

Lesson: How Plants Grow

Time: 3 - 4 weeks; 1hr each

Common Core Standards:

NGSS.4.LS1.1

Next Generation Science Standards

Standard: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Objectives:

- To teach students how different conditions can change seed and sprout growth.
- To introduce photosynthesis.
- To investigate the growing stages of a seed to a plant.
- To introduce the concept of a hypothesis.

Resources:

- Small beads
- Raisins
- Rubber bands
- Various types of seeds; sizes, colors, etc
- Small bowls
- Small clear planting container
- Soil
- Camera
- Powerpoint: 'How Plants Grow'

Activities:

Week 1 Seed Investigation:

Gather various seeds and seed-like items in 2 bowls; beads, raisins, small rubber bands, 3-4 types of seeds.* Divide class into 2 groups. Pass bowls to each group.

*items in the bowl can change just make sure they are items that look like seeds.

Students investigate the various objects in the bowl. Ask the students if they can find the seeds. Explain where each of the seeds come from; vegetable, fruit, flower, etc. Collect bowls and materials.

(Show powerpoint): Discuss the process of how a seed starts in the ground and begins to grow, and why the seed is so important to a plant's life.

Place soil in clear containers, $\frac{1}{2}$ full. Pass out 2 seeds per student. Plant seeds along perimeter of container for external visibility, with enough room for each seed to grow independently of one another. Then water!

Label student's name on seed location. Take photos on first day.

Water seeds as needed to keep soil moist. Take photos daily of seed growth for time lapse activity.

Week 2 - Time lapse prep:

Reference the 'How Plants Grow' Powerpoint again to discuss the current stage of the seeds growth. Discuss with students: What changes have they noticed? Why do they look different or the same? Are the sprouts the same size? Why or why not?

Discuss what is going on inside the soil, and how the plant has sprouted from the seed coat.

Explain what a time lapse or slideshow is, using the following youtube video as a time lapse reference, <http://www.youtube.com/watch?v=eDA8rmUP5ZM>. Discuss what is happening over time with the students. Tell the students that they will be making their own time-lapse project with their seeds, so they will need to begin uploading their photos and organizing them accordingly; type of seed, date, stage, student's name, etc.

Develop a 'Purpose/Question' and 'Hypothesis' individually or as a class.

Example Question: "Where do plants come from?"

Example Hypothesis: "Over the course of 3 weeks a seed will produce a plant."

*Continue watering seeds as needed to keep soil moist. Take photos daily of seed growth for time lapse activity.

Week 3 (or wait one more week if sprouts are still fragile) - Time lapse report and transplant:

By this time each student should have strong sprouts and can transplant them from the clear container into the garden. Students should take one last photo in the container to complete their time lapse project and then transplant.

Students will need to upload their photos and organize them accordingly; type of seed, date, stage, student's name, etc. They will then create their timelapse or slideshow, taking note of obvious changes and what is happening. Student then prepare their own slideshow and/or presentation to present for the class.

*Water plants as needed to keep soil moist in garden.

Week 4 Presentations:

Students present their projects and discuss their conclusions.