PLANT DETECTIVES

AGES 11-14

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 classroom 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.

CURRICULUM LINKS

England

KS3: Science

- The reactants in, and products of, photosynthesis, and a word summary for photosynthesis
- Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots
- The role of leaf stomata in gas exchange in plants
- The adaptations of leaves for photosynthesis

Northern Ireland

KS3: Science and Technology

- Explore the importance of biodiversity, how it impacts on our lives and how it is affected by human activity

Wales

KS3: Science and Technology

- I can explain how biological processes and control mechanisms enable organisms to function, develop, reproduce and survive

Scotland

Sciences

- I have collaborated on investigations into the process of photosynthesis and I can demonstrate my understanding of why plants are vital to sustaining life on Earth
- I understand how animal and plant species depend on each other and how living things are adapted for survival

INDOOR ACTIVITIES

YOU WILL NEED:

Plant Visual (one per pupil or group, see the end of this pack)

Other relevant resources

School visits:

- We run a wide 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: Photosynthesis

- Give each learner a Plant visual (see the end of this pack). Remind learners that plants are self-sufficient. They make their own food through a process called photosynthesis. Plants can capture the energy of sunlight and convert it into chemical energy in organic compounds. We're entirely dependent on plants for every breath we take.
- Display the following words: Light energy, Carbon Dioxide, Oxygen, Water, Glucose and explain that these words make up the basic process of photosynthesis. Ask learners to use these words to label both plants on the visual. They must include arrows to show direction of travel too.
- Does the process differ from the dandelion to the waterlily? Discuss. The water lily can take water in through the underside of its leaves as well as through its roots. The majority of intake through its roots is mineral intake.
- Learners should now research, ask questions and add additional information around the visual e.g. what is xylem, phloem, chlorophyll and carbohydrates, with a clear description of each word.
- Finally ask the learners to title the visual with a clear description of what photosynthesis is.

Activity 2: The importance of plants

- Ask learners what the world would be like without plants. Why are they important?
  We must learn about and care for plants because they provide us, and living things with:

Food

- Plants provide food for humans and other animals.

Shelter

- Plants, including trees, provide shelter for many different animals.

Oxygen

- Plants produce oxygen via photosynthesis. Humans and other creatures rely on oxygen in order to live. They also reduce pollution by reducing the amount of carbon dioxide in the air.

Water

Q **What important role do plants play in the water cycle, particularly in wetlands?**

Wetland plants act as filters of water, absorbing solids. They add oxygen to the water. Plants also remove nutrients from the water and play a cleansing role. Plants regulate the water cycle by moving water from soil to atmosphere.

Q **What is this process called?**

Transpiration

Clothes

- Plants like cotton provide us clothes to wear.

Q **Do you know of any others?**

Medicines

- Several plants are used for medicinal purpose e.g. Aloe Vera.

Q **Have you heard of any others?**

Noise reduction

- Trees and plants absorb sound. They can therefore prevent some noise pollution (e.g. from roads and trains) disturbing homes.

Activity 3: Comparing land and water plants

- Fold the Plant visual in half and display only the dandelion. In pairs or small groups, ask learners to prepare clear explanations of each feature/function. Share some of these explanations with the class. Now unfold the visual and reveal the waterlily. How do they think the features and functions have adapted for this plant that grows partially under water? Pose the following questions about the waterlily, for written explanation (this should be done in the form of labels directly onto the Plant visual):

Roots

Q **Are Waterlily's roots still for water intake?**

This plant is not short of water. As the underside of the leaves can also take up water via active transport, the root's function can be more focused on tapping into the nutrient-rich sediment at the bottoms of ponds and lakes.

Leaves

Q **How might the size and shape of the leaves help the waterlily?**

The large surface area of the leaves means they float and they can absorb a lot of light energy from the sun. As the leaves can float in the middle of a pond, they also have constant access to light because they are unhindered by taller plant species.

Stomata

Q **Stomata are often located all over leaves, do you think this is the case for the waterlily?**

Stomata are the pore-like openings on the surfaces of leaves which allow the exchange of oxygen and carbon dioxide for photosynthesis. Waterlilies have evolved so that all their stomata are placed on the upper surfaces of leaves. Stomata on the lower surface of the leaves would be unnecessary as the process would be impeded by the water contact.

