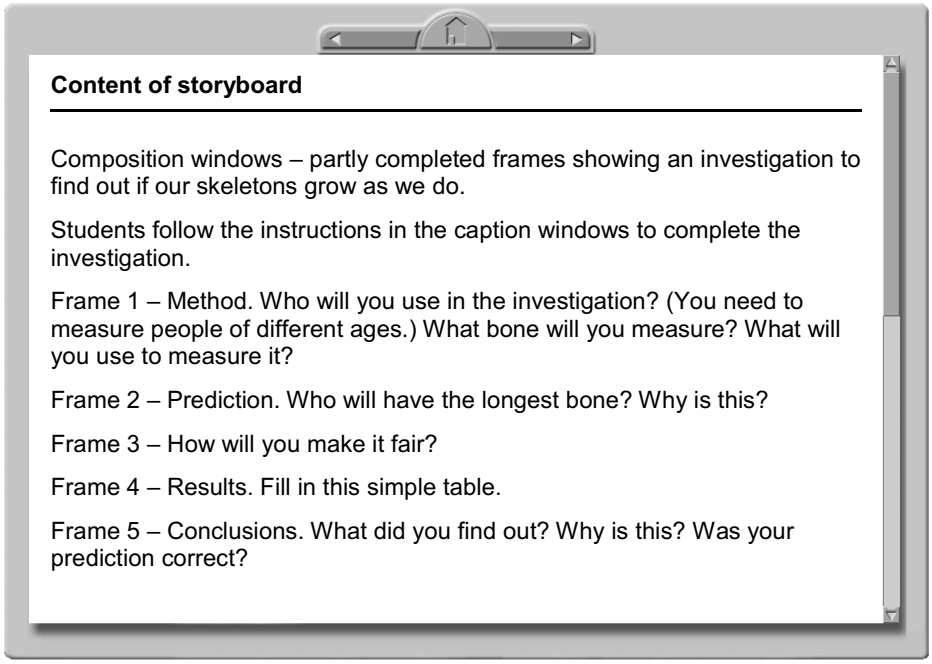


4. In small groups students devise an experiment to find out if our skeletons grow as we do. Carry out the experiment using measurements from children/adults in school or members of their family. Before they start encourage them to predict the outcome. Ask how they can ensure that they carry out a fair test. Let them consider how they can display their results and ask what conclusions they can draw from the experiment.

   One way of doing this is to measure the forearm of a number of people of different ages. It is important that the students measure the same bone each time and that they measure in exactly the

same place for each person. The children should conclude that our bones grow as we do until we reach adulthood.

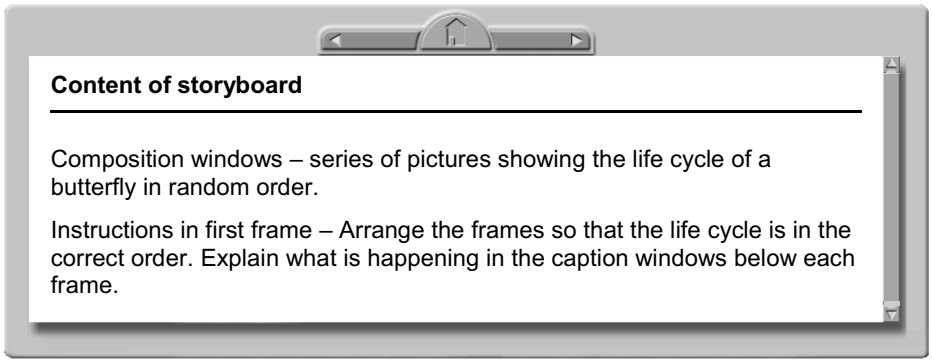
5. To give extra support students can open the **Do Bones Grow?** storyboard and complete the frames using the prompts to help.



Plenary

6. Regroup the students so that they can discuss the results of their experiments. Did all the groups carry out the experiment in a similar way? Were they all fair tests? Have all the groups drawn the same conclusions?

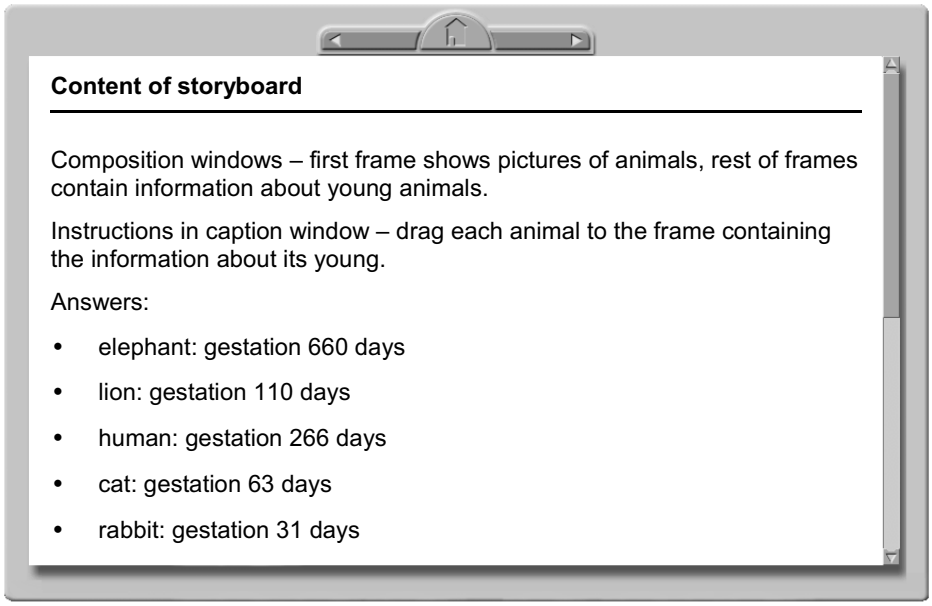
7. If there is time, students open the **Life Cycle of a Butterfly** storyboard. Then they complete it by ordering the stages and explaining what is happening in the caption windows below each frame.



Extension/ Homework

8. In groups, students research the gestation times of various animals and the average number of offspring born. Fill in the table on Sheet 2.2b *Young Animals*. Explain any patterns. Generally, they will find that the larger the size of the animal the longer the gestation time and the fewer the number of offspring. Humans have a long gestation time for their adult body size.

9. If students have access to Kar2ouche they could open the **Young Animals** storyboard and follow the instructions to complete the storyboard.



Student Notes

Unit 2.2 Growing

Objectives

During this activity you will learn that humans have a life cycle, that they need to reproduce and that a human baby depends on its parents for a long time. You will design and carry out an experiment to find out if skeletons grow as we do.

Outcomes

At the end of this activity you will have:

- produced a timeline showing what skills are learnt at different ages
- completed a storyboard to show a day in the life of a mother and baby
- ordered the stages of the human life cycle using a storyboard
- planned and carried out an experiment to find out if skeletons grow as we do
- reorganised a storyboard to put the stages of a butterfly's life in the correct order
- matched information about gestation times and offspring to the correct animals.

Resources

To complete this activity you will need:

Kar2ouche *Living Things and Healthy Lives*

Sheet 2.2a *Timeline*

Sheet 2.2b *Young Animals*

Activities

Introduction

1. Can you remember what you were able to do when you were a baby or toddler? What sort of activities did you do during the day compared to now? What extra skills will you have when you become a teenager and then an adult? Discuss this with the class.

   Fill in the Sheet 2.2a *Timeline* by matching the activities to the correct part of the timeline.

2. Open the **Baby's Day** storyboard and complete it by filling in the empty frames and thought bubbles. Use the headings to help you.

   to open the **Baby's Day** storyboard.

Development

3. Open the **Human Life Cycle** storyboard and put the stages in the correct order.

   to open the **Human Life Cycle** storyboard.

Student Notes

4. Your teacher will put you into small groups. Plan an experiment to find out if our skeletons grow as we do. Carry out the experiment using measurements from children/adults in school or members of your family. For extra help you can open the **Do Bones Grow?** storyboard. Follow the instructions to complete the storyboard.

   click here to open the **Do Bones Grow?** storyboard.

Plenary

5. Your teacher will mix up your groups so that you can discuss the results of your experiments. Did you all carry out the experiment in a similar way?
6. If there is time, open the **Life Cycle of a Butterfly** storyboard and order the stages.

   click here to open the **Life Cycle of a Butterfly** storyboard.

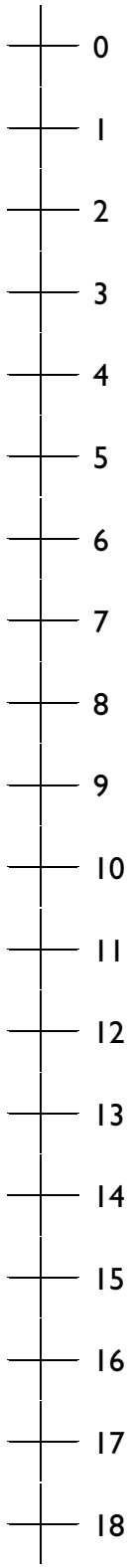
Extension/Homework

7. In groups, find out about the gestation times of some animals and the average number of offspring born. Ask your teacher for help researching this. Fill in the table on Sheet 2.2b *Young Animals*. Can you explain any patterns you see?
8. If you are able to use Kar2ouche, open the **Young Animals** storyboard and follow the instructions to complete the storyboard.

   click here to open the **Young Animals** storyboard.

Growing Sheet 2.2a

Timeline



Decide at what age you would be able to do these things. Write them next to the correct part of the timeline.

Crawl

Walk

Talk

Start school

Get dressed

Cook meals

Start work

Leave home

Have children

Shop

Drive a car

Cross the road safely

Add some more skills/activities to the timeline.

Growing Sheet 2.2b

Young Animals

Name of animal	Gestation time	Average number of young

Do you notice any patterns? Explain.

Unit 3 Blood and Circulation, and Drugs

The activities in this unit enable students to learn about the heart and circulatory system and to discover the harmful effects of some drugs on the body.

Teacher Notes

Unit 3.1 Blood and Circulation

Key Stage/Year	Key Stage 2/Years 3-5
Group Organisation	Students work mainly in pairs/threes on the computers with some small group work in the plenary and extension activities.
Suggested Timing	Three to four lessons

Overview of Task

Students learn that the heart pumps blood around the body. They find out that as they exercise, the heart beats faster to take blood more rapidly to their muscles. This can be measured by taking their pulse. They design and carry out an investigation to find out how different activities affect pulse rates.

