

BOTANY

LESSON PLAN

Meets the following 5th grade science standards:

Life Science:

2e: Students know how sugar, water, and minerals are transported in a vascular plant. The xylem of plants is a woody tissue responsible for water and mineral transport from roots to leaves. Water moving up the plant stem replaces water that has evaporated from the leaves.

2f: Students know plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar and release oxygen. Cover the photosynthesis equation. The sugar made during photosynthesis is just an initial compound the plant produces. Other organic molecules are made by modifying the simple sugar compound. EXAMPLE: a significant portion of the mass of a log from a tree was once carbon dioxide gas in the air, captured by the leaves of a tree, and fixed into larger organic molecules.

2g: Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO₂) and water (respiration).

Meets the following 6th grade science standards:

Ecology:

5a: Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs. Plants are the foundation of a successful food web.

5b: Students should know that matter is transferred from one organism to another over time and that energy is lost to the physical environment at every hierarchical level of the food chain.

5e: Students should understand that the richness of plant growth controls the diversity of life types and number of organisms that can be supported in an ecosystem.

Resources:

6b: Trees are renewable resources as long as they are rate of use does not exceed the time it takes for them to be replanted.

6c: Students know the natural origin of the materials used to make common objects.

OBJECTIVES:

1. Identify plants as primary producers and the foundation of all food chains.
2. Introduce students to the chemical process of photosynthesis.
3. Identify the many different functions and products produced by our trees.
4. Describe the many roles trees fulfill in an ecosystem.
5. Define *tree* and describe the features of a tree.
6. Describe and discuss the types of trees in our (Angeles Mtns) ecosystem.
7. Define *taxonomy* and put it into practice.

EXTRA OBJECTIVES:

8. Discuss forest management: trees are a renewable resource, but either over-growth or over-harvesting can destroy a forest.
9. Define *botanist* and discuss the many roles and careers that involve botany.

BACKGROUND:

Many of the sciences involve botany. Plants and trees play a major role in our society, economy, health, and quality of life. Plants and trees are all around us and we often do not notice them; yet, plants and trees are vital for our existence. They provide food, medicine, fibers, building materials and life for both animals and humans. Plants and trees are the only living organisms to produce their own food; using energy from sunlight in a remarkable process called photosynthesis. Other animals eat the plants and continue transferring that energy from organism to organism. Identifying plants and trees can be fun and challenging, and is the first step in understanding them and using them to their full potential.

PROCEDURES:

1. Identify plants as primary producers and the foundation of all food chains.
2. Introduce students to the chemical process of photosynthesis.
3. Play the Common Objects Game. Then talk about the resources, materials, and benefits plants and trees provide us with.
4. Describe how plants use and transport the glucose created through photosynthesis.
5. Define tree and describe the features of a tree.
6. Describe the roles trees play in the Palomar Mtn. ecosystem.
7. Teach the students how to take samples and notes to help them identify the numbered trees on the Tree Walk.
8. Take the students outside and use binoculars to identify and discuss the differences between the Black Oak, Incense Cedar, White Fir, and Coulter Pine.
9. Send the students out on the Tree Walk to gather information from the numbered trees. Have them return in 20 minutes to match the information gathered with the trees in the tree guide to see if they correctly identified the different species.

At the completion of this class the student:

- Should know:
 - That plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar (producing their own food), release oxygen, and are the primary producers in all food webs.
 - That plant cells break down sugar to obtain energy, a process resulting in the release of carbon dioxide (CO₂) and water (respiration).
 - The definition of a tree.
 - The important contributions of trees to an ecosystem.

- Should be able to:
 - Identify and classify several different types of trees on Palomar Mtn.
 - Describe the process of photosynthesis
 - Collect and sort data

The specific trees we will be studying are the