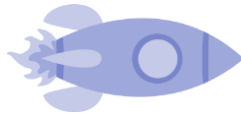




**This is the Science Guide for Day Three.  
The complete Guide is available online at  
[bannerblue.org](http://bannerblue.org).**



## Day Three: Plant Power

**Key Beatitude:** Blessed are **the meek**, for they will inherit the earth.

**Story Character:** Deborah

**Experiments Overview:** The kids will experiment with plant growth using light and will investigate the way plants absorb water in order to observe the qualities of soil. We have given you three experiments that each stretch over several days.

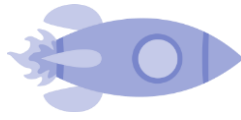
**Guiding Question:** What's hidden in the soil beneath our feet?

**Learning Objective:** The roots from plants strengthen the soil they grow in and those plants eventually become mulch. Strong plants make soil richer and rich soil make plants stronger! Plus sunlight and water help plants to grow. Deborah used to give the people of Israel help from beneath a palm tree. That tree must have been pretty important to the people who knew it but it was also important to the animals, soil, and other plants that were around. With rich soil, lots of sunlight, and plenty of water, her tree grew into something great too. With humility, confidence, creativity, and faith Deborah grew into a great hero. You can also grow into a great hero!

### Questions to ask the kids while you're exploring together:

- Have you ever planted something before?
- How long does it take for different plants to grow, like flowers, vegetable plants, and trees?
- What are the things that plants need to be able to grow?
- Do you know where soil comes from? What makes rich soil?
- When we say that soil is rich, do we mean that it's made of money?
- What does it mean to be rich but not have lots of money?
- Deborah was rich with gifts from God; name some of her gifts?

*Deborah was a prophet, judge, leader, warrior, and singer.*



## First Experiment: Light Maze

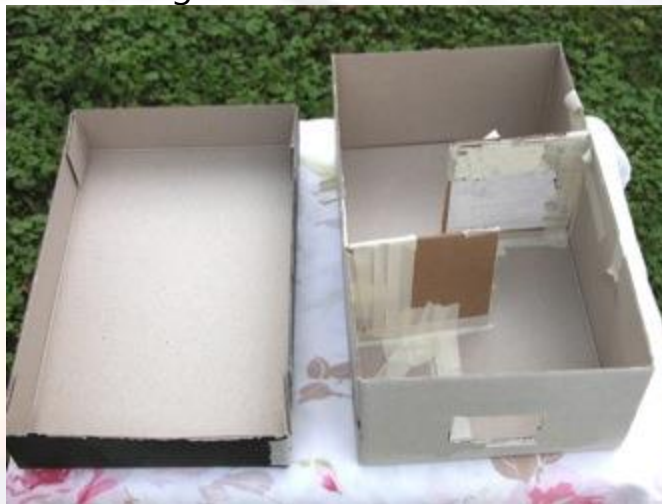
This awesome experiment proves the necessity of light to plants. The experiment stretches over several days.

### Supplies Needed:

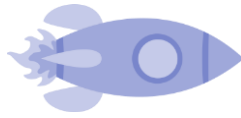
- Shoebox with Lid
- Cardboard Scraps
- Scissors
- Tape (scotch or masking)
- Planter (small; at least 1)
- Potting Soil
- Bean Seed

### Preparing for the Experiment:

1. Cut a hole at one end of the shoebox. Hold the box up to a light and be sure to tape up any other spaces where light shines through.
2. Cut two pieces of cardboard that are the same height as the box but half of the width and tape these pieces upright inside of the box at one-third and two-thirds of the length of the box.



3. Use potting soil to plant the bean seed in the small planter. Set the shoebox on end with the end that has the hole at the top and place the planter inside the box at the bottom.



4. Water the seed, tape the lid onto the box, and place the box where the hole at the top will receive direct sunlight. After 4-5 days open the box and the plant should have already grown around the cardboard towards the light.

### Experiment Instructions:

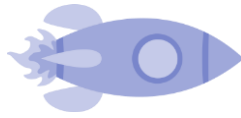
1. Show the kids the result of their light maze experiment with the bean plant but at first don't explain why the plant grew that way. Ask the kids to hypothesize as to why the plant might have grown in a zig zag. Plants need light to grow tall and strong.

## Second Experiment: The Water Way

This experiment illustrates how much water plants drink up. The experiment stretches over several days.

