

Project Learning Tree - Looking at Leaves #64

Leaf as a System

Overview: In this lesson students will observe a leaf, describe the leaf and draw and label the parts. Students will identify patterns in the leaf during their observations and talk about structure and function. Next students will read a non-fiction page from *The Big Tree* by Bruce Hiscock to think further about the leaf as a system with inputs, outputs, and flows of energy and matter.

Objectives-Students will be able to:

- describe the functions of leaf parts
- identify patterns in leaves
- describe inputs and outputs of matter and energy to their leaves
- identify a cause and effect if one part was missing or an input changes
- describe what plants need to grow

Materials: Leaves, magnifiers, rulers, paint chip cards (optional), page from *The Big Tree* by Bruce Hiscock, video on photosynthesis (optional). Extension- different types of leaves and plant ID book

Procedure:

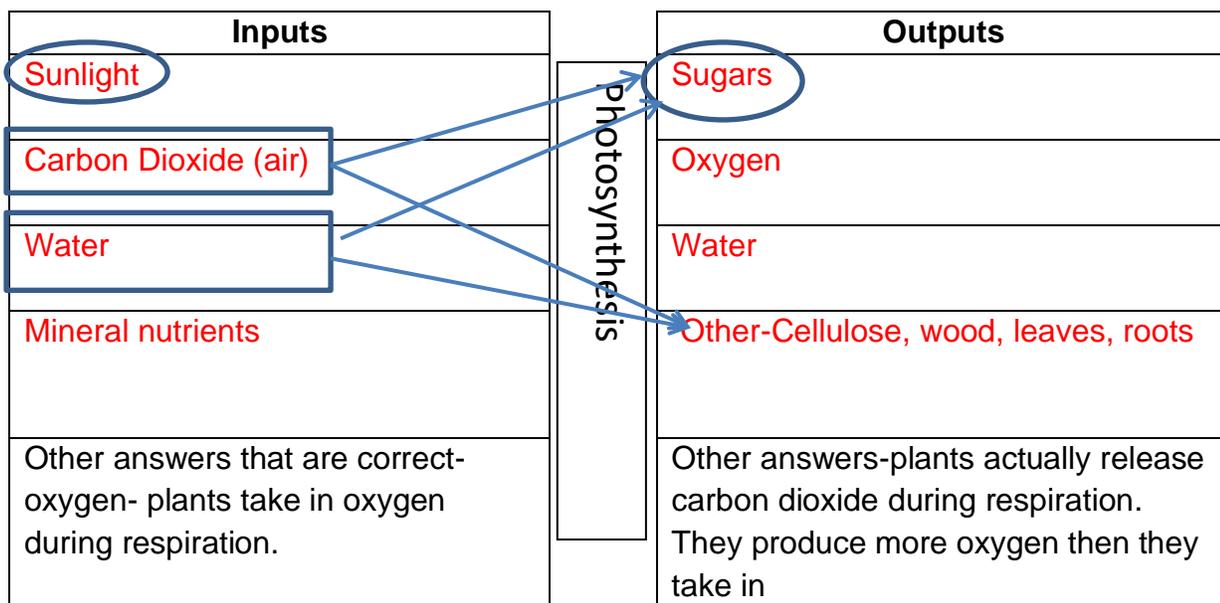
Question: What are the physical characteristics of a leaf?

1. Explain to students they are going to be scientists today and will be answering the question, “What are the physical characteristics of a leaf?” by describing a leaf and drawing and labelling the leaf. We will be using the tools of a ruler and a magnifier to allow for more detailed observations.
2. Review what is meant by observation and what physical characteristics are. Have students come up with a list of characteristics they are going to describe. This list should include but is not limited to:
 - Color
 - Size
 - Shape
 - Texture
 - Smell
 - Patterns
3. Provide students with leaves and have them draw, label, and describe the leaves in their journals. Students should use the magnifiers and rulers for more detailed observations. They could use paint chips to describe their leaf color.
4. Have students pair up to discuss their observations and add information to their journals that they gained from their partner.
5. Have students share their observations. Make sure the observation that leaves are green comes up – even though this is obvious.

Looking at the Leaf System

1. Explain to students they are to consider the leaf as a system and that all systems have inputs (coming in) and outputs (leaving the system). Now have student share out what were the parts of the leaf system they labeled and what were the functions of those parts. These should include:
 - Veins
 - Stems
 - Edges
 - Green material
2. Read the student page from Bruce Hiscock’s book on photosynthesis and watch the video on photosynthesis (optional).
3. Have students work in pairs and answer the first question - What are the 4 things plants need to grow? After they have answered the question, put a rectangle around air and water and explain that these are the major materials that plants require to grow.
 - Air
 - Water
 - Mineral Nutrients
 - Sunlight
4. Go over what inputs and outputs are as well as energy sources and transfers if you haven’t done this previously. Using the Bruce Hiscock student page, have students work in pairs to answer, “What are inputs and outputs to our leaf system?” Ask, “Are the inputs the same as the needs of the plant?”

Identify inputs and outputs to the leaf system.



