

Science – Year 5/6A Autumn 1

Living Things and Their Habitats

Illustrating Life Cycles

Session 2

Resource Pack

Images of non-flowering plants

Mosses



Liverworts



Ferns

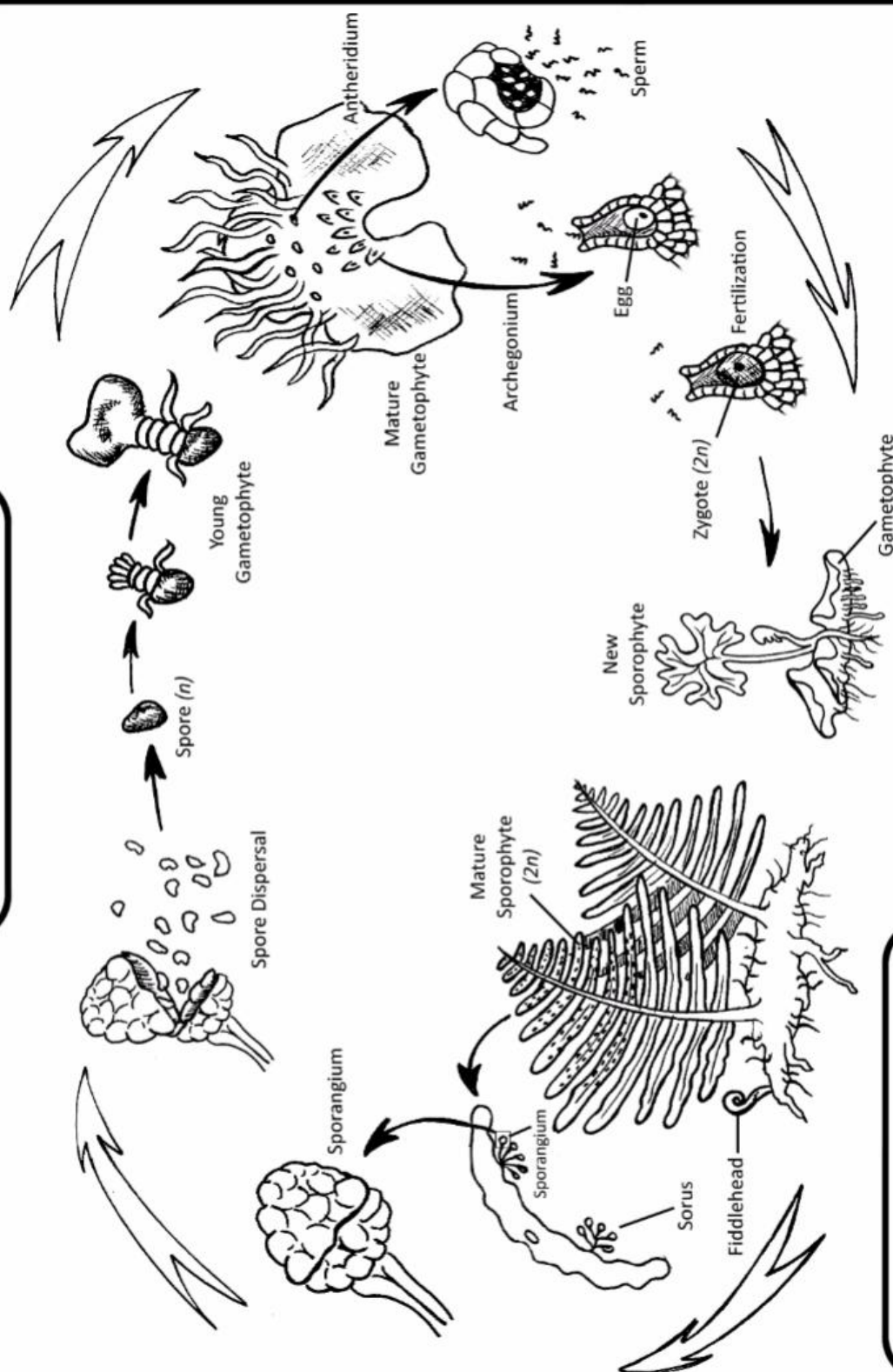


Conifers

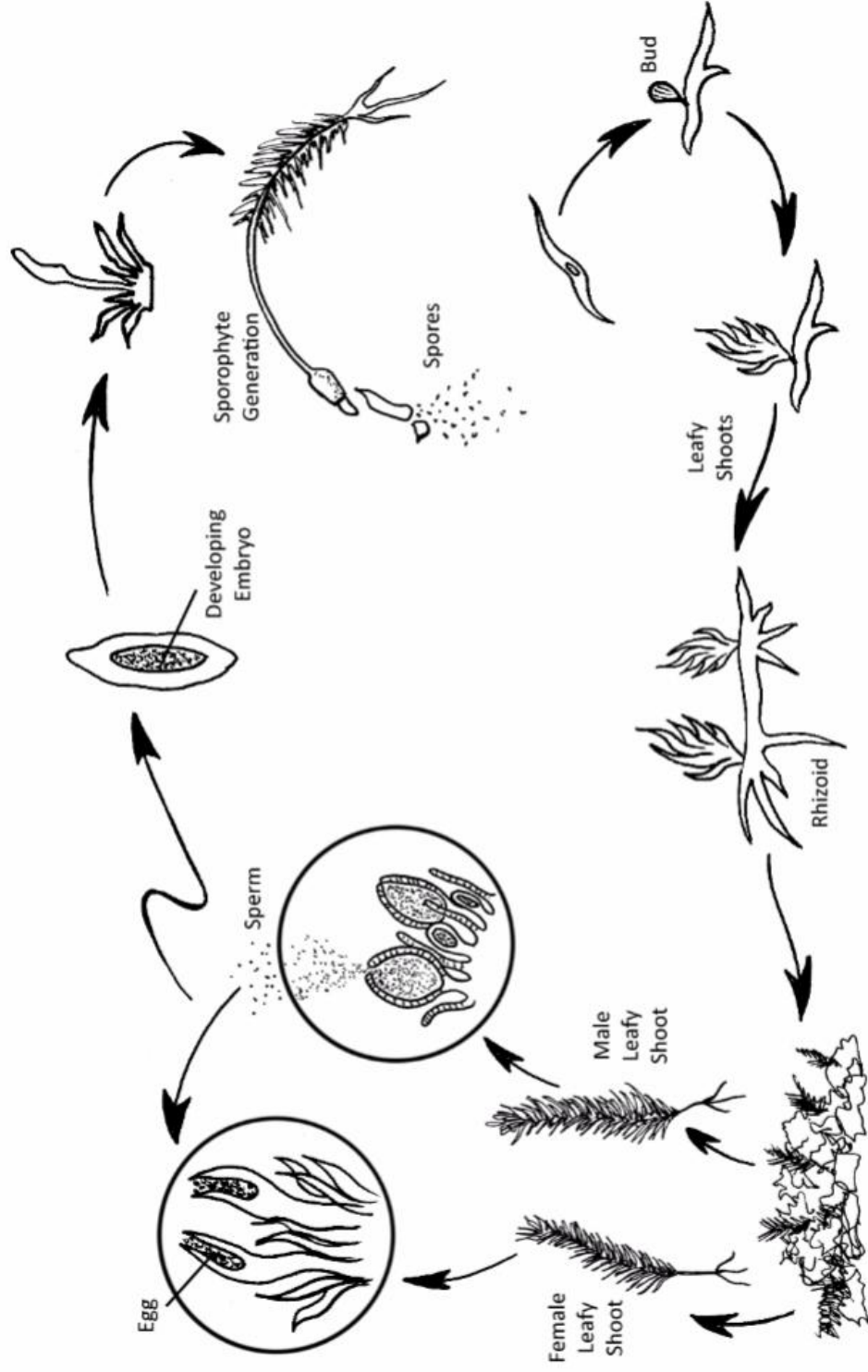


Non-flowering plant life cycles

