**Let It Grow!**

**- Second Grade Ecosystems: Interactions, Energy, and Dynamics –**

**By Rachel Pankratz and Pat Brandt**

**Next Generation Science Standards in this Unit**

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS4-1:** Develop simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

**Reading Standards Within this Unit**

**2.RI.6:** Identify the main purpose of a text, including what the author wants to answer, explain, or describe

**2.RI.9:** Compare and contrast the most important points presented by two texts on the same topic.

**Day 1**

**Materials Needed:**  Seeds, 1 Ziploc bag per student, 3 cotton balls per student, water, tape, large box that does not allow light in

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

Objectives:

* *Explain* why experiments are performed in science

Learning Activities:

1. **Why Experiment? – 5 minutes**
   1. Explain that humans perform experiments to answer questions we have about the world around us
   2. There are two questions we need to answer: Do plants need light to grow and do plants need water to grow?
   3. Explain that we will be growing bean seeds in a Ziploc bag to answer our two questions
   4. Give each student a partner to work with for the duration of this science experiment
2. **Experiment preparation – 19 minutes**
   1. Distribute materials
      1. Each partnership will need two of the following:
         1. Ziploc bags, bean seeds, 3 cotton balls, tape, water (either from classroom sink or if no sink, then have bottles of water on hand)
      2. Because each partnership will have two sets of materials, each student will need to prepare one bean bag
   2. Plant Seeds
      1. As students prepare their experiments, teacher will be modeling the setup procedure by preparing the whole class’s “Water vs. No Water” experiment.
         1. Recommended to fully prepare “No Water” bag in advance because the “Water” bag will be set up exactly the same as the student’s experiments and is better for modeling how to setup the experiment.
      2. Instruct students to use the permanent marker to label their Ziploc bag with:
         1. Their name
         2. Their partner’s name
         3. Partner 1: Light
         4. Partner 2: No Light.
      3. Instruct students to soak three cotton balls in water and then bury their bean seed in the cotton balls
      4. Have students open their Ziploc bag and place the wet cotton balls, with the seed, into the bag
      5. Place Ziploc bag experiments in appropriate environment:
         1. Partner 1 - Find a window in the classroom that has access to sunlight on a daily basis and tape their Ziploc bag experiment to the window.
         2. Partner 2 - Place Ziploc bag in light absent box
            1. Be sure no light can enter the box when all the “Box” experiments are in there
      6. Remind students that they will have to water their cotton ball everyday or every other day. It is important that the cotton ball *does not* dry out!
   3. Exit Slip
      1. Each student will write at least one sentence about why experiments are important for science and at least one descriptive sentence about our experiment setup

Assessment:

1. Experiments Exit Slip

**Day 2**

**Materials Needed:** computer, projector, journal, Anticipation Reaction Guide

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

Objectives:

* *Identify* characteristics that make up plants

Learning Activities:

1. **Anticipation Reaction Guide - 5 minutes**
   1. Give each student a blank Anticipation Reaction Guide
   2. Teacher read statements aloud and have students mark true or false on the left column
   3. Pair and Share
      1. Discuss questions from Anticipation Reaction Guide with a partner.
2. **Plants PowerPoint - 15 minutes**

*Note to teacher: be familiar with the transition animations on the slideshow before presenting. Also check the notes margins for more detailed explanations of the slide content.*

* 1. Briefly talk about the characteristics of a plant. What makes a plant a plant?
  2. Have students revisit their Anticipation Reaction Guide and mark their new responses with a different colored pen/pencil.
     1. Will display Anticipation Reaction Guide on powerpoint. Students will volunteer answers to the questions on the guide.
     2. Place Anticipation Reaction Guide in the turn-in bin for teacher to check later.
  3. Show picture of a greenhouse.
     1. The greenhouse keeps plants warm in the winter, cool in the summer, and still exposes the plants to the sunlight they need to survive.
     2. The Ziploc bag is like our own mini greenhouse. We use a Ziploc bag because we will be able to observe what is going on with the plant, the plant will receive sunlight it needs, and we can tape our “Light” bags to the window to maximize sunlight exposure and minimize clutter in the classroom.

