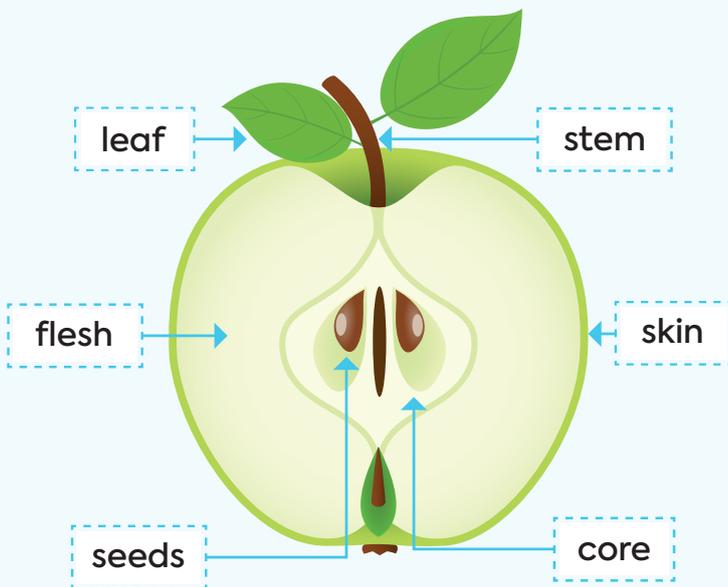


## STEM Activity 1: What's inside?

### Background information and Science information

The purpose of this activity is to familiarise learners with the names for each part of an apple. Learners will examine and then dissect apples.



We have provided a blank version of the above diagram for the pupils to label (see Resource 1: Dissecting an Apple).

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.

## Method

### Introduction

Talk about apples. Who likes apples? Do they taste the same when they are cooked? Who prefers red apples? Who prefers green?

### Development

Place two apples on a cutting board. Begin by talking about the outside of the apple. What can the learners see? Encourage them to notice:

- the skin and its colour and texture;
- the stem (if the apple has one); and
- the remains of the stamen/styles/stigmas (the hairy bit at the opposite end to the stem).

Ask the learners to remove the stem and the skin and place each part into a different part of the segmented tray. Then ask them to label the items correctly. (Remind them to be careful when using the peeler.)

Ask the learners: "What have they revealed now that you have removed the skin?" Accept answers such as 'the bit you eat'. Name this part of the apple as the 'flesh'.

Now use the apple cutter to de-core and slice the apple. Place the flesh pieces into another section of the segmented plate and label.

Ask the learners 'do you know what the centre part of the apple is and why we don't eat it?' Place the core onto a segment of the plate and label.

Take the second apple and cut it in half through the core so that the learners can see what is inside the core of the apple this time.

Can they see little dark brown objects? These are called seeds. Do any of the learners know what seeds are?

Now that you have fully segmented the apple, give the learners time to explore through:

- looking through the magnifying glasses at the items;
- smelling the apple to see if it is nice or not; and
- feeling the different parts to see if they are rough or smooth, wet or dry.

### Scientific Inquiry

What are all the parts of an apple?

### Learning Intention

Learners will be able to name the different parts of an apple: skin, flesh, leaf, seeds, stem and core.

### Equipment

- 2 Apples (per group)
- Knife
- Peeler
- Corer or apple cutter
- Chopping board
- Segmented dish
- Labels
- Magnifying glasses

### Safety

Learners should only use a sharp knife while being supervised by an adult.

## Discussion

Take photographs of the different pieces of your fruit and see if the learners can identify the part of the fruit in the photograph.

Take a new apple and ask the learners to tell you about the different parts of the apple as you come to them. Can any of the learners tell you additional information about the parts?

Stem/Stalk is the part of the apple that is attached to the tree.

Skin is the fruit's protection layer for the seed.

Flesh is often the juicy part that we like to eat, but it is also the part of the plant that provides the seed with the food it needs to grow.

Seeds are the part that the next plant will grow from.