Objectives

All students will: understand that the heart pumps blood round the body and the pulse rate is a measure of how fast the heart is beating.

Most students will: understand that during exercise the heart beats faster to take blood more rapidly to the muscles.

Some students will: know that blood is carried round the body through arteries, veins and capillaries and that blood carries oxygen to all parts of the body.

Curriculum References

Key Stage 2 Science

Sc1 Scientific enquiry 1b that it is important to test ideas using evidence from observation and measurement; **2b** consider what sources of information, including firsthand experience and a range of other sources they will use to answer questions;

2c think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and what equipment and materials to use; **2d** make a fair test or comparison by changing one factor and observing or measuring the effect while keeping other factors the same; **2e** use simple equipment and materials appropriately and take action to control risks; **2f** make systematic observations and measurements, including use of ICT for datalogging; **2g** check observations and measurements by repeating them where appropriate;

2h use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner; **2i** make comparisons and identify simple patterns or associations in their own observations and measurements or other data; **2j** use observations, measurements or other data to draw conclusions; **2k** decide whether these conclusions agree with any prediction made and/or whether they enable further predictions to be made; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 2c that the heart acts as a pump to circulate the blood through vessels around the body, including through the lungs; **2d** about the effect of exercise and rest on pulse rate.

Outcomes

By the end of this activity students will have:

- labelled the main vessels and chambers of the heart and written a simple explanation of how it works
- used a storyboard to tell the story of a red blood cell's journey through the body
- completed a storyboard of two children running for a tube by adding audio clips of heartbeats
- planned and carried out an investigation to find out how different activities affect pulse rates
- designed a poster to encourage people to look after their hearts.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Heart** storyboard
- **Heart 2** storyboard
- **Journey of a Red Blood Cell** storyboard
- **Running for a Tube** storyboard

Sheet 3.1 *Investigating Pulse Rates*

Books for research on the heart

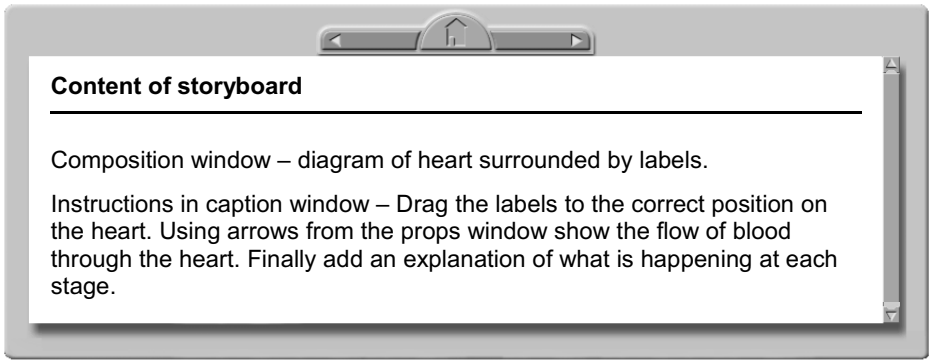
Key Words: circulation, pulse, artery, vein, capillary

Activities

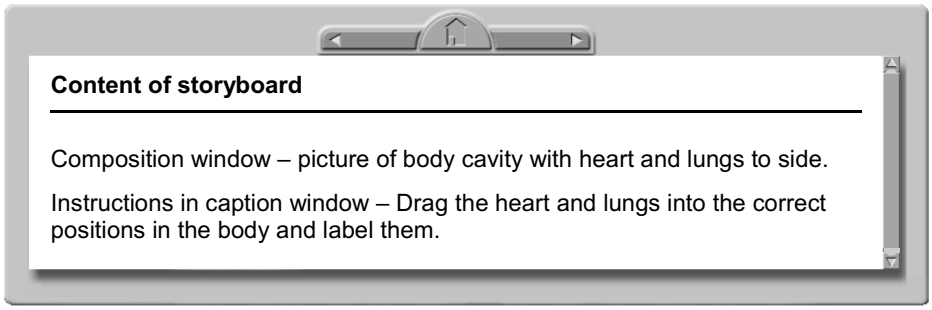
Introduction

1. Explain to students how the heart pumps blood to the body and the lungs. Use a large diagram of the heart to show the four chambers and the vessels carrying the blood in and out. Explain what the valves do. Students can use the Internet and books to find out more about the heart and the three types of blood vessels.

2. Students open the **Heart** storyboard and complete by dragging the labels of the main vessels and chambers into the correct positions. Using arrows they show the flow of blood. Students write a simple explanation of what is happening in text boxes around the image.

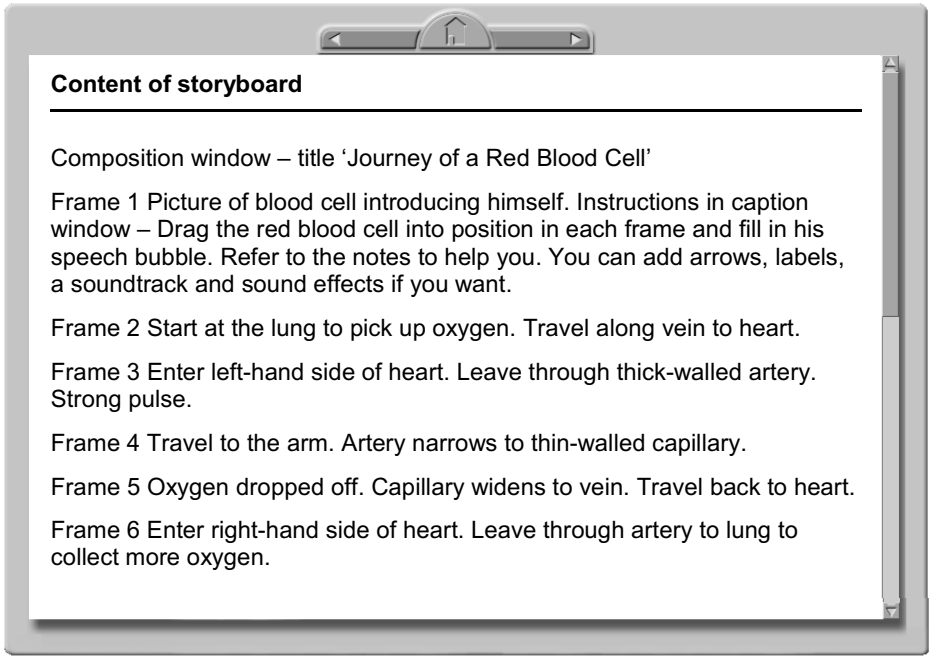


Alternatively, students open the **Heart 2** storyboard. This is simpler and just requires students to drag the heart and lungs into the correct positions in the body cavity.



Development

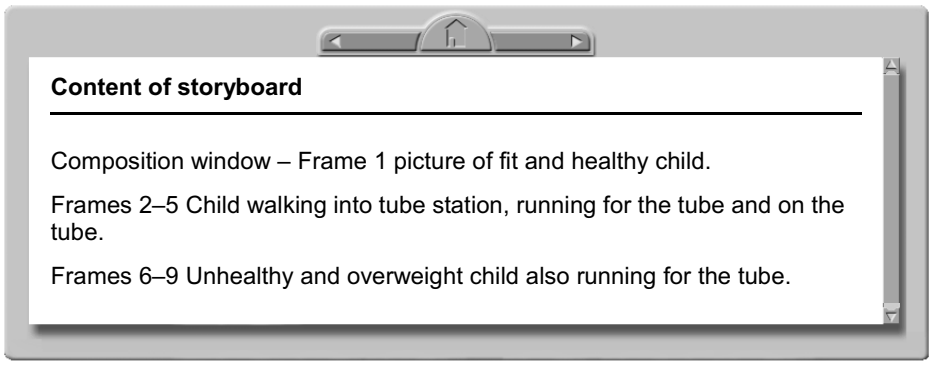
3. Students open the **Journey of a Red Blood Cell** storyboard and, imagining they are a red blood cell, tell the story of the blood's journey through the body from the lungs, to the heart, to the arm and back to the lungs. They will use the prompts in the caption windows to help.



4. Discuss with the students what they think will happen to their pulse rates when they start exercising. Ask them:
   - what happens when you stop exercising?
   - would being very unfit affect your pulse rate?

   A child's pulse rate is about 80-90 beats per minute at rest. As they exercise, the pulse rate will get faster and then begin to slow down again when they stop. If they are unfit the pulse rate during exercise will be higher than for a fitter person. It will also take longer for the pulse rate to return to normal after the exercise has finished.

5. Students open the **Running for a Tube** storyboard and complete by dragging audio clips of heartbeats to the correct frames. They explain the children's experiences in the caption windows.



Plenary

6. In small groups, students plan an investigation that they can carry out at school or home to find out how different activities affect pulse rates. After predicting what may happen, they carry out the investigation and collate their results. Make sure they address the following questions.
   - Why is it better to have several sets of results?
   - What conclusions can be drawn from the results?
   - Could they improve their investigation in any way?

   Students who need more support could use Sheet 3.1 *Investigating Pulse Rates*.
7. Students design a poster for a doctor's waiting room to encourage people to look after their hearts.

Extension/ Homework

8. Students carry out research or look back at previous units to find out how the unhealthy child in the **Running for a Tube** storyboard could become healthier. They can discuss their ideas in small groups and draw up a list of changes the child needs to make to their daily life.

Student Notes

Unit 3.1 Blood and Circulation

Objectives

During this activity you will learn that the heart pumps blood around the body. You will find out that as you exercise, your heart beats faster to take blood more rapidly to your muscles. This can be measured by taking your pulse. You will design and carry out an investigation to find out how different activities change pulse rates.

Outcomes

By working through this activity you will:

- label the main vessels and chambers of the heart and write a simple explanation of how it works
- use a storyboard to tell the story of a red blood cell's journey through the body
- complete a storyboard of two children running for a tube by adding audio clips of their heartbeats
- plan and carry out an investigation to find out how different activities affect pulse rates
- design a poster to encourage people to look after their hearts.

Resources

To complete this activity you will need:

Kar2ouche *Living Things and Healthy Lives*

Sheet 3.1 *Investigating Pulse Rates*

Activities

Introduction

1. Your teacher will show you a diagram of the heart and explain how the heart pumps blood to the body and the lungs. You can find out more information about this and the three types of blood vessel by using the Internet or books.
2. You are now going to work on one of two storyboards. Your teacher will tell you which to choose. Open the **Heart** storyboard and complete it by dragging the labels of the main vessels and chambers into the correct positions. Using arrows show the flow of blood. Write a simple explanation of what is happening in the text boxes.

   click here to open the **Heart** storyboard.