1. **Begin Plant Journal – 10 minutes**
   1. Teacher model how to fill in journal information using the whole class experiment of “Water vs. No Water”
   2. Students complete journal pages
      1. Put name on cover page of journal
      2. Without discussing it with your neighbor, fill out page two of your journal
         1. In the box (on journal page) have students draw and color in what they think their bean plant will look like based on what they already know of plants

Assessment:

Formative:

* Anticipation Reaction Guide – after reading column

**Day 3**

**Materials Needed:** multiple copies of Magic School Bus: Planted Seed by Patricia Relf & Bruce Degan, vocabulary sheets

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

Objectives:

1. *Inspect* progress in plants’ growth
2. *Illustrate* plant vocabulary

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day three entry.
2. **Magic School Bus Reading – 20 minutes**
   1. Teacher review any vocabulary words in the book with the whole group that are unfamiliar or difficult to pronounce
      1. Particularly focus on vocabulary from the Vocabulary Table marked with the Magic School Bus icon. These words will be found in the book.
   2. Teacher demonstrate how to fill in Vocabulary Table quick sketch using a word *not* found in the Magic School Bus book
   3. Teacher pair students to read Magic School Bus: Planted Seeds
   4. Every student will complete their own Vocabulary Table as they and their partner read the book
      1. To complete their tables, students must draw an illustration of each vocabulary word in the space provided

Assessment:

Formative:

* Plant Journals
* Vocabulary Table

**Day 4**

**Materials Needed:** observations table per student, tape, tub of mixed seeds, plastic tablecloth, seed key

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

Objectives:

1. *Inspect* progress in plants’ growth
2. *Classify* a seed using the five senses

Learning Activities:

1. **Plant Journal – 10 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day two entry.
2. **Practicing Observations – 20 minutes**
3. Set out tub containing an assortment of at least 10 different seeds.
   1. Putting plastic down under the tub may be helpful for quick cleanup
4. Review the five senses with students: sight, smell, touch, hearing, taste
   1. *Explicitly explain: though taste is an important sense, tasting the seeds is off limits!*
5. Teacher model for the students how to pick a seed and describe it as if to a blind person using the four senses
   1. Fill in the top line of the table as you demonstrate
6. Allow students to each pick 5 different seeds and describe it as completely as they can (as if they were talking to a blind person)
7. Each student is responsible for completing their own table of seed descriptions
   1. If students finish their table quickly, provide them with a “Seeds in the Tub” key and have them determine which seeds they described based on their observations

Assessment:

Formative:

* Plant Journal
* Seed Observation Table

**Day 5**

**Materials Needed:** Who will Plant a Tree? by Jerry Pallotta, note card and pencil

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2.RI.6:** Identify the main purpose of a text, including what the author wants to answer, explain, or describe

Objectives:

1. *Inspect* progress in plants’ growth
2. *Identify* main idea of the book

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day four entry.
2. **Who Will Plant a Tree? - 20 minutes**
   1. Teacher show students the cover of the book Who Will Plant a Tree?
      1. Ask students what they think the story is about? Why?
      2. Encourage students to explain their thinking by referring back to the cover’s illustration and title
      3. Point out the bear, squirrel, and moose on the cover.
         1. Ask students if they think these animals can help plant a tree? How?
   2. Teacher will read book aloud.
      1. Tell students to listen for the different ways that animals can help seeds travel from their parent plant to grow in other paces as you read the book aloud
   3. After the story, have students turn and talk about what they learned from the book
      1. Ask students what were some of the ways the animals in the book planted trees.
         1. (Seeds stuck to their fur or feathers and then fell off later in a different place, they ate seeds and then pooped or spit them out, etc.)
      2. Did these animals know they were planting trees? Did they do it on purpose?
         1. (No, except for the people at the end of the book)
   4. Show students the back flap of the book
      1. Tell them that often you can find more information about the author and illustrator here.
      2. Read aloud the paragraphs about the author, Jerry Pallotta, and the illustrator, Tom Leonard. Then flip through the illustrations and rearead some of the text from a few pages
      3. Ask students what they think the author and illustrator of this book are trying to tell their readers about trees with their words and pictures.
         1. (Trees often depend on animals to move their seeds around)
      4. Note card Exit Slip
         1. Have each student record their response on a notecard with their name to turn into the teacher

Assessment:

Formative:

