

Scientific Enquiry Materials

KS2

FRUIT



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Levels 2–3**Resources**

- ▶ Enquiry Sheet – Sorting fruit (these images are available in colour on the CD-ROM)
- ▶ an assortment of fresh fruit for pupils to handle



check whether or not children have food allergies

Links to skills in the Science PoS

Pupils' own ideas are explored through observation, classification and identification of fruit.

Sorting fruit**Overview**

This activity reinforces and builds upon pupils' experiences at the Foundation Phase. Pupils are required to sort different kinds of fruit according to observable characteristics or prior knowledge.

Activity

Give the pupils an assortment of fresh fruit or the Enquiry Sheet that shows photographs of different kinds of fruit.

Working in pairs, one pupil should sort the fruit into groups, whilst the other pupil should try to identify the criteria used for sorting.

Pupils should then swap roles and repeat the activity. Encourage them to sort the fruit in as many different ways as they can think of.

Suggested questions

How will you sort your fruit into groups?

What name could you give each group that your partner has used to sort the fruit?

Can you sort the fruit in a different way?

Can you find someone who has sorted the fruit in the same way as you?

Supplementary activities

Pupils could research on the Internet the range of fruit that are grown – some of which pupils may not have heard of previously.

Pupils could make and taste a fruit smoothie. They should observe the changes to the fruits as they are mixed together.



apple



banana



blueberries



grapes



kiwifruit



lemon



mango



melon



orange



peach



pear



plum



raspberries



satsuma



strawberries

Levels 2–5

Resources

- ▶ Enquiry sheet – Fruit Quescussion
- ▶ an assortment of fresh fruit for pupils to handle



Links to skills in the Science PoS

This activity is predominantly about encouraging pupils to raise questions and to listen to questions formulated by others. The pupils are then expected to analyse, compare and reflect upon the range of questions. They are encouraged to decide what makes a good question using their agreed criteria.

Fruit Quescussion

Overview

The focus of this activity is to encourage pupils to ask questions about different fruits using the 'Quescussion'* procedure. The pupils are required to think of relevant and useful questions to ask in order to find out more about a selection of different fruits.

Activity

Give the pupils an assortment of fresh fruit, some of which may be familiar, others less familiar to them.

Ask pupils to think about what makes a 'good' science question.

Encourage the pupils (working in small groups) to ask each other questions aimed at raising issues of interest about the fruit. Tell the pupils that they should not attempt to answer any of the questions, but to think of questions they could ask and listen to other pupil's questions as well.

After completing the activity, ask the pupils to compare the questions and think which were the most relevant and interesting questions asked by their group.

They could use the Enquiry Sheet to list their questions or record their discussions using a digital recorder.

They could use their agreed criteria to consider the merits of each question.

Suggested questions

Can you think of as many questions as possible to ask about fruit?

How can you make sure that the questions you ask are relevant to the fruit?

Which questions were the most useful to ask?

Which questions were the most surprising to you, questions that you would not have thought of asking?

