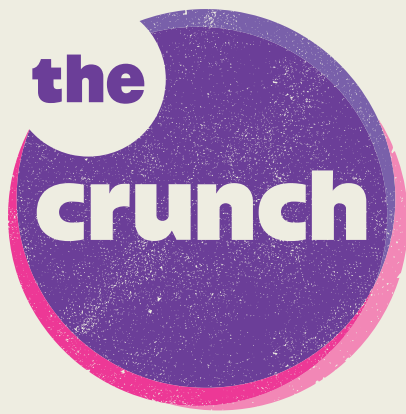


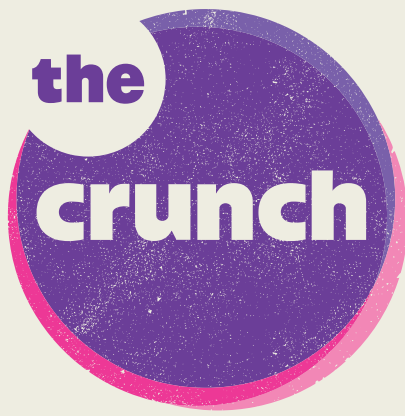


our food
our health
our planet



Ages
4–11

Teaching notes



our food
our health
our planet



Ages
4–11

Teaching notes

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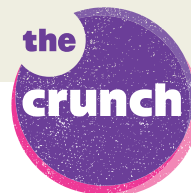
The Sumatran Orangutan Society (SOS) has created a schools pack to support teaching about rainforests, orangutans, endangered species and conservation for ages 5 - 11, available to download for free from www.orangutans-sos.org/schools. The resources include lesson plans, worksheets, films, photo packs, a rainforest sounds audio track, and a special Schools Fundraising Guide.

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What is The Crunch?

Our food, our health, our planet.

The future of food is one of the biggest challenges on our plate. Food and drink are fundamental to our lives, connecting everything from our health to the world around us. It's time for us to take a fresh look at our relationship with food, and be inspired to create the recipe for a happier, healthier future.

The Crunch is an exciting year of free activities, experiences and discussions about our food, our health and our planet. Everyone's invited to get involved and help create the recipe for a happier, healthier future. Get involved in The Crunch and be part of the conversation.

The Crunch: in your school

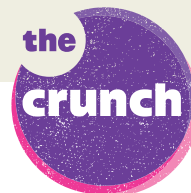
The Crunch kit is here, with completely free science equipment to help you deliver exciting, memorable, cross-curricular experiences in your school. With loads of additional resources online, including drama resources, supporting films and more, you and your pupils can tuck straight into some tasty topics.

Be part of The Crunch Week: 16–22 May 2016

Your journey starts now: use the resources in this kit to explore our food, our health and our planet, and get involved with schools across the UK in The Crunch Week, from 16 – 22 May 2016. Get hands on with your investigations, take pictures of your lessons, and share and compare your results with schools around the country.

Go to thecrunch.wellcome.ac.uk/schools to find out more.





The Crunch: beyond your school

The Crunch Ambassadors

Schools can get even more inspiration from The Crunch Ambassadors. Our passionate squad are here to kick-start conversations and facilitate activities on links between our food, our health and our planet – and for free.



From across the UK, Ambassadors come from a wide range of backgrounds including youth work, community engagement, science, health and food technology. They can share real-world experiences with your pupils, making learning relevant and increasing engagement.

Ambassadors may be interested in visiting your school to help deliver an assembly, take part in a lesson linked to The Crunch kits or even run an extra-curricular activity, providing you with an opportunity to bring diverse role models into your school.

Get to know The Crunch Ambassadors and invite local Ambassadors into your school at thecrunch.wellcome.ac.uk/ambassadors

Fancy being an ambassador yourself? The good news is that you can! Sign up online to get free resources.

Activities for families

Look out for The Crunch bike, coming this spring and summer! Families all over the UK will be getting hands-on, with fun activities and a great new online game, exploring our food, where it comes from, and how it affects our health and the world around us.



Dramatised dialogue

If you want to chew it over some more, you can get really stuck into debating these topics at one of our theatrical dialogue sessions. Aimed at adults, these in-depth sessions combine dialogue with theatre, to really think about food issues and feed into research and policymaking.



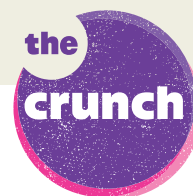
Your copy of Big Picture

Big Picture is a magazine, published by the Wellcome Trust, for education. It explores the innovations and implications of cutting-edge science. It sets out to connect modern biomedical science with its ethical and social challenges (including looking at how research impacts on individuals) and place bioscience research in a historical and cultural context. The magazine is published twice a year, and you can find out more about it here:

bigpictureeducation.com



The Crunch is brought to you by the Wellcome Trust, an independent charitable foundation dedicated to improving health around the world. Pearson Education has been commissioned by the Wellcome Trust to create exciting, memorable cross-curricular experiences for learners in all schools and FE colleges in the UK, working with Theatre of Debate, SciChem and the University of Reading.



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A Welsh edition of these teaching notes is available on The Crunch website.

Website



thecrunch.wellcome.ac.uk/schools

Presentations



Video content

Additional activities and resources



Plays and drama resources

Basmati Basmati

Beloved Burger

For Richer, For Poorer

The Day of Temptations

The Lament of the Green Bean

What is in the Kit?



- 1 Book of Teaching Notes
- 1 *Big Picture* Magazine: Fat
- 1 Mega Map – wall map of the world
- 6 Plastic Beakers
- 6 Test Tube Stands
- 3 Plastic Measuring Cylinders
- 3 Magnifying Glasses
- 30 Plastic Test Tubes
- 30 Plastic Test Tube Stoppers
- 1 Pot of NaCl (salt)
- 2 Bottles of Vinegar
- 6 Measuring Spoons
- 1 Packet of Tomato Seeds
- 120 Plant Pots
- 120 Compost Nodules
- 1 Watering Can

Flying Fruit Unit Overview

Age 4–5

Objectives

- To name different types of fruit
- To say where different fruit is grown
- To observe how a seed turns into a fruit

The Big Questions

- Where does fruit come from?
- How do different types of fruit grow?
- How do different types of fruit get to us?

Curriculum Links

Science

Early Years Foundation Stage:

Learners know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

Working Scientifically:

Showing curiosity

Observing plants

Asking questions

Finding ways to test ideas

Making links and noticing patterns

Wales: Myself and other living things

Learn the names and uses of the main external parts of the human body and plants.

Observe differences between animals and plants, different animals and different plants in order to group them.

Identify some animals and plants that live in the outdoor environment.

Northern Ireland Foundation stage: WAU

Strand 1: Interdependence

What else is living?

Strand 3: Place

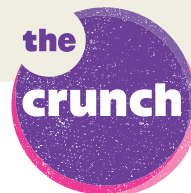
What is in my world? What is beyond my world?

Strand 4: Change over time

How do things change?



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Scotland: Curriculum for Excellence

Early: Biodiversity and interdependence: I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them.

Cross-curricular opportunities

Mathematics: learners use everyday language to talk about the size of the seeds.

Geography: learners will use the world map to show where different types of fruit are grown.

Creative development: learners act out the growth of a fruit, in a 'fruit dance'.

Exploring and using media and materials: learners use different materials to draw the inside of the fruit.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, Basmati Basmati.

Fantastic Fruit

Lesson Notes 1

What's It All About?

This lesson is an introductory lesson to enable learners to understand where our food and, in particular, fruit comes from. They will be supported in thinking about the questions they would like answered, e.g. What is it? Where does it grow? How does it grow? Through this questioning, learners will begin to understand where our food comes from, how it gets to us and why we transport our food great distances.

Learning Outcomes

- I know my food comes from different places around the world.
- I know that fruit can be part of a healthy diet.

Working Scientifically

- Showing curiosity
- Asking questions

Big Question

- Why does my fruit come from different places?

Key Words:

fruit, healthy, seasonal, vitamins



Equipment



From The Crunch Kit:

Resource Sheet 1: Fruit Cards (Teaching Notes, p17)
Resource Sheet 2: How Fruits Grow (Teaching Notes, p18)
Mega Map



From The Crunch Website

Flying Fruit PowerPoint (Lesson 1)
Video: Fruit growing

Other Things You Will Need

A selection of fruit
Paper plates
Clothes pegs
Sticky tack
String
Story book, Handa's Surprise (optional)

Preparation

Ahead of time, ask children to bring in either their favourite fruit or the strangest fruit they have seen. The Flying Fruit PowerPoint also provides photos of fruit as an alternative. Cut out cards from Resource Sheet 1 (you may wish to laminate these for durability).



Safety

Make yourself aware of any children with food allergies, especially when dealing with fruits such as kiwis, strawberries, apples, bananas, peaches, etc.

Note Fruit is rich in nutrients, low in calories, and a good source of natural sugars, vitamins, dietary fibre and antioxidants. Care should be taken not to eat too much fruit because, although natural, they can be very high in sugar.

Appetiser

Set up a fruit display table with a variety of fruit, some familiar and some that will perhaps be less well-known to the children. Ask the children to visit the display table, and to look at each fruit in turn. Encourage the children to touch, feel, and smell each fruit. Ask children to talk to each other and describe the fruit they see. Make a list on the board of the words children use to describe the fruit, e.g. smooth, rough, round, long, waxy or shiny.

With a small group of children, take a quick poll. Ask: What is your favourite fruit? Write and draw each suggestion on a paper plate and place them on the floor at front of the class. Give each child a clothes peg and hold a 'peg vote'. Ask the children to come up one at a time and place their peg on the plate with their favourite fruit.

Talk about the results. How many different types of fruit were mentioned? What was the most popular fruit? Did anyone mention a fruit that some of the children hadn't heard of? Talk with the children about why fruit is a good choice as a healthy snack.

Main Course

Ask the children where they think fruit comes from. Ask them to think, pair and share their ideas. Have any children done any fruit picking? Show the class the time-lapse videos of fruit growing, or project the videos on to the board for children to watch in small groups as a self directed activity.



Organise the children into groups and give each group a set of the Fruit Cards and the How Fruits Grow cards, cut out from Resource Sheets 1 and 2. Can they match the fruit to the type of tree or plant that it comes from?

Ask groups to show their matches and explain their decisions.

In their groups, ask the children to look carefully at the environments illustrated. Ask if they think this fruit grows in our neighbourhood. Give the children time to talk about this in their groups. Agree that not all the fruit is grown in the country and that you will now be looking at where all these different types of fruit are grown. You could look to see if any of the fruit you looked at earlier have stickers on indicating their place of origin.

Display the Mega Map and the list of countries on the Flying Fruit PowerPoint. Ask a child to choose one of the Fruit Cards and to find on the map the place where their fruit is grown. With a piece of sticky tack on each card, the children place the fruit on the map. Repeat for the other fruits. Ask the children to then draw a travel line back to the UK. Alternatively, use a piece of string to map each fruit journey.



Note Some fruits are grown in more than one location. For the purposes of the activity, one location has been provided for each one. You can also stick photos of home-grown fruit to the map.

Dessert

Ask the children to order the fruit according to how far they have to travel to get to their plates. This can be done by removing the cards from the map and ordering them on the table. One way to help the children to understand the distance travelled by some of the fruit is to plot the progress of a particular fruit from its home country to us in real time. Move the Mango Fruit Card at different points in the day, and then bring in a mango to school to show it has arrived.

Reading the book *Handa's Surprise* is an optional complementary way of ending the lesson. Can children recognise any of the fruits featured in the story?

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, *Basmati Basmati*. Explore the importance of bio-diversity. Where does our food come from and why is it important to eat lots of different things?



What's Inside?

Lesson Notes 2

What's It All About?

Learners will explore different parts of fruit, for example the skin, seeds and flesh. They will look inside fruits and consider how seeds look different in different fruits. They will start to think about what seeds might be for.

Learning Outcome

- I recognise the similarities and differences between fruit.

Working Scientifically

- Showing curiosity
- Asking questions
- Making links and noticing patterns

Big Question

- Where are the seeds in each fruit? Are seeds the same in each fruit?
Why do we need seeds?

Key Words:

seeds, stone, flesh, skin



Equipment



From The Crunch Kit:

Magnifying glasses



From The Crunch Website

Flying Fruit PowerPoint (Lesson 2)

Other Things You Will Need

Selection of real fruit, e.g. mango, melon, apple, pear, kiwi, tomato

Plastic model fruit (optional)

Cloth bag

Knife

Camera (optional)

Coloured pencils

Paint

Modelling clay



Safety

If you intend for children to cut fruit open themselves, it's best to use soft fruit that can be easily cut. Show children the correct way to handle a knife and supervise closely.

Appetiser

Talk with children about the fruit they explored in the previous lesson. With real fruit, or alternatively with plastic model fruit, play What's in the bag? Children take it in turns to guess the fruit in a bag using touch alone. Encourage children to describe the fruit as they feel it. Alternatively, hide one of the fruits in the bag and ask children to ask you 'yes or no' questions to determine what the fruit is.

Main Course

Ask the children what they can remember about the insides of any fruit they have eaten. Show the pictures of the insides of fruits on the Flying Fruit PowerPoint. Ask children to talk in pairs about what they already know about the insides of fruit and to think about what they would like to find out. Ask a few pairs to share their ideas. If children mention seeds, ask them if they think all seeds are the same.



Organise children into small groups. Choose one piece of fruit to cut open and give to children to explore. It's best to use soft fruit that can be easily cut, such as bananas or kiwis. Ask the children to talk about what they see and encourage them to use vocabulary such as skin, seed and flesh. Is this how they remembered the inside of the fruit looked? Ask them to draw what is inside or, alternatively, they can take photographs of the inside.

Now cut open a different fruit. Ask what is inside. Is this different? How? Then ask children to investigate a bigger fruit. Do they think the seeds will be bigger inside this fruit?

Children continue to investigate the insides of different fruit in their groups, looking at what's the same and what is different. They can document the similarities and differences by using the cut halves to print fruit pictures or by using modelling clay to build models of the fruit.

Dessert

Ask children to think, pair, share what they think the seeds are for. Establish that if seeds get everything they need, a seed can grow into a new plant.

Save all the seeds, particularly the melon seeds for the next lesson.

Watch It Grow

Lesson Notes 3

What's It All About?

Learners will compare the size of seeds from a variety of fruits. They will plant some fruit seeds and observe them over time, in order to begin to understand that plants need water, warmth, light and nutrients to grow. They will explore the different stages of growth; inside a fruit there is a seed, this develops into a plant which then grows more fruit and so on.

Learning Outcome

- I can observe how a seed grows into a plant.

Working Scientifically

- Showing curiosity
- Observing plants
- Asking questions
- Finding ways to test ideas
- Making links and noticing patterns

Big Question

- What does a seed need to grow?

Key Words:

seed, grow, light, food, water, germinate



Equipment

From The Crunch Kit:

Plant pots
Compost nodules
Watering can



Other Things You Will Need

Camera (optional)



Safety

The compost supplied in The Crunch kit is safe to use with children. However, if you use your own compost in future, please use current year compost that has been stored in a cool place away from the sun. The compost should be damp. Open bags carefully in a well-ventilated area using sharp scissors or a knife. Pot up plants in a well-ventilated area. Avoid making dust. Children should always wash their hands after handling compost. Please check the CLEAPSS and SSERC websites for current advice. Please note that these sites are password protected.

Appetiser

Using the seeds from the different fruit investigated in Lesson 2, ask the children to put them in size order. Ask the children why they think different seeds are different sizes.

Main Course

Explain to the children that they are going to investigate what happens when they plant the seed of one of the fruits they examined in the previous lesson. Melon is the recommended fruit for this activity or, alternatively, try avocados. If you choose to buy packets of seeds instead, make sure they haven't been treated with any fungicide. Different seeds need to be treated in different ways to germinate, however, be aware that some seeds will have been stored at very cold temperatures for long periods, or will be hybrids that are sterile. These will not germinate or grow. Talk to the children about the seed providing the food the plants need to germinate. The children should hydrate the compost nodules, then plant their seeds in the plant pots and watch them grow. Warn the children that not all the seeds will germinate, which is why farmers sometimes plant more seeds than they need.

Children should be encouraged to look after their plants in order to begin to understand that plants need water, warmth, light and nutrients to grow. Encourage children to take photos or draw pictures documenting the growth of their seeds.

If children are planting seeds from different fruit, they can chart which fruit takes the shortest/longest to grow.

Note Germination is the start of growth in a seed. Successful germination needs water, oxygen and warmth.

Dessert

Ask children to create a fruit dance. Encourage them to show the different stages of growth, starting as a seed nestling in a fruit, developing into a plant and then growing more fruit.

This series of lessons also provides an opportunity to create a big class display, with models made from different materials to show the cycle of growth over time.