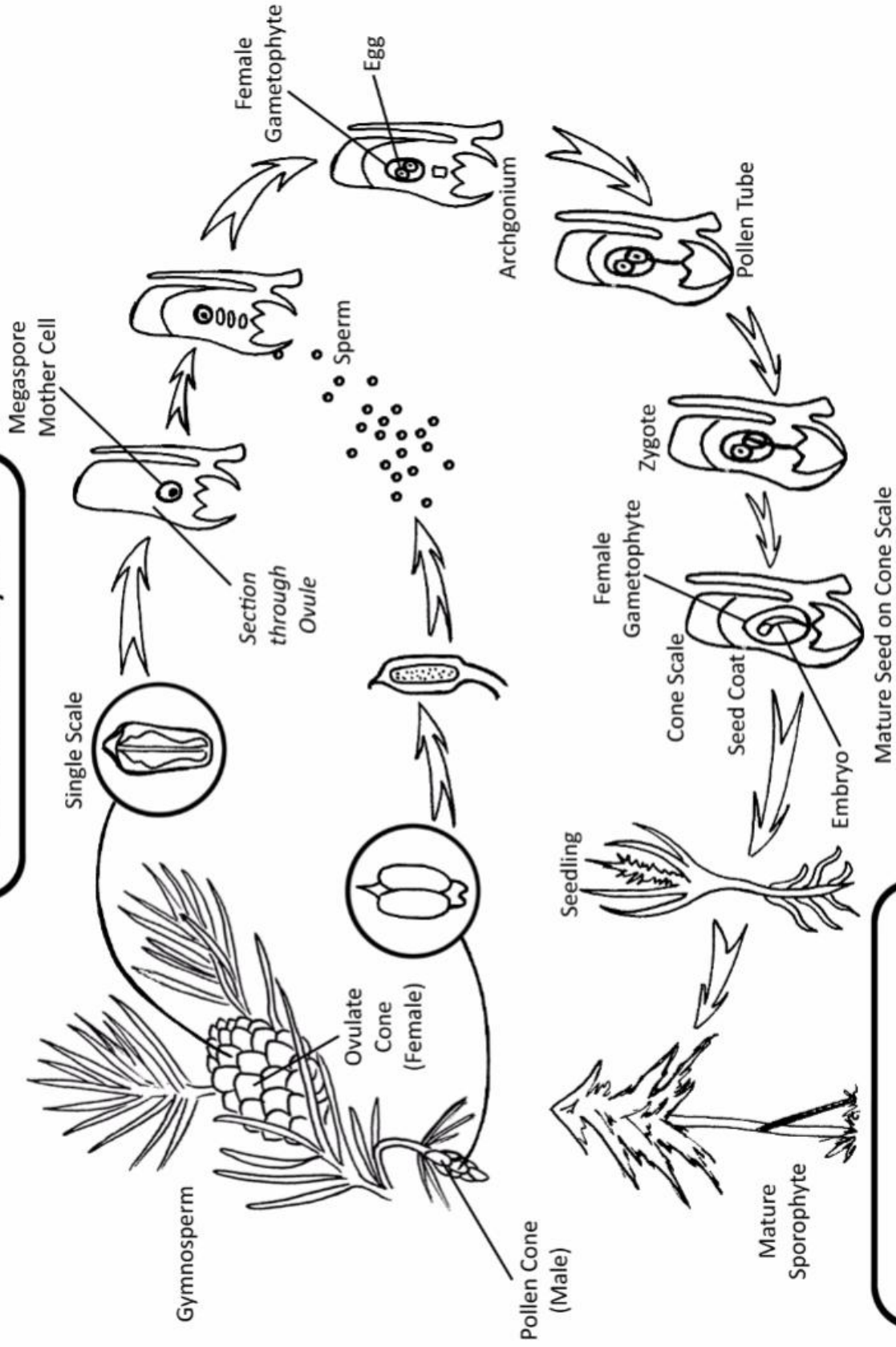
Fern Life Cycle



Moss Life Cycle



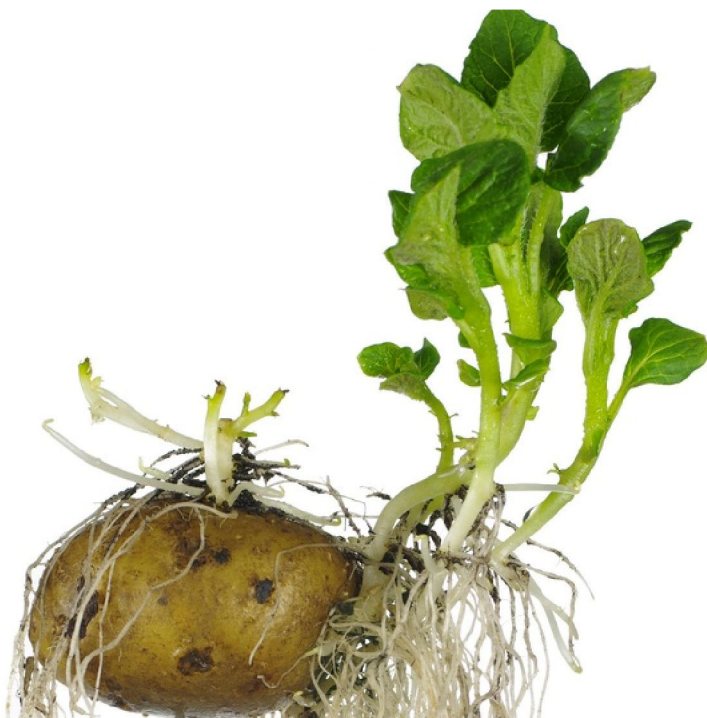
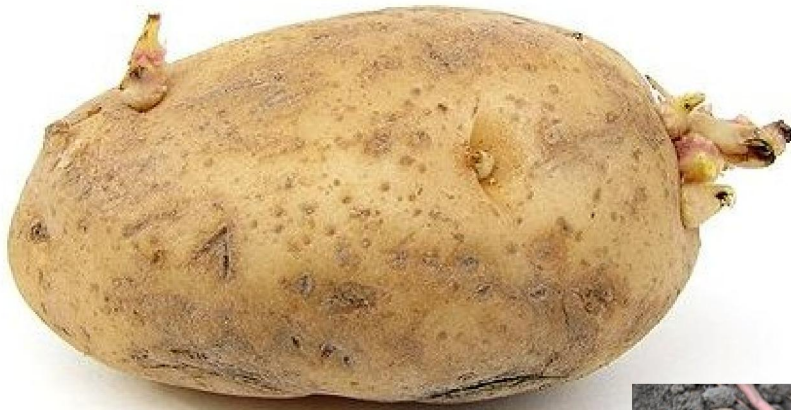
Conifer Life Cycle