   Alternatively, open the **Heart 2** storyboard. Drag the heart and lungs into the correct positions in the body.

   click here to open the **Heart 2** storyboard.

Student Notes

Development

3. Open the **Journey of a Red Blood Cell** storyboard. Imagine you are a red blood cell. Tell the story of your journey through the body from lungs, to heart, to the arm and back to the lungs.

   click here to open the **Journey of a Red Blood Cell** storyboard.

4. Discuss what you think will happen to your pulse rate when you start exercising. What happens when you stop exercising? Would being very unfit affect the pulse rate? How?
5. Open the **Running for a Tube** storyboard and complete by dragging audio clips of heartbeats to the correct frames. Explain the children's experiences in the caption window.

   click here to open the **Running for a Tube** storyboard.

Plenary

6. In small groups, plan an investigation you can carry out at school or home to find out how different activities affect pulse rates. After predicting what may happen, carry out the investigation and collect the results from the rest of the group. If you need some help, look at Sheet 3.1 *Investigating Pulse Rates*.
7. Design a poster for a doctor's waiting room to encourage people to look after their hearts.

Extension/Homework

8. Carry out research or look back at previous units to find out how the unhealthy child in the **Running for a Tube** storyboard could become healthier. Discuss your ideas in small groups and draw up a list of changes the child needs to make to their daily life.

Blood and Circulation Sheet 3.1

Investigating Pulse Rates

To find out how different activities affect pulse rates.

1. What do you think will happen to your pulse rate as you exercise?

2. Where will you measure your pulse? Do you need to take more than one measurement? Why is this? How many times will you carry out the activity?

3. Why is it a good idea to take your pulse rate at rest before you start the activities?

4. What activities will you carry out? Which type of activity will give the highest pulse rate? Why do you think this?

5. What happens to your pulse rate when you stop exercising?

6. How will you make sure the test is fair?

7. What equipment will you need?

8. What is the best way of presenting your results?

9. Why do you need to take an average of your results?

What do the results show?

Why does this happen?

Was your prediction correct?

10. How could you improve your investigation?

Teacher Notes

Unit 3.2 Drugs

Key Stage/Year	Key Stage 2/Year 5
Group Organisation	The activity starts with whole class discussion followed by work in pairs on the computers. Students discuss ideas in small groups during the plenary.
Suggested Timing	One to two lessons

Overview of Task

Students consider the difference between drugs and medicines and discover the harmful effects of some drugs on the body.

Objectives

All students will: understand that tobacco and alcohol are drugs that can affect our bodies.

Most students will: recognise some harmful effects of drugs.

Some students will: realise that drugs that are medicines can still be abused.

Curriculum References

Key Stage 2 Science **Sc2 Life processes and living things 2g** about the effects on the human body of tobacco, alcohol and other drugs, and how these relate to their personal health.

Outcomes

By the end of this activity students will have:

- completed a storyboard on the effects drugs have on various organs of the body
- answered questions about drugs using a storyboard
- used a storyboard to produce the outcomes resulting from dangerous situations
- produced a leaflet/poster to discourage teenagers from smoking or drinking.

Resources

Kar2ouche *Living Things and Healthy Lives*

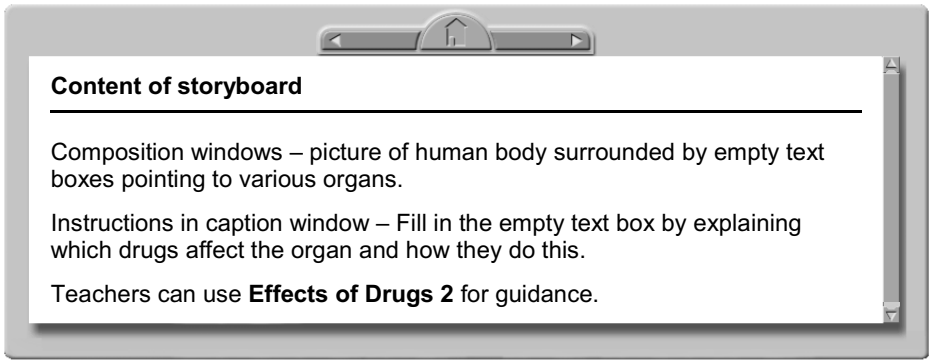
- **Police Officer's Talk** storyboard
- **Effects of Drugs** storyboard
- **Effects of Drugs 2** storyboard
- **Drugs Awareness** storyboard
- **Dangers** storyboard

Key Words: side effect, nicotine, addiction

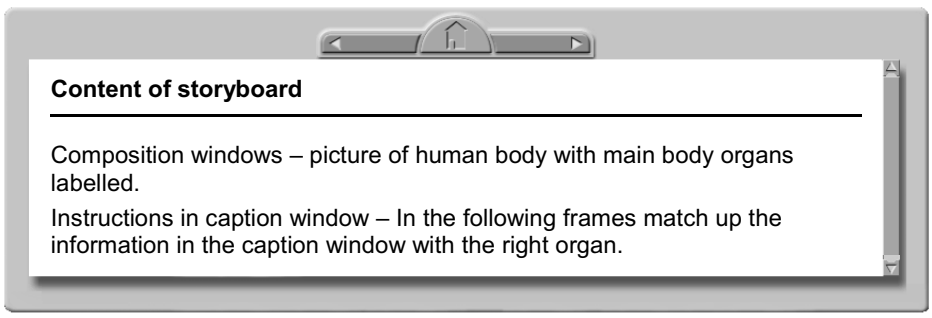
Activities

Introduction

1. Ask the students to think about the differences between drugs and medicines. Can they come up with definitions for both words? Can they give examples of each? The same drug often has a number of names. Ask students to choose one and find out how many names they have heard it called.
2. Students open the **Police Officer's Talk** storyboard, which explains the effects of drugs on the body.
3. Open the **Effects of Drugs** storyboard and complete it by filling in the text boxes explaining the effects of drugs on different organs of the body.

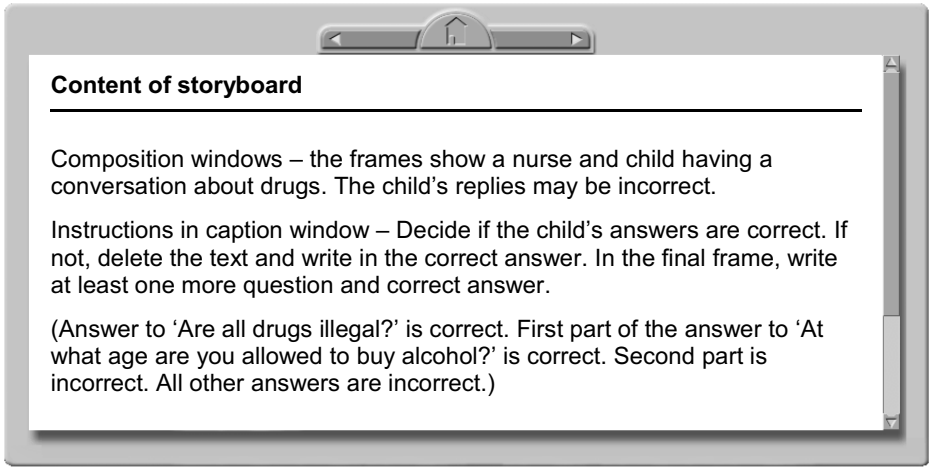


Those students who need more support can open the **Effects of Drugs 2** storyboard and drag the completed text boxes to the correct organs. This can also be used to check work from the previous storyboard.



Development

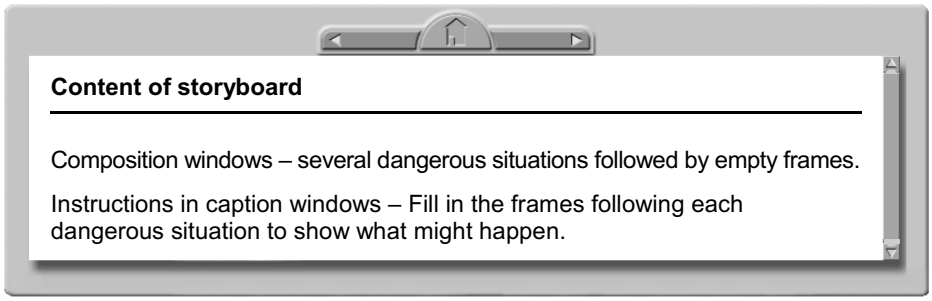
4. Open the **Drugs Awareness** storyboard showing a nurse asking a child a number of questions about drugs. Students complete the storyboard by deciding if the child's answers are correct or incorrect. If incorrect, they delete the text and write in the correct answer. Students can add extra questions and correct answers in the final empty frame.



Plenary

5. In small groups students discuss the completed **Drugs Awareness** storyboards. Do they agree on the correct answers?

6. Students open the **Dangers** storyboard showing several dangerous situations, for example, a toddler finding a bottle of tablets. They complete it by filling in the following empty frame with a possible outcome. In the caption window below they explain how this situation could have been prevented.



Extension/ Homework

7. Students produce a leaflet/poster to discourage teenagers from smoking or drinking.

Student Notes

Unit 3.2 Drugs

Objectives

You will consider the difference between drugs and medicines and discover the harmful effects of some drugs on the body.

Outcomes

At the end of this activity you will have:

- completed a storyboard on the effects drugs have on various organs of the body
- answered questions about drugs using a storyboard
- used a storyboard to show the outcome that may result from dangerous situations
- produced a leaflet/poster to discourage teenagers from smoking or drinking.

Resources

To complete this activity you will need:
Kar2ouche *Living Things and Healthy Lives*

Activities

Introduction

1. Think about the differences between drugs and medicines. Can you come up with definitions for both words? Can you give examples of each? The same drug often has a number of names. Choose one and think of how many names you have heard it called.
2. Listen to the talk by a Police Officer about the effects of drugs on the body.

   click here to listen to the **Police Officer's Talk** storyboard.
3. Open the **Effects of Drugs** storyboard and complete it by filling in the text boxes explaining the effects of drugs on the body.

   click here to open the **Effects of Drugs** storyboard.

   Alternatively, you can open the **Effects of Drugs 2** storyboard and drag the completed text boxes to the correct organs. This can also be used to check your work from the previous storyboard. Your teacher will tell you which storyboard to choose.

   click here to open the **Effects of Drugs 2** storyboard.

