

Pansy Parts & Stop Photosynthesis

4th Grade

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References:

<http://www.computing.ee.unsw.edu.au/~solar/classrooms/photosynth1.htm>

Benchmarks & Objective:

LS-2: Relate plant structures to their specific functions (e.g., growth, survival and reproduction).

Materials:

- Pansies (or any appropriate annual)
- Newspaper
- Houseplant
- Aluminum Foil (or paper to attach with paper clips)

Target Concept:

- Students will learn that each plant part serves a function (feeding, reproducing, stabilizing)
- The students will investigate plants create their own food/mass through photosynthesis.
- Students will learn that plants breathe in carbon-dioxide and respire oxygen (opposite of humans)

Initial Introduction:

What do plants need to survive? Brainstorm with the kids. (They will think of sun, water, soil- you may remind them of carbon dioxide or wait until day 2)

Ask the students what will happen to the big pot of pansies when it is dumped on the ground? (They correctly hypothesized the plant would stay together remembering our erosion experiment on grass roots).

Procedure (Day 1):

- 1) Pass out pansies to all of the students (small groups work well)
- 2) Students should draw their pansies and make any observations they have before they are directed to examine specific things.
- 3) Show them the roots; ask them what the roots might be used for (if they don't guess stability and collecting water and nutrients guide them. (Why do you think there are so many roots, why are their different sizes of root parts? Is the soil easy to get out from the roots?)
- 4) They should draw and label the roots (primary root, secondary root, and root hair).
- 5) Students should then examine the leaves- the leaves make the food for the plant. Ask the kids what food they eat? What does a plant use to make its food? (Guesses are ok at this time- you may want to hint to the kids that the leaves are not underground so the plant is most likely not eating soil). Label the blade and petiole.

- 6) Talk about the role of the stem (keeping the plant at the right height from the soil, transporting water from the roots to the shoots).
- 7) Ask them what they notice most about their plant? What is the brightest part? Students will say the flower. You can then talk about the function of the flower; it is where seeds are produced, how the plant makes more plants.

The kids should be making their own observations throughout this exercise and drawing many diagrams in their notebooks

Procedure (Day 2)

- 1) Ask the kids if they can remember which part of the plant makes the food. (Leaves) Review what plants need to survive (sunlight, water, soil, carbon dioxide.)
- 2) How do leaves create food for the plant, which makes the plant bigger if they are not eating in the same way we are?
- 3) The kids will likely guess that the plant uses nutrients from the soil, sun, water- ask them to think about what is in the air and some kids will think of carbon dioxide. (If they don't remind them what they have already learned about air- that it has mass from different gases, one of which is carbon dioxide.)
- 4) Let the kids know that the nutrients from the soil are not what build the mass of the plant, but they are more like vitamins are for people, they aren't a source of food. We could live on Pizza, but eating a variety of vitamin-rich foods keep us healthier. Remind the kids: the mass comes from the gas.
- 5) Ask the kids what the plant respire (remind them that we exhale carbon dioxide)
- 6) Put everything together and draw a simple diagram for photosynthesis. (Labels below) (Define photosynthesis- light, putting together)

Sunlight (Energy) + Carbon Dioxides + Water → Sugar (Plant Mass) + Oxygen

- 7) Now that they know about photosynthesis, ask them what would happen to the plant if they covered up some of the leaves with tinfoil. They should write down their hypotheses and draw a picture of the leaves before they put tinfoil on them. They should guess how long it will take for the change to occur.
- 8) Periodically, throughout the week you should examine the leaves and see if they have lost some of their green color.
- 9) How did their hypotheses compare to what actually happened?

Target Observations:

- Each part of a plant serves an important function.
- Energy comes from the sun.
- Photosynthesis is how plants convert energy from the sun and carbon dioxide and water into glucose and oxygen. This is how plants breathe and build mass.

Summary & Discussion:

Students should feel comfortable with the functions of different parts of a plant. They should also understand the importance of photosynthesis. The sun is the primary source of energy to our planet. Plants need sunlight, water, and nutrients from the soil to survive.

Name: _____

Photosynthesis

Photo=Light, Synthesis=putting together

- 1) Which part of the plant makes the food?
 - a) Roots
 - b) Stem
 - c) Leaves
 - d) Flower

- 2) What do plants need to live? (We will brainstorm here, please write down at least 3 ideas)

- 3) Plants make food (and grow) by photosynthesis which is the putting together of sunlight, carbon dioxide (in the air), and water (travels to the leaves from the roots through the stem). What do plants breathe in that they convert into food? (Hint it is a gas)
 - a) carbon dioxide
 - b) water
 - c) sunlight

- 4) What is the food that plants make during photosynthesis? (We will talk about this and the answer will be on the board)

- 5) Draw a diagram for photosynthesis.

5) What do you hypothesize will happen to our plant if we cover up a few of the leaves?

How long will we need to cover up some of the leaves to see a change in the plant or the covered leaves?

(Write at least **2 complete sentences**)

6) Draw what the leaves looked like before we covered them. We will draw them again after we complete our experiment and compare with the starting conditions.

Name:

Getting to know flowering plants

- 1) Draw what you can see of you flowering plant above the dirt. Guess what the plant looks like underneath the dirt and draw it.

(Dirt)

- 2) You have drawn the roots. Roots absorb water and keep the plant from falling over. Roots also store food for the plant.

Please examine and draw what the roots really do look like below: (this may be different than your above hypothesis and that is okay)

Label

- 1) the primary root (the biggest part)
 - 2) the secondary root (smaller part of root branching from primary root)
 - 3) the root hairs (smallest part of root)
- 3) Roots:
- a) Keep the plant in position and slow soil erosion when it rains.
 - b) Speed up soil erosion when it rains.

4) Draw the leaves of your plant.

Together we will label the **blade** (the main part of the leaf)
And the **petiole** that attaches the leaf to the plant.

5) The leaves are important because they feed the plant. **What do you think plants eat?** (*Hint -the leaves are not in the ground)

6) The flower of the plant is what most people notice first. The flower is what reproduces- which means that it makes seeds to grow new plants. We will examine a bigger flower later to find out how flowering plants reproduce.

You should be able to see the petals- or the brightly colored leafy structures

Draw them below:

7) What does the flower look like when you pull away all of the petals?

Draw the remaining parts beneath the petals: We will label them later when we learn about how flowering plants reproduce.

- 8) The stem keeps the flower and leaves the right distance from the soil and transports water and nutrients from the soil.

Draw the stem and measure how long the stem is in centimeters.

Vocabulary-

Leaves: This is where plants make their food. (We will talk about how plants make their own food soon).

Flower: This is where the plant makes seeds for new plants. This is called reproduction.

Roots: These grip the plant to the soil and keep it from falling over. Roots also absorb water and nutrients in the soil.

Stem: The stem keeps the flower the right distance from the soil and water and nutrients collected by the roots travel up the stem to the rest of the plant.