PLANT DETECTIVES

AGES 7-11

Curriculum resource pack for plants

WWT is one of the UK's leading providers of outdoor learning. We welcome over 50,000 learners per year to our Wetland Centres where we provide unique opportunities for learners of all ages and abilities to interact with wetland wildlife from the UK and across the world.

We are open all year round with sessions for every season. Whether you're looking for curriculum-linked learning or simply a fun day out, there really is something for everyone. To find out more about our school visits programme please visit **learningzone.wwt.org.uk.**

Why wetlands?

WWT works across the UK to save, restore and build wetlands for wildlife and people. Wetlands are one of the most important habitats on earth – storing huge amounts of CO_2, providing a natural way of stopping flooding and serving as a home for huge numbers of different creatures. Spending time in wetlands is also proven to improve mental health and wellbeing!

Using this resource pack

This resource pack contains activities designed to cover key curriculum content as well as outdoor activities designed to promote nature connection and a love of the natural world. This is accompanied by supporting resources that can be printed or used on screen with your pupils. At the end of the pack you will find a short quiz that can be used to reinforce and assess pupils' learning.

CURRICULUM LINKS

England

KS2: Science

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- Investigate the way in which water is transported within plants
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
- Describe the life process of reproduction in some plants and animals
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Northern Ireland

KS2: The world around us

- How living things rely on each other within the natural world
- Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment

Curriculum continued...

Wales

KS2: Science and Technology

- I can explore relationships between living things, their habitats and their life cycles
- I can describe how living things compete for specific resources and depend on each other for survival
- I can describe the features of organisms and recognise how they allow them to live, grow and reproduce for survival in their environment
- I can explain the role of different organs and systems that enable plants and animals to live and grow

Scotland

Second: Sciences

- Through carrying out practical activities and investigations, I can show how plants have benefited society

INDOOR ACTIVITIES

YOU WILL NEED:

Plants Visual (one per pupil/group)

Plant ID sheet (one per group)

Celery with leaves still attached or white carnation flower on stem (one per group)

4 small plants of same type and approx. the same size and condition (in pots) (multiple sets per group)

(For all accompanying resources see the end of this pack)

Food colouring (red/dark blue work best)

Vase/jar/glass (one per group)

2L plastic bottle (one per group)

Sellotape

Cardboard box (one per group)

Other relevant resources

Activities:

- Make an 'eggy-cress' animal

School visits:

- We have a range of sessions focusing on plants. Visit our Learning Zone to find out more **learningzone.wwt.org.uk.**

NOTE: **Where you see a Q this indicates a question to ask your pupils.**

Activity 1: Plant parts

- Give out plant visuals to each pupil or small group (suggest groups of 2-3). This shows two plants; a water lily and a dandelion.
- Get each pupil or group to cut out the labels and use them to label the following parts of each plant: Roots; stem; leaves; flowers. If they place them in the middle, between the two pictures, they can draw lines from each label to the correct part of both plants. Help them with any they are unsure of.
- Now see if they can match the correct description to the each part of the plant.
- They can then stick these in place if they haven't already done so.
- Go over the correct answer as a class (see below).

Activity 1: Answers

Roots:

- Anchor the plant to the ground so it doesn't blow away. Also soak up water and nutrients from the soil.

Stem/trunk:

- Carries water and nutrients from the roots of the rest of the plant.

Leaves:

- Produce food for the plant.

  Leaves take in water, light and carbon dioxide and use them to make food for the plant as well as oxygen which is released into the air. This means that plants are great for the environment because they take in carbon dioxide, a gas that causes climate change, and give out oxygen, which all animals need to breathe.

Flowers:

- Makes seeds to produce new plants. (This is explored in more detail below).

Activity 2: Water transportation in plants

- This activity can either be done as a teacher demonstration or by pupils in small groups depending on the resources available.
- Fill a vase or other container with water and food colouring (add several drops of food colouring - the more you can spare the better - red or dark blue work best).
- Cut a couple of centimetres off the bottom of the stalk of a stick of celery (with the leaves still on) or stem of a white carnation.
- Place the celery or carnation into the container with the coloured water.
- Keep observing over the next couple of days. You should see the celery leaves or carnation flower start to turn the same colour as the food colouring. This is because the colouring has been transported up through the roots and stem to the leaves / flower. If you have used celery, you might even be able to see the colouring in the 'veins' at the top of the celery.