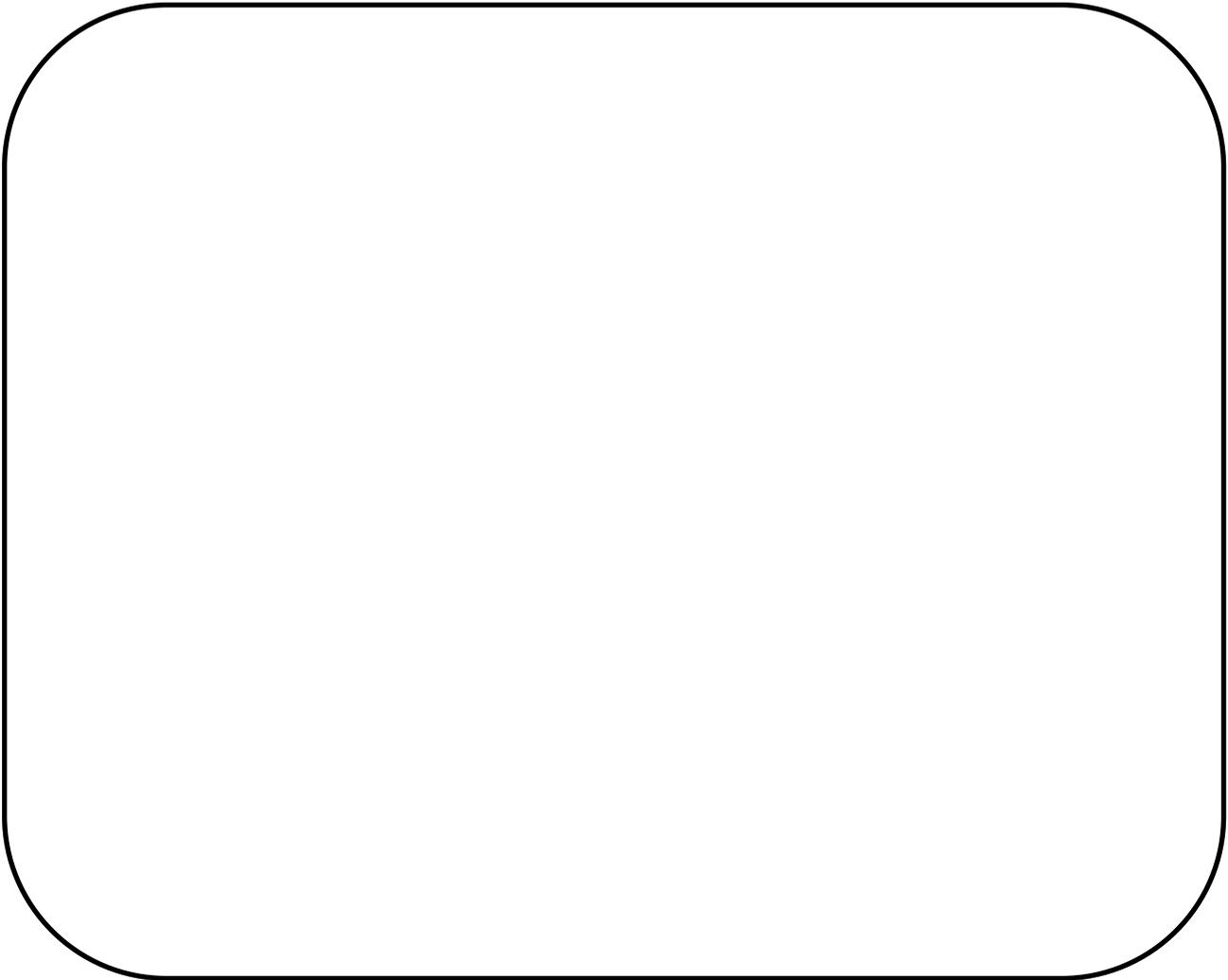
5. Review the inputs and outputs of the leaf system. Put the above chart on the board. Circle the sunlight identifying it as the source of energy coming in. Now circle the sugars as the energy that is now in the leaf after photosynthesis. Reinforce that plants make their own food and are

called producers. Now put rectangles around carbon dioxide and water showing that these are the major materials plants use to produce sugars and cellulose, wood, leaves, and roots. Draw arrows from the carbon dioxide and water to sugars and other.

6. Have students answer the other systems questions, have them share in pairs and then table groups. Go over the answers as a class.
7. Extensions include finding out what the leaf is and doing a comparison with a neighbors leaf (different types of leaves would be needed for this extension).

Leaf as a System: PLT-Looking at Leaves #64

Draw and label the leaf



Name 3 parts of the leaf and describe the function of each.

Part	Function

What are the physical characteristics of the leaf?

Size...

Shape...

Color...

Texture...

Smell...

Patterns...

My leaf reminds me of...

Questions I have about my leaf are...

Leaf as a System

1. What are 4 things plants need to grow?

1.
2.
3.
4.

2. Identify inputs and outputs to the leaf system.

Inputs

Outputs

3. What would happen if a plant didn't get enough water?

4. What is the source of energy for the leaf to grow?

5. What are the 2 major materials that plants need to grow?

6. What is the role of the plant in an ecosystem?

7. What is the function of the veins on a leaf?