Bulbs and corms



Tubers

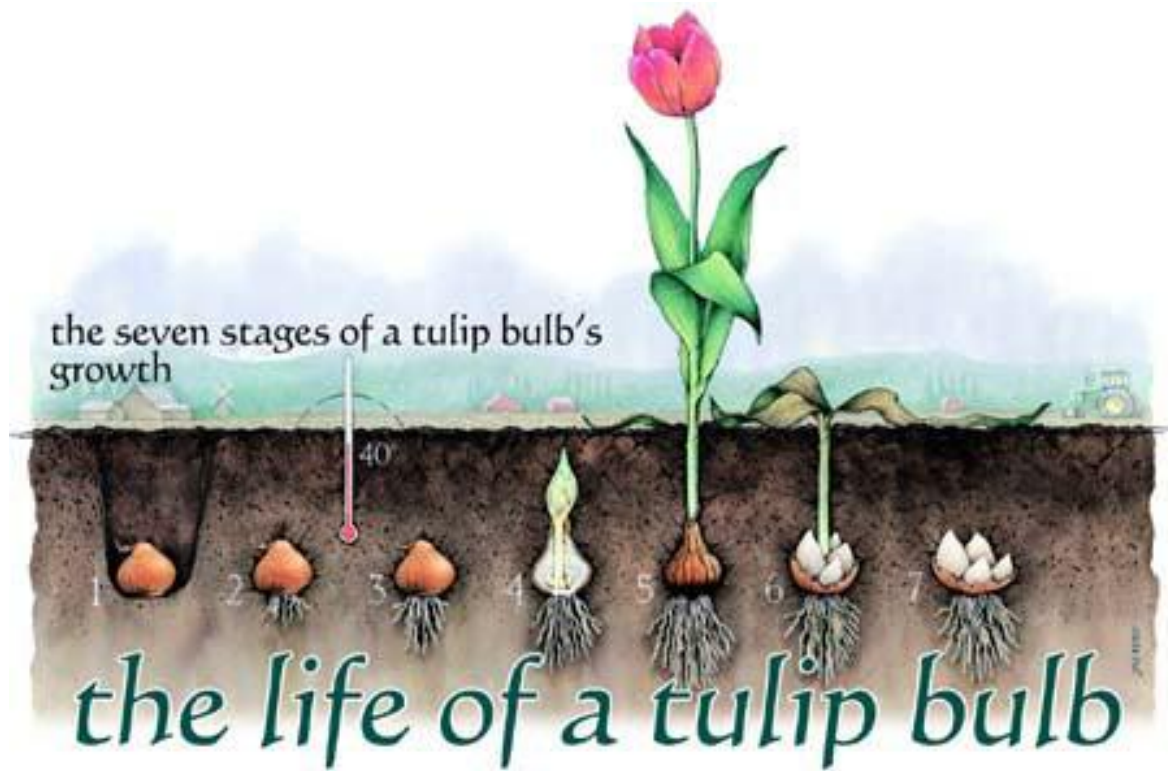


Runners

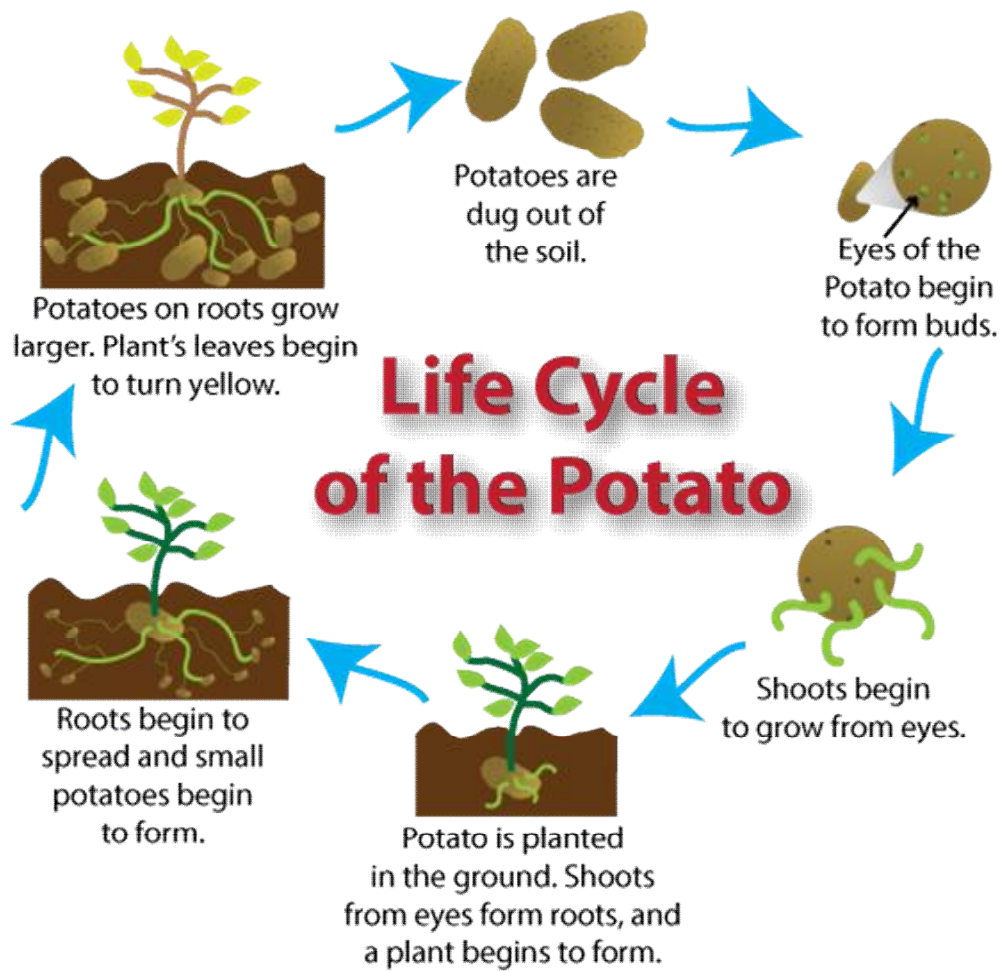


