Science Unit:

Continuity and change

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Unit Overview

Topic:

Continuity and change is an inquiry based science unit which provides students with several hands-on opportunities to examine different varieties of plant life and discover through experimentation what the different parts do, what plants need to survive, where new plants come from, and how they enrich our lives. Students will keep journals, prepare oral reports, and use stop motion photography to record their predictions, observations, and the results of their experiments.

Goals:

- Students will practice the steps of the scientific process.
- Students will learn the names and function of the different parts of plants.
- Students will discover what plants need in order to live.
- Students will find new ways that new plants can be created.
- Students will develop a new appreciation for plants as vital living beings.
- Students will see the ways in which we use plants for air, food, and clothing.

Concepts:

- Science is a process of predicting and then testing those hypotheses.
- To test a hypothesis, only one variable should be changed at a time.
- Plants need air, water, and sunlight to live.
- Plants can be created from seeds, stem cuttings, and by planting roots.

Standards:

- **Life Science**
  - **Sub-Strand 2:** Plants and animals meet their needs in different ways. As a basis for understanding this concept:
  - **Standard a:** Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
  - **Standard b:** Students know both plants and animals need water, animals need food, and plants need light.
  - **Standard e:** Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.
- **Investigation and Experimentation**
  - **Sub-Strand 4:** Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
    - **Standard a:** Draw pictures that portray some features of the thing being described.
    - **Standard b:** Record observations and data with pictures, numbers, or written statements.

Timeline:

Three weeks.

Three week Block plan

	Monday	Tuesday	Wednesday	Thursday	Friday
Week One	Unit Opener C/Q About Plants K-W-L Chart Class trip to library to find books to answer our questions.	Read A Flower Grows Plant Brassica Seeds Visual arts: Drawing flowers.	What do plants need to survive? Start experiments with air, water, and sunlight.	Read Dandelion. Discuss plants we eat. Plant wheat seeds. Begin internet research: How do plants enrich our lives?	Plant research: Different groups will focus on food that comes from plants, clothing, etc. that we use in our lives and prepare oral reports. Observe Brassica seeds, record in journal.
Week Two	Experiment: What happens when you cut a piece of a plant off and plant that piece? (Place plant cuttings in water). Observe Brassica Seeds, record in journal. Continue internet research.	Read Sunflower. Observe progress of plant survival experiments. Observe Wheat Seeds, record in journal. What do stems do? The celery stem experiment.>>>>>>>	Observe plant cuttings, record in journal. Observe Brassica Seeds, record in journal. Continue internet research. Check results.	Read The Carrot Seed. Observe progress of plant survival experiments, record in journal. Observe Wheat Seeds, record in journal.	Cross-pollinate Brassica (if ready) Observe Brassica Seeds, record in journal. Plant research groups report.
Week Three	Can roots be planted? Can some roots be eaten? Experiment: planting of carrot, radish, and sweet potato parts. Observe Brassica Seeds, record in journal.	Read How A Seed Grows. Observe progress of plant survival experiments. Observe Wheat Seeds, record in journal. Field trip: to school garden to look for seeds.	Observe plant cuttings. Observe Brassica Seeds, record in journal. Performing Arts: Skits on different parts of a plant.	Observe progress of plant survival experiments (groups prepare and present reports on their plants). Observe Wheat Seeds, record in journal.	Unit Wrap-Up Revisit KWL chart to finalize new knowledge. Plant cuttings in dirt. Watch video of Brassica seed growth. Continue observations in-class or take plants home.

Assessment

- Knowledge of Plants (Students will be assessed orally through their contributions to the KWL chart and in pair sharing with peers).
- Students will be able to state the names and function of plant parts (roots, stems, and leaves) with ninety-percent accuracy.
- Students will describe what plants need to live (air, water, and sunlight) with ninety- percent accuracy.
- Students will know three of four ways to create new plants (seeds, bulbs, stem cuttings, roots cuttings)
- Students will know two foods we eat which come from plants.
- Scientific Process Skills (Evaluation of student journals). Predictions should show what students expect to happen with seventy percent accuracy and observations should show what students see with ninety percent accuracy in terms of size, shape, and color.
- Students will demonstrate their understanding of the scientific process by being able to design simple experiments to test their hypothesis.
- Students will record their observations in drawings or writing with an eighty- percent accurate representation of color and shape of the thing they are observing.
- Journals will be evaluated by teacher, the class, and by the journal authors.

Modifications

- Students will be able to draw pictures as well as write their ideas.
- ELD 1 & 2 students, and those receiving RSP services will be allowed additional time to complete assignments.
- Real-life examples of materials we are discussing will be provided whenever possible.