* Plant Journal
* Main Idea Note Card

**Day 6**

**Materials Needed:** one clean adult size white sock per student, large Ziploc bags, water, tape, “What’s on my Sock?” journal page, hand lense

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS4-1:** Develop simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Objectives:

1. *Inspect* progress in plants’ growth
2. *Show* how animals aid in dispersing seeds

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day four entry.
2. **Sock Walk - 20 minutes**
   1. Explain to students that they will be going outdoors on a sock walk to collect seeds.
      1. Instruct students to place sock over their shoe.
      2. Explain to students that the sock represents the fur of an animal.
      3. Students will walk around a designated area with the sock on to collect seeds.
      4. Student will observe sock with a hand lense to identify any seeds they collected.
      5. Student will draw and label what they have observed on their “What’s on my sock?” journal page.
         1. “What’s on my sock?” journal page can be found on page 167 of Even More Picture Perfect Science by Emily Morgan and Karen Ausberry
      6. Student will place sock in large Ziploc bag and water sock, taping Ziploc bag to the window.
      7. Student will observe bag over the next few weeks to monitor any seed growth.

Assessment:

Formative:

* Plant Journal
* What’s on my sock journal page

**Day 7**

**Materials Needed:** plant journal, Flip, Float, Fly: Seeds on the Move by JoAnn Early Macken, seeds (Dandelion seeds, Maple Seeds, Tumbleweed Seeds, Burdock Seeds) or Seed Cards

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS4-1:** Develop simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

**2.RI.9:** Compare and contrast the most important points presented by two texts on the same topic.

Objectives:

1. *Inspect* progress in plants’ growth
2. *Compare* ways which seed dispersal occurs

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day five entry.
2. **Flip, Float, Fly: Seeds on the Move - 25 minutes**
   1. Students will observe front cover of book and make a prediction as to what is going to happen in the book.
   2. Students will preview types of seeds that will be discussed in the book (either real seeds if they are available or will use the Seed Cards provided).
      1. Seed Cards can be found on page 166 of Even More Picture Perfect Science by Emily Morgan and Karen Ausberry
   3. Students will turn and talk about the characteristics of the seeds and how they might be moved from place to place.
   4. Students come back together as a class and describe ways they think the seeds will be dispersed.
   5. Teacher will read book aloud to students.
   6. Students will signal (put their hand on their head) when they hear about the seeds they observed.
3. **Exit Slip - 5 minutes**
   1. Student will compare Flip, Float, Fly? with Who will Plant a Tree?
   2. Students will write their comparisons on a sticky note.

Assessment:

Formative:

* Plant Journal
* Sticky Note Exit Slip

**Day 8**

**Materials Needed:** plant journal, poster board, magazines, scissors, markers, glue, tape

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS4-1:** Develop simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Objectives:

1. *Inspect* progress in plants’ growth
2. *Create* a visual of knowledge on seed dispersal

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day five entry.
2. **Dispersion Model Project - 25 minutes**
   1. Explanation Poster
      1. Students will be creating a simple model of animals dispersing seeds or pollen around from one place to another. Students may get creative with either a poster or a collage.
      2. Show students the teacher’s example and then tape it to the board as a reference point for students during work time on their project
      3. Poster board, markers, magazines, scissors, glue, and tape will be provided for this project.

Assessment:

Formative:

* Plant Journal
* Dispersion Poster

**Day 9**

**Materials Needed:** computer, plant journal, completed poster

Standards:

**2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS4-1:** Develop simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Objectives:

1. *Inspect* progress in plants’ growth
2. *Propose* ways that seeds are dispersed

Learning Activities:

1. **Plant Journal – 7 minutes**
   1. Have each student log the activity of their partnership’s bean seeds in their plant journal for day six entry.
2. **Dispersion Presentations to the Class – 20 minutes**
   1. Each student will have 2 minutes to explain their poster model of dispersion.
   2. The three things the student must point out:
      1. Where their pollen or seed started out (most likely a flower)
      2. What method of transportation was used (i.e. wind, animal, gets stuck to clothing, etc)
      3. Where the pollen or seed ended up (stayed stuck on clothing, landed on another flower, etc)
   3. After each presentation, the presenter may choose one peer to ask a question about their model and one peer to make a comment on their model

Assessment:

Summative:

* Completed Plant Journal
* Dispersion Presentation