Asexual reproduction life cycles

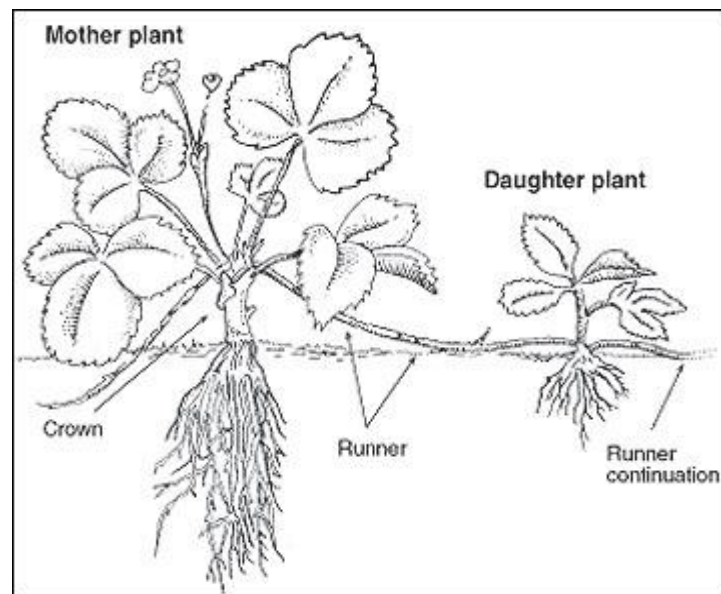
Tulip (bulb)



Potato (tuber)



Strawberry (runner)



