1st Grade Fall

(Full Lesson Plan Here) & (Full Lesson Plan Here) & (Full Lesson Plan Here)

Center 1 - Sunflower Investigation and Seed Math Activity

Location: Outdoor Classroom

(Need: sunflower head from garden, *sunflower seeds, math worksheet, pencil, dry erase board & marker, paper plate)*

1. Set the goal with this guiding objective: **I can use sunflower seeds to show partners of ten and count by ten.** .

2. Ask the students where the sunflower seeds might be found. Start by pointing out the parts that do not contain seeds as a review of plant parts. “These are the leaves, do the leaves have seeds?” The seeds are found in the flowers, and the flowers of sunflowers are very easy to spot!

3. Look at one sunflower head low so that students may see how the seeds are developing in the center of the flower. Select several flowers to compare, asking which flower has the **most**, which one has the **least** seeds. Give students a minute or two to gently investigate the seed development of several flowers on their own, while not harvesting any flowerheads.

4. Model how to do the top of the worksheet using the worksheet example from the GTT Bin.
    a. Using the back, review as a class how to count by ten, and then count on by ones.
    b. Show where they will record their prediction and actual number counted.
    c. Read the question aloud about comparing the prediction and actual answer.

5. Each group should pick out one sunflower to investigate. Please ensure there are at least 3 sunflower heads remaining for the other 1st grade classrooms. Adults can use pruning shears in the garden bin to cut the sunflower off of the stem. Students can take this sunflower and gather their other supplies.

6. Divide the class into groups of four in the outdoor classroom and give to each group:
    a. Seed Math Worksheet (English) (Spanish)
    b. Clipboard - helpful if windy or if sitting on ground
    c. Dry Erase Marker
    d. One sunflower head
    e. Paper plate

7. To start, the students should make a prediction about how many seeds they will be able to harvest from their sunflower head. They can write this prediction on their worksheet.

8. Students may harvest their seeds onto a plate. This may take about 10 minutes. Remind them to first discard both types of petals, then encourage them to break it in half so both students can harvest. Discarded parts can go in a bowl, seeds on the plate.

9. Using the backside of their worksheet, they may now count out groups of ten seeds and put ten seeds in each circle. They should count by ten, then count on by ones, to determine the total number of seeds they have. Ask them to remember or write the number, dump all the seeds back onto the plate, then write the number they counted on the front of the paper. **Note: Some sunflowers truly have more seeds than can be counted in one lesson, so praise the groups for counting as many seeds as they did in the time given.**

10. Students can answer the question about their prediction. **Was the correct number of seeds in the sunflower more than, less than, or equal to their prediction?**

11. After they finish the counting and comparing activity, they may play the Hidden Seed Math Sentence game with their group partners. Demonstrate how to play the game and write an example math sentence:
    a. Each group should start by counting out 10 sunflower seeds to use in the game. Bring those seeds onto the paper, leave the rest of the seeds on the paper plate.
    b. One partner covers up *some* of the 10 seeds with their hand. The other partner has to use subtraction from 10 to determine how many seeds are underneath their partner's hand. For example, if student A covers up *some* seeds with their hand, and student B can count 6 remaining seeds, using partners of 10 student B predicts 4 seeds are hidden under student A's hand.
    c. Both students check if the answer is correct.
    d. Students should write a math sentence on their worksheet for each round of the game. In this example, it could either be 10-6=4 or 4+6=10. There are four spaces for math sentences, but if they finish quickly, they can erase and play again.
12. Clean up procedure:
    a. Pass out a plastic ziplock bag from the GTT Bin to each student. Students may place some seeds in the plastic bags to take home.
    b. Any remaining seeds can be sprinkled back into the sunflower garden bed for birds to eat and new sunflowers to germinate.
    c. Students can erase their worksheets and return the worksheets, clipboards, and markers to the volunteers to put away.

Center 2: Seed Scavenger Hunt/Cucumber Dissection

Location: Garden

(Need: image of cucumber, cucumber from garden or coordinator, worksheet and seed/plant cards*)*

1. Engage the students by asking them to look at cucumber plants, without naming them (you can use squash/pumpkin as a great alternative). If none are available, use the Image of Cucumber Plant from the GTT Bin. Students will want to guess what type of plant they are viewing. When it is discovered that it is a cucumber, ask the students if they have seen one. Explain that it is a common vegetable served alone, in salads, or turned into pickles by soaking in vinegar.