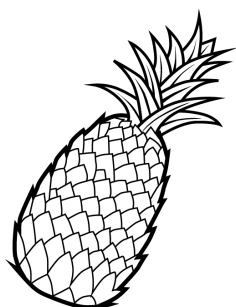
Resource Sheet 1

Name

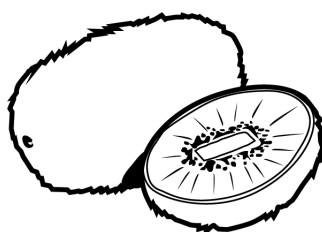
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Flying Fruit – Lesson 1

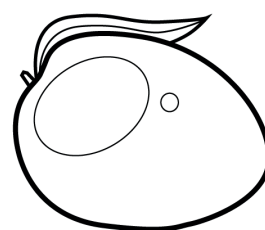
Fruit Cards



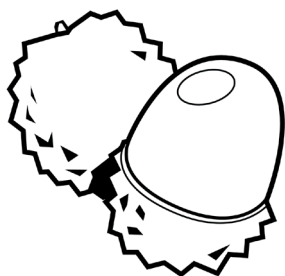
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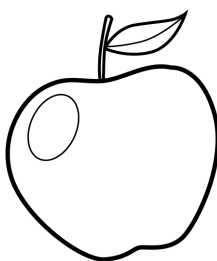
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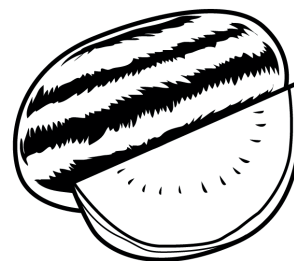
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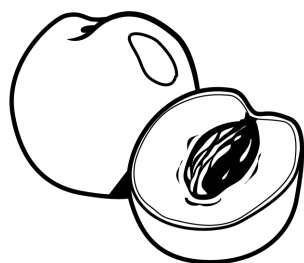
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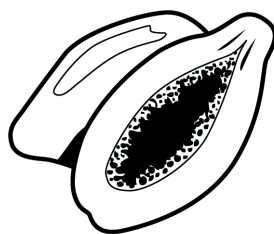
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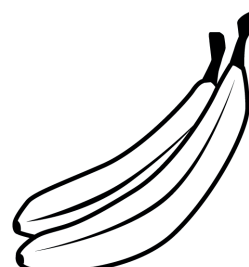
watermelon



peach



papaya



banana

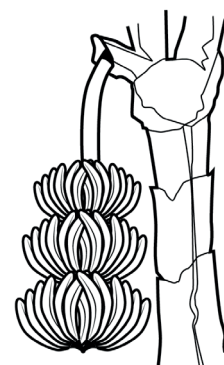
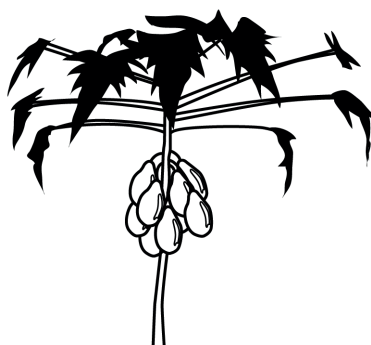
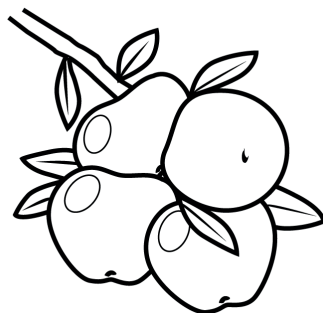
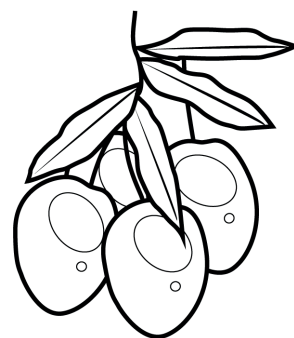
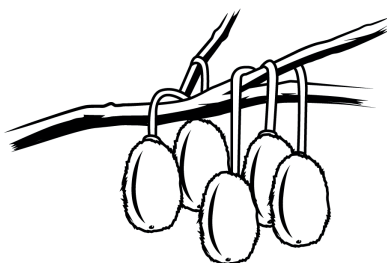
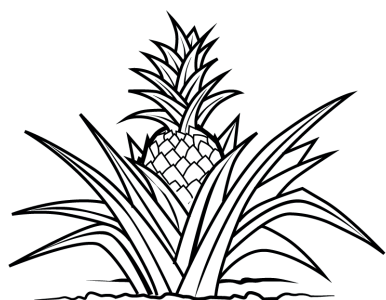
Resource Sheet 2

Name

Date

Flying Fruit – Lesson 1

How Fruits Grow



It's a Wrap! Unit Overview

Age 5–6

Objectives

- To understand that there are reasons for packaging food
- To suggest some of these reasons
- To recognise the similarities and differences between food packaging
- To describe the properties of different packaging materials
- To explain why different materials are used for different purposes
- To investigate which materials are best for packaging different foods



Packaging - Shutterstock.com / shaifulzamri

The Big Questions

- Why do we package our food?
- What materials do we use to package our food, and why?
- What happens if we package the same food in different materials?

Unit Summary

Learners will explore the many different reasons for packaging food: to preserve the food and keep it healthy for us to eat; to prevent the food from damage; to make the food easier to transport; to make the food attractive to the consumer. They will consider the impact of this packaging and consider the implications of packaging disposal.

Background Information

Food waste is a concern with a vast amount of food wasted each day – it is estimated that the UK produces 15 million tonnes of food waste (food and drink) annually, with UK households producing half of this waste. There are many reasons for having food packaging, which learners will explore during this set of activities, but one of which is to preserve food, keeping it safe for human health, and preventing food wastage. Exciting breakthroughs in packaging technology may help to reduce food wastage by sensing more accurately when food is not suitable for human consumption, replacing the often inaccurate and very generic 'best before' dates. Avoiding food waste in all parts of the food system is a crucial part of the food security agenda – there is little point growing more food, and expending all that energy, to get it from food producers to consumers' plates if waste issues are not addressed.

Current Scientific Research

Professor Andrew Mills, of the Department of Pure and Applied Chemistry at Strathclyde University, has developed a 'smart plastic' which changes colour to indicate when foodstuffs have perished or when the protective packaging has been damaged.

Curriculum Links

England: Year 1: Everyday materials

Describe the simple physical properties of a variety of everyday materials.

Compare and group together a variety of everyday materials on the basis of their simple physical properties.

Working scientifically:

Asking simple questions and recognising that they can be answered in different ways

Performing simple tests

Using their observations and ideas to suggest answers to questions

Gathering and recording data to help in answering questions

Wales: Myself and non-living things

Experiment with different everyday materials and use their senses to sort them into groups according to simple properties.

Northern Ireland KS1 WAU:

Pupils should be enabled to explore:

Strand 1: Interdependence

The effect of people on the natural environment over time.

Strand 3: Place

Features of the immediate world and comparison of places: properties of everyday materials and their uses.

Strand 4: Change over time

Positive and negative changes and how we have a responsibility to make an active contribution.

Scotland: Curriculum for Excellence

Early: Properties and uses of substances: Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes.

First: Properties and uses of substances: Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges.

Cross-curricular opportunities

English: Learners will create a list of the questions they want to ask about food packaging.

Design Technology: Learners could design their own food packaging that would preserve food for longer.

Art: After looking at a range of different food packaging, learners could create their own food packaging labels or logos.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, The Day of Temptations.

Packaging With a Purpose

Lesson Notes 1

What's It All About?

There are many reasons for packaging food, but one is to preserve food, keeping it safe for human health, and preventing food wastage. Food waste is a concern with a vast amount of food wasted each day – it is estimated that the UK produces 15 million tonnes of food waste (food and drink) annually, with UK households producing half of this waste. In this introductory lesson children will begin to explore the reasons for packaging food.

Learning Outcomes

- I know that there are reasons for packaging food.
- I can give some reasons for packaging food.

Working Scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Using their observations and ideas to suggest answers to questions

Big Question

- Why do we package our food?

Key Words:

protect, preserve, package, material



Equipment



From The Crunch Website

It's a Wrap! PowerPoint (Lesson 1)

Other Things You Will Need

Examples of food and drink in packaging, e.g. carton of eggs, tin of beans, fruit in a net, carton of milk.

Sorting hoops

Preparation

Gather together examples of food in packaging. Alternatively the It's a Wrap! PowerPoint (Lesson 1) provides visual images of a variety of packaged food and drink items.



Safety

Make sure any packaging that you use has been stored in a clean place and is free from sharp edges. Do not use any packaging that has been used for meat, poultry or fish.

Appetiser

Display the durian fruit, jack fruit and mango on the It's A Wrap! PowerPoint and talk with children about the images. Ask the children if they have ever seen any of these fruits. Now compare these images to the presentation of food on the next two slides. Ask children about the types of packaging they have seen around food, and look at real examples of food in packaging. Make sure children know that packaging means a container in which food is packed or presented. Ask them to point out any natural 'packaging' that the fruits might have. Do they think this is good packaging or not? Which fruit do they think has the best packaging? Explain that you are curious about the packaging and would like the children to investigate why we package food and to examine the different types of materials that are used.



Main Course

Organise children into groups and ask them to be packaging investigators. Give each group a different kind of packaging (or image of packaging if packaging is not available). Explain that you would like them to examine and sort the packaging, thinking about why the food is packaged in this way. Display some suggested reasons for why food is packaged on the It's A Wrap! PowerPoint, for example:

- to protect food
- to make food look nice
- to make food easier to carry
- to stop food leaking

More able children can also write some of their own suggestions if they think of any.

Support each group in examining the items and match them to the relevant reasons, and then ask children to share their findings. Compare these findings. Were the reasons for packaging that they thought of the same, or did reasons differ depending on the item?

Use these reasons to label sorting hoops, and sort each kind of packaging into the relevant hoop. Which material do they think is best suited to packaging food, and why?



Dessert

Ask children to talk about the materials that are used and compare them. Tell them that in the next lesson you will be asking them to investigate these materials further to discover the properties that make them suitable for their use in packaging.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Day of Temptations. We are surrounded by unhealthy food and not always encouraged to be very active. What choices can we make to try and be healthy all day?



Practical Packaging

Lesson Notes 2

What's It All About?

In this lesson children will investigate the properties of different packaging materials to discover what makes them suited to their purpose.

Learning Outcomes

- I recognise the similarities and differences between food packaging.
- I can describe the properties of different packaging materials.
- I can explain why different materials are used for different purposes.

Working Scientifically

- Performing simple tests
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions

Big Question

- What materials do we use to package our food, and why?

Key Words:

transparent, opaque, hard, soft, rough, smooth, shiny, dull, heavy, light, metal, glass, plastic



Equipment



From The Crunch Kit:

Resource Sheet 1: Sorting Labels (Teaching Notes, p29)



From The Crunch Website:

It's a Wrap! PowerPoint (Lesson 2)

Other Things You Will Need:

Assorted packaging: a net bag, a plastic bag, a polystyrene tray with cling film wrap, a tin can, bubble wrap, greaseproof paper, aluminium foil, a cardboard box and a plastic box

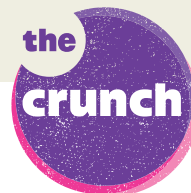
Four ripe peaches, pears or similar soft fruit

A waterproof sheet

Camera

Poster paper

Sorting hoops



Preparation

Gather together examples of food packaging or ask each child to bring in a piece of packaging from home. Do not use any packaging that has been used for meat, poultry or fish.



Safety

Make sure any packaging is clean and free from sharp edges. Do not use any packaging that has been used for meat, poultry or fish. Remind the children that packaging is not a toy and that they must not put plastic packaging near their noses or mouths.

Appetiser

Display the It's a Wrap! PowerPoint (Lesson 2), which shows images of different types of packaging used in different countries. Talk with children about the reasons for different countries using different types of packaging. Are they packaging their food for the same reasons? Are there places where food packaging is not used at all?



Main Course

Show children the different examples of real packaging materials. In small groups, give children the materials to explore.

Set up an investigation to explore which packaging is best for transporting a pear, peach or similar ripe soft fruit that bruises easily. Display a net bag, a plastic bag, a polystyrene tray with cling film wrap, a tin can, bubble wrap, greaseproof paper, aluminium foil, a cardboard box and a plastic box.

Ask children to discuss in pairs how best to transport the soft fruit. They should consider how to package the fruit to contain it well and protect it from damage.

Ask the children to use the materials to create what they think is the most suitable type of packaging, and to leave one piece of fruit with no packaging. Protect the classroom floor by laying down a waterproof sheet and ask the children to devise a test to find out how well their packaging works when transporting the fruit, perhaps based on what happens to the fruit in the story *Handa's Surprise*. Take photographs of the packaging and the fruit. Ask the children to decide whether their packaging worked well or not. What words can they use to describe why the packaging was or was not successful? For example the best packaging is soft, waterproof, clean. The worst packaging is open, absorbent, messy. Use the photos and the key words to make a class poster about choosing suitable packaging for food.

Dessert

Together, make a list of all the words used to describe the packaging, listing them in two columns if they are opposites, e.g. rough/smooth, transparent/opaque, hard/soft.

Set out sorting hoops on the floor and use the labels from Resource Sheet 1 to label each hoop. Two labels have been left blank to allow for different sorting criteria to be used. The children choose three packaging items and choose which hoop they should place the packaging in. Take photographs of the sorted packaging.

No Packaging?

Lesson Notes 3

What's It All About?

In this lesson children will conduct an experiment to determine what happens to a food when you package it, and when you don't. The children will report back, identifying the perfect packaging for a chosen food, based on what they have learned from their investigations. They will also learn about new technological advances that are being made in food packaging.

Learning Outcomes

- I can find out which materials are best for packaging different foods.
- I can give some reasons for packaging food.

Working Scientifically

- Performing simple tests
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions

Big Question

- Why do we package our food?

Key Words:

packaging, storage, perishable, mouldy, decompose



Equipment



From The Crunch Kit:

Resource Sheet 2: Timeline (Teaching Notes, p30)



From The Crunch Website:

It's a Wrap! PowerPoint (Lesson 3)

Video: Fruit rotting

Other Things You Will Need

At least three samples of food for the experiment, e.g. bread, cheese or fruit such as an orange or apple.

Clear containers with sealable lids, or closable clear sandwich bags



Safety

Some people are allergic to mould, so care should be taken to avoid contact with mould and its spores.

It's important that some air gets to food, during the experiment, in order for mould to grow. However, children and adults should be careful not to breathe in mould spores, so any holes or gaps in the containers you place the food in should be very small. Take care when moving the containers to make sure no mould spores come out through any small holes that might already be present in the container or packaging. During the experiment be careful to store the container in an area away from regular contact by children or adults, in order to avoid breathing in the spores.

Ensure that the children wash their hands after this experiment, and that all areas that come into contact with any mould are cleaned. Also, keep the classroom well ventilated throughout the experiment.

Make sure that after the experiment is complete, the containers used are discarded.

Note Different types of questions are answered with different forms of scientific enquiry, e.g. observing over time, pattern seeking, identifying and classifying or comparative or fair testing. This is a comparative test.

Appetiser

Ask the children if they have ever seen any food that has gone bad. What was it, what did it look like? Show some examples of mouldy food on the It's A Wrap! PowerPoint and watch the time-lapse videos of a banana and a bowl of strawberries rotting over time.



Explain that some foods are perishable, like meat, fish and milk. This means that after some time the food is spoiled and is no longer nice to eat. Some food lasts longer, like flour, beans and canned fruit.

Unpackaged foods, such as fresh fruit and vegetables, do not have date-marks or storage instructions. Talk to the children about how they would store these items and know when they are safe to eat, e.g. strawberries in a fridge, potatoes in a cool, dry and dark place.

Main Course

Explain that together as a class you are going to conduct a comparative test, comparing fresh food with food that has been around for a while, with or without packaging.

Talk about the food you want to use, for example bread. Ask the children to describe what this fresh food looks like. They might want to look at it and describe the colour, smell, texture, and so on. Discuss the packaging materials you could use. Ask the children how we could test our ideas about what will happen to the food over time. Come up with a test plan, agreeing the different materials you will use to wrap the food, and where the food will be kept, e.g. in the fridge, on the table or in a drawer.

Decide on a timescale for your investigation. Ask children how often they would like to observe the bread and how they are going to record their findings during the course of the investigation, e.g. take photos of the bread, draw pictures of any changes that have occurred, describe changes that they observe.

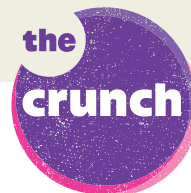
A timeline template is provided on Resource Sheet 2 for children to chart the time the chosen food takes to decompose in different food packaging.

At the end of the investigation, ask children to use their results to identify which packaging was the best in terms of food preservation.

Dessert

Talk with children about the importance of keeping food safe to eat. What do they think would happen if we ate food that is not nice to eat anymore, and how would it affect our health?

Talk with children about how food doesn't keep forever, but packaging can help to keep it fresh for as long as possible. Discuss the exciting advances in science that are changing the way we package food and how simple things can make a world of difference to human health and the food we waste.



Resource Sheet 1

Name

Date

It's a Wrap! – Lesson 2

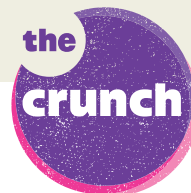
Sorting Labels

**to keep food
fresh**

**to make food
look good**

to sell more

**to stop food
breaking**



Resource Sheet 2

Name

Date

It's a Wrap! – Lesson 3

Timeline

Time	Description	Picture
Start		

Fast Food Chains

Unit Overview

Age 6–7

Objectives

- To know what animals (including humans) eat
- To understand where this food comes from
- To know what a food chain is
- To recognise the similarities and differences between food chains
- To describe what happens when an element of a food chain is removed
- To name some of the most important world foods

The Big Questions

- What do we eat?
- What are food chains and why are they important to understand?
- What will happen to our food, and the food chains we are part of, if the climate changes?



Girl - Shutterstock.com / Ami Parikh

Unit Summary

Learners will explore the foods that different animals and humans eat and how they obtain this food. They will then focus on what might happen to diets and health, if one crop is taken out of the human food chain.

This unit provides learners with the opportunity to investigate food chains, by exploring the human food chain that they sit in.

Background Information

The move towards monoculture in the production of our staple crops is a big concern for many. If one crop fails, it has the potential to have an enormous impact on human populations across the world, the impact of which could be similar to the potato famine in Ireland in the 1800s.

Curriculum Links

England Year 2

Living things and their habitats

Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

Working scientifically

Asking simple questions and recognising that they can be answered in different ways

Observing closely, using simple equipment

Performing simple tests

Identifying and classifying

Using their observations and ideas to suggest answers to questions

Gathering and recording data to help in answering questions

Wales

Myself and other living things

Observe differences between animals and plants, different animals, and different plants in order to group them.

Identify the effects the different seasons have on some animals and plants.

Places and people

Investigate how places change, e.g. the weather, the seasons, buildings, people's jobs.

Begin to recognise differences between their own locality, localities in other parts of Wales and in different parts of the world.

Northern Ireland KS1 WAU:

Pupils should be enabled to explore:

Strand 1: Interdependence

How living things rely on each other within the natural world.

The effects of people on the natural and built environment over time.

Strand 3: Place

Features of the immediate world and comparisons between places.

