Grade Level/Course: Grade 4 Science & English Language Arts

Lesson/Unit Plan Name: The Life Cycle of A Plant

Rationale/Lesson Abstract: The purpose of this unit plan is to teach students about the life cycle of plants through a collaborative and constructive approach. Students will learn what plants need to grow (parts of plants and their purpose, germination, and photosynthesis). The learning will stem from students conducting scientific experiments that allow them to create and test a hypothesis. Throughout the lesson, there is scaffolding, differentiation, guided instruction, and engaging hands on activities to meet the academic needs of each learner.

Additionally, students will make observations, organize their thoughts, and reflect on their findings in their Interactive Science Notebooks. Students will incorporate their findings into a PowerPoint presentation and opinion piece on Google Docs in English Language Arts.

Timeframe: 4 to 6 Weeks

Common Core Standard(s):
4-LS1 From Molecules to Organisms: Structures and Processes
Students who demonstrate understanding can:

4-LS1-1. 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.]

Common Core State Standards Connections

ELA/Literacy –

W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)

SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2)

Instructional Resources/Materials: FabLab Acrylic Planter, Soil, Sand, Water, Various Beans, Observation Log, Plant Vocabulary Cards, Worksheet on Scientific Method, Science Interactive Notebook, Science Textbooks & Practice Workbook, Pencils, Computer Tablets, Google Docs, and PowerPoint

Lesson Source (program, page, etc.):

- Scott Foresman California Science - Grade Level 4
- Brain Pop Science Videos: How Plants Grow, Photosynthesis, and Seed Plants - https://www.brainpop.com.
- Additional Resources: Classroom/Library Books on Plant Life.

Essential Question(s):

1. What does a plant need to grow?
2. In what material(s) do seeds grow best?
3. What is photosynthesis?
4. What is germination?
5. What are the four important factors of the plant life cycle?
6. What are the main parts of a plant? Their function?
7. Do plants grow with only light from the sun?
8. Can plants survive without water? Only water?

Background Knowledge:

Students will need to understand the concept of a life cycle and know some vocabulary related to plants.

Key Vocabulary:

stem, leaves, leaf, roots, seed, flower, fruit, petals, bud, trunk, branch, pod, water, sunlight, soil, air, oxygen, food, vegetable, pollinate, pollination, scatter, nutrients, energy, grow, germinate, plant, vine, data, measure, sprout, ground, produce, moves, emerge, seedling, life cycle, stamen, pistil, pollen, seed, coat

SWBAT (Students Will Be Able To):

- Students will be able to define and draw the life cycle of a plant.
- Students will be able to describe how plants grow from seed to plant.
- Students will be able to identify parts of a plant and their functions.
- Students will be able to use technology to search for information.
- Students will be able to use technology to present information.
- Students will be able to reflect daily in their Interactive Science Notebook on the life cycle of a plant.

Activity/Lesson:

Introduction

The class will be introduced to the topic of the lesson, "The Life Cycle of a Plant". Students will be reminded that the life cycle of most plants starts with a seed and then ends with a fully-grown plant - a plant whose internal and external structures support its growth and survival.

Accessing Prior Knowledge

I. Students will be led in a discussion on what they know about plants. Driving questions may include:
   - What are some plants you have seen?
   - Where have you seen these plants?
   - What do you think plants need to live?

   Write responses on chart paper.

II. The responses from the chart paper will be used to inform student knowledge of what plants need to grow: water, sunlight, and soil. Circle/write these needs. Then ask students:
   - Can plants grow in material other than soil?
   - What kind of material?
   - Do they need food?
   - How do their plant parts support growth (e.g. roots absorb nutrients)

   Write responses on chart paper.

Explicit Instruction/Teacher Modeling

I. Students will watch the following Brain Pop Science Videos: How Plants Grow, Photosynthesis, and Seed Plants https://www.brainpop.com.
II. Students will take notes on key points/ideas in their Interactive Science Notebook.
III. Students will also read related pages in their Science Textbook
   - Students will take the quiz at the end of each video (whole group or on tablets).
   - The content of the videos and textbook will be discussed with the students. Supporting practice workbook pages will be completed.
   - Key points will be charted from each video segment and connections will be made back to our original brainstorms.

Guided Practice/Interactive Modeling

I. Students will work with a partner to select a plant part and do a quick-write.
II. Students will conduct further research online for information about the plant part they chose and record the information in their journals. They will be provided with some websites where they can find useful information about their topic.
III. Students will draw pictures related to the life cycle of a plant in their journals.

Activity/Lesson continued:

Guided Practice/Interactive Modeling Continued

IV. Students will use the information they have gathered to create and test one of their hypothesis as related to the following questions, “In what material do plants grow best?” Do all plants need sunlight to grow?” “Does it matter where a seed is planted in order for photosynthesis to work?” “How do plant structures support plant growth?”

Independent Working Time

Students will begin the process of testing their hypothesis through experimentation and observation.

I. Students will plant 3 different types of seeds in each section of their newly fabricated acrylic planter. One section will contain soil, another sand, and the third water.
II. Students will draw and log each day of their observations in their Plant Observation Logs for the next 2-3 weeks.
III. Students will also use their observation logs to note plant parts, the stages of the life cycle of a plant, and key vocabulary.
IV. These observations will be used to summarize their findings and to present them in an opinion piece on Google Docs in English Language Arts as well as their PowerPoint for their oral presentations.

Differentiation

- ***Enrichment***: Have students create a skit, mini booklet, word search, quiz, collage, mosaic, clay model, or painting on the life cycle of a plant.

- ***Support***: Have some visual aids prepared for those students struggling to grasp the material/English Language Learners (e.g. sequence charts of the life cycle of a plant, visual vocabulary cards, additional videos, books, etc.)

- ***Math:*** Have students measure the heights of each plant daily. Have students create graphs that show the rate of growth and the variables that attribute to the increase or decline of the growth rate.

- ***Science:*** Expand this lesson by having students plant other types of seeds in the same materials. Expose the seeds to different levels of lighting, air, and/or water.

Assessment:

Assess students understanding of the Life Cycle of a Plant

Short Term/Once a Week:

- Students will discuss findings/analysis from observations in small groups
- Students will write reflections/short report on their findings/analysis
- Students will present their reflections/short reports to the class in an oral presentation
- Exit tickets on at least 1 fact students learned about plants
- Testing them on the academic vocabulary, the stages of the plant life cycle, and what plants need to grow.

Long Term/End of Unit:

- Students will write an opinion piece on Google Docs (at least 5 paragraphs)
- Students will complete unit assessments
- Students will create a display board chronicling the scientific experiment
- Students will give final oral presentation using PowerPoint
- Review student observation logs, interactive science notebooks, and related practice workbook pages and worksheets.

Review and Closing:

Review the essential questions, create a bulletin board of student work, revisit a video, draw illustrations, and/or re-pot the plants for students to take home and continue to watch their plant grow!