Development

4. Open the **Drugs Awareness** storyboard. This shows a nurse asking a child a number of questions about drugs. Finish the storyboard by deciding if the child's answers are correct or incorrect. If they are wrong, delete the text and write in the correct answer. Think of one more correct question and answer and add them to the final frame.

   click here to open the **Drug Awareness** storyboard.

Student Notes

Plenary

5. In small groups discuss the completed **Drugs Awareness** storyboards. Do you agree on the correct answers?
6. Open the **Dangers** storyboard showing several dangerous situations, for example, a toddler finding a bottle of tablets and complete by filling in the empty frames with possible outcomes. In the caption window below explain how this situation could have been prevented.

   click here to open the **Dangers** storyboard.

Extension/Homework

7. Produce a leaflet/poster to discourage teenagers from smoking or drinking.

Unit 4 Micro-organisms

This unit allows students to find out about the harmful and beneficial activities of micro-organisms.

Teacher Notes

Unit 4 Micro-organisms

Key Stage/Year	Key Stage 2/Year 6
Group Organisation	Students work mainly in pairs with some small group work and whole class discussion.
Suggested Timing	Three to four lessons

Overview of Task

Students learn that micro-organisms are living things that are too small to be seen. They realise that they can be harmful by causing illness or beneficial through their use in food production, production of some medicines and their ability to break down certain materials. They complete an experiment to find out the conditions in which micro-organisms grow best and think about the importance of good hygiene to prevent the spread of illness.

Objectives

All students will: understand that very small living things can cause illness.

Most students will: know that there are micro-organisms that can cause illness or decay or which can be used in food production and that they feed, grow and reproduce like other organisms.

Some students will: understand how micro-organisms can move from person to person or one food to another causing illness or food poisoning.

Curriculum References

Key Stage 2 Science

Sc1 Scientific enquiry 1b that it is important to test ideas using evidence from observation and measurement; **2c** think about what might happen or try things out when deciding what to do, what kind of evidence to collect, and what equipment and materials to use; **2d** make a fair test or comparison by changing one factor and observing or measuring the effect while keeping other factors the same; **2h** use a wide range of methods, including diagrams, drawings, tables, bar charts, line graphs and ICT, to communicate data in an appropriate and systematic manner; **2i** make comparisons and identify simple patterns or associations in their own

observations and measurements or other data; **2j** use observations, measurements or other data to draw conclusions; **2k** decide whether these conclusions agree with any prediction made and/or whether they enable further predictions to be made; **2l** use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions; **2m** review their work and the work of others and describe its significance and limitations.

Sc2 Life processes and living things 1a that the life processes common to humans and other animals include nutrition, movement, growth and reproduction; **5f** that micro-organisms are living things that are often too small to be seen, and that they may be beneficial (for example, in the breakdown of waste, in making bread) or harmful (for example, in causing disease, in causing food to go mouldy).

Outcomes

By the end of this activity students will have:

- grouped various activities of micro-organisms as beneficial or harmful
- used a storyboard to group materials into those which can be broken down by bacteria and those which cannot
- worked through a storyboard deciding which actions are unhygienic and how they could be prevented
- completed an experiment to find out the conditions in which micro-organisms grow best
- created a storyboard to show how a chosen character can live a healthy lifestyle
- produced a storyboard telling the story of Louis Pasteur or Alexander Fleming
- filled in a sheet to show how food is preserved.

Resources

Kar2ouche *Living Things and Healthy Lives*

- **Help or Harm** storyboard
- **Rot or Not** storyboard
- **Dirty Kitchen** storyboard
- **Conditions for Growth** storyboard
- **Healthy Lifestyle** storyboard
- **Short Interviews** storyboard

- **Famous Scientist** storyboard
- **Breakfast** storyboard

Sheet 4 *Breakfast*

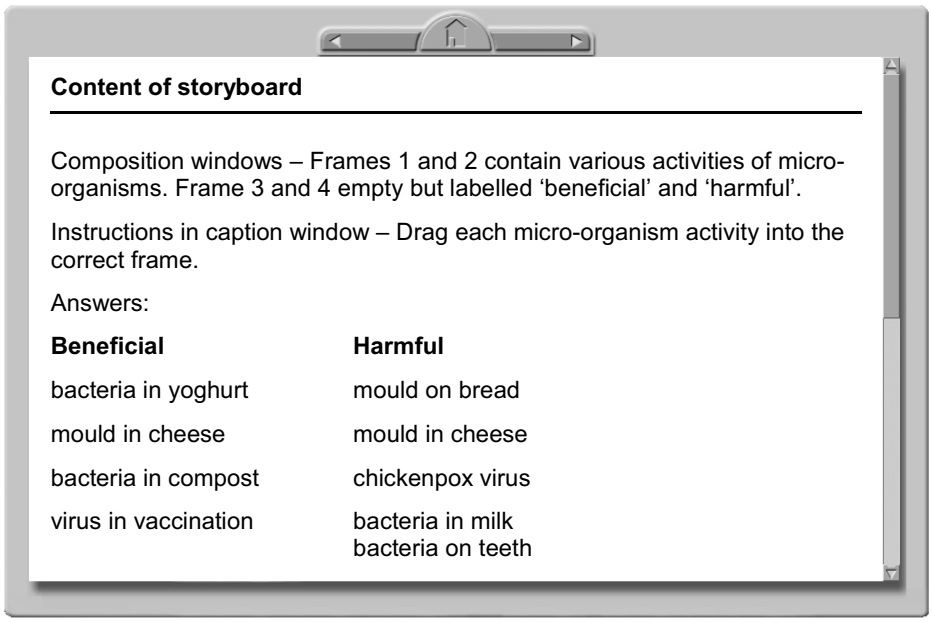
Key Words: bacteria, mould, pasteurize, sterilize, virus, yeast, hygienic

Activities

Introduction

1. Brainstorm any ideas the students have about micro-organisms and how they affect our lives. You may want to draw attention to the meaning of the word micro: a prefix meaning very small and derived from the Greek word *mikros*.

2. Students open the **Help or Harm** storyboard and group the various activities of micro-organisms as beneficial or harmful by dragging them into the correct frame. Discuss with students whether any of the activities can be in both groups. (For example, the veins in blue cheese are mould but give the cheese its taste.)



Content of storyboard

Composition windows – Frames 1 and 2 contain various activities of micro-organisms. Frame 3 and 4 empty but labelled 'beneficial' and 'harmful'.

Instructions in caption window – Drag each micro-organism activity into the correct frame.

Answers:

Beneficial	**Harmful**
bacteria in yoghurt	mould on bread
mould in cheese	mould in cheese
bacteria in compost	chickenpox virus
virus in vaccination	bacteria in milk bacteria on teeth

3. Discuss the impact on the environment if micro-organisms were unable to break down some materials. Talk about the importance of recycling materials that don't rot.

4. Students open the **Rot or Not** storyboard and look at each group of materials. They should delete materials that are in the wrong group.

Content of storyboard

Composition windows – Frames 1 and 2 contain a variety of materials, labelled 'Materials that rot' and 'Materials that do not rot'.

Instructions in caption window – Delete any material that is in the wrong group.

Answers:

Materials that rot: leaf, grass, vegetable peeling, fruit, dead animal, newspaper.

Materials that don't rot: plastic bag, crisp packet, glass bottle, tin can, coin, stone.

Development

5. Discuss how the students would prepare a meal in their kitchen at home safely and hygienically. Write their ideas on the board or a flipchart.

6. Students open the **Dirty Kitchen** storyboard and in small groups discuss what actions are unhygienic and likely to cause food poisoning. They decide how each action could be prevented. They can check answers by clicking on the picture.

Content of storyboard

Composition windows – storyboard showing a number of unhygienic actions in a kitchen.

Instructions in text box – Decide which actions you think are unhygienic and how each could be prevented. Click on the action to find out if you are correct.

Frame 1: hair not tied back

Frame 2: sneezing on food

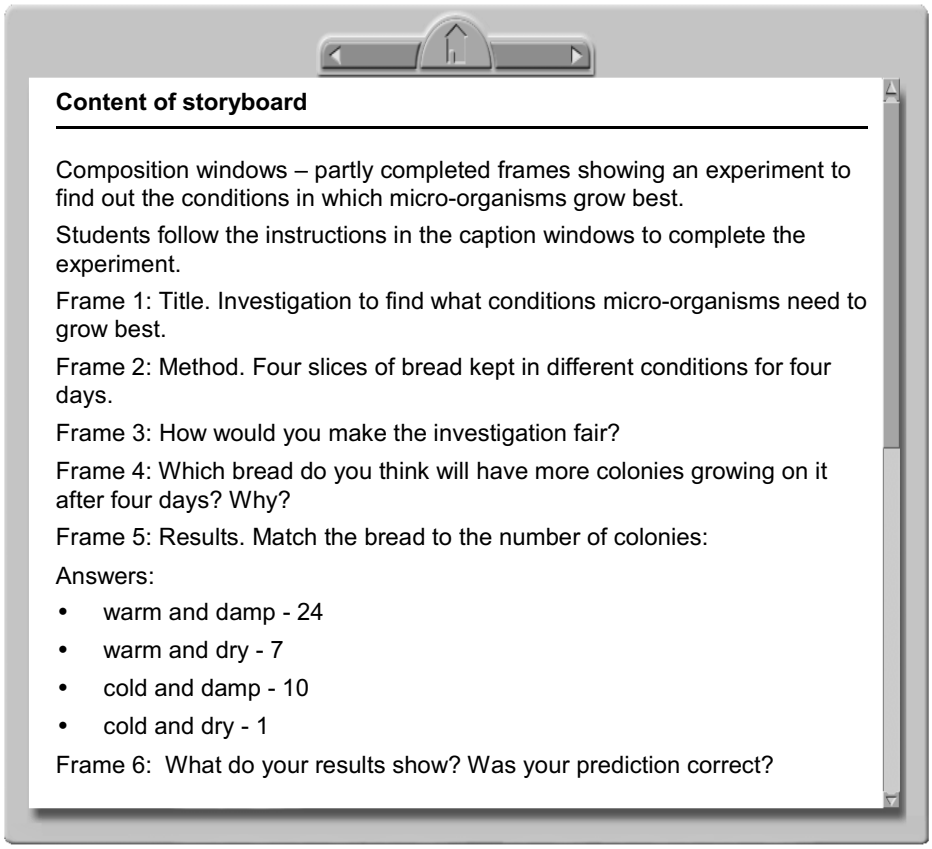
Frame 3: cat licking plate

Frame 4: blood from raw meat dripping onto cooked meat in fridge

Frame 5: chopping meat on a vegetable chopping board (green with tomatoes on edge)

Frame 6: flies on food, dirty surfaces.