Strand 4: Change over time

Ways in which change occurs in the natural environment.

Scotland: Curriculum for Excellence

First: Biodiversity and interdependence: I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food.

I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school.

Cross-curricular opportunities

Geography: Looking at maps to find out where different people in different food chains live and how the weather and seasons are different from ours.

English: Children could write a short report about how the food chains they are part of are different from those of children in other parts of the world.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, Basmati Basmati and Beloved Burger.

Making Food Chains

Lesson Notes 1

What's It All About?

In this introductory lesson, learners will explore the foods that different animals, including humans, eat.

Learning Outcomes

- I know what different animals (including humans) eat.
- I know that I am part of a food chain.

Working Scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Identifying and classifying

Big Question

- Do animals eat the same food as humans?

Key Words:

herbivore, carnivore, omnivore



Equipment



From The Crunch Kit:

Resource Sheet 1: Food Chain Cards (Teaching Notes, p39)

Other Things You Will Need:

Pencils
Crayons
Sorting hoops

Preparation

Photocopy and cut out the flashcards from Resource Sheet 1.
Consider laminating the cards for future use (optional).

Appetiser

Ask the children, who has eaten carrot recently.

Crops that we farm and eat use light from the Sun to make their own food which helps them grow. Introduce the idea of the Sun starting a food chain and explain that, as a class, the children are going to construct a food chain.

Draw an arrow from the sun to a carrot, and then from the carrot to a person, and label it:

The Sun > the carrot > you

Explain that this is called a food chain. Could they make the chain longer, perhaps by introducing an animal? For example:

The Sun > the carrot > the chicken > you

The sun helps the carrot to grow. The chicken eats the carrot and then we can eat the chicken.

Main Course

Give the children copies of the cards from Resource Sheet 1, ask them to make simple food chains of three and four elements, for example Sun > grass > cow > human.

Then ask the children to make some more of their own simple food chains by drawing pictures and linking them with arrows. They could use their favourite animals or pets for this.

For the more able children introduce the terms omnivore/carnivore/herbivore. Place two hoops, overlapping as a Venn diagram, on the floor and ask the children to label them, carnivore on the left, herbivore on the right and omnivore in the middle where the hoops overlap. They can classify the animals and themselves in each of these groups.

Dessert

The children share their own food chains with the rest of the class.

Ask: has anyone managed to make a long food chain?

Ask the class to come up with their own definition of what a food chain is. Encourage answers that summarise that a food chain shows how living things find their food by eating plants and other animals.

Food Chains Around the World

Lesson Notes 2

What's It All About?

Children will now focus on what human beings across the world eat, what food different people have access to and what food chains for these people would look like.

Learning Outcomes

- I know what a food chain is.
- I recognise similarities and differences between food chains.

Working Scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions

Big Question

- What are food chains and why are they important?

Key Words:

food chain, diet, the Sun



Equipment



From The Crunch Kit:

Mega Map

Resource Sheet 2: Food Chain Map (Teaching Notes, p40)

Resource Sheet 3: Building Food Chains (Teaching Notes, p41)



From The Crunch Website:

Fast Food Chains PowerPoint (Lesson 2)

Appetiser

Show Resource Sheet 2 with a map of the world showing children from six different countries and some of their favourite foods. Make links to the Mega Map, comparing to other foods from other countries. Show the postcards on the Fast Food Chains PowerPoint (Lesson 2). Explain that these are postcards that have been sent by the children from around the world, describing what they like to eat.



Compare their diets to those of the children in your class and look at similarities and differences.

Main Course

Look at the postcards together. Ask: do you notice any animals that eat the same food as humans? For example the sheep and Amaira both eat spinach. Ask the children how we could show this using food chains. Remind them that all food chains start with the Sun.

the Sun > spinach > sheep

the Sun > spinach > Amaira

the Sun > spinach > sheep > Amaira

Can the children identify other food chains like these using the information from the postcards? Ask them to fill in the boxes on Resource Sheet 3 to construct their food chains. Remind them that they do not need to fill in every box but challenge them to think of the longest possible food chains if they can.

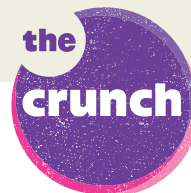
Dessert

Discuss what the children have found out that they didn't know before about what people and animals eat in different countries, where their food comes from and how plants, animals and humans fit together in food chains.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, Basmati Basmati. Explore the importance of bio-diversity. Where does our food come from and why is it important to eat lots of different things?





The Missing Link

Lesson Notes 3

What's It All About?

Building on previous knowledge of food chains and the food chains they have built themselves, the children will investigate food chains on which we are most dependent for our human health and wellbeing. They will begin to build simple food chains. They will explore what can happen if an element of a food chain is removed.

Learning Outcomes

- I can think about what happens when an element of a food chain is removed or reduced.

Working Scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions

Big Question

- What happens to a food chain if part of it breaks down?

Key Words:

nutrient, sunlight



Equipment



From The Crunch Kit:

Tomato seeds

Preparation

The seeds in The Crunch Kit have not been treated with any fungicide. However, if you choose to use bought tomato seeds, please make sure that they have not been treated with fungicide before using them with children.

Appetiser

Recap what the children have learned about food chains. What do they find most interesting? Now ask them to think about what would happen if we removed one thing from the food chain. Would the other parts of the chain have enough to eat? Would they stay healthy? Could anything else be used to fill the gap in the chain?

Explain that fish, like the salmon that we eat, are reared by farmers on fish farms. Fish need to eat special nutrients called omega-3 oils, which make them really good for us to eat. Omega-3 oils are a great fat for our brains, and help them to develop well and stay healthy. Fish normally have omega-3 oils in their diet from eating plankton, but recently there hasn't been as much plankton in the sea, so they contain less omega-3 oils.

To try and fix this problem, scientists at a research station called Rothamsted, in the south of England, are investigating how to grow special crops that contain omega-3 oils. The scientists will feed this to the fish, in the fish farms where there isn't enough plankton. So scientists have found a way to fill the gap in the fish food chain where the plankton was missing.

Main Course

Show the children a simple food chain, or use one that they constructed in Lesson 2, for example:

the Sun > spinach > sheep

Remove one element from the chain, for example the spinach. Ask: what will happen to the rest of the chain? Will the sheep have enough to eat to stay healthy? Could the sheep eat something else instead of spinach? More able children can look at longer, more complex food chains and consider the implications of removing one or more elements.

To demonstrate how the removal of an element from a food chain can affect it, conduct a simple investigation. Together, plant the tomato seeds from the box and wait until they have germinated and grown several leaves. Alternatively use any small potted plant which already has some leaves. Put some plants in the sunshine and some in the dark. Water the plants and observe what happens to them over time. Which grow better, the plants in the sunshine or the plants in the dark? Ask the learners what happens if you remove sunlight from a food chain, what might happen to the rest of the chain?

Dessert

Ask the learners what they have learned about the food we eat, and the food chains we are all part of around the world. Consider how we are reliant on a lot more than we might first think, and that we need to think about what might happen if we don't look after a particular thing in our environment.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, Beloved Burger. Lots of people want to eat more meat but it isn't good for us, the rainforests or the planet. What are the alternatives?



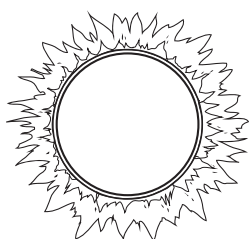
Resource Sheet 1

Name _____

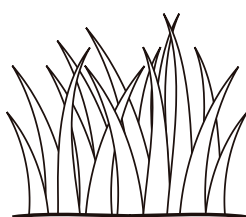
Date _____

Fast Food Chains – Lesson 1

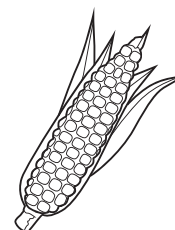
Food Chain Cards



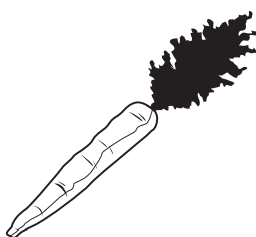
the Sun



grass



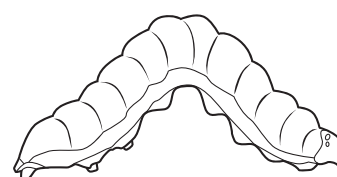
corn



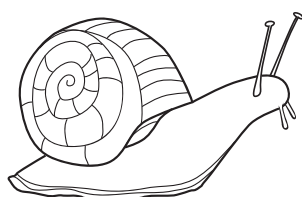
carrot



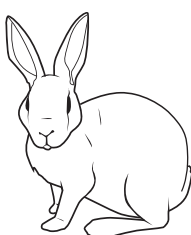
hazelnut



caterpillar



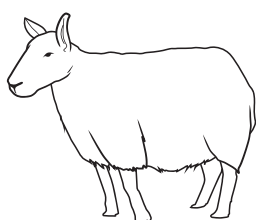
snail



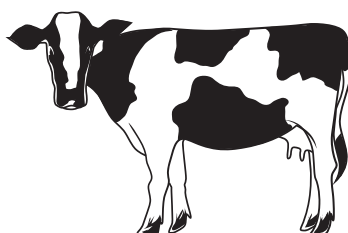
rabbit



squirrel



sheep



cow



human

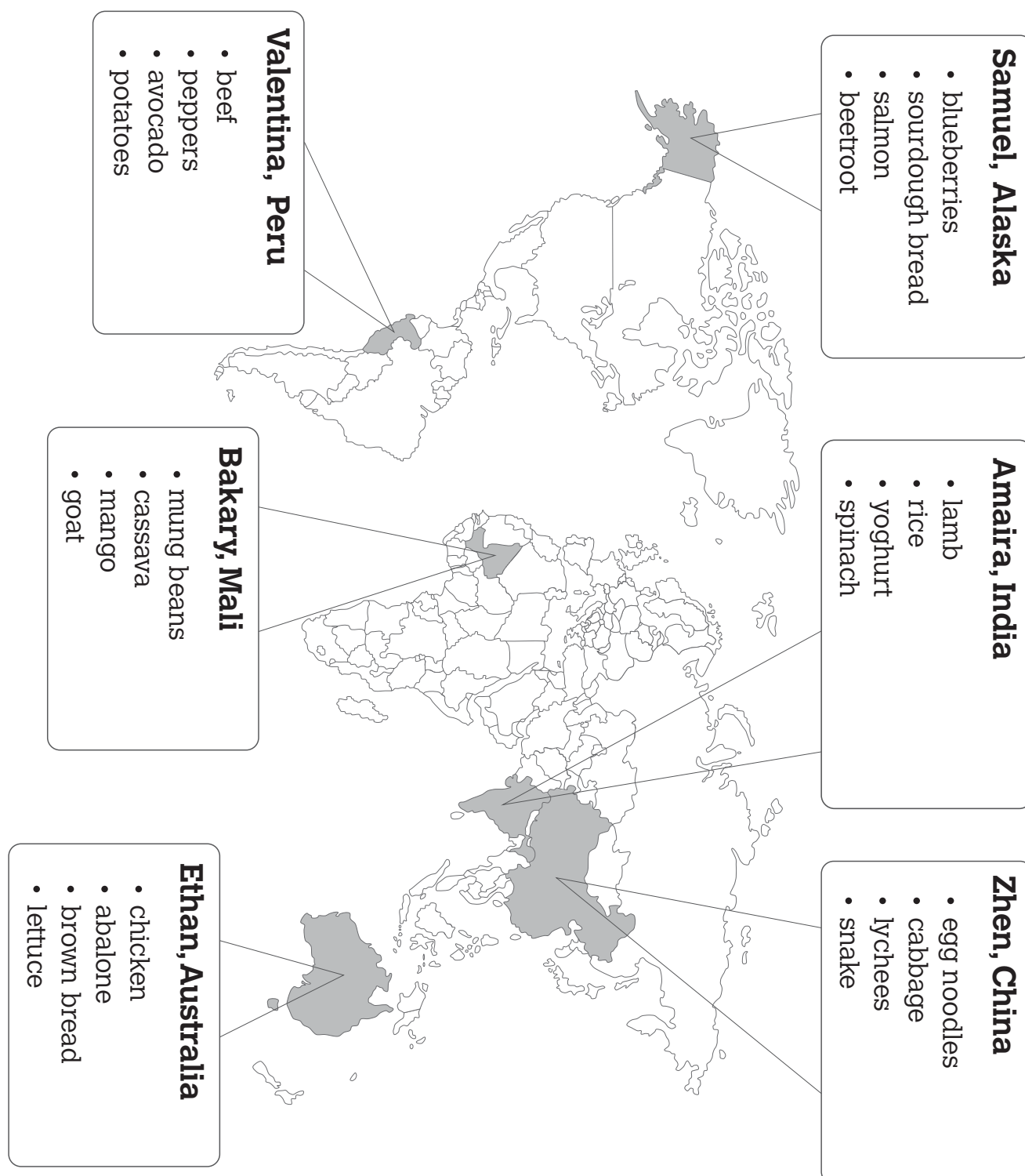
Resource Sheet 2

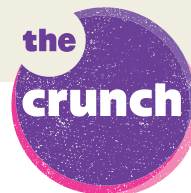
Name _____

Date _____

Fast Food Chains – Lesson 2

Food Chain Map





Resource Sheet 3

Name

Date

Fast Food Chains – Lesson 2

Building Food Chains

	▶		▶		▶		▶	
	▶		▶		▶		▶	
	▶		▶		▶		▶	
	▶		▶		▶		▶	

Incredible Ingredients

Unit Overview

Age 7–8

Objectives

- To find out about what is in different foods
- To investigate how much sugar there is in fizzy drinks
- To recognise the similarities and differences in the food people eat around the world.

The Big Questions

- What is in the food we eat?
- How much sugar is there in some of the drinks I like?
- How can different ingredients in our food affect our health?



Pad Thai - Fotolia.com / boltenkoff

Unit Summary

Learners will explore the nutritional content of food and how humans obtain nutrition from the food they eat. The practical experiment will look at the amount of sugar in different fizzy drinks and what affect this have on whether a can floats or sinks. Learners will explore food choices from different parts of the world.

Background Information

With processed foods making up 70% of the US diet, the western world is experiencing unprecedented levels of cancer, heart disease and diabetes. Many learners are unaware of which foods are processed and which are not, and what the pros and cons of different ingredients can be. This unit really makes learners begin to question what is in the food we eat and why it is there. By finding out what is in familiar foods, the aim of the activity is for children to begin to think carefully about food in relation to their health.

Curriculum Links

England Year 3

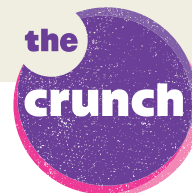
Animals, including humans

Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.

Working scientifically

Asking relevant questions and using different types of scientific enquiries to answer them.

Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.



Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

Wales: Interdependence of organisms

Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival.

They should be given opportunities to study the need for a variety of foods and exercise for human good health.

Northern Ireland KS2 WAU:

Pupils should be enabled to explore:

Strand 1: Interdependence

How they and others interact in the world.

How living things rely on each other within the natural world.

Strand 3: Place

How place influences the nature of life.

Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment.

Strand 4: Change over time

How change is a feature of the human and natural world and may have consequences for our lives and the world around us.

Scotland: Curriculum for Excellence

First: Body systems and cells: By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy.

Second: Topical science: I can report and comment on current scientific news items to develop my knowledge and understanding of topical science.

Wider curriculum

Geography: Locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries, and major cities.

Cooking and nutrition: Understand and apply the principles of a healthy and varied diet; understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Cross-curricular opportunities

History: Children could compare the diets of today to those of other peoples in history (e.g. Stone Age man).

Geography: Learners will locate different places in atlases and world maps to find out where different people live.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, The Day of Temptations and The Lament of the Green Bean.

What's It Made Of?

Lesson Notes 1

What's It All About?

In this introductory lesson, children will explore the nutritional content of food and begin to understand how humans obtain nutrition from the food they eat.

Learning Outcomes

- I know how to find out about what is in different foods.

Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.

Big Question

- What is in the food we eat?

Key Words:

nutrition, protein, carbohydrates, fats, vitamins, minerals



Equipment



From The Crunch Kit:

Resource Sheet 1: Nutrient Match (Teaching Notes, p52)



From The Crunch Website:

Incredible Ingredients PowerPoint (Lesson 1)

Other Things You Will Need:

A selection of nutritional content labels from a variety of food packaging (some healthy, some unhealthy)

Preparation

Cut out (and laminate for durability if required) the matching cards from Resource Sheet 1.

Appetiser

Display the grid on the Incredible Ingredients PowerPoint. Explain to children that you are going to use this grid to capture what they already know about the food they eat, what they want to know and what they will learn in the lesson.



Ask children to talk in pairs or small groups about the following questions:

Why do we eat? What happens when we don't eat? How do you feel when you haven't eaten for a while? Where does our food come from?

Have children share their responses and note down common themes in the K section of the grid (what they know already). Questions where children do not have ready responses or are unsure can go in the W section (what they want to know).

Circle back to the Why do we eat? question. Talk with children about the fact that we eat for many reasons (cultural, social, etc.), but that today the focus will be on the link between food and health and how humans get nutrition from the food we eat. All food and drink provides us with nutrients but different foods provide different amounts of nutrients.

Main Course

Organise children into groups and give each group a set of cut out cards from Resource Sheet 1. Use these cards to talk about different nutrients, the food that provides them and how they help our bodies. Children match the food to the nutrient and to the function.

Show children the collection of food packaging. Choose one healthy item and one unhealthy item to look at more closely. (If possible consider selecting two items that seem very similar but where one is a significantly healthier choice than the other.) Draw children's attention to the nutritional information label. Have they seen labels like these on the food their family buys? Ask children to think, pair and share what they think these labels tell us and then to use the information on the labels to work out which item is healthier and why.

Ask the children if they see labels like this on vegetables or fruit. Talk with children about what they understand by the term 'processed food' and establish that a processed food is any food that has been changed in some way from its natural state. Things that are processed may have added salt, sugar or fat.

List the different categories on the board and discuss each one.