Supplementary activities

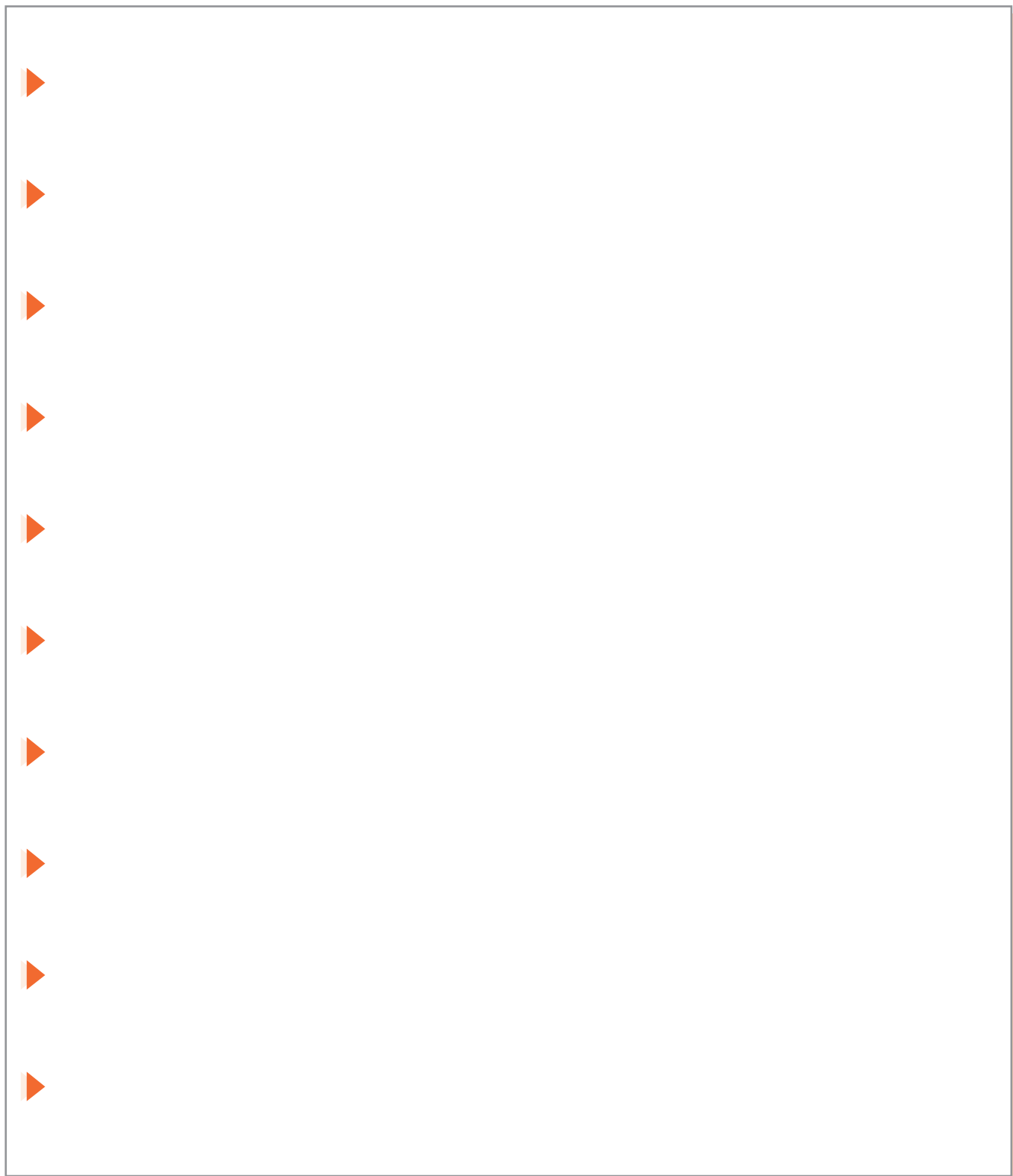
Pupils could video their discussion and review the video to decide which were the most useful questions and which were less useful in helping them to think about the fruit. They could then prioritise those questions to show those they could investigate further and those which they would find difficult to investigate.

* *Quescussion* – a questioning technique that requires pupils to ask only questions about stimulus materials. Pupils should not attempt to answer questions but try to generate as many relevant questions as possible.

You will need a selection of fruit.

Think of questions to ask about the fruit.

Make a list of what you think were the most relevant and interesting questions asked by your group. You could rank order the questions, starting with the most interesting



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Levels 3–5

Resources

- ▶ Enquiry Sheet – Buy my fruit
- ▶ selection of fruit, e.g. mango, guava, kiwi, papaya, star fruit, kumquat, etc.
- ▶ books and magazines about fruit
- ▶ Internet access



Links to skills in the Science PoS

This activity invites pupils to decide where and how to find information. They should describe the information gathered and make informed decisions about which information is to be included in a summary.

Buy my fruit

Overview

In this activity, the pupils are asked to find information about one particular fruit. They could use the Internet, magazines or books to find information. The information is to be summarised and presented as a food label or advert.

Activity

Give pairs of pupils one type of fruit and invite them to find as much information as they can about the fruit and the whole plant which produces it, as well as where and how it grows.

Encourage pupils to draw the whole plant and its flower, leaves, seeds, etc. and a map to show the country where the fruit comes from. They could also describe the growing conditions of the plant. Pupils could use the Enquiry Sheet to record this information.

Tell the pupils that the information they have collected is to be used to promote the fruit in a supermarket or greengrocer's shop. They could make labels for the shelves, leaflets to encourage people to buy the fruit and think of an advertising slogan.

Suggested questions

On what kind of plant does this fruit grow?

Where does this plant grow?

What conditions does this plant need to grow?

Which part of the fruit can be eaten?

