



1/2<sup>nd</sup> Grade: The Well Prepared Hiker & Planting Seeds  
 3<sup>rd</sup> Grade: Soil Nutrients & Planting Seeds  
 4/5/6<sup>th</sup> Grade Lunch Clubs: Planting Seeds  
 TK/K: Seed book and Planting Seeds

Grade level: All grades

Over the next two weeks, 1st and 2nd graders will learn about the parts of a seed and their functions through an interactive demonstration. Third graders will learn about three important plant nutrients and perform a simple experiment to see if their plants grow better with a soil amendment. All students will plant seeds (or starts) of cool weather vegetables.

### Materials

- Well Prepared Hiker - A backpack filled with crumbled paper, large rain jacket, tape, paper labels for the seed parts, high-energy snack stashed in the main compartment of the backpack, water bottle with straw, green hat
- Planting Seeds – gloves, seeds to plant, soil amendments, trowels, container for soil amendment (3<sup>rd</sup> only)

### Lesson Introduction (10 min)

Walk students from the classroom to the picnic blanket. Ask them to sit in a circle on the picnic blanket. Please remember to use Paw Prints!

→ "Something important happened last Monday. Does anyone know what it was? (hint: it happens once a year) – The Autumnal Equinox on September 23rd! The Autumnal Equinox marks the **beginning of fall** and is the day where the number of daylight hours is nearly equal to the number nighttime hours. After the Autumnal Equinox, days will continue to get shorter and shorter until the Vernal Equinox which marks the first day of Spring (March 19<sup>th</sup>).

→ With the days getting shorter, the weather begins to cool. Some crops that thrive during the summer do not do well in the fall. In the fall, we plant COOL SEASON vegetables instead. Many of these vegetables will not survive our hot summers. [Hold up vegetable cards and ask students to guess which are cool season and which are warm season. Cool Season – lettuce, broccoli, carrots, beets, peas..etc Warm Season – squash, beans, eggplant, tomatoes, cucumber..etc]

→ Last week we harvested seeds from **warm** weather plants. This week you will plant seeds of **cool** weather plants. [show seed packets and jar of seeds] Seeds are amazing. Every little seed in this jar is prepared to grow when conditions are right. If a seed has water, the right nutrients, and sunlight, it will mature into a mature plant and eventually repeat the cycle.

## **1<sup>st</sup> and 2<sup>nd</sup> grade**

### **Part I The Well Prepared Hiker (A lesson by LifeLab, Santa Cruz) (10 min)**

→ So how do seeds grow? Well, I'd like to show you that seeds are actually similar to a Well Prepared Hiker.

→ I am looking for someone to dress up as a Well Prepared Hiker. Help the volunteer put the backpack on first, **then** the rain jacket.

→ Okay everyone, \_\_\_\_\_ (name) is our Well Prepared Hiker. He/she has come to help teach you about seeds today. You may not realize it but our Well Prepared Hiker and seeds have a lot in common. Do you see any similarities? [shake jar of seeds]

→ Well, first, what is this \_\_\_\_\_ wearing to protect him/herself from wind, rain, and cold? (A COAT!) Seeds also have coats for protection  
[Attach the seed coat label to the coat the volunteer is wearing.]

→ When conditions change, our Well Prepared Hiker takes his/her coat off and enjoys the warm, sunny weather. [Have the volunteer remove his or her coat and hang it so that the seed coat label is clearly visible.]

Similarly, when conditions are right, a seed absorbs water, its seed coat cracks open, and it begins to sprout roots and leaves. This process is called GERMINATION.

→ What else does this Well Prepared Hiker have? (A BACKPACK WITH SUPPLIES.)  
[Let the volunteer discover the snack in the main compartment of the backpack.] Just like \_\_\_\_\_, seeds also have a supply of stored food. Our hiker's food is stored in a backpack BUT a seed stores its food in its COTYLEDONS. Cotyledons provide the plant with the initial energy to germinate and grow. Once the plant has established itself, the cotyledons fall off  
[Attach the cotyledon label to the backpack].