- Energy
- Fat
- Carbohydrate
- (of which) Sugars
- Fibre
- Protein
- Salt

Draw their attention to the portion or serving information. Through discussion help children to realise that nutrition labels can help you choose between products and keep a check on the amount of foods you're eating that are high in fat, salt and added sugars.

Dessert

Recap the main points from the lesson with the children:

- All foods provide nutrients.
- Energy is provided by the nutrients carbohydrate, fat and protein. Other nutrients include vitamins and minerals.
- The amount of energy and nutrients provided by food depends on its size, known as a portion.
- Different nutrients have different functions in the body to keep us healthy.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Day of Temptations. We are surrounded by unhealthy food and not always encouraged to be very active. What choices can we make to try and be healthy all day?



Sugar Search

Lesson Notes 2

What's It All About?

Much of the food that children in the UK eat is processed, having been altered in some way from its natural state, and one common substance to be added is sugar. It's sometimes hard to really comprehend the amount of sugar that can be added to items. In this lesson, children will conduct an experiment to investigate how much sugar there is in a can of fizzy drink. They will look at the packaging for information and then carry out a practical investigation by comparing what happens to a drink can when placed in water.

Learning Outcomes

- I can investigate how much sugar there is in fizzy drinks.
- I can read and interpret a nutritional facts label to determine sugar content in drinks

Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

Big Question

- How much sugar is there in some of the drinks I like?

Key Words:

sugar, floating, sinking, dense



Equipment



From The Crunch Kit:

Resource Sheet 2: Record Keeping Sheet (Teaching Notes, p53)



From The Crunch Website:

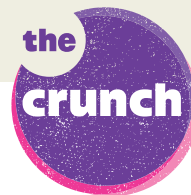
Incredible Ingredients PowerPoint (Lesson 1)

Other Things You Will Need:

A selection of cans of fizzy drinks, some with a high sugar content, and some of the diet variety

Large container, preferably transparent

Access to water



Preparation

The point of the experiment is to show that there is a difference between cans of high sugar drink and cans of diet drink. This can be demonstrated in one of two ways:

- 1 You can put both cans in a container of water. The high sugar drink should sink as it has a higher density, the diet drink should float. This often works, but be aware that you will need to select the cans carefully, and test first. Some full-sugar drinks will float because they have a lot of gas inside. Try to avoid shaking the drinks and keep them cool. It is advisable to test a few to find the best examples.
- 2 Alternatively, you can weigh the cans. The high sugar can should have a greater mass than the diet can because the sugar makes the drink more dense. This is often a more reliable test.

Appetiser

Ask the children to look at the grid on the PowerPoint that you started in the previous lesson. Ask: Do we need to add anything to any section?



Recap the points from the previous lesson around the nutrients that food provides and the recommended daily amounts for different things, including fat, sugar and salt. Talk about sugar in particular. Ask children why we like to eat sugar, how does it taste? How can sugar help your body, but what happens if we consume too much? Discuss what foods might contain a lot of sugar. Why do we like those sorts of foods? Reiterate that though they seem healthy, some fruits, fruit juices and cordials are also high in sugar.

Main Course

Ask the children how we can tell if there is sugar in a drink, when we can't see it. Conduct a small group practical activity to investigate the ingredients in cans of fizzy drink.

Hold up two cans of cola or another fizzy soft drink, for example ginger beer or an energy drink or sports drink. Make sure one of the cans is a diet version of the drink. Ask children what they think will happen if they put the cans into a bowl of water and to give reasons why. Ask them to think about how they could test their hypothesis. Can children think of any other ways of comparing the cans. What would they find if they weighed the cans, will all cans have the same mass? The high sugar can should have a greater mass than the diet can because the liquid inside is more dense. Work with them to build a test plan, incorporating their predictions before starting the investigation. Resource Sheet 2 can be used to help to record the results.

In turn, place the cans in the water, recording whether they sink or float. After testing each can, encourage children to note the amount of sugar in each can. Pass around the cans of fizzy drink, and ask children to look at the nutritional labels. Ask children to think, pair share the differences between different drinks. Establish that by reading the labels, you can see that there is a difference in the amount of sugar in a high sugar can and a diet variety.

Is there a link between the amount of sugar and whether the cans sink or float?

Dessert

Discuss the children's results. Talk to them about what they found out and what surprised them. Encourage them to give reasons for the results they obtained and to give proof. Establish that although the cans have exactly the same volume, or size, their density differs because of what's in the fizzy drink itself. Some fizzy drinks, such as ginger beer, can have more than 40g of sugar in them, whereas low- or non-sugar varieties have artificial sweeteners which leads to the difference in density. The regular fizzy drink can is denser than water, so it sinks, the non-sugar variety less dense than water, so floats.

An Extra Helping

Ask children if they can think of a way to make the regular can of fizzy drink float. By adding sugar to the water in which you are putting the can, the density of the water is now higher than the can, so it floats.

Different Diets

Lesson Notes 3

What's It All About?

Children will look at diets from different parts of the world and compare the nutritional content of these.

Learning Outcomes

- I recognise the similarities and differences in the food people eat around the world.

Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.

Big Question

- How can different ingredients in our food affect our health?

Key Words:

food, diet, ingredient, season, nutrition, healthy



Equipment



From The Crunch Kit:

Mega Map



From The Crunch Website:

Incredible Ingredients PowerPoint (Lesson 3)

Appetiser

Ask: What is your favourite food or meal? Can you think of a food that is thought of as being traditionally 'British'? Talk with children about the fact that food from other countries may be different to food that is traditionally from the UK.

Display the pictures of different food on the Incredible Ingredients PowerPoint and discuss where each dish traditionally comes from.

You could consider discussing the fact that for religious reasons, some people avoid certain meats, or choose a vegetarian diet.



Main Course

Around the world food is prepared and cooked in lots of different ways. Why is this? Encourage children to think about the seasonality of food and the availability of different ingredients in different countries.

Explain to children that their challenge today will be to investigate the diets of different nationalities and to compare the nutritional make up of these diets. Is one healthier than another?

On the Incredible Ingredients PowerPoint, display six meals and the countries they are associated with, and ask children to find each country on the Mega Map. Organise children into groups and allocate each group two of the meals pictured. Ask children to research these meals, breaking them down into the different ingredients that make up the meals. They investigate the nutritional content and compare the two meals.

Alternatively you can ask children to compare the diet of today with that of, say, 50 years ago.

Ask groups to share their findings with other groups. Talk about the special diets that some people may have, e.g. athletes or astronauts.



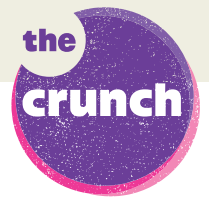
Dessert

Review the grid that you started at the start of Lesson 1. Together as a class fill in the L section (what children have learned in the lesson). Check to make sure that all the questions in the W section were answered. If not, challenge children to find out the answers.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Lament of the Green Bean. Explore the effects of food consumption. Where does our food come from, why should we be careful not to waste it, and how can we make sensible and healthy choices?





Resource Sheet 1

Name _____

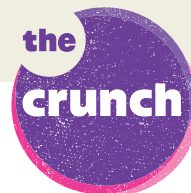
Date _____

Incredible Ingredients – Lesson 1

Nutrient Match

Cut out the cards and match each food to the nutrient and its function.

Potatoes	Chicken
Butter	Red meat
Milk	Wholemeal bread
Carbohydrates	Protein
Fats	Iron
Calcium	Fibre
Main source of energy for the body	Needed for growth and repair
Necessary but needed only in small amounts	Keeps blood healthy
Helps build strong bones and teeth	Needed to keep the gut healthy



Resource Sheet 2

Name

Date

Incredible Ingredients – Lesson 2

Record Keeping Sheet

Use this sheet to write up your method and results.

What I think

What I did

What I found out

Save Our Home!

Unit Overview

Age 8–9

Objectives

- I can describe the structure of a rainforest and explain why this is important.
- I can name different oils in our food and where they come from.
- I can explain the need for sustainable food oil production.

The Big Questions

- What is in the food we eat?
- What effects does consumption of food oil have?
- How can we help the orangutans?



Orangutan - Shutterstock.com / Matej Hudovernik

Unit Summary

Learners will explore the links between the environment and human health by exploring the palm oil debate. In short, there are around 14,000 Sumatran orangutans left in the wild because their rainforests are being cut down. This land is then being used to grow oil palm plantations, and this palm oil is found in 50% of our supermarket foods. Access to this cheap fat is often cited as one of the reasons for the global obesity epidemic.

Background Information

98% of the Sumatran rainforests could be destroyed by 2022, mainly due to the deforestation of land in order to develop oil palm plantations. This palm oil is used in many packaged supermarket foods, and has been linked to obesity and insulin resistance. In addition to this, this deforestation has rendered orangutans critically endangered, with only around 14,000 left in the wild. The palm oil debate enables children to explore a direct link between the fate of Sumatran orangutans, rainforests and the production of an ingredient that is commonly used in many of the foods that are eaten globally. Through this case study they will begin to understand the complexities of the links between food, health and the environment.

Curriculum Links

England Year 4: Living things and their habitats

Recognise that environments can change and that this can sometimes pose dangers to living things.

Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.

Working scientifically

Asking relevant questions and use different types of scientific enquiries to answer them

Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

Using straightforward scientific evidence to answer questions or to support their findings

Wales KS2 Interdependence of organisms

Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival.

They should be given opportunities to study through fieldwork, the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment;

the environmental factors that affect what grows and lives in those two environments, e.g. sunlight, water availability, temperature.

How humans affect the local environment, e.g. litter, water pollution, noise pollution.

Northern Ireland KS2 WAU

Pupils should be enabled to explore:

Strand 1: Interdependence

How living things rely on each other within the natural world.

The effects of people on the natural and built environment over time.

Strand 2: Movement and energy

How movement can be accelerated by time and natural events such as wars, earthquakes, famine and floods.

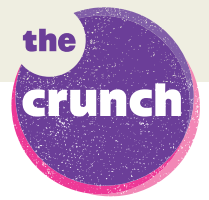
Strand 3: Place

Positive and negative effects of natural and human events upon place over time.

Strand 4: Change over time

How change is a feature of the human and natural world and may have consequences for our lives and the world around us.

The effect of positive and negative changes globally and how we contribute to some of these changes.



Scotland: Curriculum for Excellence

Second: Earth's materials: Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses.

Second: Biodiversity and interdependence: I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.

Wider curriculum

Computing: use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.

Design and technology: understand how key events and individuals in design and technology have helped shape the world.

Geography: Human and physical geography: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water.

Cross-curricular opportunities

Geography: Learners will learn about rainforest environments, and how human populations rely on them.

English: They will learn how to conduct a debate.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, The Lament of the Green Bean and Beloved Burger.

What is a Rainforest?

Lesson Notes 1

What's It All About?

In this introductory lesson to the unit, children will find out about rainforests, where they are located and the structure and function of their various parts. They will also learn about the water cycle in rainforests and also about the cycle of nutrients.

Learning Outcomes

- I can describe the structure of a rainforest and explain why this is important.

Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering

Big Question:

- Why are rainforests important?

Key Words:

rainforest, canopy, understory, emergent trees, transpiration, water cycle, rain, ground layer



Equipment



From The Crunch Kit:

Mega Map

Resource Sheet 1: Sumatra Animal Cards (Teaching Notes, p67)

Resource Sheet 2: Rainforest Structure (Teaching Notes, p68)



From The Crunch Website:

Video: The Rainforest

Save Our Home! PowerPoint (Lesson 1)

Other Things You Will Need:

Sticky tape

Litre bottle

Plastic bag

Elastic band

Paper towel

Preparation

The day before the lesson, place a plastic bag around the leaves of a plant (either an inside plant, or around the leaves of a tree outside). Cut out and laminate the animal cards (Resource Sheet 1).



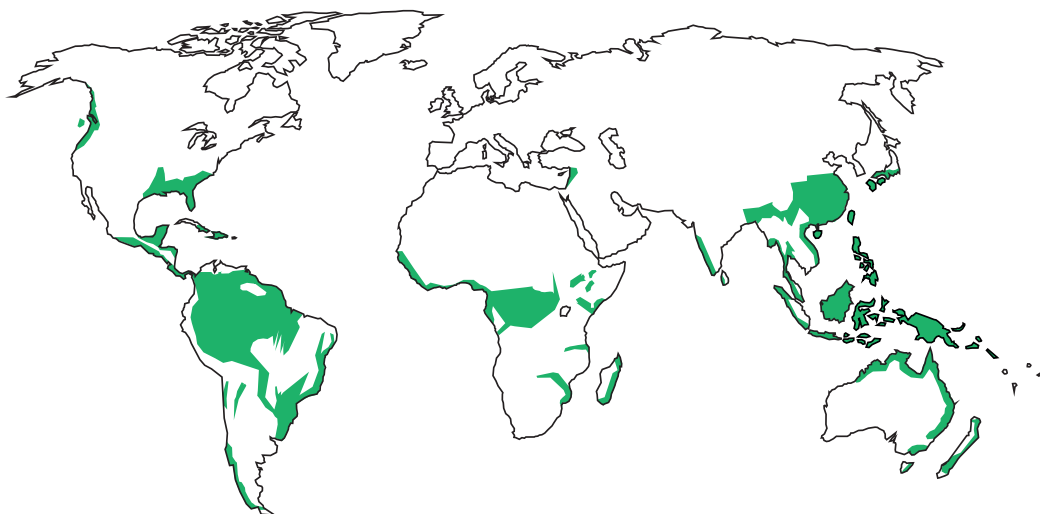
Safety

Remind the children that plastic bags are not toys and that they must not put plastic bags near their noses or mouths.

Appetiser

Give each child one of the picture cards from Resource Sheet 1 and ask them to read the information provided, e.g. how the animal moves / the noise it makes. Children then become that animal and have to find the other ones in the group who are the same animal as them.

Discuss where in the world they think these animals may live. Show the Mega Map and help the children to locate the rainforests in the world. Find Indonesia and tell them they will be looking in more detail at the rainforests in Sumatra, which is one of the islands in Indonesia.



The World's Rainforests

Use the children to 'make' a rainforest. Use about six children to make the tall emergent trees (stand with their arms in the air), then about ten children to be the canopy, (standing arms down), eight children to be the smaller shrub layer (understorey) and six children lying down to be the forest floor. Place some pictures of various animals (or toy animals) in amongst the forest and decide which bit they may live in (e.g. on the ground / in the trees). Tell the children that in the forest there are many undiscovered animals and plants. Many of our medicines are made from plants so it is possible there are plants yet to be discovered that could help make medicines to help cure some of the diseases that at the moment we cannot cure.



Rainforest Structure

Main Course

Watch the Rainforest video, focussing on the structure of the rainforest and the wildlife that lives there. Introduce Makanan the orangutan, and show his picture on the Save Our Home! PowerPoint. Tell children that Makanan and his family live in the rainforest in Sumatra.



Explain how lots of recycling goes on in a forest, both of water and nutrients. Ask children: What happens to the water we give to a plant?

Show the children a plant that has previously had a plastic bag tied around a leaf. Look at the water in the bag and discuss the movement of water through the plant and the evaporation from the leaves. This is called transpiration. The rainforest is very damp because of all the water that evaporates from the leaves. That's why we call it a 'rain' forest!

Use children to represent a part of the rainforest. What happens when a tree/shrub dies or the leaves fall on the ground? They quickly decompose and the nutrients return to the soil. But they don't stay there long because the living plants and new plants will use them to help them to grow. So although the rainforest appears to be very fertile land a lot of the goodness is actually tied up in the plants.

Ask the children to think what would happen to the nutrients if the trees are cut down and removed. And then the land is used to grow crops which are also taken away.

Dessert

Give the children the picture of the rainforest structure on Resource Sheet 2, and ask them to label the various parts and to add information that they have learned during the lesson. They could work individually or in pairs. Ask them to think how they can draw on the picture to show how water and nutrients are recycled.

They can add pictures of animals and even draw an undiscovered plant (their own design) with medicinal properties.

Ask a few children to explain one point they have learned from the lesson to the others.

An Extra Helping

Research an animal that lives in the rainforest. Find out what is happening to the rainforests. They are being cut down – why?

Clearing the Rainforest for Palm Oil

Lesson Notes 2

What's It All About?

Rainforests in Sumatra are being cleared for oil palm plantations as palm oil is in high demand. Palm oil is a fat that is used in many food and cosmetic products found in a supermarket.

It is produced from the fruits of the oil palm tree and is very high yielding and is very cheap. Refined palm oil is high in cholesterol and thought to contribute to obesity.

Learning Outcomes

- I can name different oils in our food and where they come from.

Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Using straightforward scientific evidence to answer questions or to support their findings

Big Question

What effects does consumption of food oil have?

Key Words:

oil, palm oil, cleared, plantation



Equipment



From The Crunch Kit:

Resource Sheet 3: Palm Oil Names (Teaching Notes, p69)



From The Crunch Website:

Save Our Home! PowerPoint (Lesson 2)

Video: The Rainforest

Other Things You Will Need:

Food packaging, from foodstuffs containing fats, with clear lists of ingredients

Beanbag

Preparation

Collect packaging from foodstuffs, so that the children can look at the lists of ingredients. Products that are likely to include palm oil include bread, crisps, chocolate bars, margarine and ice cream. Do not use any packaging from meat, poultry or fish.

During this lesson children will look at different foodstuffs bought in a supermarket and try and identify the ones containing palm oil.



Safety

When collecting packaging, do not use any packaging from meat, poultry or fish.

Appetiser

Children stand in a circle and throw a beanbag to each other randomly around the circle. When they catch the beanbag they must say a rainforest word from the word bank on the Save Our Home! PowerPoint, and then throw to someone else. The challenge is not to repeat a word.

Tell the children today we are going to learn about different food oils, including palm oil. Ask children to name oils that might be in their food, e.g. olive oil, sunflower oil, peanut oil. Talk about how different oils come from different countries. Ask them to discuss in pairs what they think palm oil is and what it might be used for. Ask a few children to feedback their ideas and write them up on a board.