7. Students open the **Conditions for Growth** storyboard showing a partly completed experiment to find out the conditions in which micro-organisms grow best. Complete using the prompts in the caption windows to help.



Content of storyboard

Composition windows – partly completed frames showing an experiment to find out the conditions in which micro-organisms grow best.

Students follow the instructions in the caption windows to complete the experiment.

Frame 1: Title. Investigation to find what conditions micro-organisms need to grow best.

Frame 2: Method. Four slices of bread kept in different conditions for four days.

Frame 3: How would you make the investigation fair?

Frame 4: Which bread do you think will have more colonies growing on it after four days? Why?

Frame 5: Results. Match the bread to the number of colonies:

Answers:

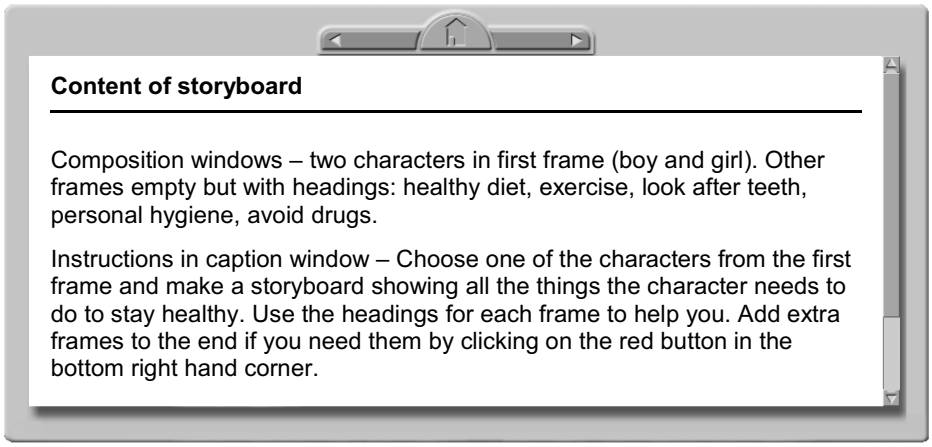
- warm and damp - 24
- warm and dry - 7
- cold and damp - 10
- cold and dry - 1

Frame 6: What do your results show? Was your prediction correct?

Plenary

8. Divide the students into groups with each group assigned an area of keeping healthy covered in the previous units. Students recap what they have learnt, writing the main points on a flipchart/sheet of paper. One person in each group reads this out to the class. Alternatively they can make a presentation about their topic in Kar2ouche.

9. Students open the **Healthy Lifestyle** storyboard and pick one of the characters in the first frame. Complete by showing all the things the character should do to stay healthy. Students can use the headings at the top of each frame to help and add extra frames at the end if required.

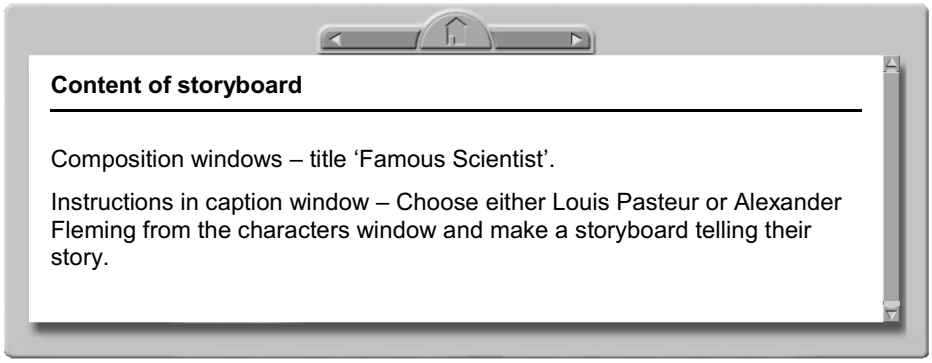


Content of storyboard

Composition windows – two characters in first frame (boy and girl). Other frames empty but with headings: healthy diet, exercise, look after teeth, personal hygiene, avoid drugs.

Instructions in caption window – Choose one of the characters from the first frame and make a storyboard showing all the things the character needs to do to stay healthy. Use the headings for each frame to help you. Add extra frames to the end if you need them by clicking on the red button in the bottom right hand corner.

10. Alternatively, students can listen to the **Short Interviews** storyboard with Louis Pasteur and Alexander Fleming discussing their lives and work.
11. Open the **Famous Scientist** storyboard and tell the story of either Louis Pasteur or Alexander Fleming.



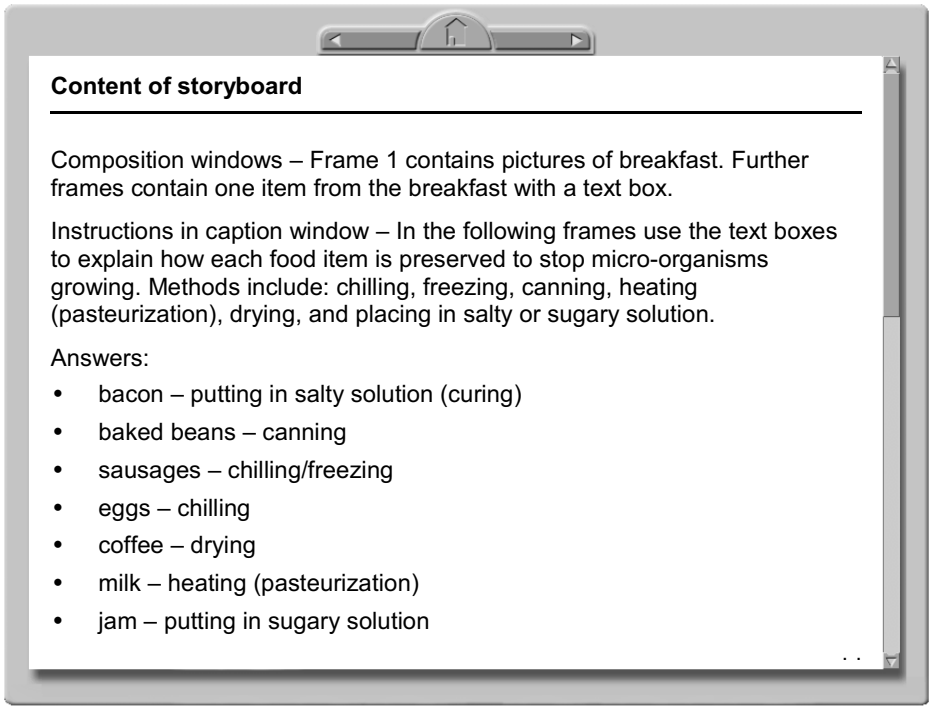
Content of storyboard

Composition windows – title 'Famous Scientist'.

Instructions in caption window – Choose either Louis Pasteur or Alexander Fleming from the characters window and make a storyboard telling their story.

Extension/ Homework

12. Students open the **Breakfast** storyboard and complete by explaining how each of the breakfast items is preserved to stop micro-organisms growing. Alternatively, fill in Sheet 4 *Breakfast*.



Content of storyboard

Composition windows – Frame 1 contains pictures of breakfast. Further frames contain one item from the breakfast with a text box.

Instructions in caption window – In the following frames use the text boxes to explain how each food item is preserved to stop micro-organisms growing. Methods include: chilling, freezing, canning, heating (pasteurization), drying, and placing in salty or sugary solution.

Answers:

- bacon – putting in salty solution (curing)
- baked beans – canning
- sausages – chilling/freezing
- eggs – chilling
- coffee – drying
- milk – heating (pasteurization)
- jam – putting in sugary solution

Student Notes

Unit 4 Micro-organisms

Objectives

You will learn that micro-organisms are living things that are too small to be seen. Some can be harmful and cause illness. Others are beneficial and can be used in food production and the production of some medicines. Their ability to break down certain materials also makes them helpful. Finally you will complete an experiment to find out the conditions in which micro-organisms grow best and think about why good hygiene is important to prevent the spread of illness.

Outcomes

At the end of this activity you will have:

- grouped various activities of micro-organisms as beneficial or harmful
- used a storyboard to group materials into those which can be broken down by bacteria and those which cannot
- worked through a storyboard deciding which actions are unhygienic and how they could be prevented
- completed an experiment to find out the conditions in which micro-organisms grow best
- created a storyboard to show how a chosen character can live a healthy lifestyle
- produced a storyboard telling the story of Louis Pasteur or Alexander Fleming
- filled in a sheet to show how food is preserved.

Resources

To complete this activity you will need:

Kar2ouche *Living Things and Healthy Lives*

Sheet 4 *Breakfast*

Activities

Introduction

1. What do you know about micro-organisms? Have you had an illness caused by them? Have you noticed food going mouldy? What do micro-organisms have to do with bread, cheese and yoghurt? Discuss your ideas with your partner and be ready to share them with the rest of the class.
2. Open the **Help or Harm** storyboard and group the activities of micro-organisms as beneficial or harmful by dragging them into the correct frame. Can any be in both groups?

   to open the **Help or Harm** storyboard.
3. Discuss with the class what would happen if micro-organisms weren't able to break down and rot plant material and dead animals. Why is it important to recycle materials that don't rot?

Student Notes

4. Open the **Rot or Not** storyboard and look at each group of materials. Delete the materials that are in the wrong group.

   click here to open the **Rot or Not** storyboard.

Development

5. Discuss with a partner how you would prepare a meal in your kitchen at home, safely and hygienically. Be ready to write some of your ideas on the board/flip chart.
6. Open the **Dirty Kitchen** storyboard and in small groups discuss what actions are unhygienic and likely to cause food poisoning. Decide how these could be prevented. Check your answers by clicking on the picture.

   click here to open the **Dirty Kitchen** storyboard.

7. Open the **Conditions for Growth** storyboard showing an experiment to find out the conditions in which micro-organisms grow best. Follow the instructions to complete the storyboard.

   click here to open the **Conditions for Growth** storyboard.

Plenary

8. Your teacher will divide you into groups and ask each group to discuss a unit/part of a unit from *Living Things and Healthy Lives*. Try to remember everything you have learnt and write the main points on a flipchart/sheet of paper. Choose one person in each group to read this to the class. Alternatively you may want to create a presentation in Kar2ouche.

   click here to open a **New** storyboard.