### Supplies Needed:

- Jars (at least 4)
- Cabbage Leaves (at least 4)
- Flowers (must be white; at least 4)
- Food Coloring (red, yellow, blue, and green)
- Water Tap

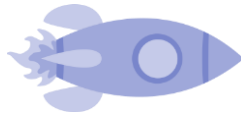


### Preparing for the Experiment:

1. Fill the four jars  $\frac{3}{4}$  of the way with water and add a different food coloring to each. Make sure the color is vibrant by using about 10 drops.
2. Cut the cabbage leaves and flowers so that the stems are about twice the height of the jars.
3. Place one flower in each jar and let the flower soak up the water for about a week so that its petals begin to change color.

### Experiment Instructions:

1. Show the kids the jars and the flowers with the colored petals. Have them hypothesize as to why the petals changed colors.
2. Ask the kids whether they think the same thing will happen to the cabbage leaves if you place them in the colored water too. Place the cabbage leaves in the water with the flowers and tell the kids that they will check on them the next day.



## Third Experiment: Soil Strength

This experiment tests different soil strengths. The experiment stretches over several days.

### Supplies Needed:

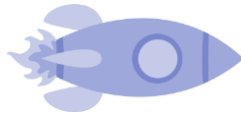
- Empty 2-liter Bottles (at least 3)
- Glue (Elmer's Style)
- Scissors or Utility Knife
- String
- Square Piece of Wood (about as long as a 2-liter bottle)
- Compost Mixture (bark chips, dead leaves, and sticks)
- Potting Soil
- Seedlings (at least 3)
- Water Tap

### Preparing for the Experiment:

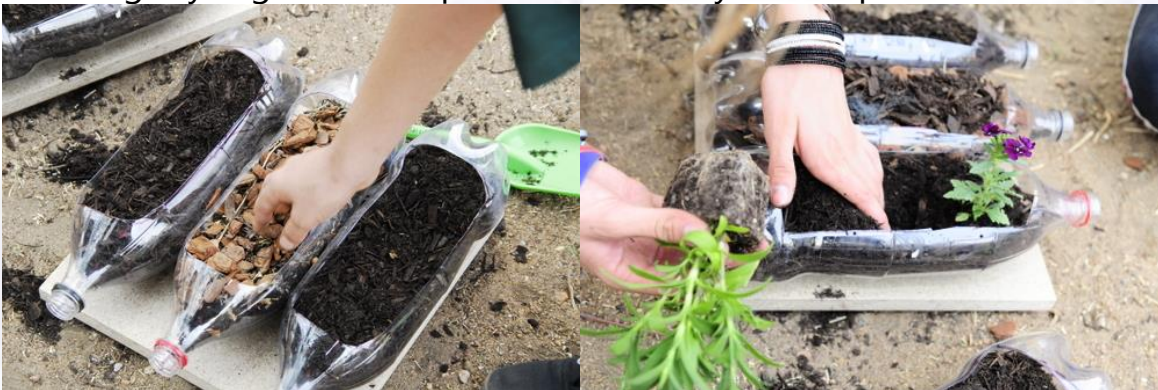
1. Prepare three of the bottles by cutting a large rectangular hole along the side of the bottle.
2. Stick the bottles to the wood with the glue making sure that the necks of the three bottles protrude a little over the edge of the board.



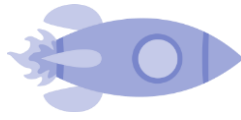
3. Fill the first bottle with potting soil and the other two with a soil and compost mixture. Press down firmly to compact it.



4. Leave the first bottle as is. Cover the top of the potting soil in the second bottle with your compost mixture (bark chips, dead leaves and sticks, etc). Plant your seedlings in the third bottle. Make sure you plant them tightly together and press down firmly to compact the soil.



5. Cut the other three bottles in half, horizontally and keep the bottom halves. Make two small holes opposite each other, nearest the cut side of the bottle. Cut three pieces of string and insert each end into the holes. Tie a knot on the ends to secure them. This will form a "bucket" to collect the water. Hang them over the necks of each of the three bottles on the board.



### Experiment Instructions:

1. Slowly pour equal amounts of water into each of the bottles. Pour the water in at the end furthest from the neck of the bottle. Take note of the color of the water collecting in the cups. The water in the first cup is really dirty but the water from the second and third cups is much cleaner which shows that both compost as well as the root structure of plants assist in preventing soil erosion and help to filter our water.