Main Course

Watch the Rainforest video, focussing on clearing the rainforest for palm oil. Alternatively look at pictures of a rainforest being cleared for an oil palm plantation and a selection of palm oil products on the Save Our Home! PowerPoint. Tell the children that it is used in our food, and also in many other things, such as shampoo.



Tell the children that it is estimated that half of supermarket foods contain palm oil so now they are going to test this out.

Ask the children to group themselves in threes. Give ten packets and ask them to look and see if palm oil is listed in the ingredients. If the statistic is right, five of the ten products should have palm oil. But there are none. Then tell the children that it might not be called palm oil, there are many different names for palm oil.

Show them a list (Resource Sheet 3). Tell them this is not all of them, there are many more but these are the more common ones. Look again at the packets – they can all have palm oil listed.

Work in bigger groups and give each group a bag of packets and ask them to sort using the list as a reference.

Following sorting, ask how many did and how many didn't contain palm oil. Discuss products which surprised them? Ask them to consider if palm oil is generally found in foods that have lots of ingredients. Is it that the more complicated the food is the more chance there is of being palm oil. Try to include examples where palm oil is listed twice in a product (as two different names).

Tell the children that oils and fats are similar in our foods. Ask why we eat fats and oils in our diet. Explain they are a good source of energy but that if we don't burn off that energy the body will store it as fat.

Look at different kinds of fats/oils that we can eat. Do they know if some are better or worse for us?

What could be done to make people aware that palm oil is in so many products? How can it be made less confusing?

Children design a palm oil label that could be used on foodstuffs – maybe with a health warning to say that too much fat can be bad for you.

Dessert

Play 'Palm oil is my surname'. Put up the list of the different names for palm oil. Children sit together, either on the carpet or at their tables. Move among them and give an object (a beanbag or a picture of an oil palm tree) to one child at a time. Children stand and read a palm oil name from the list. As the names are very complicated and difficult to read this should be made part of the fun. Explain to the children that it doesn't matter if you are not sure how to pronounce it, just have a go. After saying the name, the child adds '... but my surname is palm oil!' When everyone has had a go, explain that it is as if all these names belong to the palm oil family. It would be a lot better if the manufacturers labelled the products with just the 'surname' so that we could always tell that it was palm oil.

Look back at their ideas from the start of the lesson about what they thought palm oil was. Ask a few children to say what they know now and add any new information to the ideas. Tell children that some foods now have 'sustainable palm oil' on the label. This means the growers have promised to take responsibility for conservation, and to care for communities and wildlife affected by their oil palm plantations.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Lament of the Green Bean. Explore the effects of food consumption. Where does our food come from, why should we be careful not to waste it, and how can we make sensible and healthy choices?



Is There a Better Way?

Lesson Notes 3

What's It All About?

Children learn about two different scenarios where the land is being used for palm oil production and how this can lead to very different results. They consider the two different scenarios and how our lives could influence what happens to rainforests now and in the future.

Learning Outcomes

- I can explain the need for sustainable food oil production

Working Scientifically

- Asking relevant questions and use different types of scientific enquiries to answer them
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using straightforward scientific evidence to answer questions or to support their findings

Big Question

- How can we help the orangutans?

Key words

orangutan, sustainable, destruction



Equipment



From The Crunch Kit:

Resource Sheet 4a and 4b: Scenario 1 and 2 (Teaching Notes, p70-71)

Appetiser

Remind children of the different oils they compared in Lesson 2 and ask them to tell you what they remember about the production of palm oil. Reintroduce Makanan the orangutan and ask children how they think palm oil production might be affecting him and other inhabitants of the rainforest.

Main Course

Children work in mixed ability groups. Each group is given one of the scenarios. They build up the story using the text cards which are numbered to help them sequence it and they read the story to each other.

When they have finished each group tells the story to the others. If there are two groups doing each one (there could be three groups for each scenario if the class is quite large) they could take it in turns to explain. The teacher could interrupt and ask another group to carry on with the story. They shouldn't spend more than five minutes on each scenario – it should be a précis rather than a full recap.

The groups then swap so they can look at the other scenario which is still laid out (i.e. they don't have to put it together).

Children discuss each scenario in relation to Makanan's family. What would happen to his family in Scenario 1 and in Scenario 2? Which scenario is better for his family?

How does what we buy and eat contribute to Scenario 1 and what could we do to promote Scenario 2?

Look at some of the products that use sustainable palm oil and those that don't. Children could write a persuasive letter to a company asking them to join the Roundtable on Sustainable Palm Oil or debate / role play an interview with the managing director at a company to explain why the Roundtable on Sustainable Palm Oil is a good thing and why the companies should buy palm oil that is sustainable.

Dessert

Ask the children: How is what we eat leading to the destruction of the rainforests in Sumatra?

Children discuss in pairs one thing they could do to help the people and animals of the rainforest. Write these up and display as a 'pledge wall'.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, Beloved Burger. Lots of people want to eat more meat but it isn't good for us, the rainforests or the planet. What are the alternatives?



Resource Sheet 1

Name _____

Date _____

Save Our Home! – Lesson 1

Sumatra Animal Cards

Monkey



Monkeys swing from branch to branch at high speed. They make a chattering sound.

Orangutan



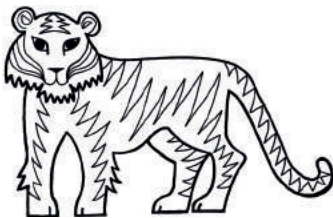
Orangutans spend most of the time in the rainforest canopy. The males make a call, a 'longcall' which can be heard from far away.

Hornbill



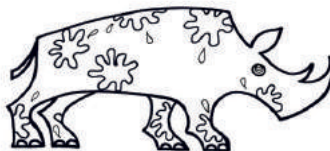
The primary food of the hornbill is fruit. It lives high in the canopy of the rainforest. It makes a 'caw-caw' sound.

Tiger



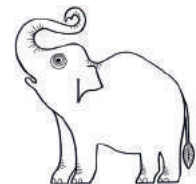
Sumatran tigers are denoted by the heavy black stripes on their orange coats. Tigers roar.

Rhino



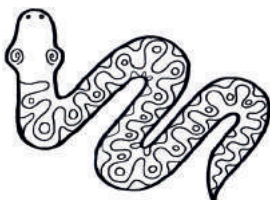
The rhino is a mostly solitary animal, and needs a good supply of water and mud wallows. It is a browser. It makes a grunting sound.

Elephant



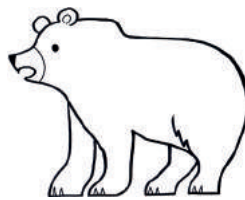
The Sumatran elephant is the smallest Asian elephant. It eats up to 200 kg of green vegetation a day. It trumpets or makes a low rumble.

Snake



Snakes make up a large number of species that live in the rainforest. Makes a hissing sound.

Bear



The Sun Bear is one of the rarest of all the bear species. It is an excellent climber and spends a lot of time in the trees. It barks or growls.

Slow loris



A nocturnal animal that has large eyes and a very long tongue, used to drink nectar. The only venomous primate. Makes little or no noise.

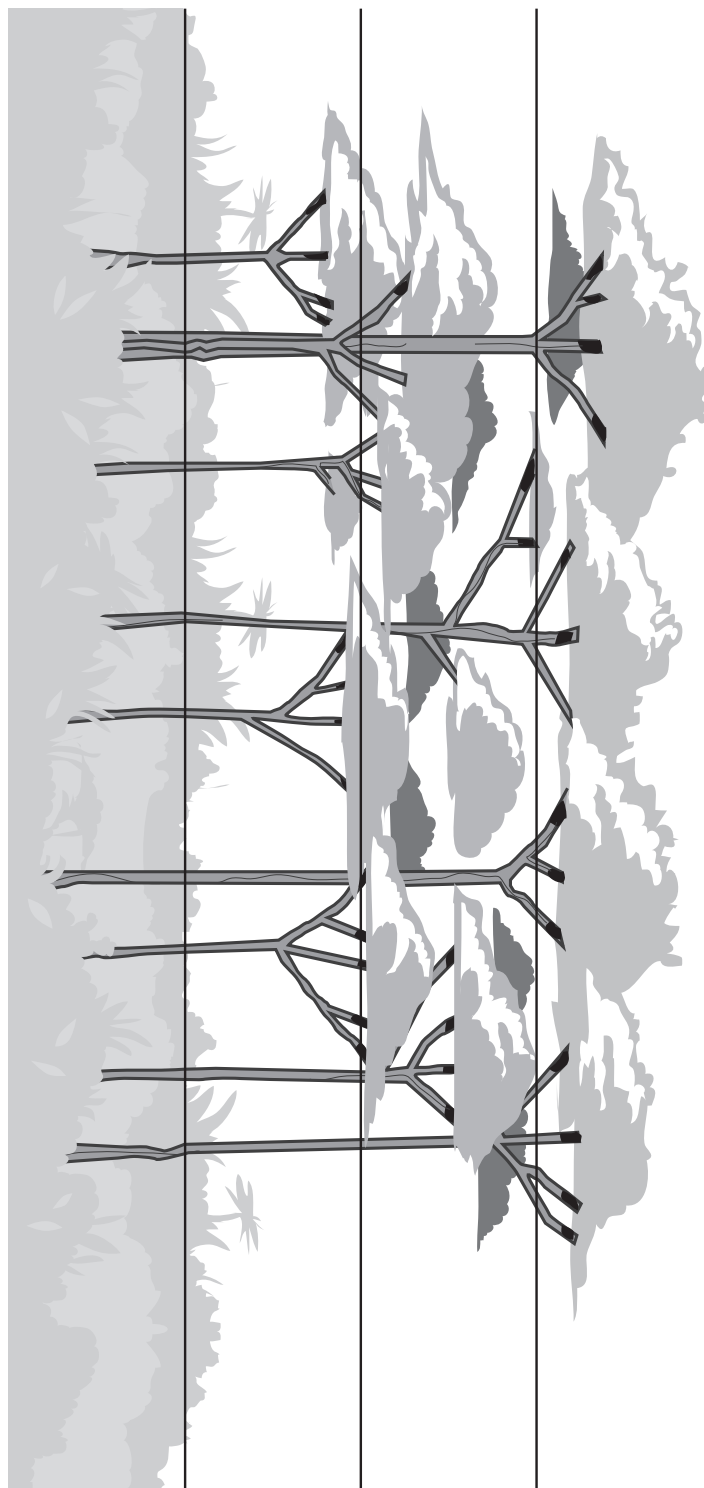
Resource Sheet 2

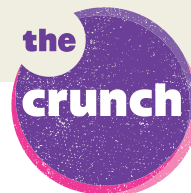
Name

Date

Save Our Home! – Lesson 1

Rainforest Structure





Resource Sheet 3

Name

Date

Save Our Home! – Lesson 2

Palm Oil Names

All these names may mean palm oil.

INGREDIENTS:

Vegetable Oil

Vegetable Fat

Palm Kernel

Palm Kernel Oil

Palm Fruit Oil

Palmate

Palmitate

Palmolein

Glyceryl

Stearate

Stearic Acid

Elaeis Guineensis

Palmitic Acid

Palm Stearine

Palmitoyl Oxostearamide

Palmitoyl Tetrapeptide-3

Hydrated Palm Glycerides

Ethyl Palmitate

Octyl Palmitate

Palmityl Alcohol

Sodium Laureth Sulfate

Sodium Lauryl Sulfate

Sodium Kernelate

Sodium Palm Kernelate

Sodium Lauryl Lactylate/Sulphate

CONTAINS: Palm oil

Resource Sheet 4a

Name

Date

Save Our Home! – Lesson 3

Scenario 1

1 AN OTHER Palm Oil Company has moved into the area of forest near Manakan's home and they are clearing a small amount of forest. They are going to plant an oil palm plantation.	2 They have promised work to local people and all goes well to begin with. Villagers work in the plantation and earn money.
3 The local people live in their village next to the plantation and they still have a small amount of land to grow their own crops.	4 AN OTHER Palm Oil has received a big order and needs room to grow more oil palm trees. They don't have permission to cut down more rainforest but they are a big powerful company and do it anyway. The villagers lose their homes as the company takes their village. They move into houses on the plantation that are not very big and have no land to grow food. So now they have to spend some of their wages on buying food. Big trucks are needed to clear the land so they have built large roads.
5 Back in the UK, people are buying more and more products. They want cheap products so the manufacturers are using palm oil. AN OTHER Palm Oil Company has more big orders.	6 Big roads now make the forest easier to get into. There are lots of poachers who come into the forest and catch and kill wild animals to sell illegally.
7 AN OTHER Palm Oil Company wants to clear land quickly so instead of cutting down the trees they set large fires and burn large areas of land. The animals have nowhere to go.	8 Because the land has been used for crops, a lot of the nutrients in the soil are now gone. They are not being recycled anymore. The plantations have to add lots of chemicals and fertilisers to the land. Some of these chemicals end up in the rivers and streams. They also add lots of pesticides which end up in the soil and water and are harmful to wildlife.
9 The eating of palm oil in the UK continues to rise.	10 AN OTHER Palm Oil Company clears more land until the forest has gone. The plants that used to hold the soil together are gone and some of it washes away. The trees that caused the rain are gone so it doesn't rain as much. All those wonderful animals have nowhere to live and amazing plants (some yet to be discovered) are gone. With not much soil or rain, the oil palm trees don't grow as well. Even if they chop down the oil palm trees the forest will not grow back.

Resource Sheet 4b

Name

Date

Save Our Home! – Lesson 3

Scenario 2

1 Budi is a villager and he wants to set up a small oil palm plantation. He has permission to clear a part of the rainforest near his village. The village is very poor and Budi uses local people to help him clear the land and plant the oil palms.	2 His business is doing well. He is selling the oil he produces to manufacturers in the UK who are using the palm oil in food products
3 Budi hears that some people are concerned about the damage that oil palm is causing to the rainforest and are demanding that oil palm growers take care and produce palm oil sustainably which limits the damage to the rainforest.	4 In the UK people like cheap food and the demand for palm oil as an ingredient rises. Budi receives an order for more palm oil.
5 He meets up with a conservation group called the Friends of Makanan to see what he can do. He does not want to extend his plantation because it would mean taking over the village as well as Makanan's home. He learns about how he can make his plantation work better and produce more palm oil from the trees he already has.	6 Because he has attended the training he now knows how to get more out of the crop he has. He applies for a Roundtable on Sustainable Palm Oil certificate. He can now sell his palm oil as certified palm oil. He earns more money for it.
7 People in the UK start to notice the signs on foods saying that the palm oil is certified as being sustainable and people research what this means.	8 They are quite amazed at how much palm oil is in all these different products but are confused because it has so many different names.
9 A campaign is started to force food manufacturers to label ingredients clearly so people have a choice.	10 Back in Sumatra, Budi is happy with his business, the villagers have work and still live in the village, the animals still have plenty of rainforest to live in.

Salty Seeds Unit Overview

Age 9–10

Objectives

- To show where Mexico is located in the world
- To describe some of the geographical features of the country
- To demonstrate how the germination of seeds is dependent on the environment
- To understand that dissolving salt in water is a reversible change of state
- To ask relevant questions to extend my understanding
- To argue my point of view and consider and evaluate different viewpoints

The Big Questions

- What problems do Mexican farmers have?
- Can plants be helped to grow in difficult places?
- Should we buy food from poorer countries?

Unit Summary

The idea behind this unit is for children to use science to solve a problem faced by real farmers in Mexico – how to grow strong, healthy plants that can survive and thrive in difficult conditions. During the activities, children will develop their skills in working scientifically, conducting an experiment under fair test conditions and in researching and debating real issues of global significance. Note that the experiment in Lesson 2 will take place over several days or up to five weeks. Complete the experiment before moving on to Lesson 3, so that children can refer to their results.

Background Information

Population growth has outstripped food production in recent years – the world's population is projected to increase to 9 billion by 2050. Demand for food is expected to increase, but the amount of land suitable for food production is likely to decrease. Drought, salt water, flooding, high temperatures, pests and disease are making it harder for farmers to produce food.

The Senora region of Mexico faces big issues caused by irrigation and water shortages in the region. Irrigation, applying water to soil in areas that are very dry or have periods of low rainfall, results in salinised soils as salt that has accumulated in the soil layers is drawn up towards the surface. Modern scientists are looking at how to speed up germination times and initial growth rates, so that the emerging roots pass quickly through soil which sometimes presents a hostile environment for young plants. Halo priming (soaking seeds in salty water before planting them) is a very simple way of changing an uncommon variable to modify the way a plant grows. It was developed with children in Northern Ireland by the University of Belfast.



Pepper - Shutterstock.com / cloki

Curriculum Links

England Year 5

Living things and their habitats

Describe the life process of reproduction in some plants and animals.

Properties and changes of materials

Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

Demonstrate that dissolving, mixing and changes of state are reversible changes.

Working scientifically

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

Using test results to make predictions to set up further comparative and fair tests

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

Identifying scientific evidence that has been used to support or refute ideas or arguments

Wales KS2 Interdependence of organisms

Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival.

They should be given opportunities to study through fieldwork, the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment; the environmental factors that affect what grows and lives in those two environments, e.g. sunlight, water availability, temperature.

How humans affect the local environment, e.g. litter, water pollution, noise pollution.

Northern Ireland KS2 WAU

Pupils should be enabled to explore:

Strand 1: Interdependence

How living things rely on each other within the natural world.

Strand 3: Place

Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment.

Positive and negative effects of natural and human events upon place over time.

Strand 4: Change over time

The effect of positive and negative changes globally and how we contribute to some of these changes.

Scotland: Curriculum for Excellence

First: Properties and uses of substances: I can make and test predictions about solids dissolving in water and can relate my findings to the world around me.

Second: Topical science: Through research and discussion I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society.

I can report and comment on current scientific news items to develop my knowledge and understanding of topical science.

Second: Biodiversity and independence: I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use.

Second: Inheritance: By investigating the lifecycles of plants and animals, I can recognise the different stages of their development

Wider curriculum

Geography: Locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries, and major cities.

Cross-curricular opportunities

Geography: Learners will learn about some geographical features and climatic conditions in Mexico, and how human populations rely on them.

English: Learners will develop an understanding of how to conduct a debate.



