



## Lesson Four: Plant Detectives

**Grade Level:** 2<sup>nd</sup> Grade

**Time:** Over a 1-week period, students will need to manipulate their experiment daily.

**Essential Question:** How can we be stewards of Wyoming's agriculture to benefit current and future generations?

**Objective:** Students will identify that plants require sunlight and water to grow successfully.

**Purpose:** Students see the effects that poor soil, excess/insufficient water, and insufficient light have on a plant's ability to survive. Students make the connection between caring for crops, successful production, and the role of stewardship in Wyoming's agriculture.

### **Required Materials/Resources:**

- Class garden (refer to the Educator Essentials at the start of this unit for directions to set up class garden)
- Substance to affect soil quality: salt, litter, flour, etc.
- Plant Observation handout (one per student per day)
- Exit ticket (one per student)
- Possible reference: *From Seed to Plant* by Gail Gibbons (Source 1)

### **Suggested Teacher Preparation:**

- Have class garden available.
- Have an area prepared for plants to experience Poor Soil, Poor Light (no sunlight), Too Much Water, Too Little Water as well as the plants that are Ideal Soil, Water, and Sun.
- Mark each cup with the variable being tested for the experiment: Poor Soil, Poor Light (no sunlight), Too Much Water, Too Little Water
- Determine how many total copies of the Plant Observation handouts are needed for the week.
- Refer back to the Wyoming Resources Map to reference crops grown in Wyoming for step 2.
- Decide if you want students to participate in extension activities (see end of lesson).

### **Standards:**

Science: 2-LS2-1 (Explicit)

ELA: 2.W.7 (Explicit), 2.L.6 (Practiced/Encountered)

Math: 2.MD.1 (Practiced/Encountered)

CVE: CV5.3.3 (Practiced/Encountered)

### **Vocabulary:**

- **Flower** - the part of a plant that is sometimes brightly colored, usually lasts a short time, and from which the seed or fruit develops after pollination
- **Fruit** - the part of a flowering plant that contains seeds
- **Harvested Crop** - the final stage of the plant life cycle in which the plant is taken and processed for use by people or animals
- **Mature Plant** - the plant with leaves, roots, and stems
- **Seed** - small object produced by a plant from which a new plant can grow
- **Seedling** - a young plant grown from a seed that has sprouted above the soil
- **Sustainable** - able to be maintained, able to last or continue for a long time

## Instructional Procedure/Steps:

1. Plants used in this lesson will come from the class garden. As you select plants to use for the experiment, please be sure to save some plants back and maintain them under “ideal” conditions for use in future lessons.
2. Review with students learning from the previous lesson. Discuss the trends students noticed about crop growth and where specific crops are grown in Wyoming. Remind students of the specific crops grown in Wyoming.
3. Say: **“This week, we will be conducting an investigation to determine the effects of soil quality, water availability, and the amount of light on the growth and health of a plant.”**
4. Divide students into four small groups. Each group will be responsible for maintaining one variable for the experiment: Poor Soil, Poor Light (no sunlight), Too Much Water, and Too Little Water. However, each student in the group will be asked to document their daily observations on the Plant Observation handouts. Part of the observations could include measuring the plants. Over the next several days, students will continue to maintain the experiment by eliminating sun, adding too much water, changing the soil quality (adding salt, litter, flour, etc.), and withholding water, then documenting the effects.
5. On the final day of observations, students share out the results of their experiment by documenting the changes that were noticed on the final Plant Observation handout. *Students should share out their results to move them toward answering the essential question of how stewardship impacts agriculture in Wyoming and the soil quality needed for crop growth.* When students finish sharing, ask students: **“What are some ways farmers are good stewards?”** *Students responses should include: make sure plants have enough water, plants don’t get too much or too little sun, plants have healthy soil, etc.*

**TEACHER NOTE:**  
Having students work in groups or individually is per teacher discretion. The following lesson steps are a suggestion of how these observations could be done in the classroom. However, students should be expected to make **individual** observations on the last day of all 4 plant experiments.

**TEACHER NOTE:**  
Observing the effects of changing the soil quality could be difficult, especially in a short duration experiment. Plants can withstand quite a bit of stress for a while.



In this task, students will be engaged in the higher order thinking skill of synthesis by creating new ideas as a result of their experiments and by connecting it to the larger focus of the unit.

6.  Conclude with discussion of the components necessary for plant growth and development. Ask the following questions:
  - **“Using your observations from these experiments, what do plants need to survive?”** *water, sunlight, healthy soil*
  - **“What connection can we make between successful growing of crops and being good stewards?”** *In order for crops to continue to grow for future generations, farmers need to be good stewards of the resources that plants need.*
7. Pass out exit tickets for students to respond to the following question: **What is one way being a good steward can help crops grow?**

#### **Possible extension activities:**

Have students try to REVERSE the effects of these variables. What happens if the plant with no sunlight is now put in the sun, plant with no water is watered, etc.? Can these effects be reversed?

**Assessment:** Check Plant Observation Handouts for accurate observations. Check exit tickets for feasible examples of being a steward.

#### **Credits/Sources:**

1. Gibbons, Gail. (1991). *From Seed to Plant*. New York City, New York: Holiday House