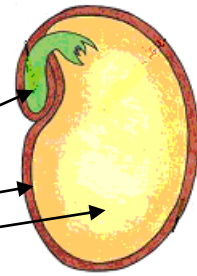


Unit 3: Growing plants (Intermediate 1)

Seed Biology

1. State that many plants can be grown from seeds.
2. Label seed diagram: embryo (root and shoot)
seed coat
food store
3. Know the function of seed parts:
 - embryo to grow into a new plant
 - food store to supply energy for growth
 - seed coat to protect the seed.
4. Define germination as the embryo growing and using up food store (reserves)
5. List 3 conditions needed for germination:
 - suitable temperature
 - water
 - oxygen.



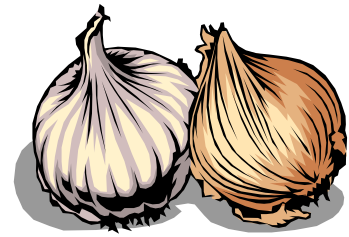
Germination

6. Explain why germination of seeds is delayed until the spring
(Reason: this is when the soil temperature rises.)
7. Explain the natural advantage of dormancy for the seed.
(Reason: delays germination until conditions are suitable for growth)
8. Define **photosynthesis** as the process that produces food, using sunlight.
9. State the food produced by photosynthesis is used for plant growth.

Growing plants from seeds.

10. List the 2 different methods used to get the correct seed spacing with large and small seeds:
 - large seeds sown individually (one at a time)
 - small seeds are mixed with silver sand, then sown.(helps space them out)
11. State that pelleted seeds are fine seeds enclosed in a ball of clay.
12. State that pelleted seeds take **longer** to germinate than non-pelleted seeds and require **more water**.
13. State that seeds with thick seed coats are chitted before germination.
14. State that chitting involves the seed coat being split, or cracked, to help the seed germinate.

Natural and Vegetative propagation



1. Know that **Vegetative propagation**:

- is the **reproduction** of plants **without seeds**.
- can be by **natural or artificial methods** as listed below:

Natural propagation

2. List the 3 possible structures involved in natural plant propagation:

- food storage organs
- attached offspring
- runners

3. List **two** examples of **food storage organs: bulbs and tubers**

4. Explain how **food storage organs**:

- allow some plants to survive the harsh winter as bulbs/tubers.
- bulbs have buds inside that grow into flowers or daughter plants.
- all contain starch produced by photosynthesis (in the summer).
- extra food (starch) produced in summer is stored for use during winter.
- new plant develops inside bulb and emerges in spring.

5. List **3** examples of **attached offspring: runners, offsets & plantlets**.

6. Explain how attached offspring benefit by being attached to the parent plant at the start of their growth. e.g. gain food from parent

7. Learn a **runner** - is a **horizontal stem** with a plantlet at the **end**. - when the plantlet's roots have grown, the runner can be separated from the parent plant

8. Learn an **offset**

- is a plantlet produced as a **side shoot**, at the **base** of the parent plant.
- can be separated from the parent plant and grow successfully

9. Learn a **plantlet** - is a miniature plant attached to the parent plant (leaf)

- can be removed and grown separately

Artificial propagation.

10. Learn **nodes** are
 - part of stem where leaves are attached
 - points on a plant that are good at growing.
 - grow well in **response to wounding** eg. **cuttings**.

11. List steps needed to taking **stem and leaf cuttings**.
 - cut below node with sharp knife / scissors
 - dip base of 'cutting' into rooting powder
 - place 'cutting' into rooting compost
 - water to dampen compost
 - *can be placed in propagator to increase growth*

12. Learn that rooting powders encourage root growth in cuttings.

- 13 List methods of reducing water loss by:
 - reducing leaf surface area
 - increasing humidity eg enclose cuttings or place in a mist propagator.

- 14 Describe **layering** for plants with long flexible stems:
 - stem is pegged down onto pot of rooting compost and left attached to parent plant
 - when roots develop at nodes, stem is cut separating new plant from parents

15. List advantages of layering:
 - new plant supplied with water and minerals from parent plant.
 - produces larger plants
 - successful for plants that are difficult to get cuttings from

- 16 List **advantages of heat** during propagation:
 - faster growth
 - prevention of frost damage.

- 17 List **disadvantages of heat** during propagation:
 - high water losses leading to **wilting**
 - higher energy costs
 - faster spread of diseases.

Conditions for plant growth - Composts & Fertilisers

COMPOSTS

1. List the **features** of good composts:
 - good drainage ('open' structure)
 - good water retention (can hold enough water)
 - reasonably sterile (free from bacteria and fungi)
 - enough minerals
2. State the **reasons** for each feature in good composts:
 - 'open' structure - for good aeration and drainage able to
 - good water retention - to avoid need for frequent watering.
 - reasonably sterile - reduces transfer of plant disease
 - minerals - needed for healthy plant growth.
3. Link **features to substances** in compost or soil:
 - 'open' structure - sand and perlite
 - good water retention - peat and peat substitutes
 - enough minerals - loam (natural supply of minerals)

Fertilisers

4. List **K, P and N** as the 3 minerals fertilizers add to compost
5. Recognise that **NPK ratio compares** levels of N, P, K minerals in fertiliser.



6. Link the minerals in fertilisers to their roles (job) in plant development:

K	- flower and fruit growth	↓ alphabetical order top to bottom
N	- leaf growth	
P	- root K flower and fruit	

7. List one **advantage** and one **disadvantage** of **liquid** fertilizers:
 - advantage of **liquid** fertilizer - quick acting (plant absorbs quickly)
 - disadvantage of **liquid** fertilizer - can be lost in drainage water
8. List one **advantage** and one **disadvantage** of **granular** fertilisers
 - advantage of **granular** fertilizer - only one application needed
 - disadvantage of **granular** fertilizer - slow to act

Conditions for plant growth : Watering Heating and Ventilation

Watering

9. State that all plants need sufficient water to survive
10. List two methods of watering plants by hand
 - hose
 - watering can
11. Recognise three methods of providing water with little effort, over a **long time**:
 - capillary matting
 - water retentive gel
 - automatic irrigation systems
12. List two signs of **over** watering
 - leaves soft and decayed
 - compost green, slimy and smelly
13. List two signs of **under** watering
 - leaves dry and brown
 - leaves may fall off

Heating and Ventilation

14. State that all plants need sufficient heat to survive.
15. List two methods of providing plants with heat
 - polythene tunnel
 - greenhouse
16. Recognise ventilation is needed to prevent decay caused by micro-organisms.
17. 12 Recognise two methods of ventilating a greenhouse as:
 - fans
 - automatically opening windows.
18. State that thermostats control temperature and ventilation
19. State that thermostats control temperature and ventilation.

