

Strand 2: Living things and their environment

2.1: Nutrition in plants

Section A

1. B
2. C
3. B
4. D
5. B
6. A
7. B

Section B

1.
 - (a) The process by which green plants make their own food using carbon (IV) oxide and water in the presence of light and chlorophyll.
 - (b) Light and carbon (IV) oxide.
2.
 - (a) Chlorophyll
 - (b) It absorbs light energy needed for photosynthesis.
3. Broad leaf surface to absorb more light. Thin leaf to allow efficient diffusion of carbon (IV) oxide and oxygen. Many chloroplasts containing chlorophyll to absorb light energy.
4. Produces food that provides energy and materials for growth in plants and other organisms. Releases oxygen needed for respiration. Removes carbon (IV) oxide from the atmosphere, helping to regulate the carbon cycle.
5.
 - (a) To prevent light from reaching that part of the leaf.
 - (b) The uncovered part will turn blue-black, while the covered part will remain yellow-brown, showing that starch was formed only where light was available.

2.2: Nutrition in animals

Section A

1. B
2. B
3. D
4. C
5. C
6. C
7. B
8. A
9. C
10. B

Section B

1.
 - (a) Jiggers
 - (b) Parasitic nutrition
 - (c) The parasite obtains nutrients from the host, causing tissue damage and depriving the host of nutrients. This may result in pain, swelling and weakness.
 - (d) Symbiosis: commensalism (Example: Egrets and cows) and mutualism (Example: oxpecker and zebra); Saprophytism. Example: fungi
2.
 - (a) A – Herbivore; B – Carnivore
 - (b) Heterodont.
 - (c) They have chisel-shaped incisors for seizing prey and cutting flesh.
They have long and sharp pointed canines for tearing flesh.
They have carnassial teeth for slicing through flesh and crushing bones.
 - (d) A. This is because plant food contains cellulose, which is tough and requires extensive chewing to break it down.
3.
 - (a) I – Oesophagus; J- Stomach; K- Pancreas; L- Ileum
 - (b) Peristalsis
 - (c) Complete the digestion of food with the help of digestive enzymes.
Absorb the products of digestion, such as glucose, amino acids, fatty acids and glycerol, into the blood and lymph.
It has many villi that increase the surface area for efficient absorption.
4.
 - (a) Carbohydrates: Glucose/simple sugars
 - (b) Proteins: Amino acids
 - (c) Lipids: Fatty acids and glycerol
5.
 - (a) Provides an acidic medium for the action of pepsin. Kills harmful microorganisms in food.
 - (b) Pepsin digests proteins into peptides.
 - (c) Peptides
 - (d) Mucus reduces friction during churning and protects the stomach walls from being corroded by hydrochloric acid.
 - (e) Chyme
6.
 - (a) Salivary amylase or Ptyalin
 - (b) Maltose
 - (c) Bile emulsifies fats into tiny droplets, increasing their surface area for faster digestion by lipase.
 - (d) Pancreatic lipase
 - (e) Fatty acids and glycerol
 - (f) Ileum (small intestine)
- 7.

- (a) Endoparasites
- (b) Tapeworms and roundworms
- (c) They absorb nutrients from the goat, reducing the nutrients available for growth and body functions. They damage internal tissues or cause blood loss, leading to weakness and poor health.
- (d) Regularly deworm the goat using an appropriate deworming medicine.

2.3: Reproduction in plants

Section A

- 1. B
- 2. D
- 3. B
- 4. C
- 5. C
- 6. A
- 7. C
- 8. B
- 9. C
- 10. C
- 11. B
- 12. B
- 13. C

Section B

- 1.
 - (a) Brightly coloured flowers attract bees by providing visual signals that help bees locate the flowers. They may also provide nectar.
 - (b) Brightly coloured petals to attract insects. Sweet scent to attract insects. Nectar to provide food.
 - (c) Maize is wind-pollinated, so it does not need brightly coloured petals to attract insects.
 - (d) Wind
- 2.
 - (a) Pesticides may kill or repel bees and other pollinating insects. This reduces the number of insects visiting pumpkin flowers and therefore reduces pollination. Fewer flowers are fertilised, resulting in fewer fruits and a lower yield.
 - (b) Plant flowering plants around the farm to attract pollinators. Reduce or avoid spraying pesticides during the flowering season.
 - (c) Pollination transfers pollen grains from the anther to the stigma, allowing the pollen grain to germinate and form a pollen tube through which the male gamete reaches the ovule for fertilisation.
- 3.
 - (a) A - Filament, B - Anther, C - Ovule, D – Petal
 - (b) Filament – It is part of stalk on which the other parts of the flower are attracted.
 Anther – It produces pollen grains which contain the male reproductive cells.
 Ovule – Brightly coloured and produce a sweet scent. They attract pollinators to the flower.

Petal – Bears and supports the anther.