Botanical images

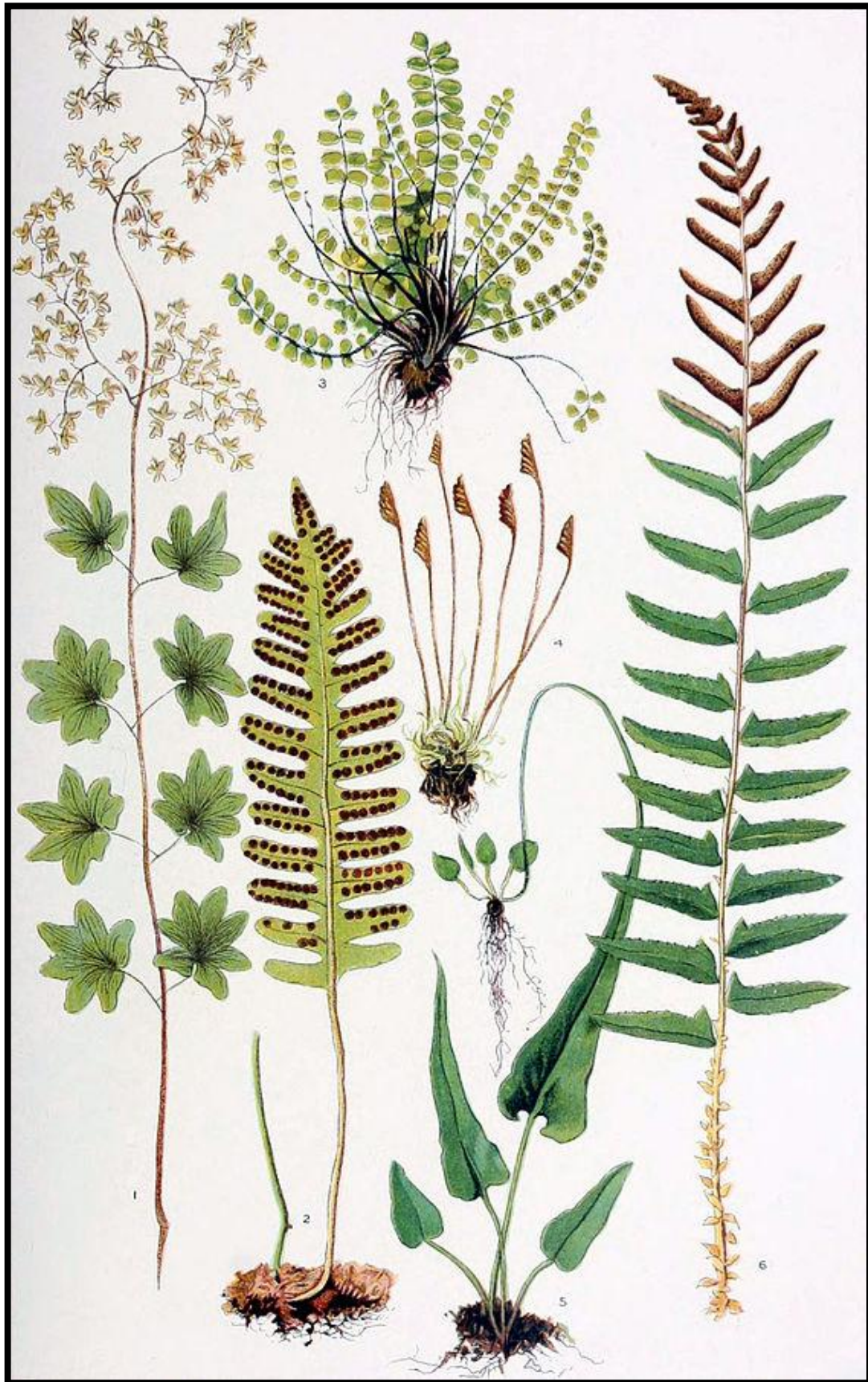












Advantages and disadvantages of sexual and asexual reproduction

	Asexual	Sexual
Advantages	<ul style="list-style-type: none">• Faster initial growth• A population can grow rapidly• Reduced competition	<ul style="list-style-type: none">• Variety• Adaptation possible• Seeds dispersed further from parent plant so competition for space can be reduced• More likely to survive disease due to variation
Disadvantages	<ul style="list-style-type: none">• Overcrowding can occur• No variation which can mean weaknesses or diseases passed on• Adaptation to a changing environment is not possible	<ul style="list-style-type: none">• Gametes are required• There is a limited amount of food stored in seeds• An isolated plant may struggle to reproduce

Where do you think self-pollinating plants fit into these advantages and disadvantages?

Y5 investigation guidance (teacher-facing)

- Ask children what they think an enquiry question is and explore the ‘developing useful scientific questions’ with them, noting how questions can become easier to investigate the more you drill down. Explain the process of question making, question sharing and question choosing, and then help them to come up with enquiry questions for their cuttings investigation
- Once they have identified their enquiry questions support children as they set up an investigation into the success of taking cuttings from various parts of plants (see instructions)
- Show children how to use the sticky-note approach to investigations, ensuring children identify what they would consider a successful propagation. Discuss what variables are and identify how they can ensure that their investigation is fair
- Ask children to predict what they think will happen
- Get children to draw and photograph the plant parts before placing them in the compost to grow and explain that they will need to monitor growth over the next few weeks
- Get children to also plant and subsequently observe spider or strawberry plants and a sprouting potato

Developing useful scientific questions

