



Sun-loving Leaves!

Grade: 3rd

Subject: Science

Time Required: 45 Minutes

Group Size: 12 – 25 students

Setting: Outdoors

Materials:

- Clipboards
- Copies of the provided datasheet
- Pencils
- Magnifying lens (optional)

Objectives:

Student will 1) recognize how leaf shape determines the amount of light a plant can use 2) distinguish differences and similarities in a variety of local plants, 3) demonstrate using methods of scientific inquiry.

Background:

Leaves have two main functions: to produce food and to discharge waste (in the form of oxygen). Leaf shape and structure are adapted for a very efficient process called **photosynthesis**. Plants have special cells called **chloroplasts**, which contain a green pigment called **chlorophyll**. Chlorophyll helps plants make their own food (sugars) by absorbing the energy from the sun. Combining this solar energy with water stored in the plant stems or trunks, plants make all their own food! To make sure they get as much sunlight as possible, plant leaves have been adapted to have a large surface exposed to the sun.

Preparation for Activity:

- Review vocabulary and role of the parts of a plant.
- Pick an outdoor space that has quite a bit of plant variety, specifically variety in shapes of leaves. Consider exploring different habitat types if possible (field/meadow, scrub, pond/wetland, upland pine, hardwood hammock, etc.)
- Prepare enough clipboard, datasheets, and pencils for each student. Could be easily modified for as a group activity.

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Activity:

- 1) Ask students “Can we tell how much light a plant needs by the type and shape of its leaf?”
 - Note: Encourage students to make a prediction. (**Save Answer for end of activity:** Yes, plants that require a lot of light will produce large leaves. A plant that lives in shade needs to capture as much solar energy as possible so its leaves will be quite big. A plant that lives in the desert gets a lot of light, sometimes it can get too much light, and so its leaves might be very tiny.)
- 2) Lead students outdoors to pre-selected activity area.
- 3) Explain to students that they’ll be making observations about the plants around their school. Emphasize that the students will be conducting a scientific investigation to determine how the shape of a leaf can help a plant thrive.
- 4) Explain to students that they’ll use a datasheet to record their observations and investigations.
- 5) Pass out clipboard, datasheet and pencils to each student. As a class, preview datasheet and explain that students will fill out their datasheet using the enumerated steps.
- 6) Ask students to look at leaves from a variety of habitats. Instruct students to locate three plants that have very different leaves. Students should compare *and* sketch leaf shape, size, and outer coverings and record their findings on the datasheet.
- 7) Allow students enough time to explore, observe, process, and interact with each other to discuss their findings.
- 8) After students have completed their datasheet, gather in a group together to discuss results and ideas for further studies!

Follow- up Questions:

- 1) Prompt students to think about a plant that grows in the shade. Would it have a large leaf or a small leaf? Why?
(**Answer:** Many shade-loving plants have very large leaves. A larger leaf has a large surface area which allows the leave to maximize the amount of food (sugar) it produces and the amount of waste (oxygen) it releases.)
- 2) Ask students to think about how a plant could respond if an animal (think caterpillar) ate a lot of its leaves?
(**Answer:** Some plants can speed up the process of creating new leaves in response to being eaten by hungry herbivores. Specialized plants can even produce toxins to prevent further leaf destruction. Scientist have discovered that some plants can even make caterpillars turn into predators of each other! The plant’s defense chemicals turn a natural herbivore into a carnivore!)

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