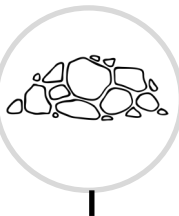
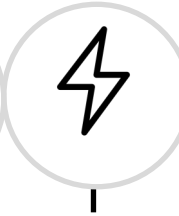
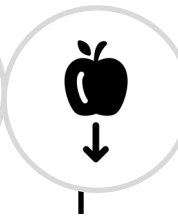
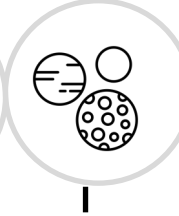
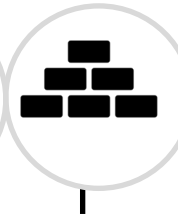
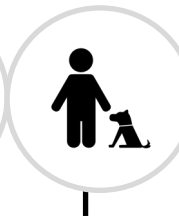
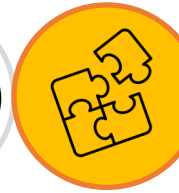
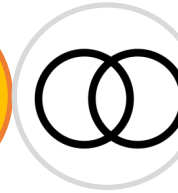
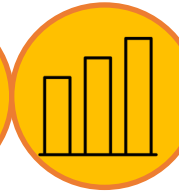
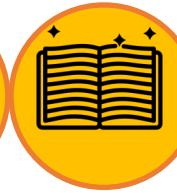
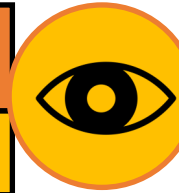


Year 3: Plants

SCIENTIFIC CONTEXT: Biology



KEY VOCABULARY:

Photosynthesis	the process that plants go through to make food by using sunlight and chlorophyll to turn water and carbon dioxide into nutrients.
Pollen	a fine powdery substance produced by flowering plants,
Pollination	the transfer of pollen from a male part of a plant to a female part of a plant to produce seeds.
Seed formation	Seeds forming
Seed dispersal	the means by which a plant ensures its seeds are spread as far as possible from the parent plant, to give the seeds the best chance of germination
Germination	When a seed has found the right conditions it breaks open and it sends out a root and a green shoot.
Nutrients	the substances in soil that plants process to enable it to survive
Absorb	Take in, or soak up
Transport	The movement of a substance from one place to another

Key Questions:

- 1) What is the function of each part of a plant?
- 2) What do plants require to grow?
- 3) Does every plant have exactly the same requirements?
- 4) What roles do flowers play in the life cycle of flowering plants?

As Scientists we will:

- 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.

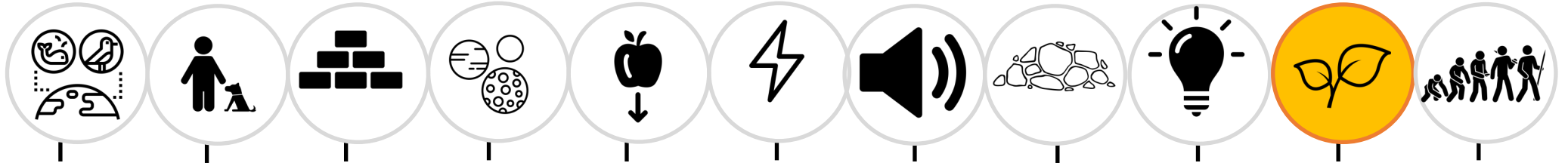
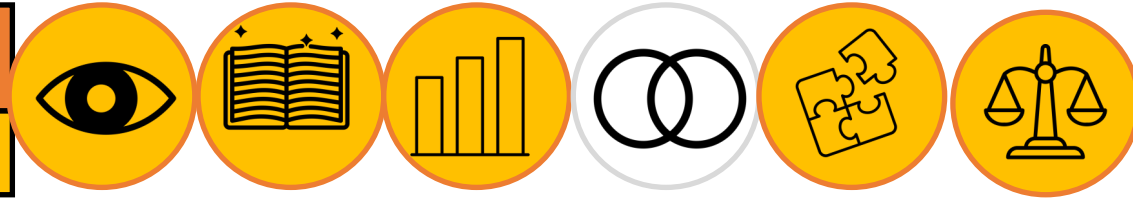
Working Scientifically:

- Use straightforward scientific evidence to answer questions or to support our findings,
- Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Set up simple practical enquiries, comparative and fair tests,
- Report on findings from enquiries, including oral and written explanations, displays or presentations,

Notable Scientist: Kiara Nirghin

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



What I need to know:

While there are many species of green plants, they are all similar in structure, comprising roots, stems, leaves and flowers. Roots anchor the plant and absorb and transport water and nutrients/minerals. Stems keep the plant upright by supporting leaves, flowers and fruit; they also transport water and nutrients. Leaves make food for the plant from carbon dioxide and water using sunlight, through the process of photosynthesis. Flowers are the reproductive organs of the plant.