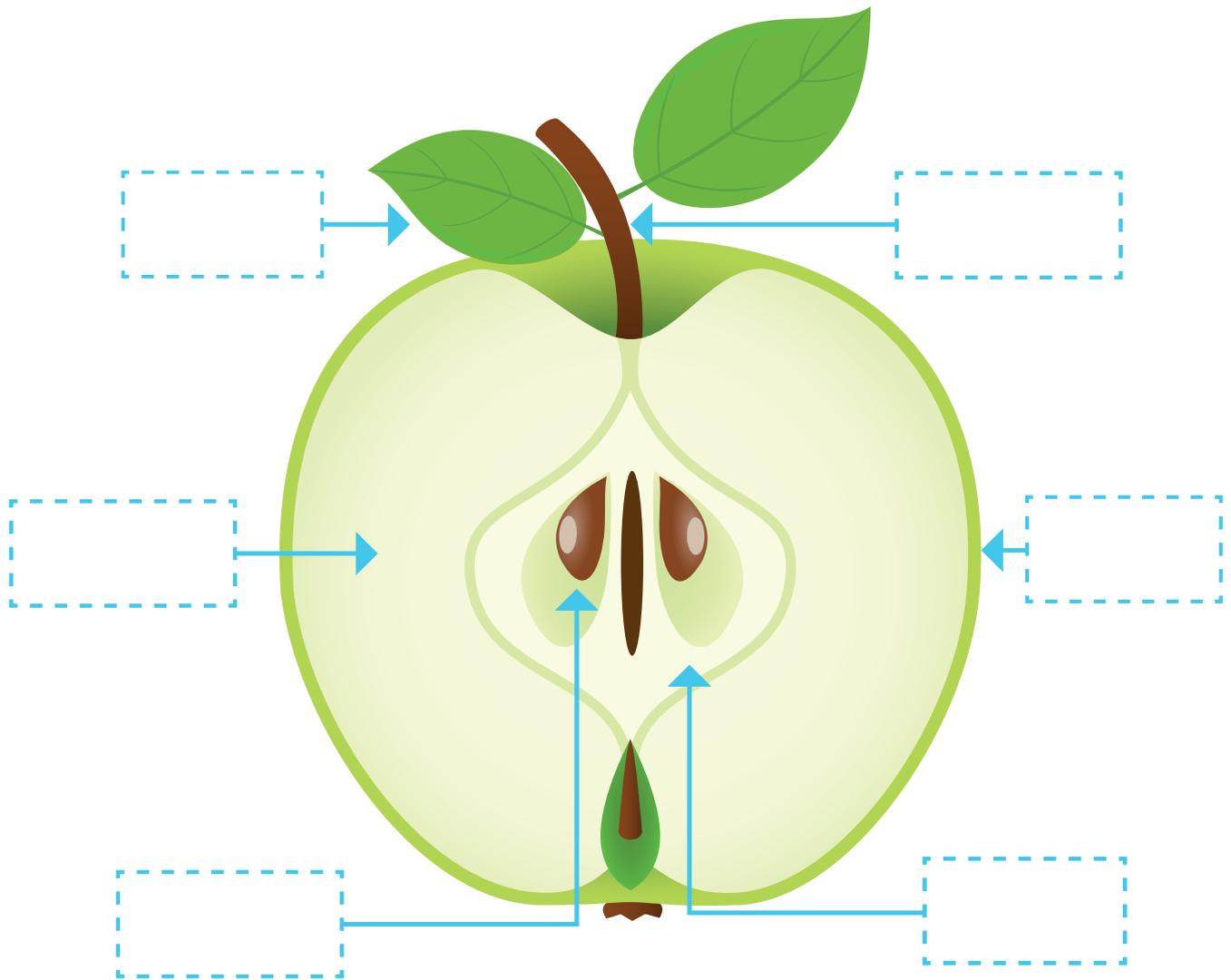
## Extension

Test the apple for floating and sinking. Is there a difference between a green and a red apple?

Test each part of the apple separately to see if they float or sink.

Taste test a variety of apples. Do they all taste the same? Are they crunchy when you take a bite?

## Resource 1: Dissecting an apple



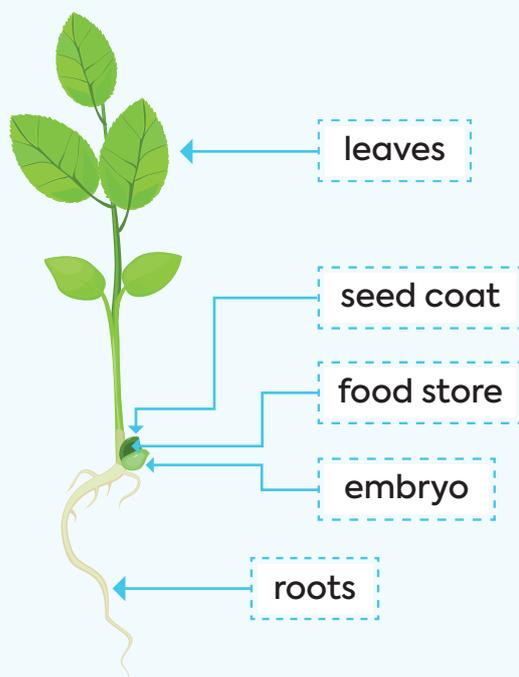
### STEM Activity 2:

How does a seed grow?

#### Background information and Science information

We have dissected an apple, and discovered that inside the apple are seeds. It is the seed that produces new plants.

This activity uses mustard seeds. You could also use other quick-growing plants if you wish.



We have provided a blank version of the above diagram for the pupils to label (see Resource 2: How does a seed grow?).

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.

### Method

#### Introduction

Remind learners of the parts of an apple. In particular, remind the learners that apples have seeds.

Look at pictures of plants growing. Talk about how new plants might grow.

#### Development

Give each learner access to a small yogurt pot. They should put a teaspoonful of soil into their pot.

Add three mustard seeds individually if possible. (They are small, so this may be difficult.)

Then add a second teaspoonful of soil to just cover the seeds.

Add a few drops of water to moisten the soil. Do not flood the pots as too much water may rot the seeds.

It will take 5–7 days for the seeds to germinate and begin to grow to a size where they can be properly examined. During this time they should be kept in a light, warm position.

When the seedlings have grown, ask the learners to use the magnifying glasses to closely examine and describe what they can see.

Then help the learners to remove the seedlings from the pot. Ask them to examine the root system. (Placing them on black sugar paper can be the best way for the learners to see the root system. Remember to shake off excess soil that clings to the roots).

#### Scientific Inquiry

How does a seed grow?  
Extension: What does a seed need to grow?