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, For Richer, For Poorer.

Viva Mexico!

Lesson Notes 1

What's It All About?

Children will learn about the problems faced by farmers in Mexico as a result of irrigation and water scarcity. They will begin to develop hypotheses about how the strength and yield of crops could be improved.

Learning Outcomes

- I can show where Mexico is located in the world.
- I can describe some of the geographical features of the country.

Working Scientifically

- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

Big Question

- What problems do Mexican farmers have?

Key Words:

borders, desert, annual rainfall, irrigation



Equipment



From The Crunch Kit:

Resource Sheet 1: Mexico Map (Teaching Notes, p84)

Resource Sheet 2: Mexico Task Instructions (Teaching Notes, p85)

Mega Map



From The Crunch Website:

Salty Seeds PowerPoint (Lesson 1)

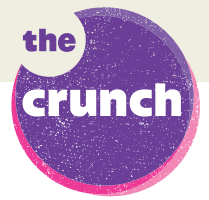
Other Things You Will Need:

Two strips of paper (1220 mm and 752 mm)

A variety of colouring pencils

Sticky notes

Access to the internet or library for research



Preparation

Cut out and label two strips of paper that are 1220 mm and 752 mm long.

Copy Resource Sheet 2 and cut it into strips to provide differentiated tasks for different children.

Appetiser

Give each child a small sticky note. Show the children the Mega Map and ask for volunteers to put their sticky note where they think Mexico is on the map.

Ask the class to confirm if they think each position is (a) close, (b) totally right or (c) totally wrong, then reveal which estimate was closest. Ask the children to look at the countries on Mexico's borders. In small groups, the children should talk about what they think each country might be like in terms of population, climate, vegetation and wildlife, for example.

Main Course

Explain that now you've agreed where Mexico is, you are now going to think more about what the country is like. Tell the children that they are going to create a Mexican Fact File.

Give the children the blank map of Mexico on Resource Sheet 1, and the relevant task for each child from the differentiated tasks on Resource Sheet 2, or displayed on the Salty Seeds PowerPoint. Less able children should complete Task 1, most children should complete Task 2 and more able children should complete Task 3.



Ask the children to use maps or the internet to conduct some research and complete the features listed on their task sheet. You may also want to ask the children to make a key for their maps.

Ask the children to share their maps with the class. Which two features on their maps are the same as in our country, and which two are different? The children may notice that there is a lot of desert in Mexico.

Now show the children the paper strip showing 1220 mm, and tell them that that represents the average amount of rain that falls in one spot in the UK in a whole year. Ask for volunteers to use a whiteboard pen to mark on how much water they think falls in Mexico on average. Now show them the paper strip showing 752 mm. Explain that this represents average annual rainfall in Mexico. Given the small amount of rain that falls in Mexico, explain that farmers have to apply a lot of extra water to their crops (irrigation) to grow enough to feed the people in their country in order to keep them healthy.

Dessert

Tell the class that they are going to play a Mexican Challenge game. Divide the class into small groups. Tell them that you will choose two of the groups. Each group will take turns to name something that is the same or different about Mexico and their area, or a fact about irrigation. Whoever gets one wrong or can't think of anything drops out. The winning team moves on to play the next team. The winner is the team who has given the most answers.

An Extra Helping

Research more facts about the country of Mexico. Use maps or the internet to compare rainfall in different countries throughout the world.

Stressing Seeds

Lesson Notes 2

What's It All About?

Looking at possible ways of improving plants' germination and rate of growth.

Learning Outcomes

- I can demonstrate how the germination of seeds is dependent on the environment.
- I understand that dissolving salt in water is a reversible change of state.

Working Scientifically

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Using test results to make predictions to set up further comparative and fair tests

Big Question

- Can plants be helped to grow in difficult places?

Key Words:

dissolving, germination



Equipment



From The Crunch Kit:

Resource Sheet 3: Seed Hypothesis (Teaching Notes, p86)

Resource Sheet 4: Seed Results (Teaching Notes, p87)

Tomato seeds

Compost nodules

Measuring spoons

Test tubes and stoppers

Test tube stands

Measuring beakers

Sodium chloride (table salt)

Plant pots

Other Things You Will Need:

Metre rulers

Labels and pencils

Preparation

Photocopy one copy of Resource Sheets 3 and 4 per group.



Safety

If you choose to buy packets of seeds, be aware that some bought seeds are coated in fungicide to help them last longer. Children should wash their hands thoroughly when handling bought seeds, or they should wear gloves throughout.

The compost supplied in The Crunch kit is safe to use with children. However, if you use your own compost in future, please use current year compost that has been stored in a cool place away from the sun. The compost should be damp. Open bags carefully in a well-ventilated area using sharp scissors or a knife. Pot up plants in a well-ventilated area. Avoid making dust. Children should always wash their hands after handling compost. Please check the [CLEAPSS](#) and [SSERC](#) websites for current advice. Please note that these sites are password protected.

Appetiser

Ask the children what they learned about Mexico in Lesson 1.

Remind them that Mexican farmers use irrigation to grow crops, and explain how this causes the soil to become very salty. This can affect the growth of crops and reduce the amount of food produced for people.

Tell them that scientists are trying to find ways of increasing food production. One way of doing this may be by 'stressing' seeds (soaking the seeds in salted water before sowing them). This is called Halo Priming. Ask the children to predict what effect they think this will have on their seeds.

The Science Behind It: In many hot countries, the top layer of soil often has a high concentration of salt in it. This is because, if the land is irrigated, the water will often go deep into the soil, dissolving mineral salts found there. These are then drawn up towards the surface, where they are deposited when the water evaporates. Roots therefore need to get to soil below this salt layer as quickly as possible, in order to have the best chance of growing.

Main Course

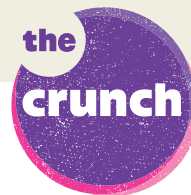
Divide the children into mixed ability groups and give each group Resource Sheet 3. Explain that children are going to carry out an experiment, soaking tomato seeds in salt water before sowing them. They will observe the germination and growth of the seeds over about five weeks to see what effect this has. Ask each group to follow the instructions on the sheet. Encourage each group to select their own amounts of salt for the other three test tubes. Check the salt solutions carefully, they may need to be made up in beakers and then transferred to test tubes, before adding the seeds. Ask children what they think would happen if they put more or less salt into the solution.

Remind the children that they need to ensure that they are changing only one variable (the amount of salt).

All other elements must be exactly the same, including the amount of water in the test tubes.

Once the children have hydrated the compost nodules and sown their seeds, tell them that they must treat each plant pot in the same way. Why do they think that is? The compost needs to be kept moist but not over-watered so keeping the compost moist for all pots is as fair as it's possible to be. Once the seeds germinate however, larger seedlings need more water.

Demonstrate how to safely remove a plant from a pot so as not to damage its roots. When the plants have developed at least two proper leaves, ask the children to carefully remove each plant from their pots and measure the lengths of the roots. They should record the longest from each pot on Resource Sheet 4.



The Science Behind It: The stressed seeds germinate and grow faster than the control seeds. It is thought that this is because they are trying to quickly produce roots which will reach down below the hostile environment (salty soil) in which they find themselves, to more suitable soil below.

Dessert

Discuss what variables the children could change in this experiment to investigate other things. Could the activity be repeated using different concentrations of salt? Consider asking the children to investigate what happens to plants grown in sandy soil. Can they predict if the outcome will be the same as or different to the outcome for plants grown in salty soil?

The Big Debate

Lesson Notes 3

What's It All About?

Learning to look at, evaluate and accept other points of view.

Learning Outcomes

- I can ask relevant questions to extend my understanding.
- I can argue my point of view and consider and evaluate different viewpoints.

Working Scientifically

- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Big Question

- Should we buy food from poorer countries?

Key Words:

sustainability, debate



Equipment



From The Crunch Kit:

Resource Sheet 5: Writing Frame (Teaching Notes, p88)
Resource Sheet 6: Debating Cards (Teaching Notes, p89)



From The Crunch Website:

Salty Seeds PowerPoint (Lesson 3)

Other Things You Will Need:

Scrap paper
Pencils
Water bottles to encourage loud speaking voices!

Preparation

If the children have never debated an issue before, look together at the writing frame on Resource Sheet 5 and discuss how this structure can be used to formulate an argument and participate in a debate.

Appetiser

Ask the children to recap what they learned in Lesson 2 about growing crops in Mexico. How do the climate and geographical features of Mexico make it difficult to grow crops? What can be done to make it easier?

Tell the children that today you will be asking them to participate in a debate. Spend some time explaining the rules and structures of a debate for children who have never participated in one before. Explain that you will use some time to plan and organise, that they should listen carefully to others when they speak and always answer people's questions respectfully. Show the writing frame on the Salty Seeds PowerPoint to demonstrate how to build and present an argument.



Once you are happy that the children are ready, introduce the motion 'This House believes that Mexico should stop exporting food'. Display the debating framework on the Salty Seeds PowerPoint and explain that there are arguments both for and against this statement.

Main Course

Divide the class into eight groups. Ask four groups to formulate arguments against the motion and four groups to argue for the motion.

Give the children the writing frame and the debating framework (Resource Sheets 5 and 6) and give them time to research their arguments.

Encourage them to draw on what they have learned about Mexico and about stressing seeds in the previous lessons.

Ask them to write out their speeches. They should put their arguments in order of importance. They will need to practise their speeches with their teams and decide who will make the best spokesperson.

Running the debates could be done in a variety of ways. For example:

- (a) one team from each side could be asked to volunteer to present their arguments, while the rest of the class listen and judge each team's contribution
- (b) a series of smaller debates could run concurrently, with certain children chosen as judges to listen and evaluate each of these smaller debates.

Dessert

Ask the children to summarise some of the arguments they have heard.

After listening to the arguments, what do they think Mexico should do? Does the class believe that Mexico should continue to export food or not? Is it a clear cut issue?

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, For Richer, For Poorer. Explore the causes and effects of malnutrition. What happens to our bodies if we don't have a balanced diet?



Resource Sheet 1

Name

Date

Salty Seeds – Lesson 1

Mexico Map



Resource Sheet 2

Name

Date

Salty Seeds – Lesson 1

Mexico Task Instructions

Task 1

1. Give your map a title: **Mexico**.
2. Colour the land in **orange**.
3. Colour the sea in **blue**.
4. Put Mexico's capital city on your map, like this: ● Mexico City
5. Put a pointer to North on a corner of your map. Draw an arrow pointing straight up and put a capital N at the top of the arrow.

Task 2

1. Give your map a title: **Mexico**.
2. Using the internet or an atlas, find out where the arid lands are in Mexico and colour them in **orange**. Then colour the rest of the land in **green** and the oceans in **blue**.
3. Put Mexico's capital city on your map, like this: ● Mexico City
4. Put a pointer to North on a corner of your map. Draw an arrow pointing straight up and put a capital N at the top of the arrow.
5. Draw the Colorado River and the Rio Grande on your map. Label them in very small writing.

Task 3

1. Give your map a title: **Mexico**.
2. Put a compass in the bottom left of your map, pointing North.
3. Find out what the capital of Mexico is, and mark it on the map.
4. Find out where all the rivers are in Mexico, mark them on the map and label them. You may have to use very small writing!
5. Using the internet or an atlas, find out where the arid lands are in Mexico and colour them in **orange**. Then colour the rest of the land in **green**.

Resource Sheet 3

Name

Date

Salty Seeds – Lesson 2

Seed Hypothesis

Step 1: Write your hypothesis (I think that... because...)

Step 2: Prepare the seeds

1. Fill one of the test tubes with water.
2. Put a stopper in the test tube. Write 0 salt onto a label and stick the label on the test tube. This is your control sample.
3. Put $\frac{1}{8}$ of a teaspoon of salt into a beaker with 100mL of water. Stir until all the salt has dissolved, and then pour some of this solution into the second test tube. Put a stopper into it. Write $\frac{1}{8}$ salt onto a label and stick the label on the test tube.
4. Decide how much more salt you are going to put into each of the other 3 test tubes. Make up each salt solution in a beaker then transfer it to a test tube. Label each test tube with the amount of salt in it. **Don't use more than 2 teaspoons of salt.**
5. Put 5 seeds into each of the 5 test tubes, and leave them to soak for between 2 and 24 hours.

Step 3: Sow the seeds and grow the plants

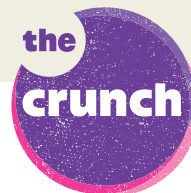
1. Label 5 plant pots with the amount of salt used in the 5 test tubes. Put compost in each pot.
2. Sow the 5 seeds in each pot, making sure that you sow the seeds in the pot with the same label as the test tube.
3. Watch the containers over the next few days and note how many in each pot germinate each day.

Step 4: Gather the results

1. When the seedlings have at least one set of true leaves, take them out of the compost.
2. Record and compare the lengths of their roots.
3. Re-pot the individual seedlings and continue to grow them to compare their growth rates.

Step 5: Test your hypotheses

Was your hypothesis right? How do you know?



Resource Sheet 4

Name _____

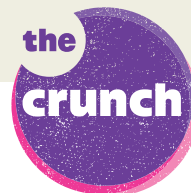
Date _____

Salty Seeds – Lesson 2

Seed Results

Record your results in the table.

Amount of salt	Date sown	Date of first germination	Length of longest root after _____ days
Control (0)			



Resource Sheet 5

Name

Date

Salty Seeds – Lesson 3

Writing Frame

Introduction

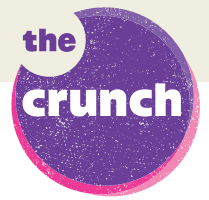
Point 1

Point 2

Point 3

Recommendations

Conclusion



Resource Sheet 6

Name

Date

Salty Seeds – Lesson 3

Debating Framework

This House believes that Mexico should stop exporting food.

Use this framework to develop your argument.

Arguments for:

A large, empty speech bubble with a rounded rectangular body and a small tail pointing towards the bottom left. It is intended for students to write their arguments in favor of the motion.

Arguments against:

A large, empty speech bubble with a rounded rectangular body and a small tail pointing towards the bottom right. It is intended for students to write their arguments against the motion.

Dazzling Digestion Unit Overview

Age 10-11

Objectives

- To analyse a group's diet
- To describe how vitamins and minerals, contained in food, help our bodies to function
- To think why different people in the world, now or in the past, have different diets.

The Big Questions

- Why does the food we eat affect our health?
- How can the food we eat help us to do our best?



Dairy products - Fotolia.com / matka_Wariatka

Unit Summary

Learners will examine their own diets in terms of the amount of different nutrients they consume and what effects these have on our bodies. They will explore how the body digests these nutrients, and carry out a comparative test to investigate why calcium is important for our bones. They will also develop an understanding of how scientists use models in their experiments to better understand the world around us. They will then explore why different people need certain diets to perform well.

Background Information

Pupils may build on prior learning about the main body parts and internal organs (skeletal, muscular and digestive system) in this unit. They will be offered opportunities to explore and answer questions that help them to understand how the digestive system enables the body to function.

The aim of this unit is to help children to develop an awareness of the vitamins and minerals contained in food, in order to better understand the effect their choice of food has on their bodies, and their overall well-being.

Curriculum Links

National Curriculum - England

- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Working scientifically Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

Using test results to make predictions to set up further comparative and fair tests

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

Identifying scientific evidence that has been used to support or refute ideas or arguments

Wales KS2 Interdependence of organisms

- Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival.
- They should be given opportunities to study the names, positions, functions and relative sizes of a human's main organs; the effect on the human body of some drugs, e.g. alcohol, solvents, tobacco.

Northern Ireland KS2 WAU:

Strand 1: Interdependence

- How they and others interact in the world;
- Interdependence of people and the environment and how this has accelerated over time by advances in transport and communications;

Strand 4: Change over time

- How change is a feature of the human and natural world and may have consequences for our lives and the world around us;
- Ways in which change occurs over both short and long periods of time in the physical and natural world

Scotland: Curriculum for Excellence

First: Body systems and cells: By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy.

Second: Body systems and cells: By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing.

Cross-curricular opportunities

Literacy: Writing; Enjoyment and choice – within a motivating and challenging environment, developing an awareness of the relevance of texts in my life

Art: Learners could design their own menu formats, taking into account the environment it will be used in



For extra drama opportunities, consider preparing and performing the Theatre of Debate Play-in-a-Day, The Lament of the Green Bean, For Richer, For Poorer and The Day of Temptations.

Food, Fabulous Food

Lesson Notes 1

What's It All About

Children will learn about the nutrients in their favourite meals, in particular vitamins and minerals. They will identify what each nutrient helps their bodies to do, and what their bodies are good at doing because of the food they eat.

Learning Outcomes

- I know that our bodies need food to stay healthy
- I can describe some of the things that food provides for our bodies
- I know why some foods are more healthy for us than others

Working Scientifically

- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Big Question

- How does the food we eat affect our health?

Key Words:

nutrition, protein, carbohydrates, fats, vitamins, minerals



Equipment



From The Crunch Kit:

Resource Sheets 1a and 1b: Vitamins and Minerals (Teaching Notes, p101-102)
Resource Sheet 2: Tally Sheet (Teaching Notes, p103)

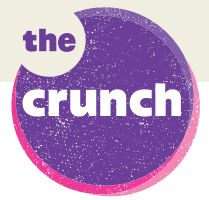


From The Crunch Website:

Dazzling Digestion PowerPoint (Lesson 1)

Other Things You Will Need:

Sticky notes or index cards



Preparation

Ask children to think about what their favourite meal is, before the lesson.

The children should have an understanding of what makes up a balanced diet before they start this unit.

Appetiser

Ask the children to think of their favourite meal, and to write it down on an index card or sticky note. Once they have done this tell them they can't change it! Include some suggestions of your own, introducing more unusual foods that children may not have tried themselves.

Remind the children what the eat well guide recommends (fruit and vegetables, potatoes, bread, rice and pasta, some dairy, beans, pulses, fish, eggs and meat). Tell the children that they are going to investigate the science behind the guide and relate it to their own favourite meals.