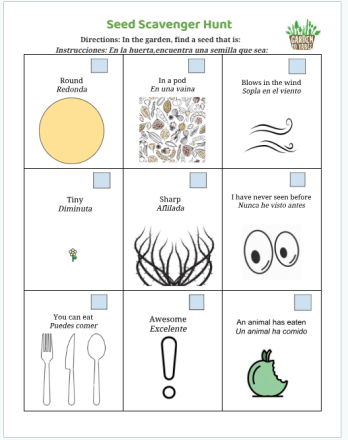
2. Explain that they are going to try to **find the seed** of the cucumber in this picture. Review the different parts of the plant in the picture, encouraging the students to fill in the blanks with any previous knowledge they may have about plant parts. You may need to compliment their answers with scientific facts. Start at the bottom of the plant and work your way up.
    - **These are (this is) the _____. They help the plant to _____.**
        i. Roots - absorb water and nutrients from the soil, anchor the plant, and store food for the plant.
        ii. Stem - provide support and move water and nutrients up and down the plant.
        iii. Leaves - turn sunlight into food for the plant.
        iv. Flowers - make pollen and nectar to help make new seeds.
        v. Fruit (cucumber) - hold the seeds
    - Ask the students "But where are the seeds in this picture? Why can't we see them?" Guide the students to discover that seeds can be inside the fruits by cutting a cucumber and allowing them to explore the seeds.
    - If no allergies, offer a slice of cucumber to each student, asking them to observe it by smelling, touching, and looking. Give them a minute to share what they ***notice*** about the cucumber slice. After a minute or two of observing, they may eat the cucumber slice if they feel comfortable doing so. Some students may not have sampled cucumber before and may be hesitant. Encourage them to try something new and celebrate it if they do, but sampling is not required. Inform them of what to do if they decide they don't want to keep eating the cucumber (a "no thank you" bowl is a good solution). Ask the students to share with the class about their experience tasting a cucumber.
    - Now show the children the cucumber seeds from the packet. Explain how these are the same type of seed that they just observed, but dried.

3. Now that we have found the seeds of this plant, we have to figure out what purpose they serve. Setting the goal with this guiding question: **Why does a plant have seeds?**

4. See if the students can determine why a plant would have a seed. Lead students to understand that seeds help a plant to grow new plants. You can explain that a seed contains:

- A miniature plant, or **offspring**, that can grow to become a new plant
- Food to nourish the offspring

5. Allow a minute or two for students to describe other seeds that they may know about (acorns, coconuts, pine cones, etc.). Focus students on the guiding question: **Are all seeds the same?** Take a minute to show some different seeds from the seed sample jars provided in the bin with the white lid labeled "1st Grade Seed Kit". Allow students to compare and contrast the seeds they are observing. Do the seeds they are observing ***remind them of anything?*** Explain that although seeds look and feel different, that they share the same goal. Allow students to recite that the goal of a seed is to make a new offspring for the plant.



6. Now, prepare the students to go on a seed scavenger hunt in the vegetable garden. Show the class an example of the seed scavenger hunt paper. Please read aloud the categories they students will be trying to fulfill in their garden exploration. This is not a race or a competition - the idea is to be curious and explore together!

7. Establish these expectations:
   - Each group of 4-5 students will have an adult helper. Stay with your assigned helper. If there are not enough helpers, make larger groups.
   - Each group will have a laminated paper, a dry erase marker, and paper plate or bowl for collecting.
   - Students with their volunteers will search the garden for seeds that fit into the different categories, checking off that category in the blue box with the dry erase marker. When they find a seed, they may harvest it one time per group with their adult helper. ***Remember you only need to harvest one of each kind of seed in your group. (With some plants, several seeds may come in one pod or fruit.) Please leave most seeds for other groups and classes.***
   - Try to determine the type of plant that made each seed.
   - It is okay if they do not find a new seed for each category.
   - It is okay if they use a seed for more than one category.
   - Send groups on their Seed Scavenger Hunt for 5-10 minutes, depending on your timeframe, the weather, and their attention spans.

8. Gather back together in groups in the outdoor classroom. Ask each group to share their favorite discovery and tell the class which category it fulfilled. Encourage the class to guess which plant produced that seed. Wrap up the discussion by revisiting the guiding questions, **Why do plants have seeds, and are all seeds the same?** Before moving on, check for

understanding among the group that seeds make new plants and come in many shapes, sizes and colors. Play a guessing game using the seed and plant cards from the bin.

9. After the discussion and guessing game, volunteers can return the seeds to the garden area. Ask the students why the volunteers are returning the seeds to the garden. Why can't we just expect a new plant to grow from the seed on the paper plate? Students should readily offer up ideas for what a seed needs to grow, but help focus the discussion to the following needs:
    - Water
    - Sunshine
    - Soil
    - Space

Center 3: Seed Dispersal Investigation

Location: Outdoor Classroom

(Need: sunflower head from garden, *sunflower seeds, math worksheet, pencil, dry erase board & marker, paper plate)*

1. Set the goal with this guiding question: **Why does a plant spread its seeds?**

2. Ask for a volunteer. That student can help you lay out the cones at the corners of the outdoor classroom an *approximate* 5ft x5ft square where all kids can see it. Hold up five different color poker chips while you explain that these five colors represent the things plants need to live. Engage students to identify those needs.
    a. Red chip - Air (for inquisitive adults and precocious students, specifically CO2)
    b. Blue chip - Water
    c. Purple chip - Soil
    d. White chip - Space
    e. Yellow chip - Sunlight
3. Begin the model (in italics below). This is meant to be a silly, fun, informative way to demonstrate the need for seed dispersal. Check out this video to see how it works ahead of time.
4. Play Ready Set Grow in Outdoor Classroom:
        a. Discuss what seeds need to grow - show corresponding chip
            i. Dark green chip - Air
            ii. Blue chip - Water
            iii. Pink chip - Soil
            iv. Lime green chip - Space
            v. Orange chip - Sunlight

