Wonderful Water

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Objectives:
Students will be able to:
- determine how many peanut plants can be supported with a given amount of water available.

National Learning Standards:
Common Core Mathematics
- Operations and Algebraic Thinking 3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 × ? = 48$, $5 = ? ÷ 3$, $6 × 6 = ?$.

Activity Description: Student groups will each be given a certain amount of water in a container. Students will measure the amount of water they have and create an algebraic equation knowing that two inches of water are needed per plant to determine how many plants could be supported with their amount of water.

Materials
- Bottle of water (1 per group of students)
- Clear plastic cups (2 per group of students)
- Ruler (1 per group of students)
- Permanent marker or pen (1 per group of students)

Activity Steps
Activity Prep: Set out lab supplies in a designated area.

Step 1: Share with students that peanut plants are efficient water users. It only takes two inches of water per week for a peanut plant to develop kernels.

Step 2: Split students into groups of four. Have each group get the lab supplies listed above. Provide the following instructions:
a) Pick up one empty cup. Using the ruler and pen, mark a line two inches up from the bottom of the cup.
b) Determine the amount of water in the bottle by pouring it into the cup with the two-inch line. After filling to the line, students should pour the water

into the empty cup. Remind students to count the amount of times they repeat this process.
c) Ask students to record the number of times they filled to the two-inch line on a piece of paper.
d) Ask students to determine how many weeks they could water their peanut plant with the water they have been given (This number will be equal to the number of two-inch measurements taken.).

Step 4: Have students complete the following math problems. For all problems, maintain the assumption that peanuts need two inches of water per week.
Problem: You have enough to water your peanuts for ____ weeks. How many inches of water do you have? 2 inches x ____ weeks = n total inches
a) 6 weeks (answer: 12 inches)
b) 3 weeks (answer: 6 inches)
c) 8 weeks (answer: 16 inches)

Step 5: Once students have mastered the problems above, ask them to complete the following problems.
Problem: For how many weeks could you water your peanuts if you have ___ inches of water? 2 inches x n weeks = _____ inches
a) 14 inches (answer: 7 weeks)
b) 8 inches (answer: 4 weeks)
c) 10 inches (answer 5 weeks)

Processing Questions:
1. Why do plants need water?
   a. Listen for students to identify that water carries important nutrients into the plant.
2. What does a plant look like that does not get enough water?
   a. Listen for students to describe a limp plant. Water fills the cells in the plant and helps the plant stand up. This is called turgor pressure. Without water, plants wilt.
3. Why do farmers work hard to make sure peanut plants get just the right amount of water?
   a. Listen for students to identify that too much or too little water can harm plants, it is expensive to irrigate fields, and farmers want to help the environment.

It's A Fact!

Peanuts are efficient water-users. For example, it takes about 4.7 gallons of water to grow an ounce*, or about a handful, of peanuts. It takes about 80.4 gallons of water to grow an ounce* of almonds and 73.5 gallons of water to grow an ounce* of walnuts. *Based on blue and grey water. [2]