Which feature of the fruit would you emphasise to persuade people to buy it?

What information will encourage people to buy the fruit?

What types of transport do you think were used to bring the fruit to the shops?

Supplementary activities

Pupils could carry out surveys to find out which type of fruit is preferred by pupils in class.

Pupils could use a hand lens or digital microscope to make detailed observations of pieces of different fruits.

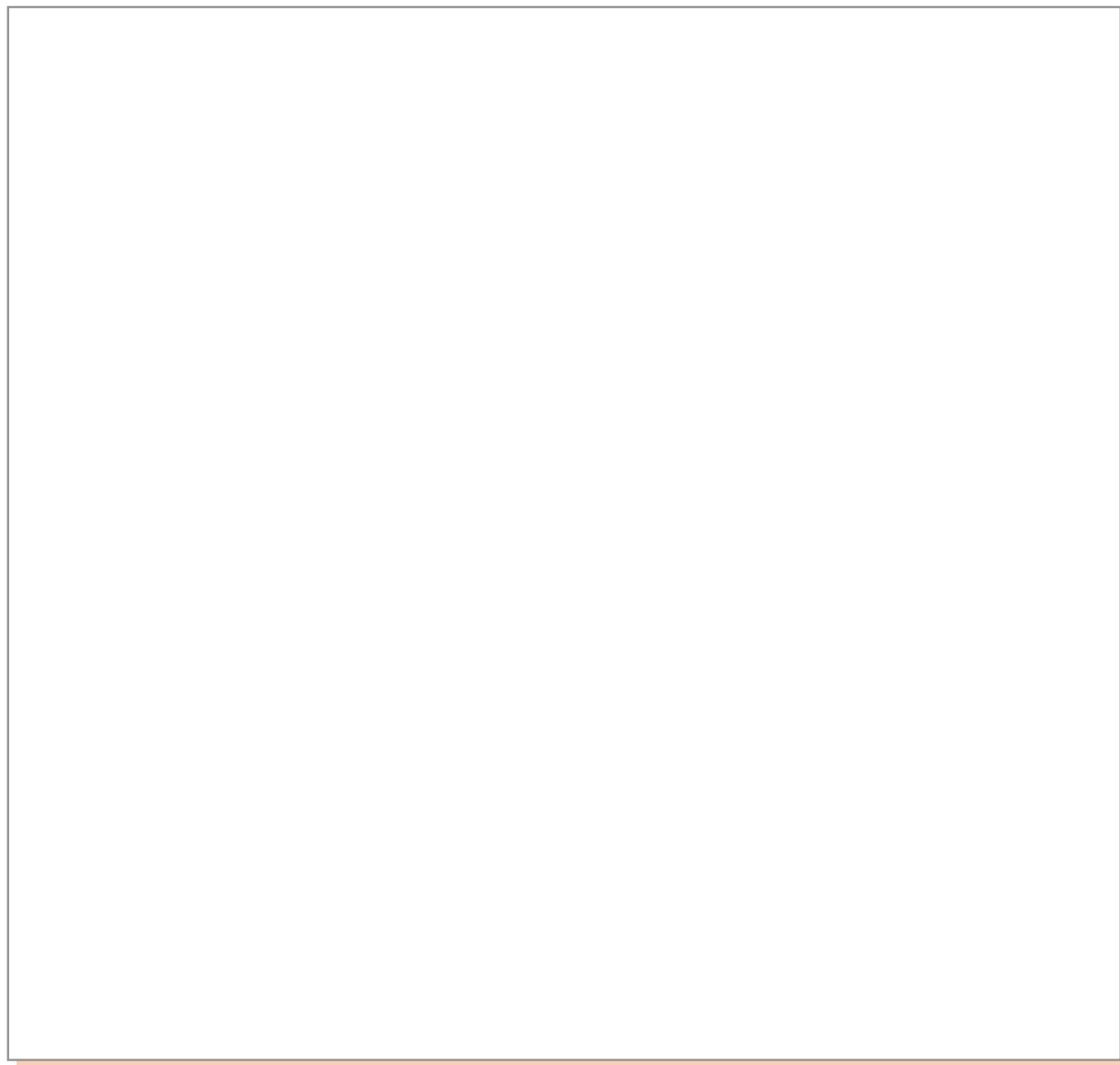
Find as much information as you can about the fruit you have been given.

Find out about the fruit and the whole plant which produces it.