→ \_\_\_\_\_ (name) uses a lot of energy when he/she hikes and eventually gets thirsty. What else do hikers need on a long hiking trip? (Water bottle!) [Have your volunteer remove the water bottle from his/her backpack.]

Plants also need water and minerals to help them grow. How do the plants get this water and minerals? (ROOTS.) (Attach the root label to the straw of the water bottle.)

→ What else would we want on a sunny hiking trip? (A HAT.) [Have the volunteer remove a hat from the backpack and place it on his/her head.] This Hiker's hat is similar to the first green leaves a seedling puts out to absorb sunlight. [Attach the LEAVES label to the hat]  
Plants need leaves so they can use sunlight to make food. The process of making food from sunlight is unique to plants and is called PHOTOSYNTHESIS. After a few weeks when the plant grows larger leaves, the cotyledons will fall off and the plant will use its large leaves to get energy from the sun. [Have the volunteer remove the backpack and place it next to the seed coat.]

→ Finally, inside each seed is a tiny plant called the EMBRYO. It has small leaves and roots. Place an embryo label around the volunteer's neck (the volunteer is like a little plant embryo).

→ Now review the various parts of the seed and their functions using the props.

[Please remove labels from the backpack, jacket and backpack contents, leave items in the shed for the next group. Re-stock the backpack with all supplies in the right locations for the next class and leave on the garden cart.]

## **Part II. Prepare Soil and Plant Seeds!**

Describe what the students will do in the garden. Bring the Rules poster to the garden if you wish. Remember to use PAW PRINTS!!

Please refer to the table below for your garden bed assignment. Refer to the map (or numbers painted on the bed) for the location of your class' planting bed.

### **Planting Seeds: 1<sup>st</sup> Grade, 2<sup>nd</sup> Grade and Garden Lunch Club (10-15 minutes)**

→ "We are going into the garden now to work. Please think about our garden rules.

→ Our garden bed is number \_\_\_\_\_. [show students the bed]

(If your bed still has plants in it, pull them and place them on the blue tarp in the garden.

Someone will come later and cut the plants into small pieces and place into the **city compost waste cart**. Many plants in the garden are diseased and CANNOT go into compost).

→ After your bed is clean, rake the soil flat and divide the garden into halves (Group A, Group B). [If you are teaching week I of this lesson, you will plant on Group A's side of the bed.]

→ Now let's form 4 groups of 3 people. I will hand each group a few seeds to plant in our garden bed. [Each group of four will get to plant in 1/8 of a bed. Please try to make sure each child has a chance to plant some seeds. We will thin the seeds out later if they are planted too densely)

- → Plant seeds following directions on packet. Leave a plant label where each group planted.
- → Indicate the type of seed, date planted on a label and place label near the seeds.
- Water gently but thoroughly with hose and spray nozzle.

[When finished, ring the cowbell and help the students wash their hands. One adult will spray the student's hands and the other will hold the spray nozzle over the bucket].

### **1<sup>st</sup> and 2<sup>nd</sup> Grade Closing Circle (5 min)**

Return to the circle and review the parts of the seed and what they accomplished today.

Thank the students for their help today and let them know they can check on the seeds after school or next time they are out in the garden!

## Plant Nutrients and Planting Seeds: 3<sup>rd</sup> Grade (20-30 min)

→ We mentioned that water, nutrients, and sunlight are required for plants to grow. Where do plants get these things from?

- Plants obtain water from rain, the water table (deep rooted plants) or when someone irrigates their garden.
- Plants use their leaves to capture light from the sun to make energy.
- **Finally, what nutrients are needed and how do plants get them???**

→The most important nutrients to a plant are Nitrogen (N), phosphorous (P) and potassium (K).

- Nitrogen (N) is important to plant growth.
- Phosphorous (P) is needed for abundant flower and fruit production.
- Potassium (K) helps plants grow stronger and boosts resistance to diseases and pests.