Stems

Q **Are the stems of a waterlily stronger or weaker than a dandelion?**

They are weaker. The water provides most of the support for the flowers and leaves; therefore there is less need for a strong stem. Rather than growing a thick stem, waterlilies have adapted to focus their energy on their leaf network instead. Dandelions need a stronger stem as it has to hold strong against the wind and weather.

Seed head

Q **How does the process of seed dispersal differ from a dandelion to a waterlily?**

The seeds of the waterlily float in the water for a while and then drop down to the bottom of the body of water, to take root. This type of seed dispersal is called hydrochory - seed dissemination by water transport.

Flower

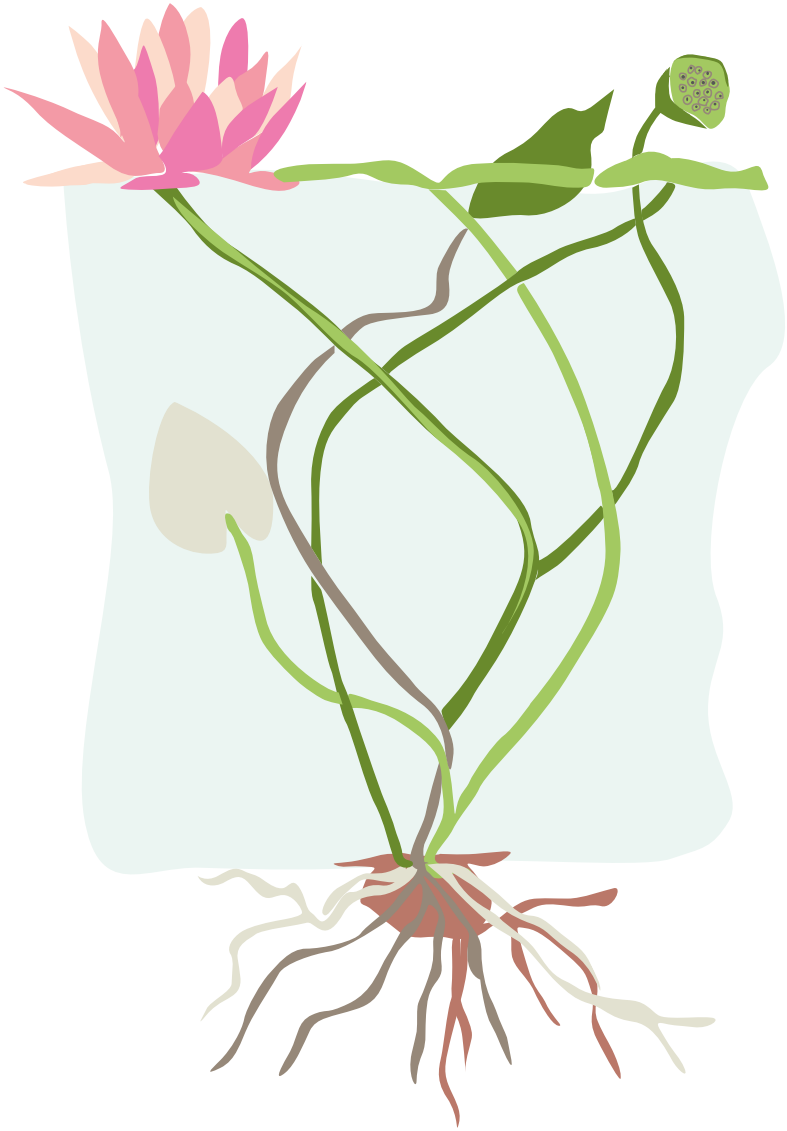
Q **How and why are these different?**

Waterlily flowers are large and bowl shaped to aid floatation on the surface of the water.

OUTDOOR ACTIVITY

Leaf Study

- Go outside to study different leaves. Find leaves from a variety of plants. Look at them and feel them. How does photosynthesis occur in the plants they have found? Does it differ depending on the plant?
- If possible, bring a few leaves indoors (remind learners that when studying living plants, it is important to keep the amount of parts picked to a minimum). Place each leaf collected under a microscope.

Q **Are the stomata visible? Is it possible to see the chloroplasts?**

PLANT VISUAL