In flowering plants, reproduction occurs in the flower itself and its structures have specific roles. Petals are often brightly coloured or scented to attract insects. Filaments and anthers (the male parts, together called the stamen) produce the male sex cells, pollen. The stigma, style and ovary (the female parts, together called the carpel or pistil) produce the female sex cells, ovules, in the ovary. The sepal are specialised leaves that protect the flower in bud.

Pollination is the transfer of pollen from an anther to a stigma. In self-pollinated plants, pollen is transferred between an anther and stigma of the same flower. Other plants are cross-pollinated: pollen from one flower is transferred to the stigma of another flower belonging to the same species. Insects play an important role in the pollination of many plants. These plants tend to be colourful, scented or provide nectar to attract pollinators, which carry pollen on their bodies as they move from plant to plant. Wind-pollinated plants have smaller, unscented flowers, but have long stamens to facilitate pollination.

Following pollination, pollen grows down the style to the ovary where fertilisation of the ovule by the pollen occurs. This produces seeds. The ovary swells around the seeds, forming the fruit of the plant.

Seeds may be dispersed by a number of methods including the wind, explosion, animals (hoarding, digesting, carried on their fur) and water. Dispersal is important as it increases the chances of survival of a species, by reducing competition for resources, such as light, water and minerals, which are necessary for new plants to survive.

Opportunities for science capital:

Invite someone in whose job relies on knowledge of plants—such as a florist, gardener, or landscaper—to talk to the class about how they rely on their scientific knowledge of plant growth and needs to help them with their job.

Alternatively, a trip to a local nature reserve, or garden centre could be organised to observe plant growth in the local environment.

Part of science capital includes scientific media consumption—documentaries, reports etc. So, I have added a couple of links which give daily science news for children. Checking in on these every now and then would be beneficial to help children see science in the wider world.

<https://>

www.sciencenewsforstudents.org/

<https://www.sciencejournalforkids.org/>

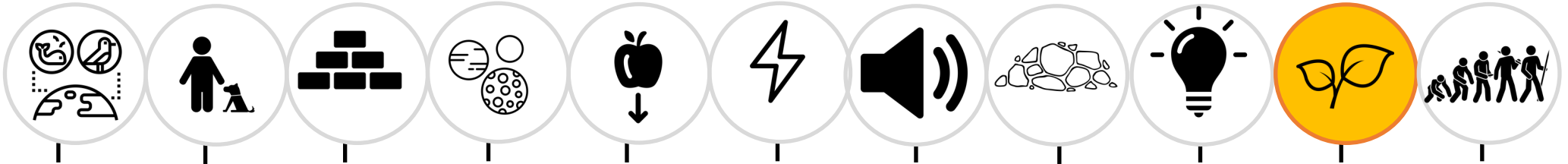
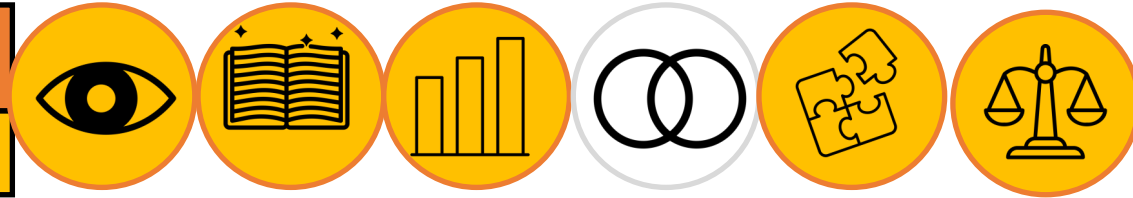
Assessment:

By the end of this unit, pupils will be able to: identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers; explain the requirements of plants for life and growth and how they vary from plant to plant; explain the way in which water is transported within plants; explain the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

