

Division of Outdoor Experiences

Functioning Forests

Grade Level: Sixth Grade

Length of Program: 2 ten-minute video segments

Setting: Asynchronous Remote Learning

State Standard:

6.LS.4: Living systems at all levels of organization demonstrate the complementary nature of structure and function.

Theme: The ecosystem services of a forest can be explored by looking at the structure and function of trees.

Objectives:

- At the end of the program, students will be able to define structure and function in biological terms
- At the end of the program, students will be able to describe two ways a forest helps to sustain other organisms
- At the end of the program, students will be able to relate one component of a tree's structure to its function in an ecosystem

Vocabulary:

- Biological structure: answers the questions: What does it look like? What is it made of?
- Biological function: answers the questions: What does it do? What is its job?
- Ecosystem: community of organisms interacting with one another and their nonliving environment
- Ecosystem services: the benefits people or other living things obtain from an ecosystem
- Provisioning services: any benefit to people that can be extracted from nature
- Regulating/supporting services: underlying ecosystem processes which allow the Earth to support life and moderate natural phenomena
- Cultural services: non-material benefits from ecosystems that contribute to the cultural advancement of humanity

Materials Needed: paper, pencil/markers, age appropriate books suggestions include *Misty of Chincoteague* by Marguerite Henry or *Wind in the Willows* by Kenneth Grahame.

PROGRAM OUTLINE:

Watch Video A

1. Form and Function in the Forest
 - Biological structure and function show how the unique parts of each organism support its own life, and the lives of living things around it. In the video, we discuss the parts of a tree and how their composition contributes to function for the tree, ecosystem, and wildlife. Leaves have a flat structure, which allow for maximum surface area for photosynthesis. They also provide nutrients and shade for wildlife. The trunk of a tree transmits water, nutrients from roots to leaves, reaching the tree closer to the sun and creating a

material that can be a habitat for creatures like an Eastern Screech Owl. Tree roots reach deep underground, capturing water and minerals to allow the tree to grow. Roots also reduce erosion by anchoring soil in place.

- Each part of an organism has features that allow it to do a different job, just like rooms in your home or school have different uses. Have students list the rooms in their chosen building and detail the structure and function of their features. For example, a bathroom has a toilet, which allows for the elimination of human waste. Some rooms have many functions! Does every room in the building function effectively?
- What benefits do humans receive from trees? List some of the ways humans need trees as preparation for the next section of the lesson.
- Discuss how the structure and function of an organism may change throughout its life cycle. For example, the trunk of a decaying tree will soften and slowly rot, creating homes for insects and food for mushrooms.

Enrichment Activity:

- Choose an animal and examine the biological structure and function of each of its parts. Draw the animal on one side of a piece of paper, then label its parts and write the structure and function of each on the back of the paper. Focus on what makes this animal different from other animals.
 - For example, humans have opposable thumbs. Thumbs have a structure which is separate and operates independently from the rest of our hands. Their biological function allows us to pick up and manipulate objects, which leads to the creation and use of tools and contributes to our survival.

Watch Video B

2. Ecosystem Services in the Forest

- Ecosystem services allow us to label and quantify the benefits we obtain from ecosystems. In a human-dominated earth, it is important to recognize that we would not survive without natural areas and wild organisms. These services are divided into three categories: provisioning, regulating/ supporting, cultural. Each is a vital part of human life. Forests offer provisioning services through food and logging. Regulating and supporting services include erosion control, carbon capture, and photosynthesis. Cultural services include recreation and inspiration for music and art.
- Choose an ecosystem (besides forests) and examine the ecosystem services that it provides to humans. Wetlands, in particular, are a rich source of regulating services. Can you find one service for each category (provisioning, regulating/supporting and cultural)?
- Discuss with the class what should happen when part of an ecosystem is removed, affecting the services it provides. For example, what should the consequences be if a new home is built in an area of forest? What services are affected? What if an entire forest is logged? Sometimes, building new structures in a natural area means that the builders are required by law to create a new habitat replacing the one that was destroyed. Is this a fair trade-off? What would make it fair?

Enrichment Activity

- Use Google Maps to find the natural areas closest to where you live. What ecosystem services do they provide? How far away from your home are sources of each type of ecosystem service?
- Watch and discuss the following video on Ecosystem Services from the California Academy of Sciences, which focuses on how biodiversity supports these services.
<https://www.youtube.com/watch?v=BCH1Gre3Mg0>
- Read a book together about an ecosystem and discuss the services it provides. Age appropriate suggestions include: *Misty of Chincoteague* by Marguerite Henry or *Wind in the Willows* by Kenneth Grahame
- Watch and discuss the following Bill Nye video on wetlands. What services do wetlands provide to humans? To other wildlife? <https://www.youtube.com/watch?v=BeUPbGWg2KU>