#### Learning Intention

To know that a plant grows from a seed.

#### Extension

To know that a plant grows from a seed given the right conditions.

#### Equipment

- Packet of seeds (mustard)
- Small yogurt pots
- Compost
- Water
- Magnifying glasses

#### Safety

Always wash your hands before and after handling plant matter.

### Discussion

What has happened to the seed? Can you still see it?  
Encourage learners to describe what they see.

Take a photo of one of the seedlings and use it to create a simple jigsaw. Encourage the learners to use their knowledge of the parts to build the jigsaw: the roots at the bottom, the seed may still be in the middle, and the shoot and leaves are at the top.

You can make the jigsaw by gluing the picture to card and cutting it into simple shapes, or you could use an app to create an electronic jigsaw.



### Extension

Investigation: What conditions does a seed need to grow? Will it grow if the pot is placed in darkness? Will it grow if it is not watered?

Investigate these by planting three pots of seeds.

Place one pot in the light and keep watered.

Place the second pot in a dark cupboard and keep watered.

Place the last pot in the light but do not water.

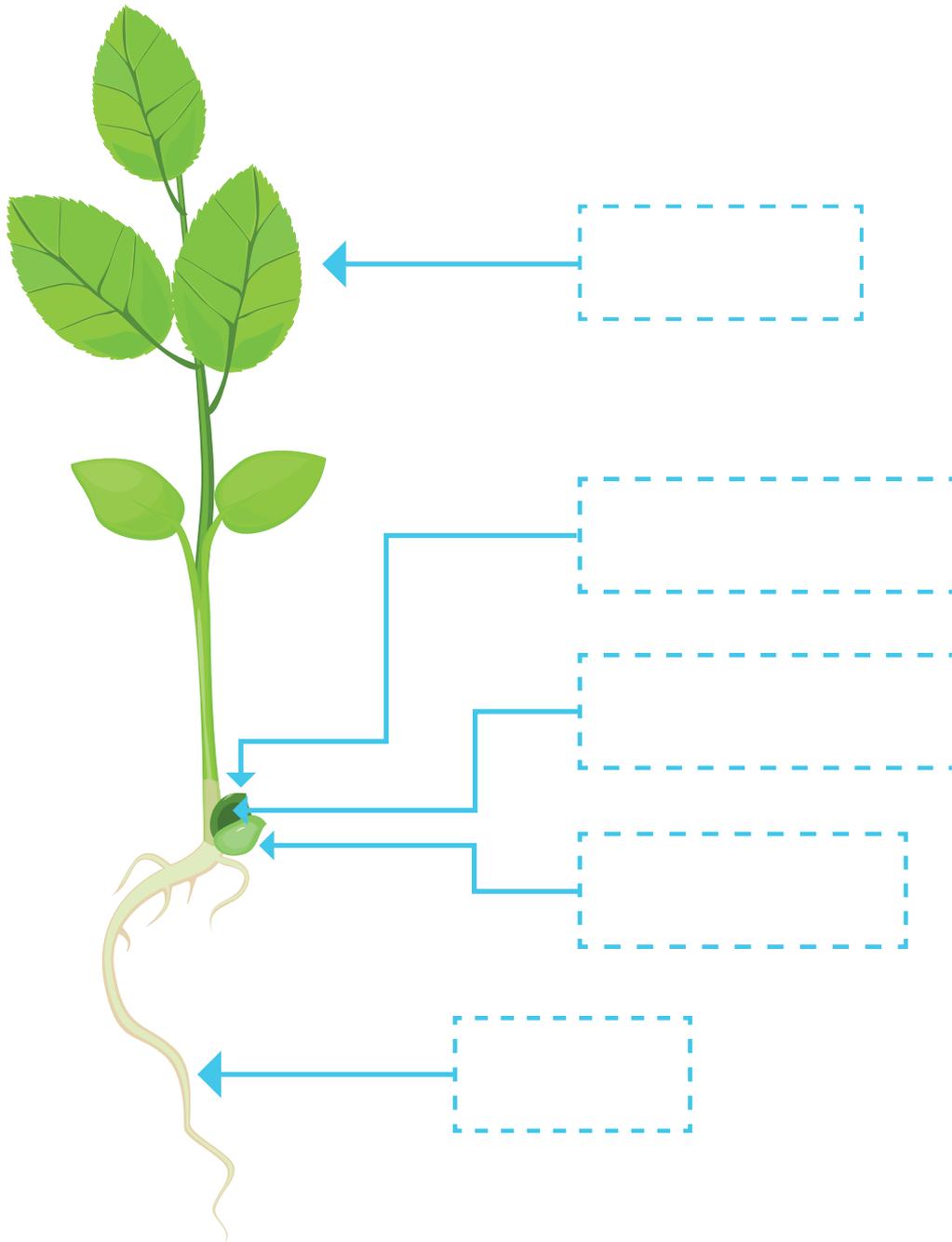
Plant different seeds: mung bean, sunflower, tomatoes, radish or pansy. Examine the seedlings.

Do the seedlings look different?

Can you still find the same parts (roots, stem, leaves, shoots, and so on)?

Which one takes the longest to grow?