When working scientifically, pupils will be able to: use straightforward scientific evidence to answer questions or to support our findings; make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers; set up simple practical enquiries, comparative and fair tests; report on findings from enquiries, including oral and written explanations, displays or presentations,

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 1: Functions

Starter:

This could be a fun starter, aimed at engaging the children with the whole topic of plants. Before the children arrive, cut up a plant into its different parts; stem, roots, flower (which in itself can be cut up into its parts), etc, and lay these out on the floor. Place some crime scene tape around this area. Put up a sign declaring it to be a murder investigation! When the children arrive, explain that there has been a murder. Ask them to identify the victim that was once alive (i.e. the plant). Ask them to decide whether or not this is a murder – i.e. is a plant a living thing, and if it is, how can we prove this? Encourage the children to share what they already know about the different parts of the plant, as well the parts they cannot recognise, and any functions of different parts that they do not know.

KWL grid

Main:

Substantive knowledge:

Watch clip: <https://www.tigtagworld.co.uk/film/parts-of-a-plant-PRM00096/>

Ask:

What is the function of the roots?

To absorb water and nutrients from the soil and anchor the plant to the ground.

What is the function of the shoots?

They grow up from seeds in search of light and develop into stems.

What is the function of the stem?

To support the plant (leaves, flower, fruit), hold it upright, and transport water and nutrients throughout the plant.

What is the function of the leaves?

To make food for the plant by photosynthesis.

What is the function of the flowers?

To make seeds for reproduction and in some cases to attract pollinators.

Note: If possible, also show real plants, either grown with the children in the classroom or found in the school grounds.

Ask the children how each part of the plant is suited to its function. For example, the roots have lots of tiny hairs to collect water/nutrients over a large area; the leaves are flat to gather sunlight and contain a green pigment (chlorophyll) to convert it into carbohydrate through photosynthesis; the stem is strong and contains tubes that can carry water and nutrients; the flowers are bright and colourful to attract insects which act as pollinators and help the plant reproduce

Plenary/assessment:

Complete labelling sheet in books including an explanation of the function of each part: https://cdn-media.tigtagworld.com/learning-materials/life-processes/green-plants/classroom-visuals/Dia-gram_Parts_of_plants_Parts_of_a_plant_UNLABELLED-01.jpg

Disciplinary knowledge

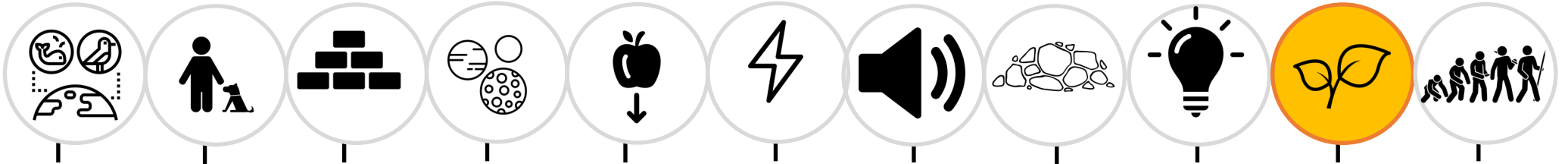
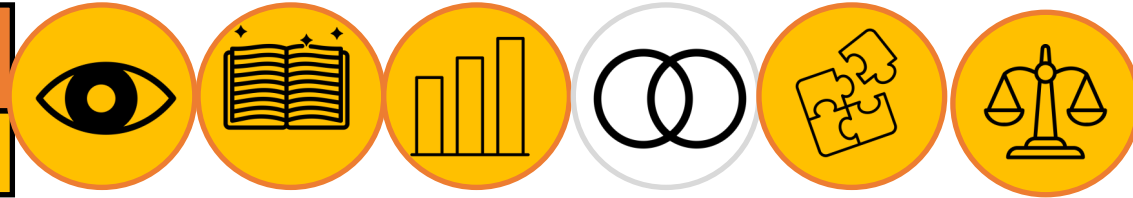
Observe over time

Working scientifically objective: Use straightforward scientific evidence to answer questions or to support their findings

See full TAPS plan: [Y3plan Function of stem - Review.docx](#)

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 2: Life and Growth

Starter:

Last year: re-cap Y2 objectives

Main:

Substantive knowledge:

Discuss what the children think plants need to grow and survive. Have they ever planted seeds before? What happens if we do not water plants/keep them in the dark/give them no soil? Ask children if they know how plants get their energy? Explain that they convert sunlight into energy. When growing plants we need to think about different factors such as the amount of light, water, temperature, room to grow and nutrients from soil. Explain that all plants need water and sunlight and when growing plants we must also consider temperature and soil but these vary according to the plant. Some plants for example need warmer conditions than others. Explain that they are going to set up an investigation to see how plant growth could be affected by amount of light, water, temperature and soil. Ask pupils if they have any ideas about how they could do this.