Technology

- Students will conduct research reports on the internet.
- Students will use a video camera to create a time-lapse video of the growth process.
- A grow light will be used to accelerate growth of Brassica seeds.

References

Foss Program: New Plants. Nashua, NH: Delta Education, 1995.

Webster, Vera R. Plant Experiments. Chicago: Children's Press, c1982.

Literature Used

Ford, Miela. Sunflower. New York, Greenwillow, 1995.

Freeman, Don. Dandelion. Reissue 1994. New York : Viking Press, 1964.

Jordan, Helene. How A Seed Grows. HarperTrophy: New York, 1992.

Krauss, Ruth. The Carrot Seed. HarperFestival: New York, 1993.

Robbins, Ken. A Flower Grows. New York: Harper-Colins, 1996.

Unit Reflection

Lesson Openings:
Lesson openings were effective in this unit in engaging students. All of the realia and real plants really helped to stimulate student interest and encourage participation. What I might do differently next time is to grow some of the plants that we grow as a class ahead of time. Although a seed is a real-life object, unless students are used to growing plants from seeds, it's still an abstract concept for them to imagine a plant coming from the seed. I might show them the full-grown plant first and then the lesson would focus more on the process of growing rather than the outcome. That seems to be fitting with the theme of the unit.

Bodies of Lessons:
Students were always excited to begin the experiments/growth processes. The interest of some students, however, did wane about midway through the growth process. I would not in the future plant everything so close together time-wise (this was, however, necessary here because we are going off-track). I think I would only grow one plant at a time and take every other day off. I also need to have some established procedure, perhaps during IWT time, when students can observe and record their plant growth when they want to and not necessarily only when it comes to science time. It's not appropriate to get up and look at the plants in the middle of reading time but some does need to be allotted to free choice observation.

Closings:
The K-W-L chart was very effective as we kept going back to it at the end of lessons. What worked best, however, was somehow noting what students said to me but not writing it directly on the chart in front of the children. Six graders get bored. They are impressed to see there own words on the chart but those words don't have to be put up there while they're watching. I would use this method again, perhaps even having children keep their own mini-KWL charts so that they can write as I write. However, that might take too long in first grade.

Assessments:
Using a combination of formal and informal assessments worked well. I would circulate during pair sharing and observation time and most of the time I could tell who understood the features of our experiments and the growth process. However, there were students who were too shy to speak up and yet their writing showed that they understood perfectly what was going on. The ongoing assessment which involved peers and journal authors was particularly effective because I was able to see students' work getting better throughout the unit once they saw that other students were achieving 4's in their journals by being a little bit extra careful.

Classroom Management
Any activities with lots of materials are difficult in a small room. Setting up stations worked but I am working on ways to make more space in the classroom like giving up certain pieces of furniture. I won't have students keep glasses of water on their desk again for extended periods (there were a few accidents). I also need to have a system in place for students to get their own journals and return them consistently to the same place.

Technology

Technology worked well. When students became somewhat bored with the Brassica seed growth (the seeds grow fast but not fast enough for six-year-olds) we would watch the videotape of their growth and that usually would renew interest in the students. Using the internet remains a novelty for students who pay much more attention to the computer screen than they do to paper and ink (as soon as we print out the web sites they lose some interest). The Internet, however, is a difficult tool for teachers because I feel I have to monitor them very carefully because there is potential for calling up inappropriate material for which I would be liable. I used to downplay this possibility but it already happened while I was sitting with students under the most innocent of circumstances. There needs to be a science Independent Work Time during which the teacher can be positioned near the computers.

Inquiry Science

There's no question that students were more engaged in this unit and learned more than had we simply studied plants in a book. There does need to be time for vocabulary development and so I would teach the ESL unit, Sunflower, in connection with "Continuity and Change" next time. Some ELL students were able to learn the process quite well but not all of the vocabulary.

General Reflection

Next time this unit needs to be spread out over a long period of time but it does not need to be taught in isolation. "Continuity and Change" could incorporate our study of weather and/or changing states of matter. I would grow the Brassica plants first and alternate between observing their growth and some other phenomenon. That said, this unit was successful in meeting its objectives for most students. However, they did tire of planting so much somewhere towards the end of the second week.

As always, some of the best learning in the unit happened spontaneously. We planted the Snapdragons in a planter box outside of our classroom when they looked like they were going to die if we kept them outside. After a couple of days, students were very excited to see that when planted outside they seemed to be coming back to live. Unfortunately, we came to school the next day to find that someone had ripped the flowers off the Snapdragons. We used our feelings of sadness to make skits about the importance of plants in our lives and how we should be kind to them. Most memorable among the skits was an interpretative dance routine of wilting flowers and rebirth (pictures follow).