Initial question <i>(what is our overarching question)</i>	Improved version <i>(is there something more specific that we are looking to do?)</i>	Best version <i>(what are the details of what and how you want to explore an overarching question?)</i>
Can we grow new plants from existing ones?	How can we grow new plants from existing ones, without fertilisation	What will happen if we take a leaf cutting and plant it in compost?
How do we know that some plants reproduce asexually?	What can we observe to show us that a plant has reproduced asexually?	What will happen if we water and observe a sprouting potato over time?

Question making – *come up with initial questions*

Question sharing – *talk to others about your question ideas*

Question choosing – *pinpoint a ‘final’ question to use*

Y6 investigation guidance (teacher-facing)

- Get children to come up with their own enquiry questions as explored in Y5 – use this as an assessment to check understanding of this process
- Ask children to independently set up their investigations (see individual instructions) into the success of taking cuttings from various parts of plants. They should use the sticky-note approach to the investigation with which they should be familiar. Note the variables identified and how they intend to ensure their investigation is fair
- Ensure children identify what they would consider a successful propagation and to predict what they think will happen
- Use the Y6 challenge questions as children complete this investigation
- Get children to draw and photograph the plant parts before placing in compost to grow. They will need to monitor growth over the next few weeks
- Get children to also plant and subsequently observe spider or strawberry plants and a sprouting potato

Challenge questions for Y6:

- What do you think the advantages of taking cuttings are?
- What do you think will happen if you take a cutting from a diseased plant?
- Why don't you think plants that rely on asexual reproduction need to have bright flowers or strong perfumes?
- Why might vegetative propagation be useful to farmers?