Find out where it grows and how it grows.

Make drawings and notes on the information you find.

Use the information you found to promote the sale of your fruit in the shops.

A large empty rectangular box with a thin black border, intended for students to draw and take notes. It occupies the central portion of the page.

You could make:

- ▶ a leaflet to encourage people to buy the fruit
- ▶ a label for the shelf
- ▶ an advertising slogan

Levels 2–5

Resources

- ▶ Enquiry Sheet – ‘Vegetable’ fruit
- ▶ a selection of ‘vegetable’ fruit, e.g. cucumber, tomato, courgette, pea pod, bean pod, marrow, butternut squash, red pepper.

Links to skills in the Science PoS

Pupils will need to plan the collection of relevant information, informed both by their science knowledge and through exploring the fruit. Exchanging outcomes with peers will enable them to reflect upon their observations.

‘Vegetable’ fruit

Overview

The focus of this activity is thinking about the parts of plants that greengrocers sell as ‘vegetables’, but are ‘fruit’ from the scientist’s (botanist’s) point of view. Pupils will also be encouraged to observe the position, number and size of seeds in fruit.

Activity

Give small groups of pupils a selection of ‘vegetable’ fruits to handle and observe. Ask them to look for the seeds in their ‘vegetable’ fruits. They should use the table on the Enquiry Sheet to record how many seeds they find, the position of the seeds and their size. Pupils might draw or photograph the seeds. To find the seeds some pupils may need help to cut the ‘vegetable’ fruits into smaller segments. Tell the pupils that these ‘vegetable’ fruits are what a greengrocer would call vegetables but what a scientist would call fruits. Ask them to think about and discuss how they would define the word ‘fruit’. Pupils could share their ideas with the class. Ask them to discuss the bullet points on the Enquiry Sheet and encourage them to record their ideas.

Suggested questions

Where are the seeds in the ‘vegetable’ fruit?
 How many seeds did you find?
 What shape and size are the seeds?
 How would you define ‘fruit’?
 How do you think a greengrocer and a scientist would define ‘fruit’?

Supplementary activities

Pupils could observe the seeds inside different fruits, taking account of their position, size and quantity.
 Pupils could study the shape and texture of different kinds of seed.
 Pupils could make an animation to show how they think a seed changes as it grows.
 Pupils could investigate whether or not any of the seeds will grow in the classroom.

Look for the seeds in your 'vegetable' fruit.

How many did you find? Where were they? How big were they?

Write your findings in this table.

name of 'vegetable' fruit	number of seeds	position of seeds	size of seeds

Think about and discuss:

- ▶ what is a fruit in your opinion?
- ▶ what is a fruit in the opinion of a greengrocer?
- ▶ what is a fruit in the opinion of a scientist?

Record your ideas and write down your group's definition of the word 'fruit'.

Levels 2–5

Resources

- ▶ Enquiry sheet – Designer fruit
- ▶ variety of seeds that are dispersed in different ways

Links to skills in the Science PoS

Pupils will need to use their knowledge of seed dispersal to design their imaginary fruit. Shared reflections can consider the appropriateness of the criteria selected.

Designer fruit

Overview

In this activity, the pupils discuss some of the features they observe in seeds and consider how these features affect seed dispersal. They should agree some of the features of an effective seed. They will use their ideas to design an imaginary fruit.

Activity

Ask the pupils to think about and discuss the different ways that seeds might be dispersed and the reasons why the seeds might be dispersed in these ways. They should think of the features of a seed that enable it to be dispersed effectively and share their ideas with the class.

Ask the pupils to invent an imaginary fruit. They should choose one way a seed can be dispersed and design a seed for their imaginary fruit that is ideally suited to that mode of dispersal. They could design their fruit on the Enquiry Sheet or use a 3D model or video animation.

Encourage them to think of the factors that might affect how many seeds germinate and grow.

Finally, ask the pupils to make a series of labelled drawings on the Enquiry Sheet to show how the seeds of their imaginary fruit are dispersed. Ask pupils to reflect on each other's drawings and evaluate the appropriateness of the features highlighted in each seed design.

Suggested questions

Why do you think seeds are dispersed?

What ways can you think of that seeds can be dispersed?

What features of the seed help it to be dispersed?

Supplementary activities

Pupils could sort seeds according to how they are dispersed.

Pupils could role-play being seed suppliers and present their new seed for fruit farmers to buy.