Activity 3: What do plants need to stay healthy?

Q **What do you think plants need to grow and stay healthy?**

- Pupils to discuss their answers to this question in small groups and then report back to the class.
- Make a list of all the answers your class come up with. Add and discuss any of the following that they haven't come up with: **Water, air, light.**
- Explain that they are now going to carry out an experiment to test whether plants need water, air and light to survive.

PLANT 1
Will have light, water and air.

PLANT 2
Will receive no water.

PLANT 3
Will receive no light.

PLANT 4
Will receive no (additional) air.

Activity 3 continued...

- Each group should prepare and look after each plant as follows:

All plants:

- It is best if each plant is in its own plastic pot and has a saucer underneath to collect any water (not required for plant 4). Place them in a location such as a windowsill where they will get plenty of light.

PLANT 1

Water each day.

PLANT 2

Don't water at all.

PLANT 3

Place a cardboard box over it and seal up any gaps where light might get in.

Remove the box to water the plant each day.

PLANT 4

Cut the top off a 2L plastic bottle. Put the plant in and add enough water to last it a week or so.

Re-seal the top of the bottle using sellotape and ensure that the lid is firmly screwed on.

- They should keep an eye on their plants over the next week or so. They should see plant 1 surviving well but the other plants wilting and eventually dying.
- Once the changes have started to take effect, get groups to look at each others' plants.

Q **What has happened? Why?**

- The plants without water, without light and without air have started to die. This shows that plants need water, light and air (carbon dioxide - see below) to survive.
- **NOTE:** With the plant that didn't have any additional air it is actually a lack of carbon dioxide that meant it couldn't survive. Plants take in light, water and carbon dioxide and use this to produce food (also giving out oxygen as a waste product from this process).
- Look back at the list you created. Are there any other things that plants need to survive?
- Plants also need:

Warmth:

- Below a certain temperature, most plants are unable to survive.

Nutrients:

- Most (but not all) plants obtain their nutrients from the soil.

- **NOTE:** Seeds do not need light to germinate because seeds have their own store of food. It is only once the plant's leaves are fully developed that it needs light.

Activity 4: How do plants reproduce?

- Just like all other living things, plants don't live forever. They need to make new plants. This is called reproduction.

Key word

REPRODUCTION

When animals and plants create new animals or plants.

Parts of a flower:

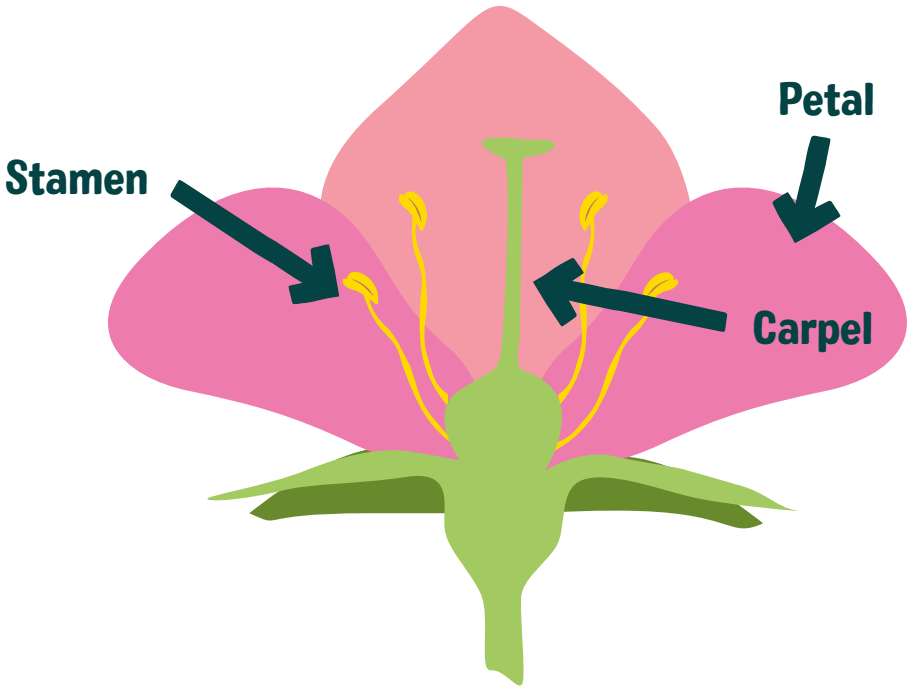
- It is the flowers and the parts inside them that make seeds which then grow into new plants.
- Give each group a Flower Parts Visual and ask them to cut out the labels.