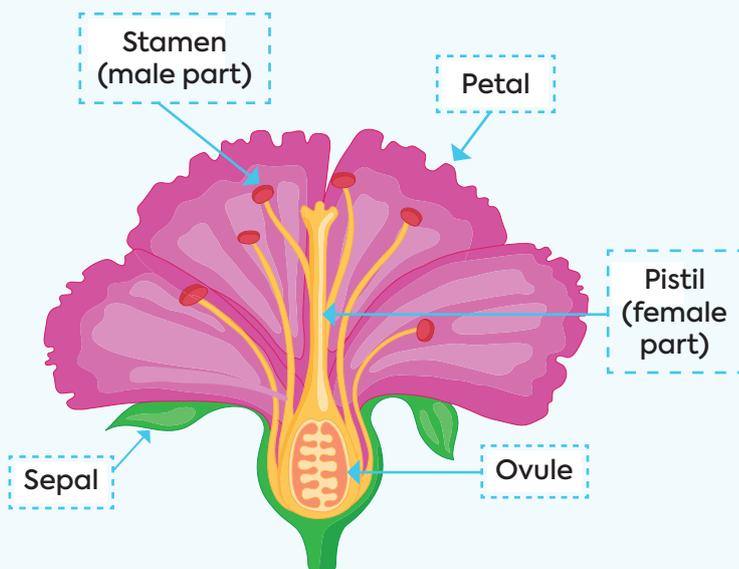
## Resource 2: How does a seed grow?



### STEM Activity 3: The parts of a flower

#### Background information and Science information

The purpose of this activity is to familiarise learners with the names for each part of a flower. Learners will examine and then dissect apples. This activity is best suited to spring or summer when plants and trees are flowering.



We have provided a blank version of the above diagram for the pupils to label (see Resource 3: The parts of a flower).

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.

### Safety

(These safety points come from Science and Plants in Schools: SAPS website)

- Anyone working with plants should ALWAYS wash their hands after handling plants (including seeds), soils, composts, manures, equipment and other related materials.
- Plants (or parts of plants) can be poisonous, cause allergic reactions in some people, or may have been treated with chemicals (such as pesticides).
- Learners must NEVER eat plants found in the wild or in the school grounds, unless given permission to do so.
- Learners/Staff with very sensitive skin or allergies should wear gloves when handling plant material.
- Wildflowers should not be picked and it is illegal for anyone (without the permission of the landowner or occupier) to uproot any wild plant.

### Method

#### Introduction

As a class investigate:

- when plants flower; and
- whether apple trees/fruit trees flower before they produce fruit?

Go out into the school grounds or on a walk to a local garden or park and take photographs of any flowers you can find. If possible, visit an orchard when the trees are flowering and take photographs there.

#### Development

Place the flower that you are dissecting into a slim vase. This will hold it steady.

Start at the base of the flowering part of the flower. First, remove the outer ring of parts. This should be the sepal (the small leaves that sit next to the petals). Place them on the left side of the sticky tape.

### Scientific Inquiry

What are all the parts of a flower?

### Learning Intention

Learners will be able to name different parts of a flower: petal, stamen (male part), sepal, ovule and pistil (female part).

### Equipment

- Flowers such as lilies (two per group)
- Gloves in case of allergies
- Tweezers (may be easier to use your fingers)
- Strip of A4 card landscape with a run of double-sided sticky tape on it
- Thick, clear, sticky tape
- Magnifying glasses

Then remove the next ring which, in the case of the lily, will be the petals. Again, place these next to the sepal on the double-sided sticky tape.

Repeat this process to remove the stamens. Place them next on the sticky tape.

Finally remove the carpel from the stem and place it on the sticky tape as well.

When the dissection is complete and all the flower parts are on the double-sided sticky tape, cover them with a thicker piece of clear sticky tape.

### Discussion

Look at all the different parts of the flower.

Name the parts of the flower again.

Match the dissected flower parts with those on the whole flower.