Vegetative propagation investigation

Sticky-note investigations (after Goldsworthy and Feasy, 1997)

Stick filled in sticky-notes on the blank boxes to help organise thoughts – the sticky-notes can be moved as the investigation plan progresses. Alternatively use this online version:

<http://www.ciec.org.uk/planning-board.html>

Enquiry question:

VARIABLES

Thing I could change/vary

Thing I could observe or measure

Ensuring my test is fair	
I will change	
I will observe	

Predicting	
What I think will happen to the cuttings	

Results and patterns	
Plant and cutting type	What I observed

Results and patterns	
Plant and cutting type	What I observed

Table to record growth data

	Growth measured at weekly intervals				
	Week 0	Week 1	Week 2	Week 3	Week 4
Stem cutting					
Leaf cutting					
Root cutting					

	Growth measured at weekly intervals				
	Week 0	Week 1	Week 2	Week 3	Week 4
Stem cutting					
Leaf cutting					
Root cutting					

Stem cuttings

You will need:

- pot
- compost
- scissors
- geranium plant
- pencil
- water
- label
- plastic bag and elastic band
- rooting powder (optional)

Method:

1. Place compost in the pot, leaving enough room for watering
2. Using a sharp pair of scissors, cut off a shoot tip from the geranium plant that is about 5cm long. Cut just below a leaf node (the point where the leaf joins the stem) as this is where the new roots will grow from
3. Carefully remove all the lower leaves, leaving one or two at the top of the cutting
4. Use a pencil to make a hole in the compost and put the cutting in. Lightly press the soil back against the stem. (To ensure good growth you can dip the stem into a rooting powder before potting or use a product like Groovy Roots (http://www.nugel.co.uk/groovy-roots#g_1_0))
5. Label the cutting with the date and your name
6. Water the cutting
7. Place the pot in a plastic bag and secure with an elastic band to keep the air around the cutting moist
8. Place the pot on a windowsill in the light

Leaf cuttings

You will need:

- African violet plant
- pot
- compost
- vermiculite
- water
- plastic bag and elastic band
- scissors (optional)

Method:

1. Mix some compost and vermiculite in a ratio of 1:2
2. Place the compost mix in the pot, leaving enough room for watering
3. Take a mature leaf (i.e. not old and tough) from near the centre of the African violet plant including the petiole (leaf stem)
4. Cut the petiole at an angle of 45 degrees (optional, but this does encourage rooting)
5. Place the cut end into the compost up to the leaf blade itself (alternatively you can cut the leaf transversely into several sections and put the lower cut face of each into the compost)
6. Water the cutting lightly (take care not to over water or the leaf will rot)
7. Label the pot and place in a plastic bag secured by an elastic band to keep the air around the cutting moist
8. Place in a bright position out of direct sunlight
9. After about one month the cutting should be rooted and then a new plant will grow from the base of the leaf

Root cuttings

N.B. root cuttings for propagation of garden plants are usually taken in mid to late autumn or early winter when plants are dormant, so may not be so suitable to use with chn if the block is taught in the summer term, although some commonly occurring weeds will grow from small pieces of roots left in the soil & can be used:

You will need:

- pot
- compost
- scissors
- dandelion, bindweed or couch-grass root
- pencil
- water
- label

Method:

1. Place compost in the pot, leaving enough room for watering
2. Using a sharp pair of scissors, cut off a piece of root
3. Use a pencil to make a hole in the compost and put the cutting in. Lightly press the soil back over the root
4. Label the cutting with the date and your name
5. Water the cutting
6. Place the pot on a windowsill in the light and water regularly

Glossary

- Diff – different
- Chn – children
- Gp/s – group/s
- H/W – homework