Title: Sprouting!

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Theme: Energy from the sun is stored in plants.

Objectives:

- Students will understand that energy from sun causes plants to grow.
- Students will practice good observation techniques and collect data.
- Students will demonstrate group cooperation skills.

Duration: 30 minutes to introduce, 30 minutes to wrap-up, and 5-minutes for daily or weekly observations over the course of 4-6 weeks

Age Range: Kindergarten – 4th Grade

Materials:

- Small cups, plant pots, or nursery sixpacks (2 per student)
- Tray or plates
- Seeds (nasturtiums or beans work well, 4 per student)
- Soil
- Bowls
- Spray bottle with freshwater
- Permanent marker
- Ruler
- Journals or paper
- Pencils
- Watercolors or colored pencils

Background:

This is a very simple experiment in which students observe how energy from the sun helps plants grow.

Introduction:

Ask students how plants grow. Brainstorm a list of different things plants need to grow. Have students repeat the following chant: "Sun, soil, water, and air. Sun, soil, water, and air. Everything we eat and everything we wear comes from sun, soil, water and air."

Activities & Procedures:

Explain to students that even though you can't directly see energy from the sun, you can observe its impact on plants. Pass out 2 pots and 4 seeds to each student. Label the pots with students' names. Distribute bowls of soil around the classroom and have students fill their pots with soil until it reaches about ½ inch from the top. Carefully read the instructions on the back of the seed packet to students and pass out rulers. Have students create two small holes in each pot and measure them to the right depth for the seeds. Students should then put one seed in each hole and sprinkle a small amount of soil on top.

Place one pot from each student in a tray on a windowsill that gets good sun. Place the other pots on a tray in a shaded area, or, for more dramatic results, in a cabinet with no light access. Have students spray them well with the spray bottle.

Choose a time of day or the week to observe plants. Have students record observations in their journals, such as when their seeds first sprout, develop leaves, and flower. Each time, students should measure the height of the plant. If a seed does not sprout or dies, students should make note of that. Plants will need to be watered every 1-4 days, depending on humidity.

After a few weeks, discuss the results of the experiment. Compare the growth of the seeds in the sun to those in the shade or cabinet. To help generate conversation ask questions such as: Where did plants grow best? Why do you think that is? What caused the plants to grow at different rates? Steer them to understanding that the sun's energy is now stored in those plants!

Wrap-Up:

Ask students, "What happens to the sun's energy if we eat a plant?" If you chose a plant that students can eat, allow them to sample their crop. Then ask students to think of other ways we use the solar energy stored in plants – firewood, fossil fuels, clothing, etc. After lunch, discuss how the sun's energy helped bring that food to their lunchbox or tray.

Evaluation:

Assess student observations for completeness, neatness, and accuracy. Check for comprehension by asking students to explain what their plant will need to continue to grow (with older students, have them write a "care manual"). Then allow students to take their plants home.

Sprouting

Science As Inquiry and Process: Students develop an understanding of the processes and applications of scientific inquiry.

SA1
Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments

The student demonstrates an understanding of the processes of science by:

[3, 4, 5, 6, 7, 8] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[3] SA1.2 observing and describing the student's own world to answer simple questions

[4] SA1.2 observing, measuring, and collecting data from explorations and using this information to classify, predict, and communicate

SA2
Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by:

[3] SA2.1 answering "how do you know?" questions with reasonable answers

SA3
Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local applications provide opportunity for understanding scientific concepts and global issues.

The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by:

[3] SA3.1 observing local conditions that determine which plants and/or animals survive

[4] SA3.1 identifying the local limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

[5] SA3.1 identifying the limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

Concepts of Life Science: Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC2
Students develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms.

The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by:

[4] SC2.2 describing the basic characteristics and requirements of living things