Q **Why do you think flowers have petals?**

- Explain that petals are used to attract insects to the flower. Insects want to find flowers so that they can feed on the nectar they contain.
- Ask each group to add the petal label.
- Inside the flower there are male and female parts.
- Explain that the male part is called a stamen. It contains pollen. There are usually several of these and they are made up of a thin 'filament' holding up an anther containing the pollen.
- Ask pupils to point to the part they think is the stamen.
- Ask each group to add the stamen label.
- Explain that the female part is called a carpel. It contains the eggs. The carpel has an ovary containing the eggs at the bottom and a sticky 'stigma' at the top to catch the pollen (held up by a 'style').
- Ask pupils to point to the part they think is the carpel.
- Ask each group to add the carpel label.

Activity 4 continued...

Activity 4: Answers



Pollination

- When pollen is transferred from the stamen to the carpel it fertilises the eggs and makes seeds.

Q **How do you think the pollen could be transferred from the stamen to the carpel?**

- Get each group to discuss how they think the pollen might be transferred.
- Groups to report back.
- There are two ways the pollen can be transferred:

1. By insects. Insects dig around for the tasty nectar and get covered in pollen. Some of this pollen falls off into the carpel of either this or another flower.
2. By wind.

Seed dispersal

- Of course, the seeds now need to find their way to the soil. The seeds need to be carried away from the parent plant because otherwise they won't have enough water and nutrients between them. This is called dispersal.

Q **How do you think seeds might be dispersed?**

- Get each group to discuss how they think the seeds might be dispersed.
- Groups to report back.

By animals

- Some plants have their seeds inside fruits and berries. Animals eat these and then poo them out somewhere else. Other plants have seeds that stick to animals and then fall off somewhere else.

Q **Can you think of any plants whose seeds might be dispersed by animals?**

- Seeds that are eaten by animals include the seeds inside all fruits including berries such as hawthorn, ivy, holly, roses (rose hips) and rowan trees.
- Examples of plants whose seeds stick to animal fur include burdock and goose grass (often called 'sticky weed' or 'sticky wicky').

By wind

Q **Can you think of any plants whose seeds might be carried by the wind?**

- Examples of plants whose seeds are carried by the wind include dandelions and bulrush as well as ash and sycamore trees (whose seeds are often called 'helicopters').

By water

- Many seeds float and are carried by water.

Q **Can you think of any plants whose seeds might be carried by water?**

- Coconuts and the seeds of foxgloves, harebells, willow and birch trees all float and can be carried by water.

By explosion

- Possibly the most impressive are plants whose seeds are dispersed by explosion! They usually have a pod that dries up and splits open, shooting out the seeds.

Q **Can you think of any plants whose seeds are dispersed by explosion?**

- Examples include peas and laburnum.

- When these seeds enter the soil and begin to grow, this is called germination.

Key word

GERMINATION

When seeds start to grow.

Activity 5: The importance of plants

Q **Why do you think plants are important?**

- Ask each group to list as many reasons they can think of.
- Get each group to feed back and use their responses to produce a class list.
- Add any from the list below that they might have missed:
  - Plants provide food for a wide range of animals. Without them there would be no life on earth!
  - Plants provide shelter for a wide range of animals. Many animals live in and on trees and other plants. Many animals nest in them.
  - By absorbing water and providing root ways into the soil, plants can help reduce flooding.
  - By absorbing carbon dioxide, plants help to combat climate change (see 'climate champions' session).

Activity 6: How are plants adapted to life in wetlands?

- Many of the plants that live in wetlands have specific adaptations that enable them to live in these habitats.
- Look back at the water lily illustration on the Plants Visual.

Q **How do you think the water lily is adapted to life in a pond?**

- Get each group to come up with a list of ways they think a water lily is adapted to life in a pond.
- Get each group to feed back and use their responses to produce a class list.
- Go over each of the key adaptations below together as a class:
  - They can take in water from the underside of their leaves as well as their roots.
  - They have leaves with a large surface area to enable them to float. Because they can float, they can rise and fall with the water level. It also means water lilies can live away from the edges of the pond where they might be overshadowed by taller plants.
  - Their flowers are bowl-shaped to enable them to float.
  - The seeds are designed to float for a short period of time and then sink. This enables them to float away from the plant and then sink down into the soil and sediment at the bottom of a pond.
  - They have much weaker stems because the stems don't need to support the weight of the plant.
- Groups can then add some of this information to their Plants Visual (but it's more important to discuss it).

