FIRST TERM MODEL QUESTION PAPER 2024 WITH ANSWER KEY SET 2
BASIC SCIENCE - Standard V
Time: 2 hours
(Prepared by www.educationobserver.com)

Activity 1: Ecosystems and Food Chains

a. Discuss the concept of a food web.

- Identify three producers in an ecosystem.
- List two primary consumers and two secondary consumers.
- Explain the role of decomposers in maintaining the balance of an ecosystem.

b. Examine the impact of human activities on food chains.

- How does pollution affect aquatic food chains?
- Suggest ways to minimize human impact on ecosystems.

Activity 2: Types of Habitats

a. Describe the habitat of a deer and a frog.

- What are the key features of these habitats that support the animals living there?
- How do these features contribute to the survival of these species?

b. Define the term "habitat."

- Provide examples of three different types of habitats around your school or home.
- Explain how these habitats meet the needs of the organisms living in them.

Activity 3: Photosynthesis and its Importance

a. Describe the process of photosynthesis.

- What are the inputs and outputs of photosynthesis?
- How does this process contribute to the energy flow in an ecosystem?

b. Discuss the importance of photosynthesis for life on Earth.

- What would happen to living organisms if photosynthesis stopped?
- Explain the relationship between photosynthesis and respiration.

Activity 4: The Water Cycle

a. Explain the stages of the water cycle.

- Define evaporation, condensation, and precipitation.
- How does the water cycle help in maintaining the availability of fresh water on Earth?

b. Discuss the impact of climate change on the water cycle.

- How could changes in the water cycle affect human activities?
- Suggest measures to mitigate the impact of climate change on water resources.

Activity 5: Plant Adaptations

a. Examine the adaptations of plants to different environments.

- Describe two adaptations of desert plants.
- How do aquatic plants adapt to their environment?

b. Conduct an observation of plants in your surroundings.

- Identify one plant with leaves adapted to conserve water.
- Explain how the structure of its leaves helps in water conservation.

Activity 6: Human Impact on Natural Resources

a. Discuss how human activities affect natural resources.

- Provide examples of human activities that lead to the depletion of natural resources.
- What are the consequences of deforestation on water resources?

b. Suggest ways to conserve natural resources.

- What role can students play in conserving water and energy?
- Propose a school project focused on environmental conservation.

Activity 7: Diseases and Prevention

a. List the differences between communicable and non-communicable diseases.

- Provide examples of each type of disease.
- How do vaccinations help prevent communicable diseases?

b. Discuss the importance of personal hygiene in preventing diseases.

- What daily habits can reduce the risk of getting sick?
- How can schools promote hygiene among students?

Activity 8: Seeds and Germination

a. Describe the process of seed germination.

- What conditions are necessary for a seed to germinate?
- How does the cotyledon support the growth of a seedling?

b. Explain the concept of seed dispersal.

- What are the different methods of seed dispersal?
- How do animals and wind contribute to the dispersal of seeds?

Answer key

Activity 1: Ecosystems and Food Chains

a.

- Producers:
  - Examples include plants, algae, and phytoplankton.
- Primary Consumers:
  - Herbivores such as deer and grasshoppers.
- Secondary Consumers:
  - Carnivores like frogs and birds that eat herbivores.
- Role of Decomposers:
  - Decomposers like bacteria and fungi break down dead organisms and waste, returning essential nutrients to the soil, which are then used by producers. This helps maintain the balance of the ecosystem.

b.

- Impact of Pollution:
  - Pollution, especially water pollution, can disrupt aquatic food chains by killing off primary producers like algae or affecting the health of fish and other organisms. This disruption can cascade up the food chain, affecting all organisms that depend on the affected species.
- Minimizing Human Impact:
  - Reducing waste, controlling pollution, protecting natural habitats, and using sustainable practices in agriculture and fishing can help minimize human impact on ecosystems.

Activity 2: Types of Habitats

a.

- Habitat of Deer:
  - Deer typically inhabit forests, grasslands, and savannas. These habitats provide them with ample food (plants), cover from predators, and space to roam.
- Habitat of Frogs:
  - Frogs are often found in wetlands, ponds, and rainforests. These habitats offer moisture, which is essential for their skin and for laying eggs, as well as plenty of insects to eat.
- Key Features:
  - The forest habitat provides shelter, food, and protection for deer.
  - Wetlands offer frogs the necessary water for breeding and maintaining their moist skin, which is vital for respiration.

b.

- Definition of Habitat:
    - A habitat is the natural environment where an organism lives, and it provides the necessary resources for survival such as food, water, and shelter.
- Examples of Habitats:
    - Forests: Home to trees, deer, birds, and insects.
    - Ponds: Habitat for frogs, fish, aquatic plants, and insects.
    - Deserts: Support cacti, lizards, and camels.
- Meeting Needs:
    - Each habitat provides specific conditions that meet the needs of the organisms living there, such as water availability in ponds or shade in forests.

Activity 3: Photosynthesis and its Importance

a.

