**Leaf Properties…and more Betty Darleen Horton**

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**NGSS:**

**K – Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment**

**1st – Structure, Function, and Information Processing**

**2nd – Interdependent Relationships in Ecosystems**

**3rd – Inheritance and Variation of Traits: Life Cycles and Traits**

**4th- Structure, Function, and Information Processing**

**5th – M – Matter and Energy in Organisms and Ecosystems (Analyzing and Interpreting Data)**

**Background: Appropriate information K - Middle**

**Leaves** come in lots of different sizes and shapes. For younger students, the shapes are very basic such as hand shaped, heart shaped, round, spear shaped and needle shaped. From 2nd grade on, attention should be given to the edges of leaves (smooth, toothed, lobed). With older students, the arrangement of leaves (simple, compound) and the arrangement on the stem of the leaves (alternate, opposite and whorled) are important to point out. When teaching the structure and function of plants, the veins play a major role as well.

Typically leaves are flat and thin, thereby maximizing the surface area directly exposed to [light](http://en.wikipedia.org/wiki/Light) and promoting photosynthetic function. They are arranged on the plant so as to expose their surfaces to light as efficiently as possible without shading each other.

The shape and structure of leaves vary considerably from species to species of plant, depending largely on their adaptation to climate and available light, but also to other factors such as grazing animals (such as deer), available nutrients, and ecological competition from other plants.

*Leaves all have one thing in common - leaves change sunlight into energy through photosynthesis. The leaves absorb carbon dioxide from the air and with water that comes through the roots of the plant, combines these elements and releases the oxygen into the air. By this exchange, plants maintain a level of oxygen in the air that benefits all living things.*

Plants in the garden are also vehicles through which energy is transferred from the sun and become food sources for animals, including people.

**Properties** are the way we describe objects. Examples are color, size, shape, and other distinguishing features. The older the students, the more in-depth the observations should be.

K – 2: Pre Assessment: How can we describe leaves by their properties?

* In a sharing circle, introduce the term, properties, to students. An easy way is to ask students to describe a person – hair color, tall, short, what they are wearing, etc. Move on to describe an object in the garden, such as a vegetable and then a leaf. Put emphasis on the importance of using properties to describe leaves as we are now going on a leaf hunt!
* Give students background information about leaves and the role they play in the way plants “work”. Younger students will be concerned primarily with color, shape and size.
* Direct students to look at least three different kinds of leaves before choosing a leaf to bring back to the circle. Explain that students should first look for a leaf on the ground under a plant and if none are there, to carefully remove a leaf from the bottom of a plant. (This likely should be demonstrated. If the group is large, the teacher may want to have a variety of leaves available for observation to protect the garden.)
* Tell students they will have 5 minutes, or until the shadow from the sundial has moved to touch the string attached from the gnomon to the edge of the circle.
* When students return with their leaves, let them use descriptive words to describe their leaves.
* For students in grades 1 – 3 have students classify their leaves according to any one of the properties you select such as shape, color, size….
* A good addition to the initial activity is to divide the class in half. Let the groups decide how they will classify their leaves and then have a sharing time to explain their choice after the leaves are sorted. Ask students to think of another way they could sort their leaves. If time permits, let students experiment with classifying. A fun closing activity is to have students create a line or a path with their leaves using one property such as size when placing them on the line – smallest to largest?
* Have a plan in mind about what to do with the leaves that have been collected. Possibly send them back to school, let students keep them or add them to a composting area.

Post assessment for K – 2: When I look at my leaf, this is what I see.

* This is what I want to remember about my leaf.
* This is what I can tell you about my leaf.
* There are a lot of ways to sort leaves, for example….

In responding to these ideas, students will be practicing their observation, documentation, and communication skills. They will also be thinking about and integrating the types of things they have learned about leaves through this lesson.

Science, Math, Literacy, Art