Invent an imaginary fruit that contains seeds that disperse very effectively.
Draw the fruit, including a cross-section showing its seed or seeds.
Design the seed so that it can be dispersed in a particular way.



Make four labelled drawings to show how your fruit's seeds are dispersed.

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Levels 2–5

Resources

- ▶ Enquiry Sheet – Bad apple

Links to skills in the Science PoS

This activity will require pupils to use prior knowledge and evidence to support their stated point of view. Class debate will encourage reflection on the likelihood of the suggestions offered and perhaps invite consideration of wider possibilities.

Bad apple

Overview

This activity requires pupils to brainstorm the possible causes of the damage they can see on photographs of the outside and inside of an apple.

Activity

Give pupils the Enquiry Sheet and tell them that photograph 1 shows an apple with a hole in it and photograph 2 shows the same apple cut in half. Ask the pupils to draw a line on photograph 1 to show where they think the knife would need to cut through the apple to make the two halves shown in photograph 2. Ask pupils to think of possible causes of the damage to the apple and to record their ideas on the Enquiry sheet. They should choose the most likely idea and suggest reasons for their choice.

Suggested questions

How did you decide where the knife cut through the apple?
What do you think might have caused the damage to the apple?
What do you think is the most likely cause of the damage? Explain why.

Supplementary activities

Pupils could consider which of the possible causes or hypotheses listed by pupils on the Enquiry Sheet can be investigated. Pupils could cut out each 'cause / hypothesis' and put them into sets – 'cannot be investigated', 'can be investigated', 'unsure'.

Look at the two photographs.

Draw a line on photograph 1 to show where the knife would need to cut the apple to make the two halves shown in photograph 2.

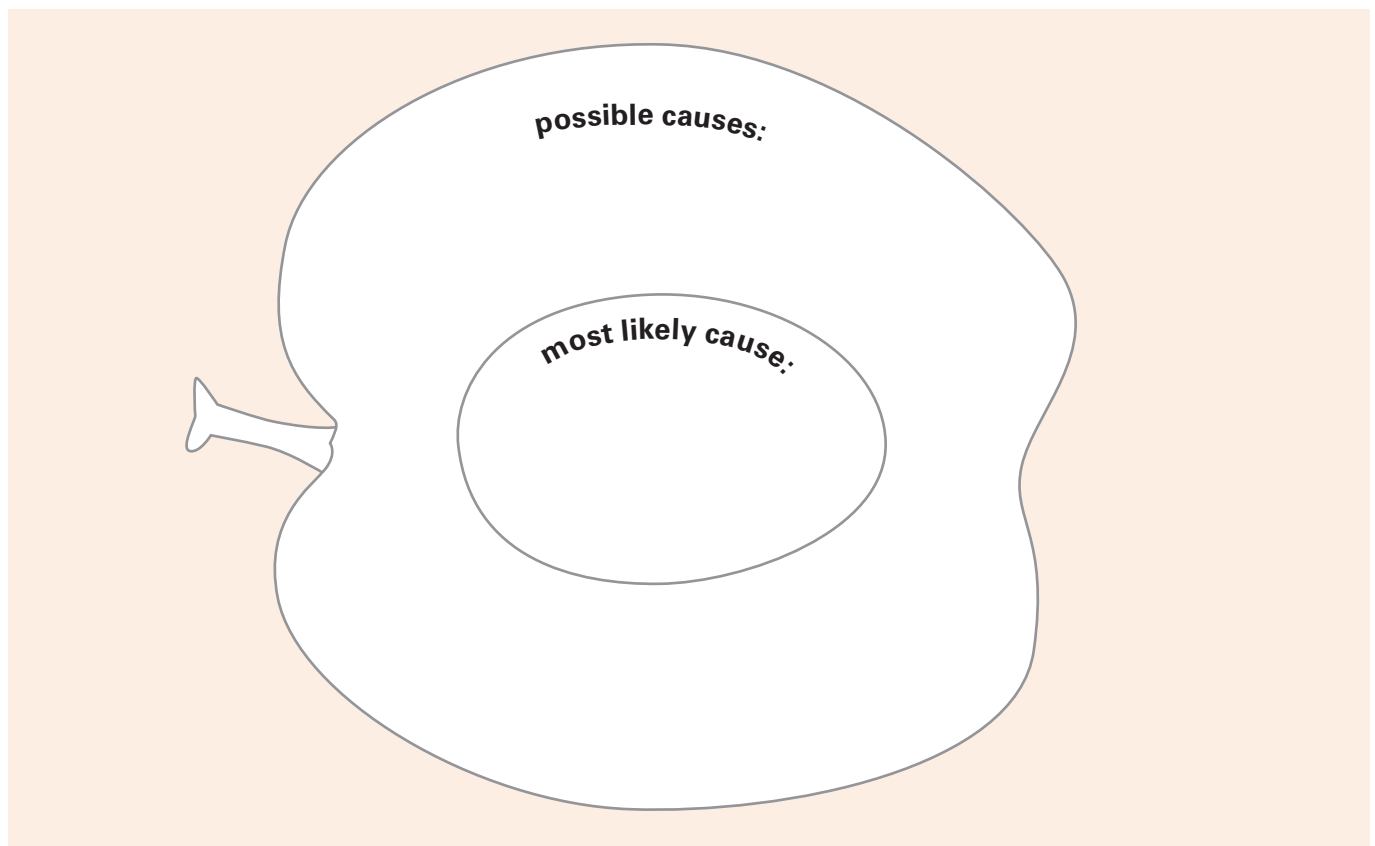
Find a pupil who drew their line in a different place and share your ideas.



