

Forests & Sunlight

Section 4 FOREST ACTIVITIES



Grade Level: 5 - 12

NGSS: MS-LS1-5, MS-LS2-1,
MS-LS2-4

Subject: Science

Skills: Observing, measuring,
inferring, comparing, drawing

Duration: 60 minutes

Group Size: Individuals

Setting: Outdoors & indoors

Vocabulary: canopy, ground
cover, understory

Objective:

Students will observe and compare densely forested and open forest sites to determine the role sunlight plays in a forest ecosystem.

Complementary Activities:

OUTDOORS: “Forests and Soil” in this section; “Forests and Air” in Section 1, *Elements* (both compare and contrast forested and non-forested sites). **INDOORS:** “Tree Seed Chain Game” and “Forest Food Web Game,” both in Section 2, *Ecosystem Connections*.

Materials:

Clipboards and writing paper or field note books, pencils or pens for each student. Two sets of thermometers, five or more colored pencils, and copies of “Science Cards” for each student (following pages).

Background:

See **INSIGHTS**, Section 4, *Succession*.

Procedure:

IN ADVANCE, select two sites, one forested or densely forested, and one non-forested or open area.

IN CLASS, explain to students that they will be taking measurements at two forest locations to investigate the interrelationships between forests and the nonliving environment. Tell them they are to look for differences and determine what causes the differences.

Classroom Follow-Up:

Students discuss the two Forest and Sunlight sites.

(a) Which site had the most plants in the shrub and ground cover layers? Was this the site where more or less sunlight reached the ground? Why would the amount of sunlight reaching the ground affect the number of plants growing there?

(b) In which site was the air warmer? How does the air temperature relate to the amount of sunlight reaching the ground?

(c) Which site, the sunny one or shaded one, would provide more food for animals that eat ground cover plants? Which site would provide more food for animals that eat shrubs? Would students expect to find more eaters of shrub and ground cover plants in a dense forest or in an open forest?



Students should conclude that where more sunlight reaches the shrub and ground cover layers, more plants will grow, because plants need sunlight for photosynthesis. Sunnier sites will have more low-growing plants and thus more food for those animals that feed on those plants.

Curriculum Connections:

(See appendix for full citations)

Books:

America's Forests (Staub)

Biomes of the World (v.1) (Allaby) 7-12

Forests and Woodlands (Pipes) K-6

Taiga (Kaplan)

Taiga (Sayre)

U-X-L Encyclopedia of Biomes (v.3) (Wigel) 7-12

Website:

<https://www.gi.alaska.edu/AlaskaScienceForum/administration>

Teacher Resources:

(See appendix)

SCIENCE CARD

Forests & Sunlight: Dense Forest

1. Turn to a page of your field notebook and write the heading "Forests and Sunlight." Draw a line down the center of the page. Write a heading that describes this site on the left side of the paper.

2. As you look up, the main plants you will see are trees, if any occur at this site. These form the overstory or **canopy** layer of plants. As you look straight ahead, you may see another layer of plants, the **understory** or shrub layer. As you look down, you will see a **ground cover** layer of plants. Different sites usually have different numbers and kinds of plant layers. Some sites have only one of these layers. Other areas may have more layers – perhaps a tall tree, small tree, tall shrub, low shrub, and ground cover layer will be present.

3. Look around you and draw a picture on the left side of your page that shows the different layers of plants in this area. Use a different colored pencil to draw each layer. The number of lines you draw for each layer

should show how many plant stems are in that layer. Draw in many lines to show that there are many plant stems. If there are large spaces between the plants in any layer, then draw just a few lines.

4. Look overhead at the number of leaves and branches. These block sunlight and prevent it from reaching the ground. How much sunlight do you think reaches the shrub layer at this spot: (a) nearly all sunlight, (b) some, but not all sunlight, or (c) very little sunlight? How much reaches the ground? Record your answers in complete sentences below your drawing.

5. Use the thermometer to measure the air temperature. Record this in your notebook below your drawing of this site.



Forests & Sunlight: Open Site

1. In your field notebook, turn to the “Forests and Sunlight” page that you set up earlier or start a new page. Write a heading that describes this site on the right side of the paper.
2. As you look up, the main plants you will see are trees, if any occur at this site. These form the overstory or **canopy** layer of plants. As you look straight ahead, you may see another layer of plants, the **understory** or shrub layer. As you look down, you will see a **ground cover** layer of plants. Different sites usually have different numbers and kinds of plant layers. Some sites have only one of these layers. Other areas may have more layers – perhaps a tall tree, small tree, tall shrub, low shrub, and ground cover layer will be present.
3. Look around you and draw a picture on the right side of your page that shows the different layers of plants in this area. Use a different colored pencil to draw each layer. The number of lines you draw for each layer should show how many plant stems are in that layer. Draw in many lines to show that there are many plant stems. If there are large spaces between the plants in any layer, then draw just a few lines.
4. Look overhead at the number of leaves and branches. These block sunlight and prevent it from reaching the ground. How much sunlight do you think reaches the shrub layer at this spot: (1) nearly all sunlight, (2) some, but not all sunlight, or (3) very little sunlight? How much reaches the ground? Record your answers in complete sentences below your drawing.
5. Use the thermometer to measure the air temperature. Record this in your notebook below your drawing of this site.