9. Open the **Healthy Lifestyle** storyboard. Pick one of the characters in the first frame and complete the storyboard by showing all the things this character should do to stay healthy.

   click here to open the **Healthy Lifestyle** storyboard.

10. Alternatively, listen to the **Short Interviews** storyboard with Louis Pasteur and Alexander Fleming discussing their lives and work.

    click here to listen to the interviews.

11. Open the **Famous Scientist** storyboard and tell the story of either Louis Pasteur or Alexander Fleming.

    click here to open the **Famous Scientist** storyboard.

Extension/Homework

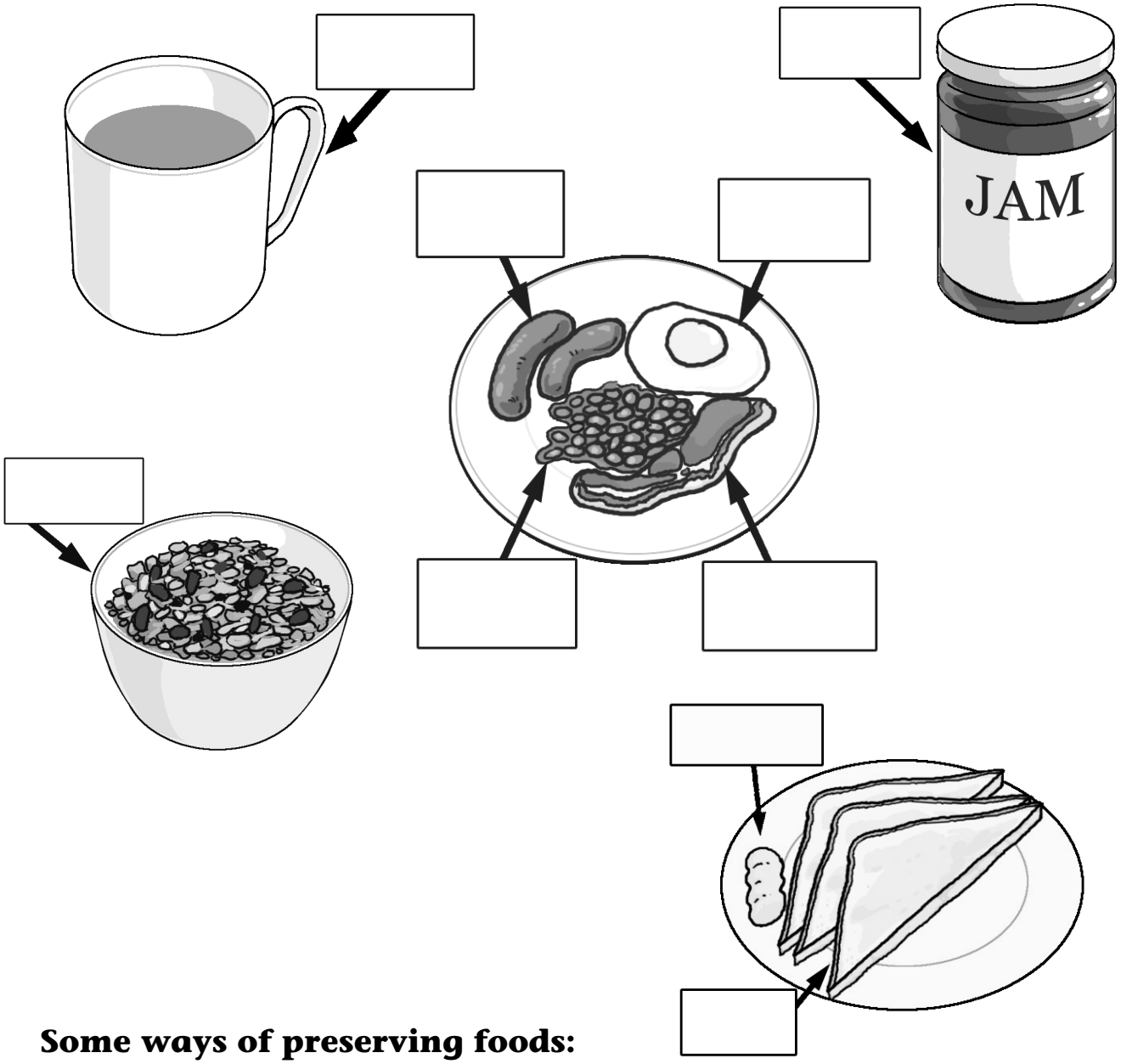
12. Open the **Breakfast** storyboard and complete it by explaining how each of the breakfast items is preserved to stop micro-organisms growing. You can also fill in Sheet 4 *Breakfast*.

    click here to open the **Breakfast** storyboard.

Micro-organisms Sheet 4

Breakfast

Explain how each of the breakfast items below is preserved to stop micro-organisms growing. Use the words at the bottom of the page to help you.



Some ways of preserving foods:

Chilling	freezing	canning
heating (pasteurization)	drying	placing in salty or sugary solution

Appendices

This section contains an explanation of how Kar2ouche supports students with special needs. It also provides a paper copy of the scripts used to record the audio for the software.

Appendix 1
Kar2ouche and Special Needs

It may be a truism to say that all children have special educational needs, but it does mean that teachers are always considering ways of differentiating the lessons that they teach in order to meet the requirements of individual pupils. A totally flexible learning and teaching tool, Kar2ouche is easily adapted to these needs so that the teacher and/or learning support assistant can create lessons that appeal to the full ability range from the least to the most able.

However, looking at the more widely used definition of special needs as referring to those pupils who experience some kind of sensory or learning difficulty, on average 20% of pupils in comprehensive schools fall into this category. A number of studies have shown that computers can enhance the learning experience of these children.

> 'From 1988-90 the Palm Project explored the effects of computers on pupils' autonomy in learning. The project found that not only were more autonomous but also more motivated.'
>
> Glendon Ben Franklin in Leask, M Ed. (2001) *Issues in Teaching Using ICT*, Routledge.

In particular, multimedia products, such as Kar2ouche, appeal to a wide range of learning styles and have the advantage of being able to reinforce learning in a multi-sensory way through the use of visual and auditory stimuli. The fact that Kar2ouche enables pupils to create storyboards, animations and publications, plus manipulate and interpret text, also appeals to those with a preference for a kinaesthetic approach to learning.

Special needs children are often prevented from functioning effectively in lessons because much of the work required is based on reading and writing, skills that are often under-developed. In Kar2ouche all of the text is provided with a soundfile so that pupils can access information even if their reading skills are impaired. Listening to increasingly complex texts extends a pupil's vocabulary whilst also increasing his or her attention span. By following the text as they listen, pupils begin to recognise words and are provided with a real context for their learning.

In addition Kar2ouche enables children to record their own voices, thus providing an alternative to writing. This provides immediate gratification and the ability to communicate with their peers in a way that increases their confidence. 'Nothing motivates children with

special needs more than success, especially when their peer group can see that success is demonstrated on an equal basis without allowances being made.' (Angela McGlashon in Gamble, N and Easingwood, N (2000) *ICT and Literacy*, Continuum.) Once confidence has been built, the speech and thought bubbles offer the opportunity for pupils to write in small bite-size chunks. This can be increased gradually by requiring pupils to produce a paragraph in the caption window and subsequently maybe use the writing frames and scaffolds provided in the education support packs that accompany the software.

The soundfiles and recording facility can therefore be seen to enable the learner to develop greater independence and this encourages them to continue with tasks that may once have been beyond them. Using Kar2ouche makes a range of curriculum areas far more accessible to non-readers and also to children whose first language is not English. These children often find reading the language far more difficult than speaking it.

As well as children with learning difficulties, Kar2ouche enhances the learning of children with behavioural problems, such as attention deficiency syndrome. In trials, these pupils found the multi-sensory and creative approach motivating, non-threatening and rewarding. It has been shown in a range of research that, pupils who experience difficulties interacting socially often find using computers less intimidating or confusing. However, ideal for pair or small group work, Kar2ouche can be used by the teacher to encourage collaborative learning thereby supporting these pupils as they begin to develop the ability to express themselves in a social situation. Having rehearsed ideas in a small group they are then more confident when required to present their ideas to the class or an adult.

For pupils with visual impairment, the teacher can go into the password-protected area to increase the size of the font. The sound files also help these children. Likewise the brief sound-clips support dyslexic children many of whom find processing large amounts of information in a single unit difficult. They can also control the pace of the reading and repeat it as necessary thus allowing them to consolidate learning. For those whose hearing is impaired, the combination of text and exciting visual material is motivating and by being able to attach pre-recorded soundfiles, pupils are provided with an effective means to communicate with their hearing peers. The record and playback facility also allows children with less severe hearing problems to rehearse their enunciation in a safe environment before sharing with others.

Every effort has been made to make Kar2ouche a fully flexible learning and teaching tool, to enable children of all abilities to have fun whilst engaging in activities that challenge them appropriately as they develop skills, knowledge and understanding in a range of curriculum subjects. To this end we are continuing to listen to teachers, support research projects and use findings to develop additional features that will help to move learning forward.

Appendix 2
Scripts of Material in Text/audio screen

Unit 1.1 Healthy Eating: Doctor's Orders

Doctor: Hello, I'm Doctor James Lind. I hear you're not feeling too well. What's the problem?

Sailor 1: Hello Doctor. I don't know where to start!

Sailor 1: I feel so tired all the time. It's really hard to do my job properly.

Sailor 1: My gums are sore and swollen and they hurt when I try to eat.

Sailor 1: Look at my legs. They're swollen and purple from bruising.

Doctor: How long have you been feeling like this?

Sailor 1: Well we've been at sea for about 3 months.

Sailor 1: I felt fine to begin with but over the last two weeks things have got worse.

Sailor 1: Several of my mates are feeling like me too.

Doctor: If you agree I'll carry out an experiment on you and your friends to see if I can work out what's making you feel so poorly.

Sailor 1: I'll do anything if it will help me feel better. What do we need to do?

Doctor: I'm going to put you into groups and give each group a different treatment.

Doctor: I have an idea that the problem may be due to your diet.

Doctor: You and Jerry can be the first group. You'll be given two oranges and a lemon to eat every day.

Sailor 1: I can't see how that's going to help.

Doctor: Group 2 will have some cider to drink daily; Group 3 will gargle with a type of acid.

Doctor: Group 4 will have 2 spoonfuls of vinegar, 3 times a day; Group 5 will drink some seawater daily and Group 6 will drink barley water.