4.
 - (a) Cross-pollination
 - (b) Introduces genetic variation among offspring. Increases the chances of producing offspring with desirable characteristics.
 - (c) Flowers of the same species have compatible reproductive cells, allowing fertilisation to occur.
 - (d) Insects and wind.
5.
 - (a) Coconut – water; Tomato – animal; Beans- self-dispersal
 - (b) Coconut: Fibrous, buoyant husk that enables it to float.
Tomato: Fleshy, brightly coloured fruit that attracts animals to eat it.
Beans: Dry pod that splits or bursts open, scattering the seeds.
 - (c) Prevents overcrowding and competition for light, water, mineral salts and space.
Enables plants to colonise new areas.
Reduces competition between the parent plant and its offspring.
6.
 - (a) Promotes pollination of flowering plants. Increases fruit and seed production in crops. Supports biodiversity by helping plants reproduce and maintain healthy ecosystems.
 - (b) Kills pollinating insects such as bees and butterflies. Repels or disrupts their feeding and reproductive activities.
 - (c) A reduction in pollinating insects would reduce pollination of crops that depend on them. This would lead to less fertilisation, fewer fruits and seeds and therefore reduced food production.
7.
 - (a) Ovary
 - (b) C and D
 - (c) Ovule and ovary.
 - (d) Sepal, petals, stamen and style.
 - (e) It results in the formation of seeds. It leads to fruit formation. It ensures continuation of the species through production of new plants.
8.
 - (a) A
 - (b) The flower is large, conspicuous with brightly coloured petals or leaves. They have nectaries to secrete nectar. Anthers are small and firmly attached to the filament to resist breakage by insects when they rub against them. They have small sticky stigma located inside the flower for easier collection of pollen grains from the insect body.
 - (c) Wind-pollinated flowers produce large quantities of pollen grains because much of the pollen is lost or carried away by the wind. Producing many pollen grains increases the chance that some will reach the stigma of another flower.

2.4: The interdependence of life

Section A

1. B
2. B

3. B
4. B
5. B
6. B
7. B
8. C
9. C
10. B
11. B
12. B
13. B
14. C

Section B

1.
 - (a) Deforestation/clearing of forests for farming. Burning of vegetation
 - (b) Destroys habitats, causing loss of shelter and food for animals. Reduces biodiversity as some organisms die or migrate. Increases soil erosion, leading to loss of fertile soil and reduced plant growth.
 - (c) Reforestation/planting trees. Protecting remaining forests from further clearing
2.
 - (a) Grass → Grasshopper → Frog → Snake → Hawk
 - (b) Producer: Grass; Primary consumer: Grasshopper; Secondary consumer: Frog; Tertiary consumer: Snake
 - (c) Energy decreases at each trophic level because some energy is lost to the environment during excretion in sweat and urine, defecation through undigested matter, heat loss, death and decay and through incomplete predation of the prey.
3.
 - (a) Salinity
 - (b) High salinity makes it difficult for most plants to absorb water through their roots. It may also cause excess salt to accumulate in plant tissues, which can inhibit growth.
 - (c) Mangroves and salt-tolerant grasses (halophytes).
 - (d) Temperature; Water availability; Light intensity
4.
 - (a) Grass → Grasshopper → Lizard → Hawk
Grass → Rabbit → Hawk
Grass → Mouse → Snake → Hawk
 - (b) Grass – producer; grasshopper, rabbit, mouse – primary consumer; lizard, snake – secondary consumer.
 - (c) Decomposers break down complex organic matter into simpler substances. They help in cleaning up the ecosystem. They also help in recycling nutrients.
5.
 - (a) Decomposers
 - (b) Bacteria and fungi
 - (c) Releases mineral nutrients into the soil, making them available for uptake by plant roots. Forms humus/organic matter, which improves soil fertility and water-holding capacity.

6.

- (a) A- Competition; B – Predation
- (b) Predation helps maintain a balanced ecosystem by controlling the population of prey species. It prevents prey populations from becoming too large and reduces competition for food and other resources.
- (c) Parasitism – a tick feeding on the blood of cattle.
Symbiosis – bees obtain nectar from flowers while pollinating the flowers.

7.

- (a) Water – It is needed by living organisms for processes such as photosynthesis, transport of substances and other life processes. Adequate water enables organisms to survive and reproduce.
Wind – Wind aids in processes such as pollination and seed dispersal. Strong winds, however, may damage plants and increase water loss.
Light – Light provides energy for photosynthesis in green plants. It also influences the growth and development of plants.
- (b) Predation controls the population of prey organisms, preventing overpopulation and excessive competition for resources. Symbiosis allows organisms to interact in ways that may provide benefits such as food, protection or other resources, helping populations survive within the ecosystem.

8.

- (a) Reducing the lion population may cause the population of their prey to increase. This may lead to overgrazing or depletion of vegetation, reducing food and other resources available to other organisms and disrupting the food chain.
- (b) Loss of species and reduction in wildlife populations. Loss of genetic diversity.
- (c) Strengthen anti-poaching patrols and law enforcement. Educate local communities on wildlife conservation and involve them in conservation activities. Protect and restore wildlife habitats.