        b. Plants need *all* of these to grow

c. Explain and play Ready Set Grow Game:
    i. Give all students a chip -
    ii. Spread 2-3 sunflowers around learning area (fake flowers can be stuck in grass or held by volunteer adults)
    iii. When I say Ready Set Hop/Skip/Jump (pick one), kids do that around the area to get wiggles out. Then, when I say Ready Set GROW, kids have to find a sunflower that still needs what they have (sun, water, soil, space or air).
    iv. Each sunflower can be inspected, does it have what it needs to grow (one of each chip)? Yay! It can grow - pretend to grow from seed to flower.
    v. Make sure all kids still have their chip - play again. Ready Set (Movement of Choice), Ready Set GROW. Review which sunflowers grew, or if they didn't, what were they missing?

5. Discuss the outcome: What did they ***notice*** about the model? Why did some plants not make seeds? (Too many plants sharing resources.) Ask the students to talk with a partner about what they ***wonder*** happens in nature to stop this overcrowding. After a minute or two, ask them to share with the class. Guide the discussion to the following three points.
    a. The plants needed more resources.
    b. Resources are limited in any particular natural space.
    c. Plants have to find a way to make sure their seeds grow far away from them so each seed has plenty of resources.

6. Restate the guiding question: **Why does a plant spread its seeds?** The students should be able to respond that plants spread seeds so they are not sharing limited resources with their offspring.

7. Establish the second guiding question: **How does a plant spread, or disperse, its seeds?** Introduce the vocabulary **disperse -** to spread over a wide area.

8. Using the seed travel cards and the sample seed jars guide the students through these questions. Refer to the chart provided in the Background Knowledge section (last page) for more information to share.
    a. What is this plant called?
    b. Where on the plant could you find seeds? - Show the seed if you have it.
    c. How might these seeds disperse?
    d. Who would like to pretend they were this seed? (if there is time)

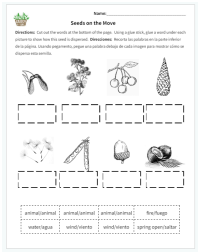
    A volunteer student (or small group) can stand up and act out what it might look like as one of these seeds disperses. Choose different students for each, focusing on children who did not participate in the model activity. It will be difficult or

even silly to try to act some of these dispersal methods out, but it is a great way to have students move and create visuals to help remember these methods.

9. Guide students to make connections between concepts like air resistance and wind (moving air), and see how those factors aid in seed dispersal. Show the students the CO Plants Dispersed by Wind Packet (with the silver ring clip) as a way to create authentic connections between the air and wind unit and the experiences students may have had.

Worksheet (if time permits)

10. If time permits, complete the Seeds on the Move Worksheet (English).



11. Revisit the guiding questions with a sense-making discussion. **Why does a plant spread its seeds? How does a plant spread its seeds?** See if the children can demonstrate learning.

Science Background Knowledge

- Most plants need water, air (CO2), space, sun, and soil to survive.
- It is advantageous for a plant to disperse its seeds away from the parent plant, so the parent is not competing with the offspring for limited resources.
- Check out the CO Plants Dispersed by Wind Packet in the GTT bin for wind dispersed plants specific to Colorado. Here are some other examples of how seeds can be dispersed.

Ways Seed Travels	Type of seed	Example of plant that may be in garden or on campus	Notes
Wind	Helicopter	Dandelion, Lettuce, Cottonwood	Many seeds travel by wind. These light-weight seeds might float away, flutter to the ground, or tumble in the wind.
	Parachute	Pine, Maple	
	Tumbleweed	Russian thistle, Kochia	
Animal	Hitchhikers	Burdock Plants (burrs) Some flowers in the perennial bed may have hitchhiker seeds.	Hitchhikers can either have spikes or a sticky substance that allows it to stick to fur.
	Plop Planters	Tomatoes, Apples, Watermelon, Cucumber, or many other plants with seeds inside fruits.	Many fruit seeds are eaten by an animal and then pooped out. Some plop without help from an animal, by dropping fruit with seeds to the ground.
	Carry/Bury	Oak Trees (acorns), Sunflowers, Beans	Animals like squirrels collect, carry and bury these seeds.

Water	Floaters	Coconuts, cranberries - Sorry, no coconuts or cranberries in this climate zone!	Coconuts may drift for several months and travel up to 1,200 miles before reaching land.
Explode or Spring Open	Seed Pod	Columbine rods, Radish pods, chive flowers, beans	These seed pods will burst open or can be broken to release seeds.
Fire/Wind	Cones	Lodgepole Pines are common in Colorado mountainous zones, but unlikely to be found on school campuses.	Some plants have cones sealed with a resin. The seeds can only come out of the cones once fire has melted the resin.

Disperse - to spread out, or for plants, the way seeds are transported from the parent plant
Offspring - A baby plant or animal
Reproduce - to make more of something; for plants and animals, that means making offspring
Seed - small parts produced by a plant from which new plants grow