OUTDOOR ACTIVITIES

Activity 7: Plant hunt

- Carry out a plant hunt. See how many of the common plants on our Plant ID Sheet each group can find.

Q **Which is your favourite plant? Why?**

- Explain that without plants animals wouldn't survive and there would be no life on earth.

Q **How does this make you feel about plants? Aren't they amazing?**

Activity 8: Plant parts

- Find a weed that can be uprooted. Uproot it and lie it on the ground. Get pupils to point to each of the parts (roots; stem; leaves; flowers) and tell you what each does.

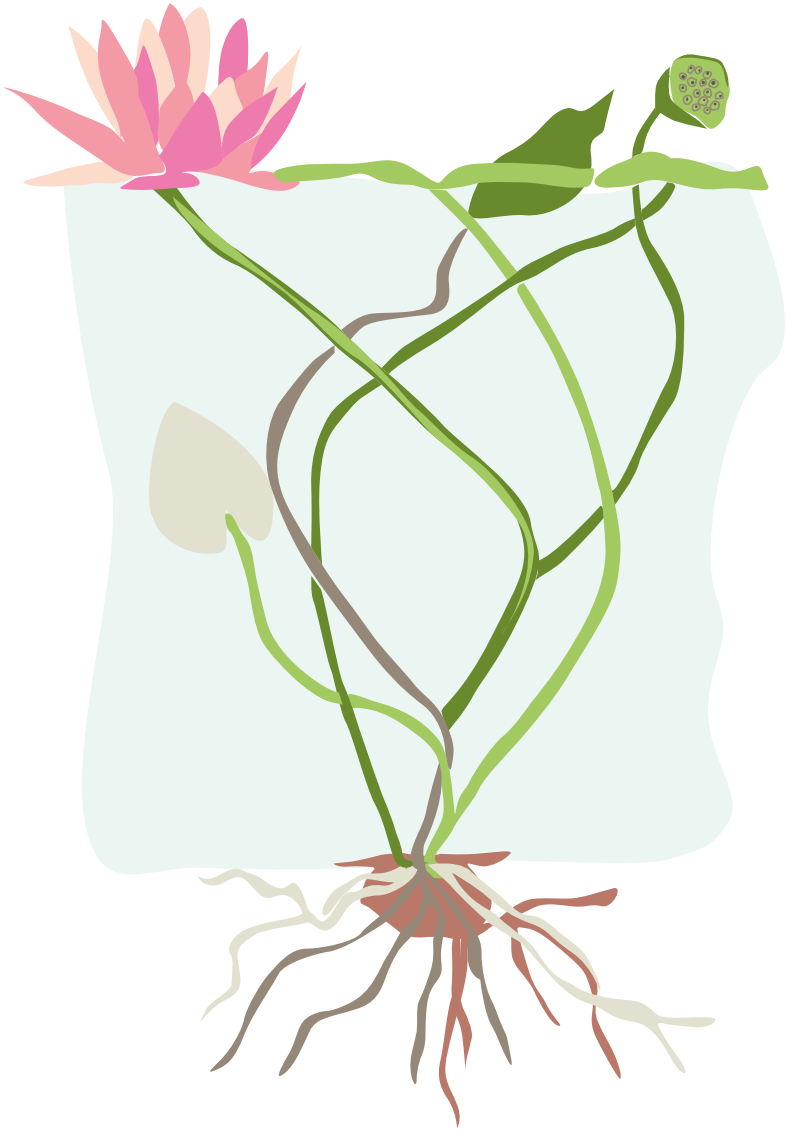
Activity 9: Bee search

- Keep an eye out for bees and see if you can observe them pollinating flowers. Can you see any of the pollen stuck to their bodies? Approach the bees carefully so as not to get stung.