Doctor: We'll see how you all feel in a few days.

Narrator: Six days later.

Sailor 1: I can't believe it! Jerry and I feel so much better. We're working twice as fast as we were.

Sailor 1: How are people in the other groups feeling?

Doctor: Unfortunately they're feeling worse. You and Jerry are the only two who are feeling better.

Sailor 1: But why?

Doctor: Well, your diet was lacking in fresh fruit and vegetables. Because they are hard to keep fresh they are eaten at the beginning of the journey.

Doctor: Fruit and vegetables contain something called Vitamin C. You need this to keep you healthy. You have been suffering from Vitamin C deficiency.

Sailor 1: So if the other sick sailors are given some oranges or lemons they'll get better too?

Doctor: Yes, they'll be fine. I'm going to suggest to the Navy that all sailors are given fruit juice to drink on long journeys.

Unit 1.1 Healthy Eating: Scurvy

Sailor : Doctor, I feel terrible. I'm tired, my gums are sore and my legs are swollen and bruised. What's the matter with me?

Sailor : I've never heard of that. What is it?

Sailor : Can you give me some medicine to help me feel better?

Sailor : When will I start to feel well?

Sailor : How can I stop myself getting scurvy on my next journey?

Unit 1.1 Healthy Eating: Diets

Nikki: Hello, my name is Nikki. I'm a vegan. That means I don't eat meat, fish or any product that comes from an animal.

Andrew: Hi, I'm called Andrew. I'm four years old. I'm growing fast and need plenty of protein. I also need calcium for healthy teeth and bones.

Jessica: Hi there, I'm Jessica. I'm an athlete. I eat lots of foods that give me energy so I can run fast.

Dave: Hello, my name is Dave. I'm trying to lose some weight so that I'm healthier. I need to cut down the amount of fatty foods that I eat.

Unit 1.2 Teeth: Guess Who I Am

Lion:	I have four large pointed canines that I use to hold my prey, kill it and tear it apart.
Lion:	I have no teeth suitable for chewing and so swallow my food in chunks.
Lion:	I eat deer, antelope and zebras.
Cow:	I don't have any teeth at the front of my top jaw.
Cow:	This means that I can't bite the grass I eat but tear it by moving my head.
Cow:	To get enough energy I have to eat for about eight hours every day.
Cow:	I have lots of flat molars that I use to grind the grass.
Mouse:	My teeth grow throughout my lifetime so I'm constantly gnawing on things to keep them from getting too long.
Mouse:	I can actually chew through wood, but seeds, nuts, berries, and insects are much tastier!
Shark:	Unlike human teeth mine can be replaced again and again throughout my life.
Shark:	This is good news if they wear down or get broken.
Shark:	I need them to be in good working order to catch and eat the fish and other sea animals that are my main diet.
Hippopotamus:	Although I have a very large mouth and razor sharp teeth I don't eat meat.
Hippopotamus:	I like grass and fallen fruit.
Hippopotamus:	My large teeth are useful to scare away predators!

Unit 1.2 Teeth: Talking Teeth

Incisor:	Hi! I'm an incisor. I have a squarish end so that I can cut and snip food.
Incisor:	I act like a knife when you eat.
Incisor:	An adult has eight incisors.
Incisor:	We're right at the front of the mouth.
Canine:	Hello! I'm a canine tooth.
Canine:	I'm pointed so that I can grip and hold food.
Canine:	I act like a fork when you eat.
Canine:	There are four of us in an adult mouth.

Canine: We're either side of the incisor teeth.

Premolar: Good day. I'm a premolar.

Premolar: I have a flat top with two sharp ridges so that I can tear and grind food.

Premolar: There are four pairs of us in an adult.

Premolar: We're at the side of the mouth next to the canines.

Molar: Hello there. I'm a molar.

Molar: I have a flat bumpy top so that I can grind and chew food into small pieces.

Molar: This makes it easy for you to swallow. You should find twelve of us in an adult.

Molar: We hang out at the back of the mouth.

Unit 2.1 Moving: Bones and Joints

Narrator: There are about 206 bones in the body.

Narrator: Over half of them are found in the hands and feet.

Narrator: Each foot has 26 bones and each hand has 27 bones.

Narrator: The smallest bone in the body is found in the ear.

Narrator: It is called the stirrup and is less than half a centimetre long.

Narrator: The longest bone is the thighbone. In an adult it can measure about sixty centimetres.

Narrator: Bones are made mainly of calcium which is the same substance that is found in teeth.

Narrator: Bones have a hard outer covering but are hollow.

Narrator: This means that they are strong but light.

Narrator: Joints connect two or more bones together.

Narrator: There are several types of joints in the body.

Narrator: Most allow the bones a certain amount of movement, but also prevent them from moving in the wrong direction.

Narrator: The ball and socket joint is found in the hip and shoulder and allows movement in almost any direction.

Narrator: The hinge joint is found at the knee and elbow and allows movement similar to the opening and closing of a hinged door.

Narrator: The gliding joint is found in the wrist and allows bones to slide past each other.

Narrator: The joints in your skull allow no movement.

Unit 2.1 Moving: Quiz

Narrator 1: Test your knowledge of the skeleton by completing this multi-choice quiz. For each question click on one of the four possible answers. Good luck.

Narrator 1: The smallest bone in the body is in the ...?

Narrator 2: Foot

Narrator 2: Ear

Narrator 2: Neck

Narrator 2: Finger

Narrator 1: A jellyfish's body is supported by ...?

Narrator 2: Jelly

Narrator 2: Skeleton

Narrator 2: Sea

Narrator 2: Air

Narrator 1: Muscles move the bones in your body by ...?

Narrator 2: Pushing and pulling

Narrator 2: Relaxing and lengthening

Narrator 2: Contracting and relaxing

Narrator 2: Contracting and shortening

Narrator 1: Which of these does the skeleton not do?

Narrator 2: Protect organs

Narrator 2: Support the body

Narrator 2: Help us to move

Narrator 2: Keep us warm

Narrator 1: Which of these is important for healthy bones?

Narrator 2: Calcium

Narrator 2: Vitamins

Narrator 2: Carbohydrates

Narrator 2: Protein

Narrator 1: Which of these body organs do the ribs protect?

Narrator 2: Brain

Narrator 2: Kidneys

Narrator 2: Appendix

Narrator 2: Lungs

Narrator 1: How many bones are in the hand?

Narrator 2: 17

Narrator 2: 7

Narrator 2: 27

Narrator 2: 47

Narrator 1: A ball and socket joint allows ...?

Narrator 2: Movement similar to that of a door opening and closing

Narrator 2: A sliding movement

Narrator 2: Movement in all directions

Narrator 2: No movement

Narrator 1: What is another name for the hip bone?

Narrator 2: Pelvis

Narrator 2: Vertebra

Narrator 2: Humerus

Narrator 2: Femur

Narrator 1: Which of these animals does not have an external skeleton?

Narrator 2: Lobster

Narrator 2: Beetle

Narrator 2: Crab

Narrator 2: Snail

Narrator 1: Vertebrae are bones in your ...?

Narrator 2: Arm

Narrator 2: Back

Narrator 2: Shoulder

Narrator 2: Toes

Narrator 1: Brilliant, that's absolutely right.

Narrator 2: That's right, well done.

Narrator 1: Super – you've got it right.

Narrator 2: No, not quite, have another go.

Narrator 1: Try again.

Narrator 2: Almost, have another try.

Unit 2.2 Growing: Young Animals

Narrator 1: Elephant
Narrator 2: Gestation: 660 days.
Narrator 2: Average number of young: 1.
Narrator 2: Walk within about half an hour of being born.
Narrator 2: Looked after by mother for at least 4 years.
Narrator 1: Lion
Narrator 2: Gestation: 110 days.
Narrator 2: Average number of young: 1.
Narrator 2: Born blind. Begin walking at about 2 weeks old.
Narrator 2: Stay with mother until about 2 years old.
Narrator 1: Human
Narrator 2: Gestation: 266 days.
Narrator 2: Average number of young: 1.
Narrator 2: Need a lot of help and attention in the first few years.
Narrator 2: Cared for by parents for up to 18 years.
Narrator 1: Cat
Narrator 2: Gestation: 63 days.
Narrator 2: Average number of young: 4.
Narrator 2: Born blind and deaf with soft fur.
Narrator 2: Look after themselves at about 6 weeks of age.
Narrator 1: Rabbit
Narrator 2: Gestation: 31 days.
Narrator 2: Average number of young: 6.
Narrator 2: Born blind, deaf and with no fur.
Narrator 2: Can care for themselves at 3 weeks of age.

Unit 3.1 Blood and Circulation: Running for a Tube

Claire: Hello. I'm Claire.
Claire: I love playing football. I'm always kicking a ball around.
Claire: I eat a well-balanced diet with plenty of fruit and vegetables.
Claire: Hope I don't have to wait long for the next tube.
Claire: Uh oh! That sounds like it now. I'll have to run.
Claire: That was much further than I thought.

Claire: Made it. I'm out of breath!

Dave: Hello. My name is Dave.

Dave: I love eating junk food.

Dave: I spend my spare time watching television or playing on my computer.

Dave: To be honest I need to do a bit more exercise and eat a more healthy diet.

Dave: Hope I don't have to wait long for the next tube.

Dave: Uh oh! That sounds like it now. I'll have to run.

Dave: That was much further than I thought.

Dave: Made it. I'm out of breath!

Unit 3.2 Drugs: Police Officer's Talk

WPC: Good afternoon. My name is WPC Davis. I'm going to be talking about the effects of certain drugs on your bodies. Please feel free to ask questions.

WPC: I'm going to concentrate this afternoon on the problems caused by alcohol, smoking and sniffing solvents.

WPC: Let's start with alcohol.

WPC: Alcohol is a drug. It changes the way we feel. It slows down our reactions. This is why it is important that adults don't drink and drive.

WPC: If you drink a large quantity of alcohol it can affect your eyesight, cause you to slur your speech and upset your balance.

WPC: It may well cause you to be sick and give you a hangover and will certainly make your breath smell. Not a very attractive picture!

Audience 1: Is it true that it can give you brain damage?

WPC: Well, every time you get drunk you destroy a number of brain cells. Over time it can affect your memory.

Audience 2: My uncle has something called cirrhosis that he says was caused from drinking too much. What is it?

WPC: Cirrhosis is a disease of the liver caused by drinking over a long period of time.