Working with a partner, think of some possible causes of the damage to the apple.

Which of your ideas is the most likely cause of damage.

Think of some reasons for your choice.



Levels 3–5**Resources**

- ▶ Enquiry Sheet – Investigating the damage
- ▶ Internet access

**Links to skills in the Science PoS**

The focus of this activity is the production of agreed success criteria for a plan of an investigation. Pupils will use these criteria to develop their own plans and to reflect on the appropriateness of plans developed by others in the class.

Investigating the damage**Overview**

This activity is linked to the previous activity ('Bad apple'). Pupils are invited to evaluate a plan to find out how and when the damage to the apple was caused. Pupils should be encouraged to think about and discuss the features of a good plan as an introduction to the activity.

Activity

Ask the pupils to think about and discuss what makes a good plan for an investigation. Encourage them to share their ideas with the class and agree success criteria.

Then, ask the pupils to plan an investigation to find out how and when the kind of damage to apples encountered in the previous activity is caused. Ask them to swap plans with a partner and to consider the advantages and disadvantages of their partner's plan, using their agreed criteria. They could record their ideas on the Enquiry Sheet.

Suggested questions

What does a good plan need to include?

What do you think is good about your partner's plan?

Are there any problems with your partner's plan?

Are there any improvements you can suggest?

Supplementary activities

Pupils could use the Internet to find out about other things that can affect the growth of healthy apples.

Pupils could plan their own investigation to find out when the damage to the apple was caused.

Pupils could review each other's plans and think about the merits and limitations of all the different ways the problem might be investigated.

Design a plan for an investigation to find out how and when the kind of damage shown on 'Bad apple' is caused.

Swap plans with a partner. What are the advantages and disadvantages of your partner's plan?

advantages	disadvantages

Ask your partner to return your Enquiry Sheet and read what your partner has written about your plans. You might want to change your plan.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Organic fruit
- ▶ Internet access

**Links to skills in the Science PoS**

This activity requires pupils to gather evidence relevant to given claims. It is expected that their reasoning will be shaped by considerations of cause and effect, using some prior knowledge and additional information gleaned from secondary sources. Discussion with peers will facilitate reflection on the criteria selected to arrive at judgments.

Organic fruit**Overview**

This activity invites pupils to think about the claims made for the benefits of organic fruit. Making comparisons between organic fruit and other fruit produce may help pupils evaluate some of the claims.

Activity

Tell the pupils that the term 'organic' fruit is used to describe fruit produced in a particular way.

As an introduction to the practice of making scientific claims, ask the pupils to think about and discuss their ideas about what a 'claim' is. Encourage them to share their ideas and to give examples of some claims they have heard. If necessary, explain to the pupils that claims are 'ideas' that need to be supported by evidence.

Many pupils will have seen advertisements and labels on foods in local shops and supermarkets describing the claims for the advantages of organic fruit. Ask the pupils to look at the three claims about organic fruit on the Enquiry Sheet.

They should use secondary sources to try to find evidence to support each claim and evidence that does not support each of these claims. They could record any evidence that they find on the Enquiry Sheet.

