

STEM-Integrated Lesson Design

- I. **Grade Level and Subject Area:** First Grade Science
- II. **Title of Lesson:** Soil Survivors
  - a. **Big Idea**
    - i. Students will investigate the importance of the amount of water needed in order for plants to grow. There will be four environments (dry, moist, wet, and very wet) where students will be able to control the amount of water. They will create a hypothesis on which environment they think will be the best environment for the seeds.
    - ii. Students will also be asked...
      1. Which environment do you think will produce the tallest plant?
      2. Which environment will produce the plant with the most leaves?
- III. **Tasks:** We will create four different environments that will be able to show the students the importance of water levels for plants. We will use three different plants to see if each plant grows differently.
  - a. **First**, we will prepare the environments. Each group will be responsible for their set of plants. They will create a dry, moist, wet, and very wet environment along with three different plants.
  - b. **Second**, we will have the plants sit for about two weeks and let them grow. It is key to have these plants in the same environment that way the environment is not compromised.
  - c. **Last**, we will find a day where we will take the plants out of the soil and start measure each one in order to answer the two questions above.
- IV. **Justification Statement**
  - a. This lesson series what type of environment certain plants need in order to survive. It creates a hands-on unit that will allow students to create hypothesis and watch their plants grow. It is important for students to learn about this because in order to take care of our planet, we will need to continuously plant plants. As a class, we can find an environment which will allow plants to grow tall as well as grow many leaves.
- V. **Standards**
  - a. **NGSS**
    - i. 1-LS1-1
      1. All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
    - ii. 1-LS3-1
      1. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
  - b. **Common Core**
    - i. RI.1.1
      1. Ask and answer questions about key details in a text.

- ii. W.1.8
  - 1. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- iii. 1.MD.A.1
  - 1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

**VI. Measurable Objectives**

- a. At the conclusion of this lesson, students will be able to...
  - i. Identify which environment would best benefit plants.
  - ii. Present their findings out loud in front of class.
- b. At the conclusion of this lesson, teachers will be able to...
  - i. Utilize this lesson to promote sustainability for our planet.

**VII. Total Time**

- a. Day one to set up will take about one hour.
  - i. For this day, we will introduce the lesson and have students create their hypothesis. The students will then be able to create each environment.
    - 1. For the environments, they will need to grab soil, seeds, and water. Based off the handout, the students will then water the plants and from there we will wait for the plants to grow.
- b. We will need about a week and a half to two weeks to allow the plants to grow according the amount of water each environment has. As a class we can check this on a daily basis “Check our plants” time every day.
- c. By the end of the waiting period, the students will then count the leaves on the plants then write it down. They will then measure the height of each plant. Once the data is collected, the students will then share their data out loud on a class table. Once the students see the final overall data, they can check on their hypothesis to see if they were correct.

**VIII. Social Skills and/or Habits of Mind to Engage/Assess**

- a. Use each other names
- b. Disagree with the idea not the person
- c. Respect the opinion of others
- d. Share materials
- e. Encourage each other
- f. Persistence
- g. Questioning
- h. Empathetic Listening
- i. Drawing on Past Knowledge
- j. Inquisitiveness, curiosity
- k. Enjoyment of Problem Solving.

**IX. Level of Voice Appropriate for Activity**

- a. The noise level for most of the activity will be 1 and 2. Students will be sharing their ideas within their table group. Once students share their data out loud, they will be using a level three, strong speaker voice. The little cards on the side will

be used as placards on each table group that way they can self-monitor themselves.



## X. 5E Framework

### a. Engage

#### i. Paper Monitor

1. The paper monitor will also be the materials manager. This person will be in charge of grabbing all materials necessary in order for the lesson to go smoothly.

#### ii. Walker

1. The walker will be in charge of walking around their table group and double checking all the measurements in the experiment. They will also be the ones who check on other groups to make sure that their own group is on task.

#### iii. Speaker

1. The speaker is going to be the one will ask the questions out loud to the teacher along with speaking with other groups. If there are any questions, the speaker is encouraged to ask, "three before me." This will help with an 80/20 rule because there is a possibility that 20% of my students will be confused while 80% might know what we are doing.

- iv. **Encourager**
  - 1. The encourager will work along with the speaker when it comes to “three before me.” This person will also be the one that promotes a positive group and environment and acknowledges everyone’s hypothesis and opinions.
- b. **Explore**
  - i. **Formation of Groups**
    - 1. For the formation of groups, I will definitely do a Human Graph. With the Human Graph, I will use student’s experience on gardening. By doing this, I can have balanced groups that way the ones who are considered experts in this area can help students who may not exactly know how to garden yet.
- c. **Explain/Extend**
  - i. As students are creating their hypothesis, they will need to explain why they think their hypothesis will be correct. By doing so, they will be able to create a supportive argument as to why they think a certain environment will be successful. As for extend, we will extend our learning by asking our classmates to also share their hypothesis. I would also extend this into art by having students draw out their hypothesis along with draw out the results of their environment. By doing so we will be able to use art along with this lesson.
- d. **Evaluate**
  - i. **Content Formative Assessment**
    - 1. Students will be assessed by writing about their hypothesis with their supporting evidence. They will then write about whether or not they were correct and how close their original hypothesis was.
  - ii. **Formative Assessment of Non-Cognitive Factors**
    - 1. Students will be assessed for effort and teamwork throughout this lesson. This will be assessed by their groupmates using a checklist then writing down any additional notes they may want to add. This will also be done individually and with dividers that way students can be confident, comfortable, and honest when it comes to grading their groupmates.
  - iii. **Content Summative Assessment**
    - 1. The criteria will ask the following questions as a summative assessment:
      - a. Which environment worked best for the plants?
      - b. Was there one environment where all the seeds were successfully able to grow?
      - c. List the environments from least beneficial to most beneficial for the seeds.

## **XI. Materials List**

- a. Soil
- b. Cups with dome lids
- c. Three different types of seeds
- d. Water

- e. Sticky Notes
- f. Beaker
- g. Ruler

**XII. Bibliography**

- a. Foss Next Generation Lesson Plan
  - i. Investigation 4: Range of Tolerance
    - 1. Pages 274 to 291