- Process of Photosynthesis:
    - Photosynthesis is the process by which plants use sunlight, carbon dioxide, and water to produce glucose (food) and oxygen.
- Inputs and Outputs:
    - Inputs: Sunlight, carbon dioxide (CO_2), and water (H_2O).
    - Outputs: Glucose ($C_6H_{12}O_6$) and oxygen (O_2).
- Contribution to Energy Flow:
    - Photosynthesis is the foundation of the energy flow in an ecosystem, as it provides the primary energy source (glucose) for producers, which are then consumed by other organisms.

b.

- Importance of Photosynthesis:
    - Photosynthesis is crucial because it produces oxygen, which is necessary for the survival of most life forms, and it is the primary source of energy for nearly all ecosystems.
- Impact of Stopping Photosynthesis:
    - If photosynthesis stopped, plants would die, leading to a collapse of food chains, resulting in the extinction of herbivores, followed by carnivores.
- Relationship with Respiration:
    - Photosynthesis produces glucose and oxygen, which are used in respiration to release energy for living organisms. Respiration, in turn, produces carbon dioxide and water, which are used in photosynthesis.

Activity 4: The Water Cycle

a.

- Stages of the Water Cycle:
  - Evaporation: The process by which water is converted from liquid to vapor due to heat from the sun.
  - Condensation: The process by which water vapor cools and turns back into liquid droplets, forming clouds.
  - Precipitation: When water droplets in clouds become too heavy, they fall to the earth as rain, snow, sleet, or hail.
- Maintaining Fresh Water Availability:
  - The water cycle helps recycle water, ensuring that fresh water is continuously available by moving water from oceans to the atmosphere, then to the land, and back to the oceans.

b.

- Impact of Climate Change:
  - Climate change can alter the water cycle by increasing evaporation rates, causing more extreme weather events, and shifting precipitation patterns, leading to droughts or floods.
- Effects on Human Activities:
  - Changes in the water cycle can affect agriculture, water supply, and energy production. For example, reduced rainfall can lead to water shortages, while increased rainfall can cause flooding.
- Mitigation Measures:
  - Strategies include reducing greenhouse gas emissions, conserving water, improving water management, and protecting wetlands to help mitigate the impact of climate change on the water cycle.

Activity 5: Plant Adaptations

a.

- Adaptations of Desert Plants:
  - Thick, waxy cuticles: Reduce water loss.
  - Deep or widespread root systems: Maximize water absorption.
- Adaptations of Aquatic Plants:
  - Flexible stems: Allow plants to move with water currents.
  - Air-filled tissues: Help plants float and keep leaves above water for photosynthesis.

b.

- Observation of Plant Adaptations:

    - Example: The cactus has leaves reduced to spines and thick stems that store water, helping it survive in arid environments.
    - Water Conservation: The spines reduce water loss by minimizing the surface area, while the thick stems store water for dry periods.

Activity 6: Human Impact on Natural Resources

a.

- Human Activities and Natural Resources:
    - Deforestation: Leads to habitat loss, reduced biodiversity, and disruption of water cycles.
    - Overfishing: Depletes fish populations, disrupting marine ecosystems.
    - Mining: Leads to soil degradation and water pollution.
- Consequences of Deforestation:
    - On Water Resources: Leads to soil erosion, reduced rainfall, and altered water cycles, resulting in decreased water availability.

b.

- Conserving Natural Resources:
    - Role of Students: Students can conserve water by fixing leaks, using water-saving fixtures, and reducing energy consumption by turning off lights when not in use.
    - School Project: A project could focus on creating a school garden using recycled water, organizing energy-saving campaigns, or conducting clean-up drives to reduce waste and protect natural habitats.

Activity 7: Diseases and Prevention

a.

- Communicable vs. Non-Communicable Diseases:
    - Communicable Diseases: Spread from person to person through pathogens (e.g., influenza, tuberculosis).
    - Non-Communicable Diseases: Not spread through pathogens; usually lifestyle-related (e.g., diabetes, heart disease).
- Role of Vaccinations:
    - Vaccinations help prevent communicable diseases by building immunity against specific pathogens, reducing the spread of disease in populations.

b.

- Importance of Personal Hygiene:
    - Daily Habits: Washing hands regularly, maintaining oral hygiene, and using clean water can reduce the risk of infections.

    - School Promotion: Schools can promote hygiene by providing handwashing facilities, teaching hygiene practices, and encouraging students to follow healthy routines.

Activity 8: Seeds and Germination

a.

- Process of Seed Germination:
    - Germination begins when a seed absorbs water, leading to the activation of enzymes that start growth. The radicle emerges first, followed by the shoot.
- Necessary Conditions:
    - Water, oxygen, and a suitable temperature are essential for germination. Light is also necessary for photosynthesis after the seedling emerges.
- Role of Cotyledon:
    - The cotyledon provides stored nutrients to the developing seedling until it can produce its own food through photosynthesis.

b.

- Seed Dispersal:
    - Methods: Wind (e.g., dandelions), water (e.g., coconuts), animals (e.g., berries eaten by birds), and mechanical (e.g., explosive seed pods).
    - Role of Animals and Wind:
        - Animals disperse seeds by eating fruits and excreting seeds elsewhere. Wind disperses lightweight seeds by carrying them over long distances.