Main Course

Talk about why we need food. Establish that all foods provide nutrients. There are 6 'classes' of nutrients: water, proteins, carbohydrate, fats, minerals and vitamins. Tell them that most, but not all, of the food we eat contains vitamins and minerals. These are chemicals that help our bodies to work really well. There are lots of different types, and each one helps us in different ways. Look at some of the examples on the Dazzling Digestion PowerPoint.



Divide the class into groups and give them Resource Sheet 1 and Resource Sheet 2. Ask them to read about the vitamins and minerals on Sheet 1 and to talk about what vitamins and minerals they think are contained in their favourite meals. Which ones have the most vitamins and minerals, which ones have the least?

Ask each group to go through each of their favourite meals and keep a tally chart of how many foods, in their favourite meals, contain each of the vitamins and minerals. They can record their tally on Sheet 2. Alternatively, they could record their favourite meals on the British Nutrition Foundation's Explore Food website. The Diet or Recipe Calculator will automatically calculate the vitamins and minerals in most foods.

Once the groups have completed their recording, ask them to look at which vitamins and minerals they have a lot of, and which they don't. Were there any meals that were particularly high or low in vitamins or minerals? Do they think that there are any that are particularly hard to find, what foods would they have to eat more of to get that nutrient?

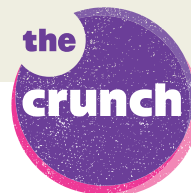
Dessert

In their groups, ask the children to look at the list of nutrients on Sheet 1 and what each one helps their bodies to do. Ask them to use their tallies to identify what their bodies are really good at doing, because of the food they eat. Finally, ask the children to complete the sentence: 'If there was one food that we should eat more of, it would be... because ...'.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Lament of the Green Bean. Explore the effects of food consumption. Where does our food come from, why should we be careful not to waste it, and how can we make sensible and healthy choices?





An Eggs-cellent Eggs-periment!

Lesson Notes 2

What's It All About

Children will learn about what happens if we are missing an important mineral from our diet. They will carry out an experiment soaking eggs in vinegar to find out what happens to bones when there is not enough calcium.

Learning Outcomes

- I can describe the process of digestion
- I understand the importance of calcium in our diets to strengthen bones

Working Scientifically

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

Big Question

- What happens if an important nutrient is missing from our diet?

Key Words:

digestion, prediction, comparative



Equipment



From The Crunch Kit:

Vinegar
Beakers
Measuring cylinders
Resource Sheet 3: Eggs-cellent Models (Teaching Notes, p104)



From The Crunch Website:

Video: Dazzling Digestion

Other Things You Will Need:

Sticky notes
12 eggs, hard-boiled
Water
Measuring scales
Spoons

Preparation

This activity takes place over the course of 24 hours (you could carry out the experiment over the weekend), and you will need to make sure that you have enough hard-boiled eggs for two per group.

The experiment in this lesson uses eggs to find out what happens if we remove calcium from our bones.



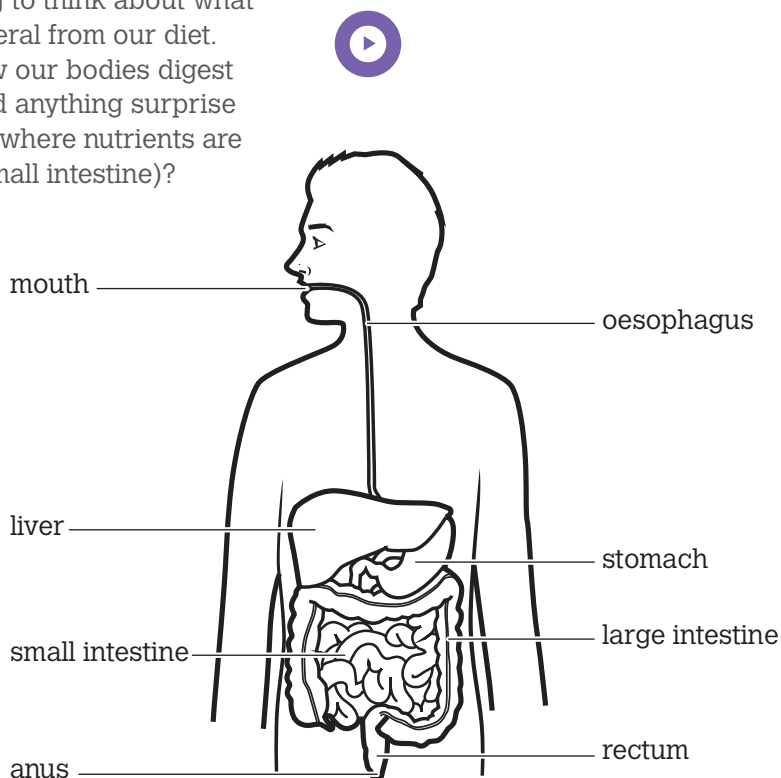
Safety

Always wash your hands after handling eggs.

Appetiser

Tell the children that, in this lesson, they are going to think about what happens to us if we are missing an important mineral from our diet. First show the Dazzling Digestion video about how our bodies digest food. Ask the children what they already knew, did anything surprise them? In the digestive system, do they remember where nutrients are absorbed into the rest of our bodies (the upper small intestine)?

Remind children that different foods provide us with the nutrients we need to keep our bodies healthy. Which nutrients do they remember? What do they do? Can they name a food and the nutrients it might contain? Do they remember a mineral called 'calcium' and do they know which foods are good sources of calcium (cheese, milk, yogurt, dark green leafy vegetables, tinned sardine or salmon fish bones etc)? What parts of our bodies need calcium (our bones and teeth need calcium to keep them strong and help them to grow; our nerves and muscles use calcium to help us move)? Explain to the children that they will be carrying out an experiment which will take 24 hours to find out about calcium in our bones.



The Digestive System

Ask the children to make predictions about what they think our bones would be like if we didn't have enough calcium in our diet. Ask the children to make their predictions on sticky notes and stick them to a display board, or to a wall or window. They may want to write their answers down, or draw pictures.

Look at the predictions as a class; ask for a few volunteers to explain their theories. Tell the children that it would be very hard for us to remove the calcium from a person to find out if their predictions are right. The person probably wouldn't appreciate it either! Tell the children that often scientists use models to conduct experiments, rather than trying things out in the real world where people or the environment could be damaged.

Put the children into groups. You may want to ask each group to suggest a way of finding out what happens to bone if there is not enough calcium. Alternatively, tell the class that they are going to use hard-boiled eggs to create a model to find out what happens to bones when there is not enough calcium.

Main Course

Give each group two hard-boiled eggs, two beakers, a measuring cylinder, some vinegar, some water, a set of measuring scales, and a washing up bowl. Tell the children that the egg shell contains lots of calcium, just like bones. It is made from calcium carbonate and it is very strong. Explain that they are going to remove the calcium by using vinegar, a weak acid. They will put one egg in water and the other in vinegar for at least 24 hours. Ask them to predict what will happen to the shell of the egg put in water and the egg put in vinegar, an acid. (The calcium carbonate will react with the vinegar to make a new substance, leaving the egg without a shell, if it is left long enough.)

Give each group a copy of Resource Sheet 3 and ask them to choose a name for each of their eggs, and measure and record the mass using the measuring scales. This is a comparative test and the variable being changed is the liquid (vinegar or water). Measure at least 120 mL of vinegar into a beaker and then measure the same amount of water into another beaker. Ask the children to write down the volume of liquid you have used for each beaker. Label each beaker so you know which is which.

Each group should place one egg into a beaker of vinegar, and another egg into a beaker of water, as a control. Make sure that they record the time and date. Ask the children to watch what happens to each egg and to write down any changes that they see happening on Resource Sheet 3. (The egg that has been placed in vinegar will be covered in bubbles. This is because carbon dioxide is being released as the calcium carbonate in the egg shell reacts with the vinegar.)

Now, ask the children to leave their eggs somewhere safe, where they won't get knocked, for 24 to 48 hours.

When the children come back to their eggs, ask them to look carefully at both beakers and to think about the best way to record any changes they can see to the liquid and to the eggs. (They could write down, draw or photograph anything they notice.) Ask what they think has happened and why. Put both beakers into the washing up bowl and remove the egg carefully from the water. This egg will look the same as it did before. Check the mass of the egg. Has it changed? Use the measuring cylinder to find out how much water is left in the beaker. Is it the same? There may be less water if some has evaporated.

Now remove the egg from the vinegar. This egg will still look like an egg, but it will no longer have a shell, only the membrane that surrounds the hard-boiled egg will be left. Use the measuring cylinder to find out how much vinegar is left. Is there less or still the same amount? Explain that the liquid still smells vinegary but it's not vinegar anymore because the calcium carbonate in the egg shell has reacted with the vinegar to make a new substance. Is this a reversible reaction? Why do you think that?

Finally, ask the children to measure the mass of the eggs, is it the same as at the beginning of the experiment? Can they offer reasons why? What do they think the inside of the egg will be like? Ask them to try and break the membrane of the egg. The egg white and yolk will look the same as any other hard-boiled egg.

Dessert

In their groups, ask the children to look at their predictions about what they thought would happen to the egg. How accurate were their predictions? What have they learned as a result of the experiment? What does this show you about why you need calcium in your bones? They should use all their observations and measurements to help explain their ideas.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, For Richer, For Poorer. Explore the causes and effects of malnutrition. What happens to our bodies if we don't have a balanced diet?



The Perfect Menu

Lesson Notes 3

What's It All About

Children will research the dietary needs of a particular person and use what they have learned to design a meal that will give that person the best diet, with all the nutrients they will need to survive and thrive.

Learning Outcomes

- I can create a menu of food that will give someone 'superpowers'
- I know that the type of food I eat can have an impact on my performance

Working Scientifically

- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Big Question

- How can food help someone be amazing?

Key Words:

menu, thrive, fresh, diabetes

Preparation

This activity is a mini project that could be used as a homework activity, or as part of topic work in class. Children will need to choose an occupation or person (e.g. an astronaut, a gladiator, Scott of the Antarctic, someone with a particular medical condition, etc.) to design a menu for.

Appetiser

Tell the children that they are going to use what they have learned in the last two lessons to design a menu for a person. Remind children that we all need vitamins and minerals in our diets. They will need to think about the best diet that this person will need to survive and thrive, and they will also need to think about whether the food that contains these nutrients will stay fresh in the conditions that the person has to eat them.

Main Course

Ask children to select a type of person from a topic they are studying (e.g. a gladiator, astronaut, explorer, etc). Explain to children that gladiators actually had a very healthy diet. They were slaves who were often treated as the lowest of the low, and so their diet included a lot of vegetables and barley. Occasionally they could eat the meat from the animals they slaughtered but it was tough and not very nice! Alternatively ask children to think of someone with a particular medical condition which is affected by diet, for example diabetes. Ask them to research the dietary needs that this person may have, and use what they have learned to design a meal for them, that will give them all the nutrients they will need.

If children need some inspiration, have a look on stem.org.uk at the project that has been done about designing a meal for British astronaut Tim Peake's journey into space in December 2015.

After the children have done the research, tell the children that they should present their menu and write a short paragraph explaining why their menu is perfect for their chosen person. Display these on a board, and ask the children to read other people's menus, and award a star to the menu they would like the most.

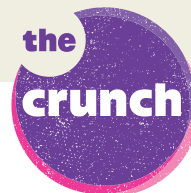
Dessert

Once all the stars have been awarded, ask the class to choose three to present in a school assembly. Remind them that menus with no stars may be as good to present, as one with lots of stars. Some menus may be really good for our health, or for the conditions we find ourselves in, even if they don't sound very nice.

An Extra Helping

Consider preparing and performing the Theatre of Debate Play-in-a-Day, The Day of Temptations. We are surrounded by unhealthy food and not always encouraged to be very active. What choices can we make to try and be healthy all day?





Resource Sheet 1a

Name

Date

Dazzling Digestion – Lesson 1

Vitamins and Minerals

Vitamin or Mineral	What it does	Where you can find it
Vitamin A (Retinol)	Helps your immune system to fight against infections Helps you see in dim light Helps keep skin and linings of parts of our body, like the inside of your nose) healthy.	Cheese, eggs, oily fish, fortified low-fat spreads, milk and yogurt
Vitamin B1 (Thiamine)	Works with other B vitamins to help the body break down and release energy in food Keep your nervous system healthy	Vegetables, like peas; fresh fruit and dried fruit, eggs, whole grain bread, some fortified breakfast cereal, liver (you shouldn't eat more than one portion of liver a week)
Vitamin B2 (Riboflavin)	Keeps our skin, eyes and your nervous system healthy Helps your body release energy in food	Milk, eggs, fortified breakfast cereal, rice
Niacin	Helps keep our skin and nervous system healthy Helps to release energy in the foods we eat	Meat, fish, wheat four, eggs, milk
Vitamin B6	Helps our bodies to use and store energy Help form haemoglobin the substance in our blood that carries oxygen round the body	Pork, chicken or turkey, fish, bread, porridge, brown rice, eggs, vegetables, soya beans, peanuts, milk, potatoes and some fortified cereals
Vitamin B12	Keeps our nervous system healthy Releases food from the food we eat	Meat, salmon, cod, milk, cheese, eggs, some fortified cereals

Resource Sheet 1b

Name

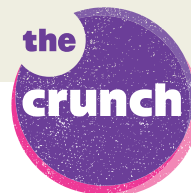
Date

Dazzling Digestion – Lesson 1

Vitamins and Minerals

Vitamin or Mineral	What it does	Where you can find it
Vitamin C	Helps wound healing Helps protect against damage Helps maintain healthy skin, bones and blood vessels	Oranges and orange juice, red and green peppers, strawberries, blackcurrants, broccoli, Brussel sprouts, potatoes
Vitamin E	Helps maintain healthy skin, eyes and strengthens the immune system	Nuts and seeds, soya oil, corn oil, olive oil
Vitamin K	Helps wounds to heal properly Helps keep bones healthy	Green leafy vegetables, like broccoli and spinach, vegetable oils, cereal Small amounts can be found in meat and dairy foods too
Calcium	Builds strong bones Helps muscles to work (including keeping our heart beating!) Helps wounds to heal	Milk, cheese and other dairy foods, green leafy vegetables (not spinach), soya beans, tofu, fish bones and bread fortified with calcium
Iron	Helps your blood to carry oxygen round your body It is essential for our body to work properly	Meat, beans, nuts, dried fruit (like apricots), brown rice, fortified breakfast cereals, soybean flour, and most dark green leafy vegetables (such as water cress and curly kale)

These are some of the main vitamins and minerals you will find in food, there are more! Like anything, you should eat foods with lots of different vitamins and minerals in them, but be careful not to eat too much of each one.



Resource Sheet 2

Name

Date

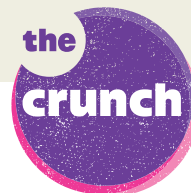
Dazzling Digestion – Lesson 1

Tally Sheet

My favourite meal is:

It contains:

Vitamin or Mineral	Tick the box if your meal has this vitamin or mineral in it
Vitamin A	
Vitamin B1	
Vitamin B2	
Niacin	
Vitamin B6	
Vitamin B12	
Vitamin C	
Vitamin E	
Vitamin K	
Calcium	
Iron	



Resource Sheet 3

Name

Date

Dazzling Digestion – Lesson 2

Eggs-cellent Models

Name your two eggs and write down their mass:

Egg names	Mass of the eggs	We will put this egg in (Cross out one)
	g	water/vinegar
	g	water/vinegar

When we soak the eggs in vinegar and water, I predict that:

When soaked in water the egg will
When soaked in vinegar the egg will

When I first put the eggs in the solutions this is what happened:

In water
In vinegar

This is what happened to the eggs:

Egg names	Mass of the egg	What happened to the egg?
	g	The water made this egg
	g	The vinegar made this egg

My prediction was:

Theatre of Debate

Plays-in-a-Day

The Wellcome Trust has commissioned five Plays-in-a-Day from the Theatre of Debate. Try preparing and performing one with your class, to really reinforce some of the key messages from their Science lessons.

The plays can be incorporated into your Science teaching whenever you like. Here are just a few suggested lessons that work well with the theme of each play.

	Flying Fruit Age 4–5	It's a Wrap! Age 5–6	Fast Food Chains Age 6–7	Incredible Ingredients Age 7–8	Save Our Home! Age 8–9	Salty Seeds Age 9–10	Dazzling Digestion Age 10–11
Basmati Basmati	Lesson 1, Fantastic Fruit		Lesson 2, Food Chains Around the World				
Beloved Burger			Lesson 3, The Missing Link		Lesson 3, Is There a Better Way?		
For Richer, For Poorer						Lesson 3, The Big Debate	Lesson 2, An Eggs-cellent Eggsperiment!
The Day of Temptations		Lesson 1, Packaging With a Purpose		Lesson 1, What's it Made Of?			Lesson 3, The Perfect Menu
The Lament of the Green Bean				Lesson 3, Different Diets	Lesson 2, Clearing the Rainforest for Palm Oil		Lesson 1, Food, Fabulous Food

The Play-in-a-Day scripts and supporting resources are on The Crunch website.

Mini-ambassadors

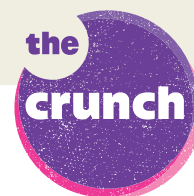
Introduce the tasks in the mini-ambassadors programme for the children in your class to carry out independently and in their own time, so that they begin to realise how much they can achieve by themselves.

As a class, celebrate each task that children achieve at the end of the week.

Once all the tasks have been achieved, you could give out awards, to be presented by the headteacher, governor, teacher or by another child in the class.