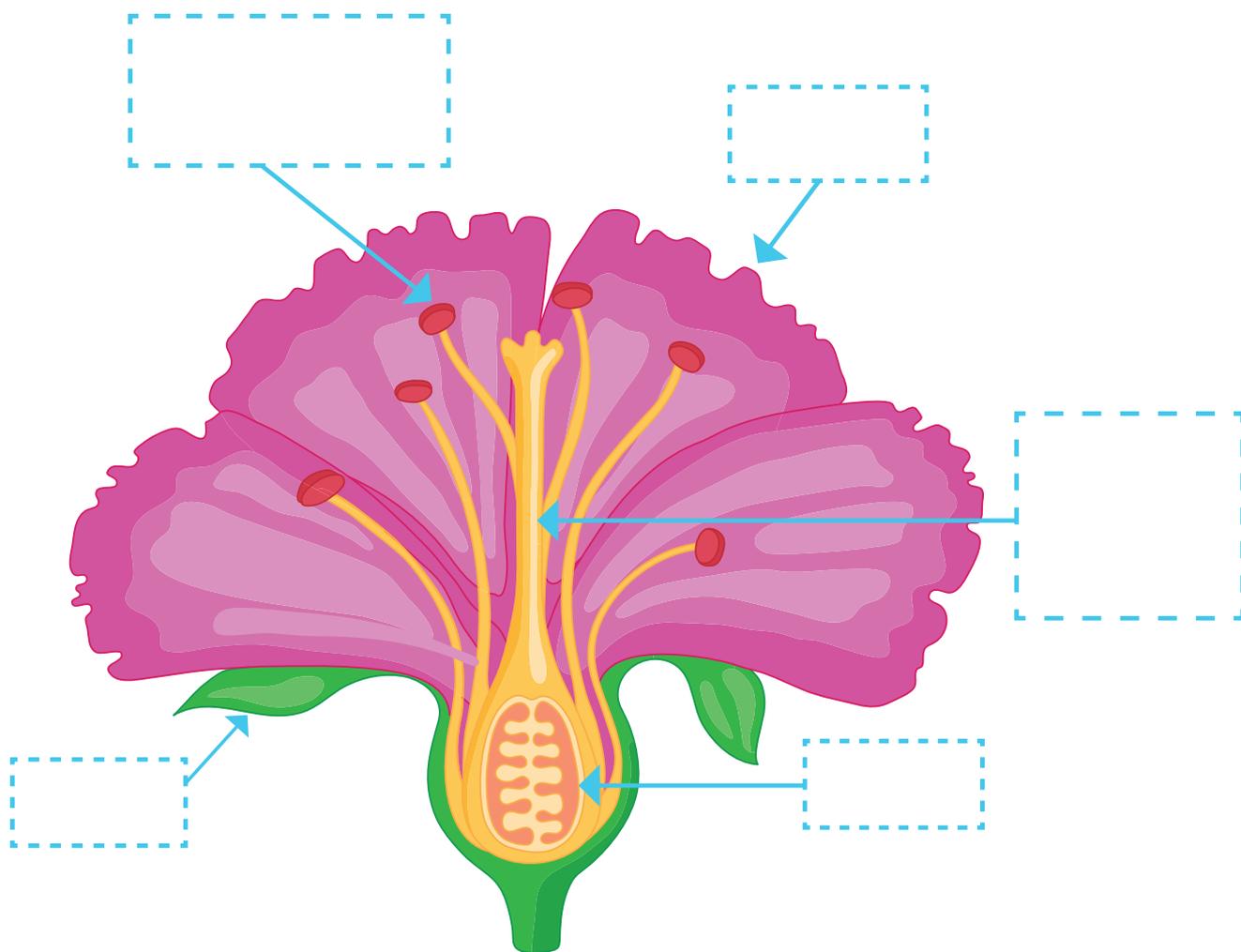
Give each group a copy of the diagram showing the parts of the flower. Match the real flower parts to the ones in the diagram.



### Extension

Dissect other flowers and name the parts.

## Resource 3: The parts of a flower



### STEM Activity 4:

### Pollination of the flowers to make the fruit (an apple)

#### Background information and Science Information

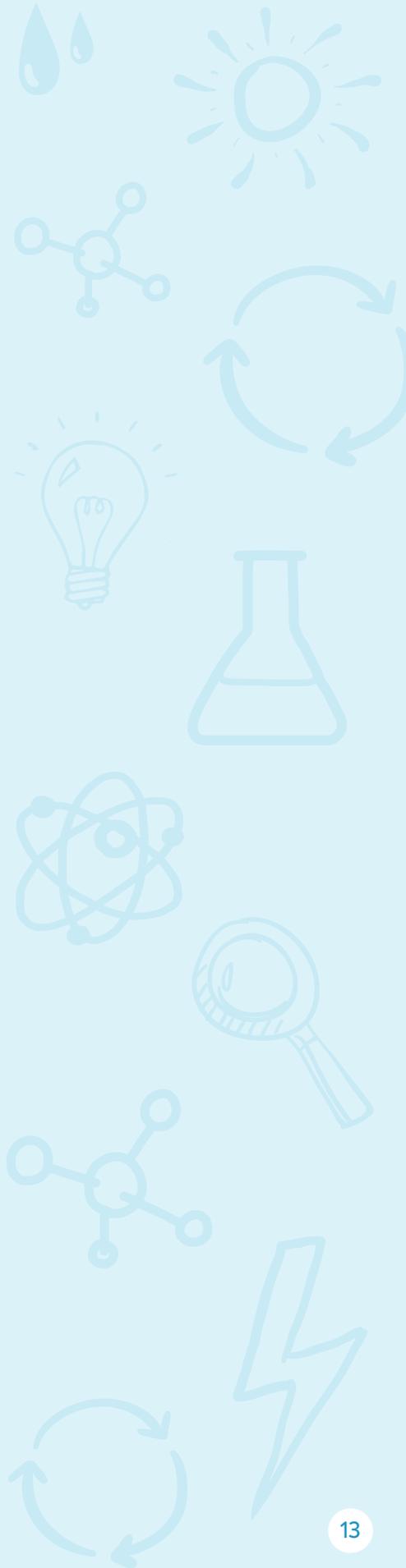
##### What is pollen?

A pollen grain is a microscopic/tiny body that contains the male reproductive cell of a plant.

##### What is pollination?

Pollination is a very important part of the life cycle of plants. Insects, birds, bats and the wind take pollen between flowering plants, which means the plants can make seeds and reproduce (create more of the same). For more information and diagrams, take a look at [www.edenproject.com](http://www.edenproject.com)

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.



### Launch

Look again at Resource 3: The Parts of a Flower and see how many parts of a flower the class can recall. Look at how the parts of the flower go together.

Examine the real flowers. Name each part. Do the parts look different on different flowers?