Encourage pupils to think about and share their ideas of how they would practically gather evidence to test each claim.

Suggested questions

What is a claim?

Is there anything that is similar about all the claims you have heard?

What evidence have you discovered that supports this claim?

What evidence have you discovered that does not support this claim?

How would you gather evidence to test these claims?

What would you need to persuade people that this claim is valid?

Supplementary activities

Pupils could look in newspapers and magazines for scientific claims.

They could make a list of these scientific claims and record any evidence they can find in support of a claim or evidence that can be used to challenge a claim.

claim	evidence to support the claim	evidence that does not support the claim
organic fruit tastes better than non-organic fruit		
organic fruit makes you more healthy than non-organic fruit		
organic fruit is no more expensive than non-organic fruit		

Levels 3–5

Resources

- ▶ Enquiry Sheet – Fruit or vegetable?
- ▶ globe artichoke



check whether or not children have food allergies

Links to skills in the Science PoS

Pupils should be encouraged to choose their own success criteria and how they will find out information relevant to their enquiry. They should discuss the information collected and form considered opinions. They will be encouraged to evaluate outcomes against their own success criteria and suggest ways their approach could have been improved.

Fruit or vegetable?

Overview

In this activity, the pupils are required to carry out a scientific study to identify a specific part of a plant and to decide whether it is part of a fruit. (Note that there is deliberate ambiguity in the fact that there are two unrelated plants called 'artichokes' – the 'globe' and 'Jerusalem' artichokes.)

Activity

Give pairs or groups of pupils a real artichoke to handle and study and the Enquiry Sheet – Fruit or vegetable? Ask pupils to think of a way to find out which part of a plant they have in front of them. In pairs or groups, they should share their methods and compare the likely success of each method. Encourage pupils to suggest ways that each method could be improved.

Pupils could discuss whether the evidence points to the artichoke being a 'fruit' or some other part of a 'vegetable'. Encourage them to justify their ideas by reference to the relevant evidence.

Finally ask pupils to search the Internet to find out more information about artichokes.

Suggested questions

What made you think it was this part of a plant?

Did you find any information about artichokes that surprised you?

Do all artichokes look the same?

How could you improve your method of finding out which part of a plant you have in front of you?

Supplementary activities

Pupils could use the information from this activity to define the terms 'fruit' and 'vegetable'.

Pupils could carry out this activity with any unfamiliar plant.

It may be possible to cook and eat the artichoke.

Some children were discussing this part of a plant that someone had bought in a greengrocer's shop. The greengrocer called it an 'artichoke'.



It's a fruit



It's a vegetable



How would you find out what part of a plant this is and whether it is part of a fruit or a vegetable? You can pull it apart and cut it or just think about what you would look for.

Explain what you would look for, what you might find and how the evidence you collect would help you to decide what part of a plant it is.

Search the Internet to find out more about artichokes and write a summary of the information you find.

Levels 2–5

Resources

- ▶ Enquiry Sheet – Find that fruit
- ▶ books about trees



Pupils should not remove parts of the tree. Carry out a risk assessment before taking pupils to observe trees.

Links to skills in the Science PoS

This activity requires careful observation and identification of trees. Pupils should use prior knowledge and information from other sources to identify trees.

Find that fruit

Overview

This activity requires pupils to photograph and identify trees in their local area. They should find out what part of the tree has fruit and when the fruit appears.

Activity

Ask pupils to think about whether or not all trees have fruit. They might be able to list some trees which they know have fruit. Ask pupils to observe closely and draw or photograph some trees in their local area. They are to use the information they collect and secondary sources of information to find out:

- ▶ the name of the tree
- ▶ what the fruit of the tree looks like
- ▶ the time of year they might expect to find fruit on the tree

Encourage the groups to share their information. Some pupils may want to make a game or a presentation to show their understanding of trees and their fruit.

Suggested questions

What features of the tree will help you find its name?

What parts of the tree will you draw or photograph?

Do you think this tree has fruit? Why do you think that?

How will you find out more about this tree?

Do you think all trees have fruit?

Supplementary activities

Some pupils may produce a website showing all the links to the information they have found about trees.

Describe the four different trees you have seen using pictures or photographs.

- ▶ Find out the name of each tree.
- ▶ Find out whether each tree forms fruit.
- ▶ Describe and draw the fruit of each tree and write the month the fruit forms.

Month:	Month:
Month:	Month:

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