→In our garden, we add compost and an assortment of organic soil amendments to the soil. These **amendments** provide Nitrogen, Phosphorous, and Potassium to the soil and they keep our plants healthy.

→Today we will design an experiment to test the efficacy one or a mix of soil amendments. You will compare growth of plants in your experimental plot to your control plot (no amendment).

You may choose one of the following soil amendments (amounts will be noted on the bag) for your test plot:

- Neem seed meal (2-5% Nitrogen, .5-1% Phosphorous, 1-2% Potassium) ~1/2 cup
- Kelp meal (1% Nitrogen, .5% Phosphorous, 2% Potassium) ~ 2.5 cups
- Alfalfa pellets (2% Nitrogen, 1% Phosphorous, 2% Potassium) ~4 cups
- Fish bone meal (3% Nitrogen, 16% Phosphorous, 0% Potassium) ~3/4 cup

### Instructions

- As a garden group, select the amendment to test.
- Write down the amendment you will be testing on the metal plant tag in your bed.
- Spread the amendment (maximum volume indicated on package – please do not use more than the suggested amount) in a 2x4 test plot of your class bed and thoroughly mix it in to a depth of about 6 inches.
- The other 2x4 section will be your “control plot” (do not add any amendment)
- Plant wheat seeds in the soil in both the test and control plots at the depth and spacing interval recommended by the package. Water well.

Ring the cowbell and help the students wash their hands.  
(see next page for Closing Circle)

### 3<sup>rd</sup> Grade Closing Circle (10 min)

Return to the circle and have them discuss what they did in the closing circle.

- What is a “control plot” in today’s experiment.
- Why do we need a control plot in our experiment?
- What do you think will happen?

Thank the students for their help today and let them know they can check on the seeds after school or next time they are out in the garden!

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**Table 1. Fall 2019 Planting Chart.**

This planting chart lists where and what your class will plant. We are planting many beds with wheat because it is an easy seed for kids to plant AND the soil in those beds is damaged and will recover if planted with a grass such as wheat.

| Day                                      | Teacher (Grade)                                    | Seed(s)                                 | Location       |
|--|--|---|----------------|
| Friday <sup>1</sup> /Monday <sup>2</sup> | Sodergren (1)                                      | Wheat                                   | 3              |
| Monday <sup>1/2</sup>                    | Powell (2)   | Carrots                                 | 15             |
| Monday <sup>1/2</sup>                    | Keller (1)   | Wheat                                   | 4              |
| Tuesday <sup>1</sup>                     | Caridi (3)   | Wheat                                   | 18             |
| Tuesday <sup>1/2</sup>                   | DeUlloa/Patchett (2)                               | Different types of kale                 | 2              |
| Tuesday <sup>1/2</sup>                   | Fields (2)   | Lettuce (plants and seeds)              | 19             |
| Wednesday <sup>1</sup>                   | TK/K   | Carrots, broccoli, rainbow chard, peas  | Kinder Barrels |
| Wednesday <sup>1/2</sup>                 | Campbell (1)                                       | Wheat                                   | 17             |
| Thursday <sup>1</sup>                    | Cosgrove (3)                                       | Wheat                                   | 16             |
| Thursday <sup>1</sup>                    | 6 <sup>th</sup> Grade Lunch<br>Luciana             | Peas (2 varieties)                      | 12a            |
| Thursday <sup>1/2</sup>                  | Rosas (2)  | Broccoli and Kale                       | 12b            |
| Friday <sup>1</sup>                      | Fingerman (3)                                      | Wheat                                   | 20             |
| Friday <sup>1</sup>                      | 5 <sup>th</sup> grade lunch club<br>Sheryl         | Peas and Carrots                        | 14             |
| Friday <sup>2</sup>                      | 4 <sup>th</sup> grade lunch club<br>Tiffany/Joanie | Remove and harvest Jobs Tear<br>Carrots | 6              |

Figure 1 Map of Edible Garden

