

## **Interactions & Ecosystems / Plants for Food and Fiber Learning Outcomes - Student Friendly Language**

Investigate and describe relationships between humans and their environments. Identify related issues and scientific questions.

- Show how different environments meet basic needs for living things (include energy, moisture, habitat and gas exchange)
- Describe examples of how different living things interact and depend on each other- include adaptations, symbiosis, predator-prey and how humans use parts of the environment.
- Explain how human use of environmental factors is different in various cultures and how it has changed over time.
- Identify examples of human impacts on ecosystems
- Investigate and analyze how human wants and needs impact how we impact the environment

Investigate life process and structures of plants; interpret related characteristics and needs of plants in a local environment.

- Describe the general structure and function of seed plants.
- Investigate and interpret variations in plant structure.
- Explain how different structures help plants adapt to their environments.
- Investigate and interpret variations in needs of different plants and their tolerance for different growing conditions.
- Describe processes of diffusion, osmosis, transpiration, photosynthesis and gas exchange in plants.
- Describe life cycles of seed plants including how they germinate, grow and reproduce.

Trace and interpret the flow of energy and other materials in an ecosystem.

- Identify biotic and abiotic factors within a given ecosystem
- Describe interactions between biotic and abiotic factors
- Identify producers, consumers and decomposers within a given ecosystem
- Describe how energy is supplied to, and flows through a food web by:
  - Explaining how energy and nutrients are stored in plants and animals
  - Describe how energy is recycled through plants, animals, fungi, bacteria and other microbes
  - Predicting effects of changes to any part of a food web - describing multiple impacts.
- Describe how water and carbon are cycled through an ecosystem
- Identify ways that pollutants enter an ecosystem
- Describe how pollutants move through an ecosystem
- Explain how some pollutants can be concentrated (build up) in some organisms

Investigate plant uses and identify links among needs, technologies, products and impacts.

- Illustrate and explain the essential role of plants within the environment.
- Describe human uses of plants in a variety of ways (food, raw materials, other)
- Describe how land use has changed over time.
- Investigate problems and issues in maintaining productive plants within sustainable environments.
- Identify questions for further study.

Analyze plant environments and identify impacts of specific factors and controls.

- Describe methods used to increase yields of plants by modifying or creating different environments.
- Investigate and describe characteristics of different soils and their major components.
- Identify things we do that enhance (make them better) or degrade (make them worse) soils
- Describe and interpret the consequences of using herbicides, pesticides or biological controls in agriculture and forestry

Identify and Interpret relationships among human needs, technologies, environments, and the culture and use of living things as sources of food and fiber.

- Investigate and describe development of plants varieties through selective breeding and identify related needs and problems.
- Investigate and identify intended and unintended consequences of environmental management.
- Identify effects of different practices on sustainability of agriculture and environmental resources.

Monitor a local environment, and assess the impacts of environmental factors on growth, health and reproduction of organisms.

- Investigate a variety of habitats
- Describe and interpret distribution patterns of living things found in those habitats
- Investigate and interpret evidence of interaction and change
- Identify signs of ecological succession in local ecosystems

Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments.

- Identify intended and unintended consequences of human activities on environments.
- Describe and interpret examples of scientific investigations that help when making decisions about the environment.
- Give examples that illustrate the limits of science and technology in making decisions about life supporting environments.
- Analyze a local environmental issue or problem based on evidence from a variety of sources; give possible solutions and consequences.