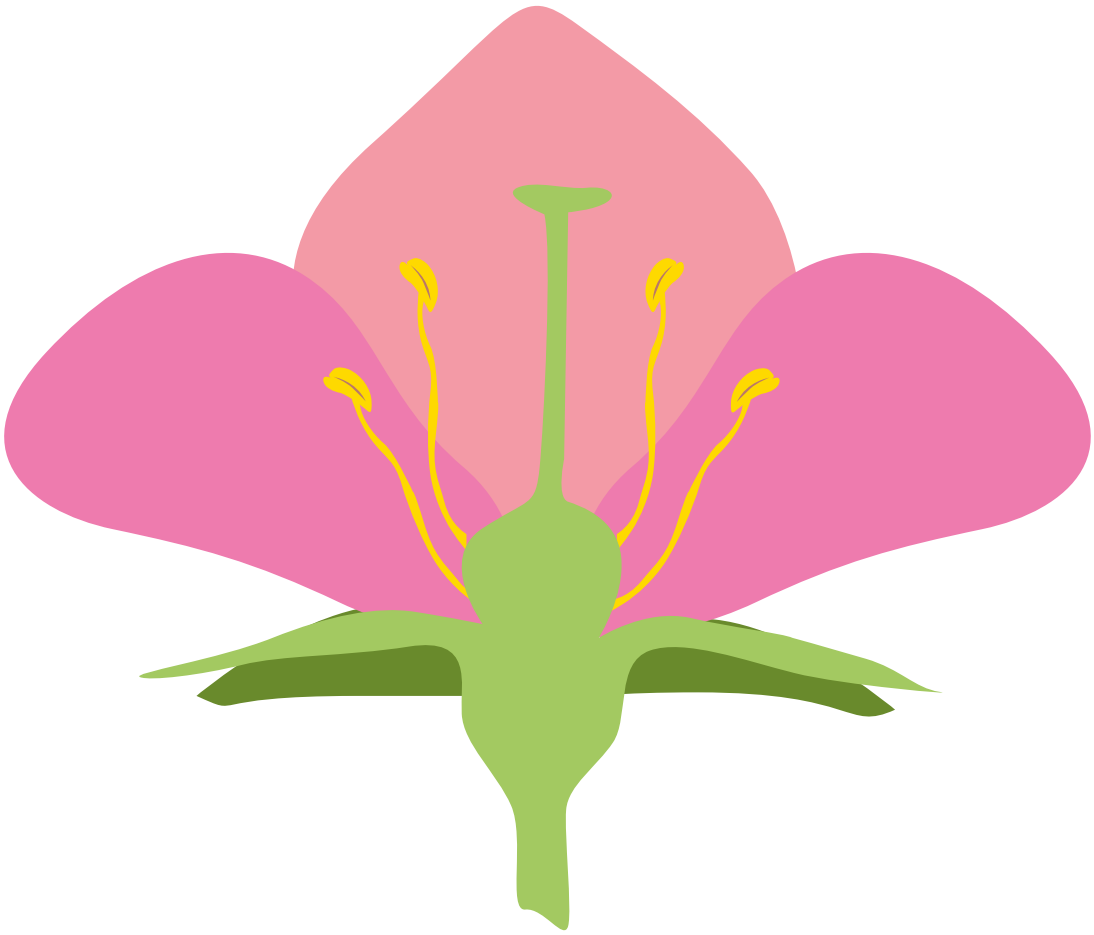
Q **How did watching the bee(s) make you feel? Why?**

- Explain that without bees and another pollinating insects, many plants would not be able to survive. Aren't bees amazing?

PLANT VISUAL



PARTS OF A FLOWER



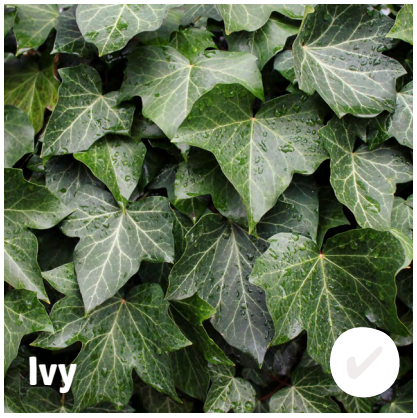
PLANT VISUAL CUT OUTS

STEM	**ROOTS**	Anchor the plant to the ground and soak up water and nutrients from the soil.	Makes seeds to produce new plants.
FLOWERS	**LEAVES**	Carries water and nutrients from the roots of the rest of the plant.	Produce food for the plant.