Explain that they will be growing plants (beans, or quick growing seeds such as cress) under different conditions: (1) light, water and soil; (2) no water; (3) no light; (4) no soil; (5) kept in a fridge; (6) no room to grow.

Each group will have four plants to pot up, and monitor throughout the week. Ask pupils to think about how we can ensure this is a fair test? Refer to independent variables and dependent variables e.g. same amount of water, same place for light, same type and amount of soil. Why is a fair test important?

Plenary/assessment:

Disciplinary knowledge

Observe over time

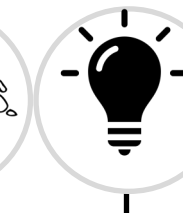
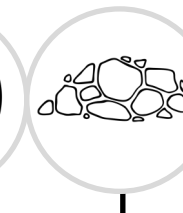
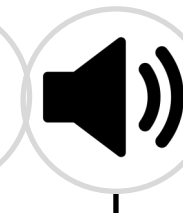
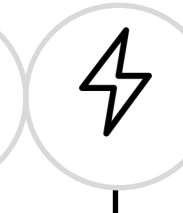
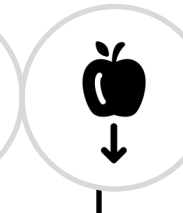
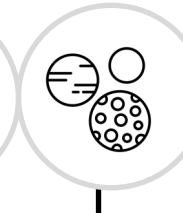
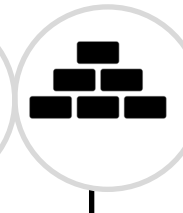
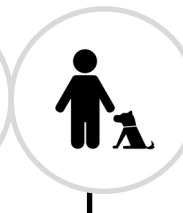
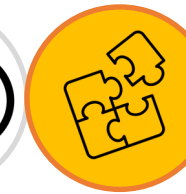
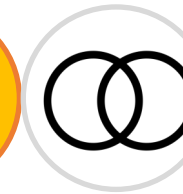
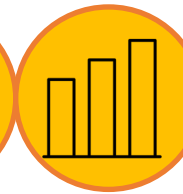
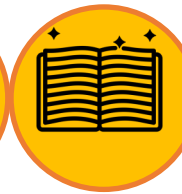
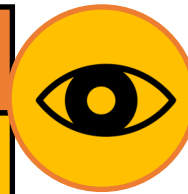
Working scientifically objective: setting up simple practical enquiries, comparative and fair tests

Each group will have six plants to pot up, and monitor throughout the week. Ask pupils to think about how we can ensure this is a fair test? E.g. variables e.g. same amount of water, same place for light, same type and amount of soil. Why is a fair test important?

Get children to make predictions, plant seeds, record findings over the week and write up a conclusion. Resources for this on next page.

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 2: Life and Growth (resources)

My prediction

Which plant do you think will grow the best?

I think plant number(s)with

..... will grow the best because

Which plant or plants do you think will not grow very well?

I think plant number(s)with

..... will not grow very well

because

Recording sheet

Observe changes each day.
Has the plant grown? Has anything changed?
What can you see?

Day	Plant 1 Water, sunlight, soil.	Plant 2 Sunlight, soil but no water.	Plant 3 Water, soil but no light.	Plant 4 Water, sunlight but no soil.
Day 1				
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				
Day 8				
Day 9				
Day 10				

My conclusion

Were my predictions correct? If not what was different?

.....
.....
.....

Which plant grew the best? Why?

Plant with grew the best. I

think this happened because

Did any plants not grow? Why?

Plant with did not grow. I think
this happened because

What did I find out about plant growth?