Summary of mini-ambassador tasks

Age Group	Unit title	Task focus	Tasks for Mini Ambassadors
4 to 5	Flying Fruit	Widening horizons, making sense of the world	The Give it a Go Award To share their pictures of fruit with the wide community either on the school website, in a whole school assembly or during sharing time. To pick a fruit or harvest a vegetable or to eat a fruit or vegetable that is in season in the UK. To talk to their carer about the fruit they have learned about in school.
5 to 6	It's a Wrap!	Finding out how you can change the world.	The Funky Food Award To find out how much food the school wastes every day. To ask children in school why they have thrown food away To talk to the headteacher about what they have found out. To present findings, in an assembly, and ask the children in the school to make some changes to what they throw away
6 to 7	Fast Food Chains	Finding out how you can change the world	The Sprout Award Children should write to their headteacher and ask for a small part of the school grounds for a class allotment or potting area. Plant and grow 2 vegetables, without using any bought seeds. Children should eat a vegetable they have grown with their class or family Tell others how they got on through a presentation, blog or display



Age Group	Unit title	Task focus	Tasks for Mini Ambassadors
7 to 8	Incredible Ingredients	Working with others to influence change	The Switch It Award Children research foods that have the highest and lowest levels of refined sugars in them Make a leader board at school to record and compare their findings. Create a list of the worst offenders that they eat regularly and suggest good alternatives for each one. Work with others to publish a master list for use in school or at home.
8 to 9	Save Our Home!	Finding out how you can change the world	The Water the World Award Find out what parts of the world suffer from drought – can you make links between those areas and areas of starvation and conflict? Track how much water you drink in a day. Track how much water your family uses for cooking in a day. Make your own 'Water promise'. Brainstorm ideas for how you will protect water. Educate others about your efforts, inspire them to join in and make their own promise.
9 to 10	Salty Seeds	Finding out how to reduce the cost of transporting food	The Transport It! Award Collect six food items such as apples, pineapples or coffee. Discuss whether they are produced in this country or another. Design a poster to highlight the problems of transporting food a long way. Find out what a 'locavore' is (a person who only eats foods grown or produced locally). Talk about what it would be like to be one. Think about people around the globe who have no other choice but to be locavores. Debate as a class the pros and cons?
10 to 11	Dazzling Digestion		The Food Power Award Have you ever thought about how much food equals 800 calories a day? This amount is the minimum number of calories an adult can eat and survive. As a team, put together a creative display of foods and how much of them make up 800 calories. Find out which areas of the world have the highest malnutrition rates. Afterward discuss what it would be like to live on that much food every day

Unit Summaries

Age 4 to 5: Flying Fruit

Why does my fruit come from different places?

How do different types of fruit get to us?

Unit Summary	Learning outcomes	Links to National Curriculum
<i>Using a huge world wall map, flower pots, compost and videos, children find out everything there is to know about the fruit they eat. They investigate where their fruit has travelled from, and what transport those tasty morsels used. Then they get their hands dirty, planting the seeds they have found in their fruit to investigate how each one grows.</i> Learning Experience 1: This lesson is an introductory lesson to enable learners to understand where our food and, in particular, fruit comes from. They will be supported in thinking about the questions they would like answered, e.g. What is it? Where does it grow? How does it grow? Through this questioning, learners will begin to understand where our food comes from, how it gets to us and why we transport our food great distances. Learning Experience 2: Learners will explore different parts of fruit, for example the skin, seeds and flesh. They will look inside fruits and consider how seeds look different in different fruits. They will start to think about what seeds might be for. Learning Experience 3: Learners will compare the size of seeds from a variety of fruits. They will plant some fruit seeds and observe them over time, in order to begin to understand that plants need water, warmth, light and nutrients to grow. They will explore the different stages of growth; inside a fruit there is a seed, this develops into a plant which then grows more fruit and so on.	● I know my food comes from different places around the world. ● I recognise the similarities and differences between fruit. ● I know that fruit can be part of a healthy diet. ● I can observe how a seed grows into a plant.	England EYFS Learners know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one to another. They make observations of animals and plants and explain why some things occur, and talk about changes. Working scientifically Showing curiosity Observing plants Asking questions Finding ways to test ideas Making links and noticing patterns Wales: Myself and other living things Learn the names and uses of the main external parts of the human body and plants. Observe differences between animals and plants, different animals and different plants in order to group them. Identify some animals and plants that live in the outdoor environment. Northern Ireland Foundation stage: WAU Strand 1: Interdependence What else is living? Strand 3: Place What is in my world? What is beyond my world? Strand 4: Change over time How do things change? Scotland: Curriculum for Excellence Planet Earth: Early I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them

Age 5 to 6: It's a Wrap!

Why do we package our food?

Activities	Learning outcomes	Links to National Curriculum
<i>Most of the food we buy comes packed in plastic, cardboard or tins and jars, but why? Children explore this question, by investigating the properties of different materials, and finding out what the best packaging is for keeping bread fresh.</i> Learning Experience 1: Learners are asked to help to find out more about food packaging. Why are some of the foods we eat packaged in different ways (e.g. to prevent leaks or breakages, to preserve food and avoid wastage)? Learners investigate the different types of materials used in food packaging: plastic, paper, glass, metal, etc. They will work with their teachers to formulate their own questions about food packaging. Learning Experience 2: Learners will learn about how food is packaged in other countries across the world. They will investigate the properties of different materials and which are best for packaging different foods. Learning Experience 3: Learners will think about mould and will conduct an experiment to determine what happens to a food when you package it, and when you don't. Learners will report back, identifying the perfect packaging for a chosen food, based on what they have learned from their investigations. They will also learn about new technological advances that are being made in food packaging (e.g. smart plastics) and their implications for human health.	● I know that there are reasons for packaging food, and I can give some reasons for packaging food. ● I recognise the similarities and differences between food packaging and why different materials are used. ● I can find out which materials are best for packaging different foods.	England: Year 1: Everyday materials Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. Working scientifically Asking simple questions and recognising that they can be answered in different ways Performing simple tests Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions Wales: Myself and non-living things Experiment with different everyday materials and use their senses to sort them into groups according to simple properties. Northern Ireland KS1: WAU Pupils should be enabled to explore: Strand 1: Interdependence The effect of people on the natural environment over time. Strand 3: Place Features of the immediate world and comparison of places: Properties of every day materials and their uses. Strand 4: Change over time Positive and negative changes and how we have a responsibility to make an active contribution. Scotland: Curriculum for Excellence Materials: Properties and uses of substances Early: Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. First: Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. Wider curriculum Design and technology Numeracy: Calculate size and volume of containers Art: Design packaging

Age 6 to 7: Fast Food Chains

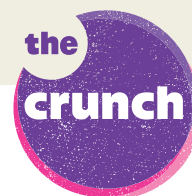
Why do we package our food?

Activities	Learning outcomes	Links to National Curriculum
<i>This set of activities was inspired by the work of Rothamsted Research, who are growing crops that produce omega3 oil naturally. Children find out about simple food chains, and what their own food chains look like. Once they are food chain experts, they can explore what might happen when an element of a food chain disappears.</i> Learning Experience 1: Learners will explore the different types of food that animals eat, and will start to build up simple food chains. They will learn the terms omnivore, carnivore and herbivore and will sort animals into these categories. Learning Experience 2: Learners will look at the diets of children from other countries, and suggest how food chains for these children would look. They will use this to think about how plants, animals and humans fit together in food chains. Learning Experience 3: Learners look at the food chains they have built and begin to question what happens if an element of a food chain is missing. They grow tomato seeds, some in sunlight and some in the dark, to explore what could happen to the rest of a food chain if there isn't enough sunlight. They start to think about how to replace elements that are missing from key food chains.	● I know what a food chain is. ● I recognise the similarities and differences between food chains. ● I can describe what happens when an element of a food chain is removed.	England Year 2: Living things and their habitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Working scientifically Asking simple questions and recognising that they can be answered in different ways Observing closely, using simple equipment Performing simple tests Identifying and classifying Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions Wales: Myself and other living things Observe differences between animals and plants, different animals and different plants, in order to group them. Identify the effects the different seasons have on some animals and plants. Places and people. Investigate how places change, e.g. the weather, the seasons, buildings, people's jobs. Begin to recognise differences between their own locality, localities in other parts of Wales and in different parts of the world. Northern Ireland KS1: WAU Pupils should be enabled to explore: Strand 1: Interdependence How living things rely on each other within the natural world. The effects of people on the natural and built environment over time. Strand 3: Place Features of the immediate world and comparisons between places. Strand 4: Change over time Ways in which change occurs in the natural environment. Scotland: Curriculum for Excellence First: I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food. I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned. I can grow healthy plants in school.

Age 7 to 8: Incredible Ingredients

What is in the food we eat?

Activities	Learning outcomes	Links to National Curriculum
<i>Why is a can of fizzy drink heavier than its diet alternative? This is a question children investigate, and along the way, they learn that there are some incredible ingredients in a lot of the food we eat. These ingredients help our bodies achieve amazing things.</i> Learning Experience 1: Learners will investigate the different ingredients that make up their food. Learners will learn how to read labels on packaging, and understand how much sugar and salt we should eat. They will match foods to the common nutrients that they provide. Learning Experience 2: Learners will discuss why things like sugar are sometimes added to food. They will conduct an experiment to investigate how much sugar is in fizzy drinks. They should find that high sugar drinks are more dense than diet alternatives. Learning Experience 3: Learners will look at meals from different parts of the world. They will locate the countries on a world map, and start to think about the seasonality of food and the availability of different ingredients in different countries. They will break each meal down into its ingredients and compare the nutritional content. Learners can also start to think about the special diets that some people might need, for example athletes or astronauts.	● I know how to find out about what is in different foods. ● I can investigate how much sugar is in fizzy drinks. ● I recognise the similarities and differences in the food people eat around the world.	England Year 3: Animals, including humans Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Working scientifically Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries, comparative and fair tests Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identifying differences, similarities or changes related to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings Wales: Interdependence of organisms Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival. They should be given opportunities to study the need for a variety of foods and exercise for human good health. Northern Ireland KS2: WAU Pupils should be enabled to explore: Strand 1: Interdependence How they and others interact in the world. How living things rely on each other within the natural world. Strand 3: Place How place influences the nature of life. Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment. Strand 4: Change over time How change is a feature of the human and natural world and may have consequences for our lives and the world around us.



Age 7 to 8: Incredible Ingredients *continued*

Activities	Learning outcomes	Links to National Curriculum
		Scotland: Curriculum for Excellence First: By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy. Second: I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. Wider curriculum Geography: Locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries and major cities. Cooking and nutrition: Understand and apply the principles of a healthy and varied diet; understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Age 8 to 9: Save Our Home

Why are the rainforests important for human health?

Activities	Learning outcomes	Links to National Curriculum
<i>What is the common link between chocolate biscuits and orangutans? Children investigate the connections between our food and its impact on our health and the global environment to find out the answer to this question.</i> Learning Experience 1: Learners will find out about the rainforest, how it is structured and the soil that is typical in rainforests, and what benefits rainforests bring to local human populations. They will be introduced to Makanan, an orang-utan who lives in the Sumatran rainforest. Learning Experience 2: Learners will start to think about oils in their food. They will find out where palm oil comes from, and how rainforests are being cleared to make way for palm oil plantations. They will collect data about which foods they commonly eat that contain palm oil. They will explore the impact different fats can have on our bodies (e.g. why our bodies need <i>some</i> fat). They will find out about all the different names that are used for palm oil, and will start to think about the importance of sustainable palm oil production. Learning Experience 3: Learners will explore different scenarios featuring the many different protagonists involved in palm oil production, and rainforest conservation. They will consider the effects of palm oil production on local communities, as well as on Makanan the orang-utan and his family. Together they will list things that they can pledge to do to help the people and animals of the rainforest.	● I can describe the structure of a rainforest and explain why this is important. ● I can name different oils in our food and where they come from. ● I can explain the need for sustainable oil production.	England Year 4: Living things and their habitats Recognise that environments can change and that this can sometimes pose dangers to living things. Pupils should explore examples of human impact (both positive and negative) on environments. For example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter, or deforestation. Working scientifically Asking relevant questions and use different types of scientific enquiries to answer them Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using straightforward scientific evidence to answer questions or to support their findings opy TBCthy choices?come from and how can we make snsbile diet?orest? good for us?s, to really reinforce some of the key messagWales KS2: Interdependence of organisms Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival. They should be given opportunities to study through fieldwork, the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment. The environmental factors that affect what grows and lives in those two environments, e.g. sunlight, water availability, temperature. How humans affect the local environment, e.g. litter, water pollution, noise pollution.

Age 8 to 9: Save Our Home *continued*

Activities	Learning outcomes	Links to National Curriculum
		Northern Ireland KS2: WAU Pupils should be enabled to explore: Strand 1: Interdependence How living things rely on each other within the natural world. The effects of people on the natural and built environment over time. Strand 2: Movement and energy How movement can be accelerated by time and natural events such as wars, earthquakes, famine and floods. Strand 3: Place Positive and negative effects of natural and human events upon place over time. Strand 4: Change over time How change is a feature of the human and natural world and may have consequences for our lives and the world around us. The effect of positive and negative changes globally and how we contribute to some of these changes. Scotland: Curriculum for Excellence Second: Earth's materials: Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses. I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. Wider curriculum Computing: use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content. Design and technology: understand how key events and individuals in design and technology have helped shape the world. Geography: Human and physical geography: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water.

Age 9 to 10: Salty Seeds

What problems do Mexican farmers have?

Activities	Learning outcomes	Links to National Curriculum
<i>Many farmers across the world are finding it harder to grow the crops we want to eat. In this set of activities, children explore the problems faced by Mexican tomato farmers. They think about why these farmers use irrigation to grow their crops. Then they investigate how they can help tomato plants adapt to harsh environments, using the halo priming of seeds (soaking them in salty water before planting them).</i> Learning Experience 1: Learners explore the problems faced by farmers in Mexico as a result of irrigation and water scarcity. They begin to develop their own hypotheses about how the strength and yield of crops could be improved, and the benefits this might have for human health. Learning Experience 2: Learners investigate whether they can improve germination and plant strength by conducting a Halo Priming experiment, soaking tomato seeds in salt water solutions before sowing them. This activity will take place over about five weeks. Learners will ensure that they are conducting a fair test, by changing only one variable (the salt). When the plants have developed at least two leaves, learners will carefully remove each plant from its pot, measure the roots and note any differences. Learning Experience 3: Learners formulate their own arguments for a debate about whether Mexico should continue to export food given its problems with water supply. Split the class into groups and allocate a different viewpoint to each group. Each group should discuss their viewpoint, then present it to the class.	- I can show where Mexico is located in the world and describe some of the geographical features of the country. - I can demonstrate how the germination of seeds is dependent on the environment; I understand that dissolving salt in water is a reversible change of state. - I can ask relevant questions to extend my understanding. I can argue my point of view and consider and evaluate different viewpoints.	England Year 5: Living things and their habitats Describe the life process of reproduction in some plants and animals. Properties and changes of materials Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Demonstrate that dissolving, mixing and changes of state are reversible changes. Working scientifically Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments Wales KS2: Interdependence of organisms Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival. They should be given opportunities to study through fieldwork, the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment; the environmental factors that affect what grows and lives in those two environments, e.g. sunlight, water availability, temperature. How humans affect the local environment, e.g. litter, water pollution, noise pollution.

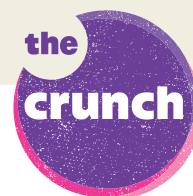
Age 9 to 10: Salty Seeds *continued*

Activities	Learning outcomes	Links to National Curriculum
		Northern Ireland KS2: WAU Pupils should be enabled to explore: Strand 1: Interdependence How living things rely on each other within the natural world. Strand 3: Place Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment. Positive and negative effects of natural and human events upon place over time. Strand 4: Change over time The effect of positive and negative changes globally and how we contribute to some of these changes. Scotland: Curriculum for Excellence First: I can make and test predictions about solids dissolving in water and can relate my findings to the world around me. Second: Topical science: Through research and discussion I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society. I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. Second: Biodiversity and independence: I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use. Second: Inheritance: By investigating the lifecycles of plants and animals, I can recognise the different stages of their development. Second: Chemical changes: I have investigated different water samples from the environment and explored methods that can be used to clean and conserve water and I am aware of the properties and uses of water. Wider curriculum Geography: Locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries, and major cities.

Ages 10 to 11: Dazzling Digestion

How do foods keep our body healthy?

Activities	Learning outcomes	Links to National Curriculum
<i>In this set of activities, children investigate digestion, in all its glory. From what happens inside us, to why certain foods are so good for us to eat, they learn enough to design menus for astronauts, gladiators and any superhero who needs their help.</i> Learning Experience 1: Learners will explore the nutrients in their favourite meals, in particular vitamins and minerals. They will identify what each nutrient helps their bodies to do, and what their bodies are good at doing because of the food they eat. Learning Experience 2: Learners will investigate what happens if we are missing an important mineral from our diet. They will carry out an experiment soaking eggs in vinegar to find out what happens to bones when there is not enough calcium. Learning Experience 3: Learners will research the dietary needs of a particular person and use what they have learned to design a meal that will give them the best diet, with all the nutrients they will need to survive and thrive.	• I know that our bodies need food to stay healthy; I can describe some of the things that food provides for our bodies; I know why some foods are more healthy for us than others • I can describe the process of digestion; I understand the importance of calcium in our diets to strengthen bones • I can create a menu of food that will give someone 'superpowers'; I know that the type of food I eat can have an impact on my performance	England Year 6: Animals including humans Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans Working scientifically Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments Wales KS2: Interdependence of organisms Pupils should use and develop their skills, knowledge and understanding by investigating how animals and plants are independent yet rely on each other for survival. They should be given opportunities to study the names, positions, functions and relative sizes of a human's main organs; the effect on the human body of some drugs, e.g. alcohol, solvents, tobacco.



Age 10 to 11: Dazzling Digestion *continued*

Activities	Learning outcomes	Links to National Curriculum
		Northern Ireland KS2: WAU Strand 1: Interdependence How they and others interact in the world; Interdependence of people and the environment and how this has accelerated over time by advances in transport and communications; Strand 4: Change over time How change is a feature of the human and natural world and may have consequences for our lives and the world around us; Ways in which change occurs over both short and long periods of time in the physical and natural world Scotland: Curriculum for Excellence First: Body systems and cells: By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy. Second: Body systems and cells: By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing. Wider curriculum Literacy: Writing; Enjoyment and choice – within a motivating and challenging environment, developing an awareness of the relevance of texts in my life Art: Learners could design their own menu formats, taking into account the environment it will be used in

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