PARTS OF A FLOWER VISUAL CUT OUTS

STAMEN (male part): Contains pollen	**CARPEL** (female part): Contains eggs	**PETAL** Attracts insects

PLANT ID SHEET

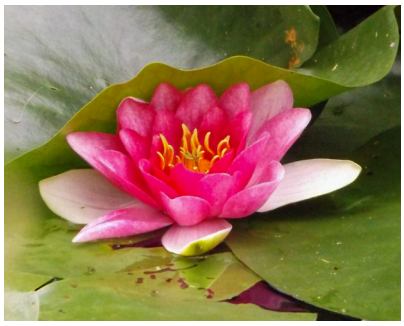


QUIZ: PLANT DETECTIVES

Round 1: Picture round

Q Can you name these common wetland plants?

1 .....



2 .....

3 .....

4 .....

5 .....

Round 2: Plant parts

Q Can you match each **Plant** to the **Role it plays?**

Draw lines to match them up.

6 **Leaves**	Soak up water and nutrients from the soil
7 **Stem**	Produce food for the plant
8 **Flower**	Carries water and nutrients to the rest of the plant
9 **Roots**	Makes seeds to produce new plants

Q What do we often call flowers found on trees?

.....

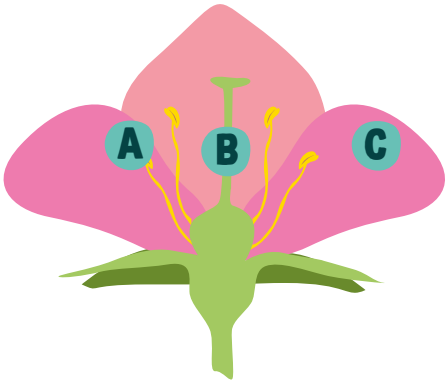
Round 3: Flower parts

Q Label the following three parts of the flower: **Carpel, Petal, Stamen**

A .....

B .....

C .....



Q Which of these parts is the male part that contains the pollen?

.....

Q Which is the female part that contains the eggs?

.....

Round 4: Seed dispersal

Q Can you match each **Seed** with its **Dispersal method?**

Draw lines to match them up.

10	**Coconuts**	**Eaten and pooed out by animals**
11	**Peas**	**Sticks to animals' fur**
12	**Holly berries**	**Dispersed by the wind**
13	**Burdock seeds**	**Dispersed by water**
14	**Dandelion seeds**	**Dispersed by explosion**

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Have fun and do share your score to our social media accounts

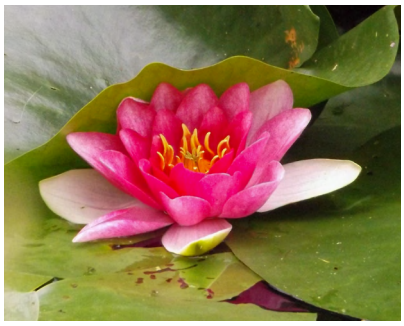
We'd love to find out how you got on!

ANSWERS: PLANT DETECTIVES

Round 1: Picture round

Q Can you name these common wetland plants?

1 Willow tree



2 Water lily

3 Marsh marigold

4 Water forget-me-not

5 Yellow flag iris

Round 2: Plant parts

Q Can you match each **Plant** to the **Role** it plays?

Draw lines to match them up.

6	Leaves	Soak up water and nutrients from the soil
7	Stem	Produce food for the plant
8	Flower	Carries water and nutrients to the rest of the plant
9	Roots	Makes seeds to produce new plants

Q What do we often call flowers found on trees?

Blossom

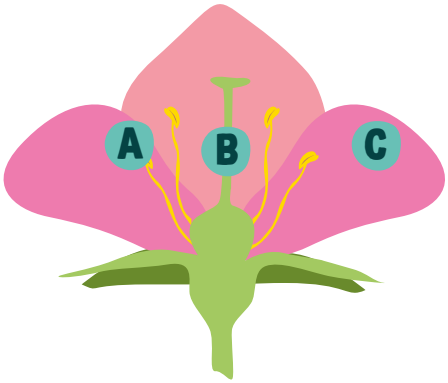
Round 3: Flower parts

Q Label the following three parts of the flower: **Carpel, Petal, Stamen**

A Stamen .....

B Carpel .....

C Petal .....



Q Which of these parts is the male part that contains the pollen?

Stamen .....

Q Which is the female part that contains the eggs?

Carpel .....

Round 4: Seed dispersal

Q Can you match each **Seed** with its **Dispersal method?**

Draw lines to match them up.

10	Coconuts	Eaten and pooed out by animals
11	Peas	Sticks to animals' fur
12	Holly berries	Dispersed by the wind
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