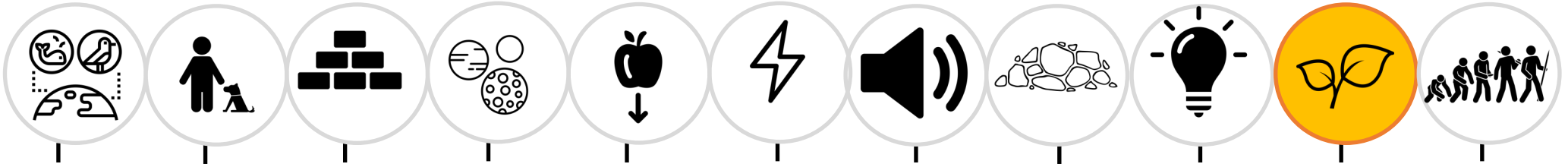
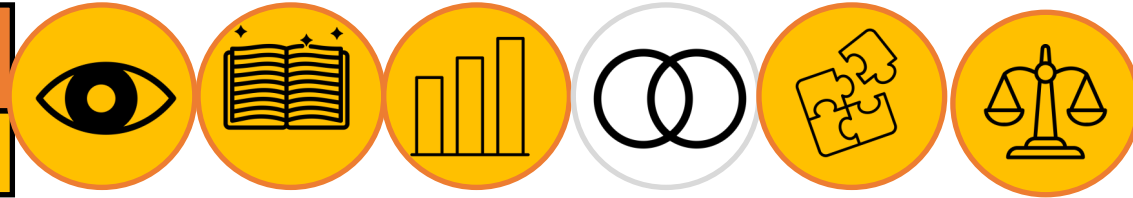
.....
.....

What could I investigate now to find out more?

.....
.....
.....

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 3: Variation in requirements

Starter

Recap/deeper thinking opportunity:

Thinking about what a plant requires to grow and survive, ask children: what if plants could talk?

<https://explorify.uk/en/activities/what-if/plants-could-talk>

Main

Substantive knowledge

Ask: would a plant that grows in the rainforest where it's very wet need the same amount of water as a plant growing in the desert where there's very little water? Would a plant growing between the cracks on a pavement need the same amount of room as a tree growing in the forest? Get children to discuss.

Watch clip on plant adaptations: <https://www.tigtagworld.co.uk/film/plant-adaptations-PRM00103/>

Explain, not all plants need the same amount to grow and survive as they have adapted to their environment.

Plenary/assessment

Disciplinary knowledge

Research

Working scientifically objective: reporting on findings from enquiries, including oral and written explanations, displays or presentations

Split the class into 4 groups, each group will research a plant that grows in a different habitats: tundra, desert, aquatic and rainforest. Children to make either a poster, or presentation on their plants, where it grows and what it needs to grow and survive and present to the rest of the class.

Potential plants to research:

Tundra: Arctic moss, arctic poppy.

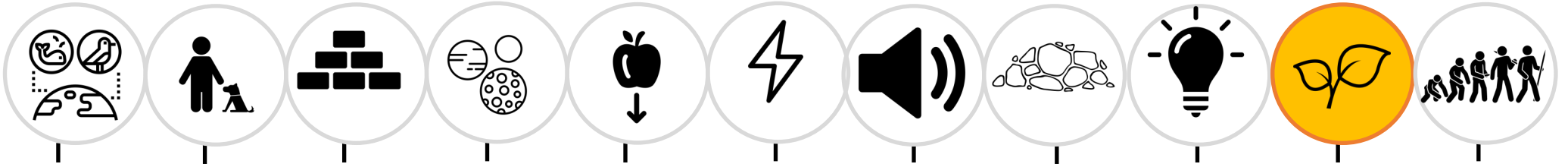
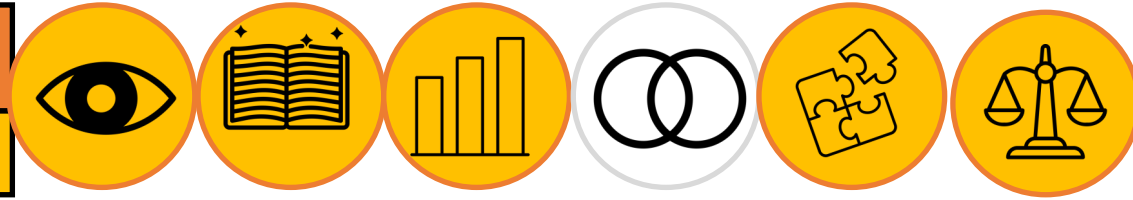
Desert: cacti, desert lily.

Aquatic: water lily, kelp.

Rainforest: kapok tree, orchids.