WPC: You can also damage your kidneys and the muscles of the heart. This can lead to heart attacks.

WPC: It can also irritate the lining of your stomach and cause ulcers. Alcohol can cause cancer of the mouth, liver and throat.

Audience 3: My mum gets all giggly and happy when she has a few drinks. That's good, surely?

WPC: It can make you happy if you were in a good mood when you started drinking.

WPC: However it often makes people feel depressed or behave in an aggressive manner.

WPC: People often do things that they wouldn't do if they were sober. A lot of crime that we deal with is caused by people having had too much to drink.

WPC: Moving on to smoking.

WPC: Cigarettes contain nicotine, which is addictive. Once you start smoking it is very hard to give up.

WPC: Nicotine is poisonous and affects your arteries, making them narrower. This means that the heart has to work harder to pump blood around the body and leads to heart disease.

WPC: Smoking makes your breath, hair and clothes smell and will stain your fingers and teeth. Friends who don't smoke won't like standing near you.

WPC: In fact, they can breathe in your cigarette smoke and it will make them ill too.

Audience 4: My dad has a really bad cough, especially when he first gets up in the morning. Is that due to smoking?

WPC: Yes, cigarettes contain tar, which builds up in the lungs of smokers. It causes irritation and coughing and prevents the lungs from cleaning themselves.

WPC: People who smoke are also at greater risk of developing bronchitis and lung cancer.

WPC: Smokers also need to breathe faster to get enough oxygen into their bodies and quickly become breathless when they exercise.

Audience 1: My gran has given up smoking. Will her cough get better?

WPC: Yes, the good news is that her health will have started to improve as soon as she stopped, no matter how long she smoked for.

And finally sniffing solvents.

Audience 2: What is a solvent?

WPC: Solvents are products which have fumes that, when breathed in, can cause you to feel different. Common ones are glue, aerosol sprays, cleaning fluid, felt pens, liquid paper, paint thinner and petrol.

WPC: Like alcohol, sniffing solvents is addictive and can cause changes in behaviour that may lead to you doing something dangerous.

WPC: If you use them over a period of time they can cause sores on and around the nose or mouth, nosebleeds, bloodshot eyes, headaches, sickness, weight loss, lack of co-ordination, brain damage and affect the liver and kidneys.

WPC: Thank you for being such an interested audience.

WPC: Please think carefully about what I've said. Keep yourselves safe and just say No!

Unit 3.2 Drugs: Effects of Drugs

Narrator: Skin: Solvents can cause sores on nose and mouth. Cigarettes stain fingers.

Narrator: Stomach: Alcohol can irritate the lining, leading to ulcers. Alcohol, nicotine and solvents may cause nausea.

Narrator: Brain: Alcohol and solvents destroy cells, affect memory and alter the way you behave. Alcohol, nicotine and solvents are all addictive.

Narrator: Heart: Cigarettes make this organ work harder to pump blood round the body. Alcohol affects the muscles inside it.

Narrator: Lungs: Cigarettes lead to irritation, coughing and a build up of chemicals. This prevents them cleaning themselves and may also cause cancer or bronchitis.

Narrator: Liver: Alcohol may result in cirrhosis and cancer. Solvents can cause damage.

Narrator: Kidneys: Solvents and alcohol can cause damage.

Unit 3.2 Drugs: Drugs Awareness

Nurse:	Do medicines always make us feel better?
Child:	Yes, although it may take a couple of days for the medicine to work.
Nurse:	Are all drugs illegal?
Child:	No. Alcohol, cigarettes and solvents are all legal although children are not allowed to buy them. Hard drugs like heroin and cocaine are illegal.
Nurse:	Can drugs make you seriously ill only if you have been taking them for a long time?
Child:	Yes. It takes time for the harmful effect of drugs to build up in your body.
Nurse:	Is it easy to give up smoking if you really want to?
Child:	Yes, I think some people don't try very hard. It's just like giving up sweets or biscuits.
Nurse:	At what age are you allowed to buy alcohol?
Child:	You can buy alcohol when you are 18. If you are younger you can get an adult to buy it for you.

Unit 3.2 Drugs: Dangers

Young child:	Yummy, sweeties.
Friend 1:	I can't get my breath. My chest feels really tight.
Friend 2:	Here, use my inhaler.
Child 1:	Hey, look what I've found. Looks like a needle.
Child 2:	Let me see. Ow! I've stabbed my hand.
Teenager 1:	Fancy a bit of vodka to liven things up a bit?
Teenager 2:	Great! Thanks.

Unit 4 Micro-organisms: Dirty Kitchen

Narrator: Yes. Long hair can fall into food. It should be tied back. Wearing a hair net or hat would be even better.

Narrator: Yes. The person sneezing is spreading germs onto the food. Use a tissue when sneezing and wash hands thoroughly afterwards.

Narrator: Yes. Germs from the cat can be spread from the plate to food. Keep all animals out of the kitchen.

Narrator: Yes. Blood from the raw meat at the top of the fridge is dripping onto cooked meat at the bottom of the fridge. Raw meat should always be placed at the bottom of the fridge.

Narrator: Yes. Meat is being chopped on a vegetable chopping board (coloured green in restaurants). Meat should always be chopped on a separate board (red in restaurants) to prevent spread of micro-organisms.

Narrator: Yes. Flies landing on food or kitchen surfaces can carry a number of micro-organisms. All food should be covered and surfaces cleaned regularly.

Unit 4 Micro-organisms: Short Interviews

Alexander Fleming

Fleming: Hello, my name is Alexander Fleming.

Fleming: I'm famous for discovering the first antibiotic: penicillin.

Fleming: Although I'm very proud of what I did, if I'm honest, it really happened by accident!

Fleming: Anyway, let me start at the beginning.

Fleming: I was born in Scotland in 1881 and moved to London when I was 13. I did pretty well at school and went on to study medicine at St Mary's Hospital, London.

Fleming: I then stayed on and worked as a research assistant studying bacteria.

Fleming: One day when I was clearing up some dishes that I had been growing bacteria on, one of them caught my eye.

Fleming: Some mould had landed on the dish by chance and the area surrounding it had no bacteria growing. I realised that the mould must have released a substance that was stopping the bacteria from growing.

Fleming: The substance was identified as penicillin and it was found to kill many kinds of bacteria, but was safe for the human body.

Fleming: I was very excited by this finding but soon had to return to my other work.

Fleming: Fortunately for me, and the medical world, three other scientists at Oxford, Florey, Chain and Heatley, developed penicillin further and their success led to the drug being produced.

Fleming: At first supplies were limited but by World War 2 it was being mass-produced by the American drugs industry.

Fleming: It was given to soldiers to cure all sorts of infections.

Fleming: I think my finest moment was being presented with the Nobel Prize for Medicine in 1945, along with Florey and Chain.

Fleming: What an honour!

Louis Pasteur

Pasteur: Bonjour, my name is Louis Pasteur.

Pasteur: I am famous for discovering germs and how they are the cause of contagious diseases.

Pasteur: I'm also known for developing vaccinations against a number of deadly diseases.

Pasteur: You may think my name sounds familiar. Due to my work I have the honour of having pasteurized milk named after me!

Pasteur: First things first, I was born in France in 1822.

Pasteur: I became a research chemist at the age of 21 and in 1856 I was asked to help the French wine industry because much of the wine was going off.

Pasteur: I found out that a tiny living organism, a yeast, which could be killed by heat, caused this.

Pasteur: The heating process was named 'pasteurization' and was later used to make milk and other foodstuffs safe to drink and eat.

Pasteur: This was the start of my work on what causes diseases.

Pasteur: I found out that microscopic living organisms, 'germs', carried disease from one person to another.

Pasteur: I made a special study of a disease called anthrax, which kills cattle and sheep and discovered that by preparing a weak form of the anthrax germ and injecting it into sheep, it prevented them from getting the disease.

Pasteur: This was the first of several vaccines that I developed to protect humans and animals against a number of diseases.

Pasteur: In 1885 I tested my rabies vaccine on a young boy who had been bitten by a rabid dog.

Pasteur: The vaccine had not been tested on a human before but thankfully it worked, the boy survived and I had found a vaccine for rabies!

Pasteur: In 1888 I helped to set up the Pasteur Institute in Paris, a clinic for the study of infectious diseases, the treatment of rabies and a centre for teaching.

Pasteur: It meant that the study of germs could continue and in time lead to new ways of fighting disease and saving lives.

Glossary

Narrator: Addiction: become dependent on ever-larger doses of a drug

Narrator: Artery: thick-walled blood vessel carrying blood away from the heart

Narrator: Bacteria: single cell micro-organisms

Narrator: Canine: tooth that grips and holds food

Narrator: Capillary: fine blood vessel

Narrator: Carbohydrate: food that gives rapid energy

Narrator: Carnivore: meat-eating animal

Narrator: Circulation: movement of blood to and from the heart

Narrator: Contract: becoming smaller or shorter in the case of a muscle

Narrator: External: outside a person or animal

Narrator: Fat: food that gives a store of energy and keeps the body warm

Narrator: Gestation: length of pregnancy

Narrator: Herbivore: plant-eating animal

Narrator: Incisor: tooth that bites and cuts food

Narrator: Internal: inside a person or animal

Narrator: Invertebrate: animal without a backbone

Narrator: Life cycle: full cycle of animal life

Narrator: Molar: tooth that grinds and chews food

Narrator: Mould: type of fungus that causes decay

Narrator: Nicotine: a poisonous and addictive substance found in cigarettes

Narrator: Omnivore: plant and meat-eating animal

Narrator: Plaque: build up of bacteria on teeth

Narrator: Premolar: tooth that crushes and grinds food

Narrator: Protection: keeping safe from harm

Narrator: Relax: becoming bigger or longer in the case of muscles

Narrator: Reproduction: to produce offspring

Narrator: Pasteurize: method of preserving food by heating for a short time to destroy micro-organisms

Narrator: Protein: food that is needed for growth and repair

Narrator: Pulse: pressure wave of the heartbeat through the body

Narrator: Side effect: unwanted effect of a drug

Narrator: Sterilize: method of destroying micro-organisms on an object by heating to the boiling point of water

Narrator: Vein: thin-walled blood vessel carrying blood to the heart

Narrator: Vertebrate: animal with a backbone

Narrator: Virus: tiny living organism, smaller than a bacterium – can make you ill by changing the way your cells work

Narrator: Vitamin: chemicals needed for healthy growth

Narrator: Yeast: type of mould used in bread, beer and wine manufacture