### Method

1. Collect all the items required to your work area. Groups of learners can make a whole flower or they could focus on a particular flower part, and then the class could work together to combine each part into a whole flower.

| Parts to make | Items needed  | Instructions  |
|---------------|---|---|
| <b>Sepals</b> | A4 green card template for sepal (see Resource 4)<br>Scissors<br>Velcro pad (fluffy side) for each sepal                      | Cut out 4 sepal leaves from the A4 green card   |
| <b>Petals</b> | A4 coloured card template for a petal (see Resource 4)<br>Scissors<br>Velcro pad (fluffy side) for each petal                 | Cut out 4 petals from the A4 coloured card  |
| <b>Stamen</b> | Polystyrene oval<br>Pipe cleaners<br>Small fluffy pieces of cotton wool (to represent the pollen)<br>Velcro pad (fluffy side) | Attach one end of the pipe cleaner to the piece of polystyrene using sticky tape. Attach some of the fluffy side of the Velcro around the bottom of the opposite end of the pipe cleaner. Place very small pieces of cotton wool to the piece of polystyrene. Try and keep it fluffy if you can (the cotton wool will represent the grains of pollen that are located on the anther.) |

### Scientific Inquiry

How does pollination (when the pollen gets transferred between plants) happen?

### Learning Intention

Learners will be aware of the insect's involvement with the flower during the process of pollination.

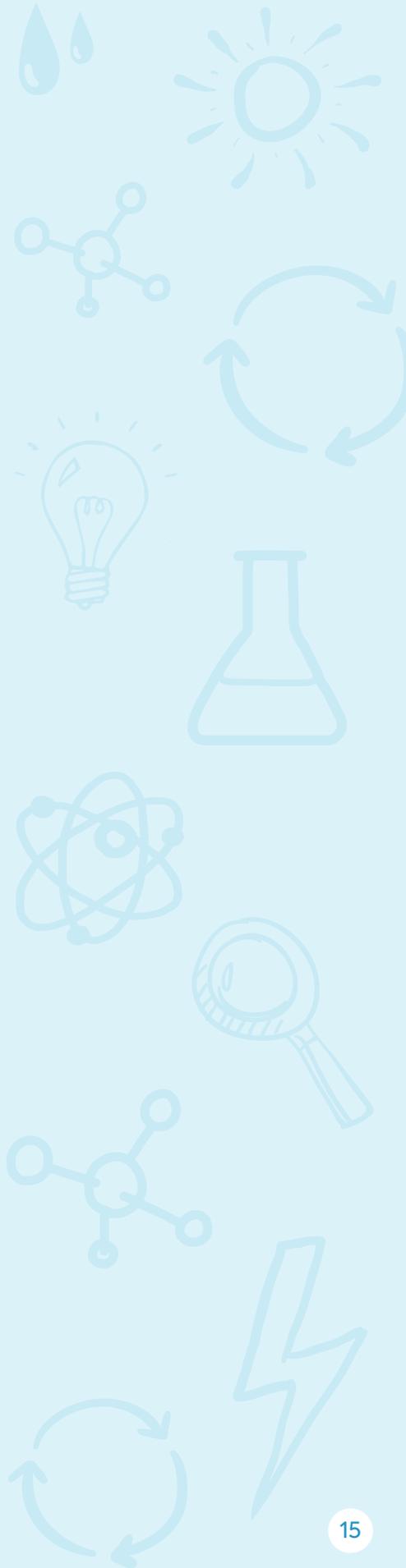
### Equipment

- You need to make at least two flowers to effectively demonstrate pollination. See list of items needed in the table in the Method section. This will give you the materials needed for ONE flower. You will need to make at least two.
- A selection of real flowers for the class to examine.
- Resource 4: Pollination of flowers to make a fruit (an apple)

### Safety

Learners should only use scissors and other sharp objects, and glue guns, under adult supervision. Ensure that you wear the safety gloves and goggles.

| Parts to make                             | Items needed  | Instructions   |
|---|---|--|
| <b>Stem and connector base for pistil</b> | Cardboard tube<br>Top of 500ml plastic bottle<br>Velcro pads (hook side)                                | Place the bottle top on its neck so that it acts like a funnel. Place fluffy pads of Velcro around the neck of the bottle so that it will fit securely into the cardboard tubing that will be used to represent the stem. Then place 3/4 pads of fluffy Velcro on the inside of the wide opening of the bottle so that the pistil (250ml bottle base) will fit neatly into this part to hold the flower together.  |
| <b>Pistil</b>                             | 250ml plastic bottle with lid and window cut out of the side<br>3 ping-pong balls<br>Velcro pads        | <p>The bottle top represents the sticky stigma so cover it with sticky-sided tape. The window will allow you to fix the ping-pong balls along the inside of the bottle with Velcro to represent the ovules in the ovary. Then put 6 strips of Velcro on the base of the bottle to fix the stamen to.</p> <p>Place 3 pads of Velcro around the lower walls so that when this pistil is set into the receptacle (the larger 500ml bottle), the two parts will hold together.</p> |
| <b>Insect bumble bee</b>                  | Yellow sponge<br>Black insulating tape<br>Black pipe cleaners<br>Clear acetate or plastic bag for wings | <p>Place the black tape around the sponge to create a bee-shape body with the yellow and black stripes. Use the glue gun to stick on the pipe cleaners to make antenna.</p> <p>Cut out wing shapes from the acetate/ plastic bag and then stick the wings to the back of the body.</p>   |



2. Ask the learners to assemble the parts to create a flower.
3. Now you need to demonstrate the role the bee plays in pollinating the flowers. Fly the bee to the first flower where it feeds on the nectar. While doing so, it manages to rub against the anther and collect pollen grains on its body! Then it flies to the second flower where again, it feeds on the nectar; this time, the pollen on the bee's body sticks to the sticky top part of the carpel, and this completes the pollinating process.
4. Give the learners the opportunity to use the bee to demonstrate the pollinating process.