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 4: Water transportation

Starter

Recap

Main

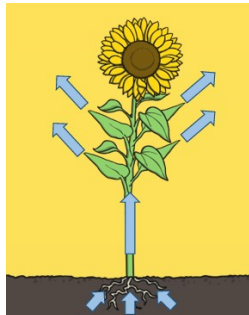
Substantive knowledge

Watch: <https://www.youtube.com/watch?v=Rz7zmSlvrtA>

Explain: The process of water transportation is the way water moves through a plant. The roots absorb water from the soil. The stem transports water to the leaves. Water evaporates from the leaves. This evaporation causes more water to be sucked up the stem. The water is sucked up the stem like water being sucked up through a straw.

In books, children use the diagram on the right, or

draw their own diagram to demonstrate how water is transported through a plant.



Plenary/assessment

Disciplinary knowledge

Comparative/fair test

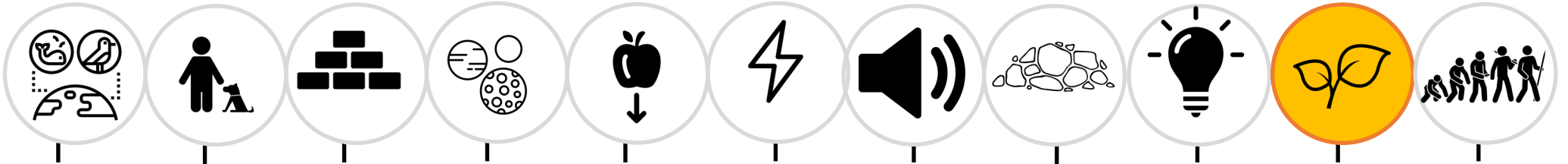
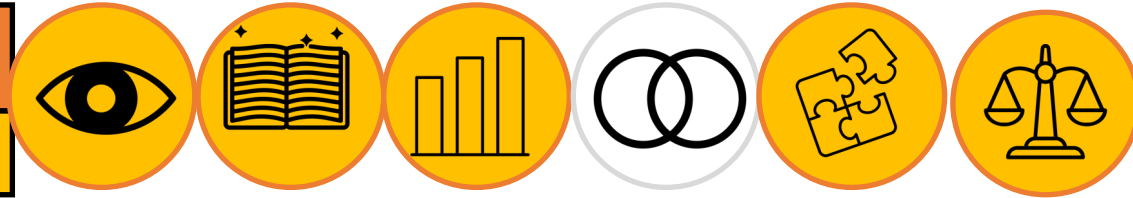
Working scientifically objective: taking accurate measurements using standard units, using a range of equipment, including thermometers

Ask: how does temperature affect how fast the stem sucks up water?

In groups, children plan investigation using comparative/fair test planning grid. Set it up! You will be changing the temperature in this investigation. You should keep everything else the same, such as the amount of water in each beaker (100ml), the size of the beaker, the type of flower, the length of the stem and the amount of water in each beaker. Place the beakers with flowers in around school in the different places you decide on. Remember, each place should be a different temperature. Observe over time and measure which flower transports all of its water first.

Year 3: Plants

SCIENTIFIC CONTEXT: Biology



Theme 5: Flowers and seeds

Starter

Recap

Allow the children to look inside a range of flowers. Ask them to identify different parts. Can they work out what the different parts are for? Children can dissect flowers and stick them on a sheet, then label. Look at each part closely using a hand lens or microscope. Children can cut open an ovary to describe what can be found inside.

Main

Substantive knowledge

The following video is a brief introduction to the male and female parts of the flower. <http://www.bbc.co.uk/learningzone/clips/reproduction-in-plants/117.html>

The following videos clearly show how the pollen from one plant must fertilise the female parts of another plant.
<http://www.bbc.co.uk/learningzone/clips/pollination-in-plants/118.html> <http://www.bbc.co.uk/learningzone/clips/how-plants-produce-seeds/2255.html> <http://www.bbc.co.uk/learningzone/clips/pollination-of-the-elephant-yam-plant-by-beetles/10553.html> <http://www.bbc.co.uk/learningzone/clips/fertilisation-in-plants/120.html>

Discuss how seeds are formed by exploring the different stages of plant life cycles over a period of time:
<https://www.bbc.co.uk/bitesize/topics/zk7h34j/articles/z7tbgwx>

Plenary/assessment

Create plant life cycles to show the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

HA: give examples of different types of pollination and dispersal.

Complete KWL grid