### Discussion

Look at all the different parts of the flowers they have made. Ask the learners to name each part.

Talk about pollen.

- What is pollen?
- What does the bee do to pollen?
- What size is the pollen?
- What texture does the pollen need to be so that it can stick to the bee?
- Can we see it in flowers? It is very tiny, so it can be the smallest part of the flower that we can see.
- How does it travel? (The insect may have to carry it on its body without even knowing! Therefore, it will need to be light.)
- How does it stay on the insects' body? (It sticks to it, therefore it needs to be able to stick to fibres.)
- What happens when the pollen is moved to a different flower? (When the insect gets to the second plant, the pollen needs to come off and stick to the sticky carpel of the other plant. Therefore, the pollen has to be able to stick to the insect's body and then detach when something sticky catches it.)



### Extension

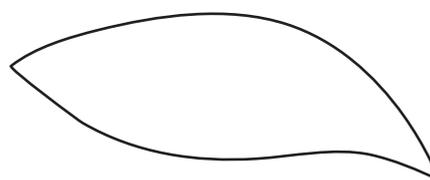
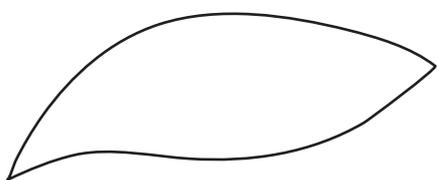
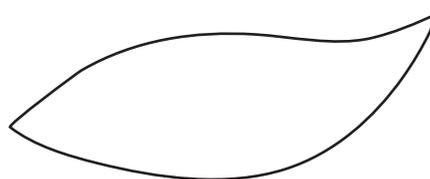
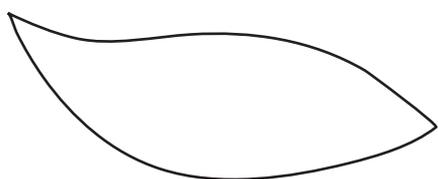
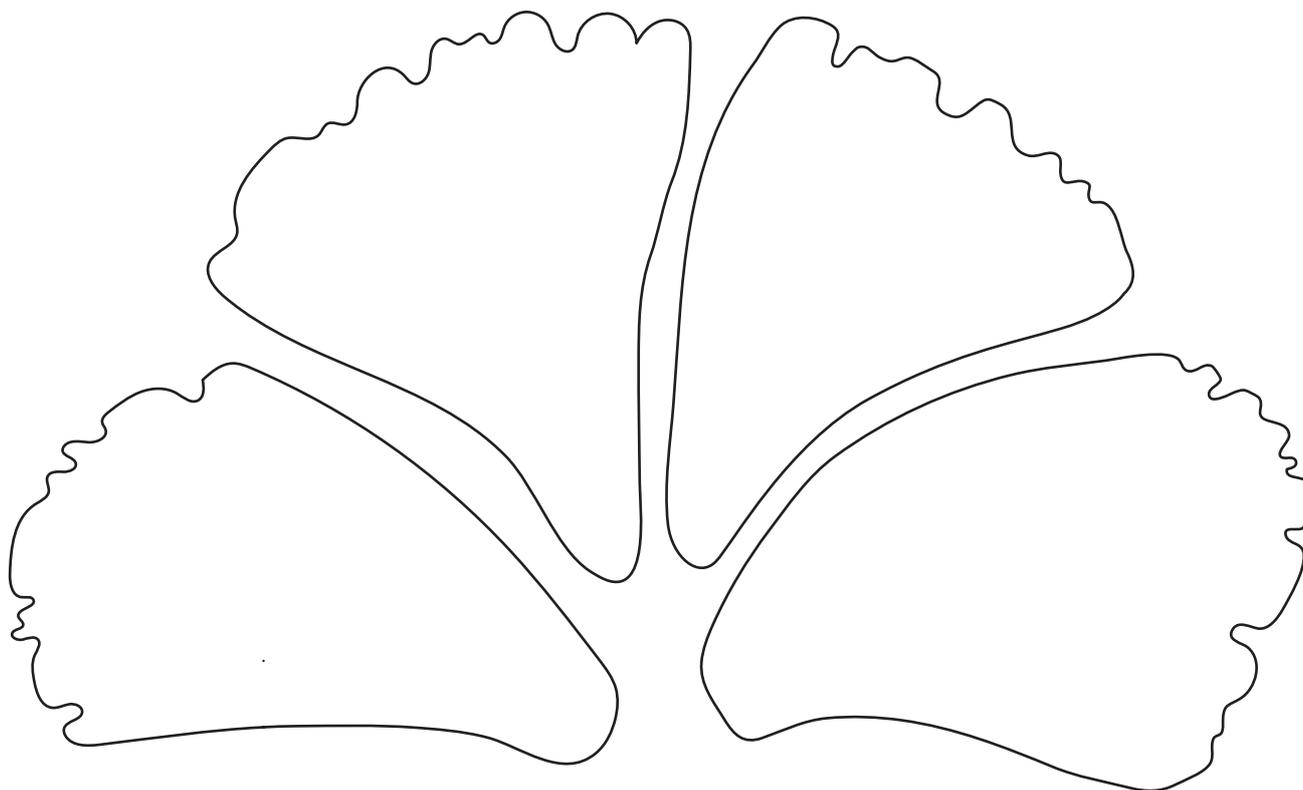
This can lead into a further investigation: can we make a good pollen grain? Remember its properties:

- small;
- light; and
- has an ability to attach to insect fibres, and then detach when it becomes stuck to something else.

Present the learners with lots of materials and fabrics, including microfiber, and let them experiment. Discuss the results. What worked well? What didn't work well? Why?

Growing a sweet pea plant allows the children to see the stages of the plant's growth (from seed, to flowering plant, to fruit) in a relatively short time (April to June/July).

## Resource 4: Pollination of flowers to make a fruit (an apple)



### STEM Activity 5: Dispersal of seeds

#### Background information and Science information



This activity looks at seed dispersal methods. It is important to plants that their seeds are spread widely. If a second or third plant grew in the same place as the parent plant, they would be in competition for food, light and water.

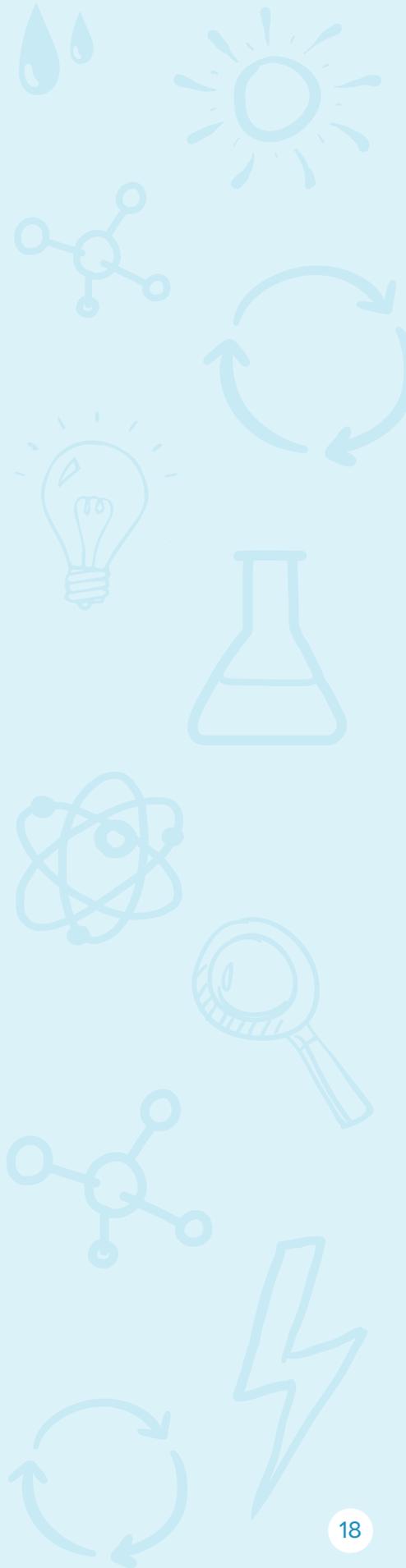
There are different methods of seed dispersal:

- animal dispersal;
- wind dispersal;
- water dispersal;
- explosions dispersal; and
- fire dispersal.

You can find more information at [www.bbc.bitesize](http://www.bbc.bitesize) and at [www.schoolgardening.rhs](http://www.schoolgardening.rhs)

In this activity we will consider animal dispersal.

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.



### Method

#### Introduction

We know that plants grow from seeds. How do the new plants end up growing in places that are far away from the original plant?

#### Development

1. Take the learners to an outdoor area, preferably where there are hedges or trees (places to hid things). Give each learner two or three conkers or raisins and ask them to imagine that they are squirrels, and they have to hide their food so that they can use it over the winter.
2. Leave the area overnight. Then bring the learners back to the same location and ask them to find their conkers or raisins.

#### Discussion

The learners will probably not find all the conkers or raisins. Use this fact to explain animal dispersal of seeds to them: the nuts and seeds dropped by the 'animals' can then grow into new plants.

You can find many videos on YouTube that show wild animals taking nuts and seeds, for example: [gray squirrel eating pine nuts](#), [red squirrel](#), [N.Ireland badger](#), [Irish hare at Belfast International Airport \(Autumnwatch\)](#), [hare at Belfast International Airport](#), and [golden hare on Rathlin](#).

### Scientific Inquiry

How do seeds end up growing in places that are far away from the original plant?

### Learning Intention

To identify a way that a seed can travel and end up growing a significant distance from the original plant.

### Equipment

- Packet of raisins (or conkers if they are available)
- Outdoor area

### Safety

Do not allow the learners to eat the raisins after they have been hidden.

### Extension

Investigate and research how other fruits/seeds are dispersed:

1. Animal dispersal
2. Wind dispersal
3. Water dispersal
4. Explosions dispersal
5. Fire dispersal

