

We Grow Corn!

Raising corn on a Kansas family farm

Summer Scientist: Does Corn Need Light?

In the “We Grow Corn!” book, the reader will learn about the process of growing corn. In this lab, the reader becomes a summer scientist while learning what a healthy plant needs to grow, specifically looking at light. It is a fun way to get the reader to test for themselves if they would be successful at growing corn.

This Summer Scientist Lab can be used as a standalone or can be paired with reading the “We Grow Corn!” book. This lab is broken into three parts but can be modified to meet the time allotted with the children. To access additional resources referenced within this lab, visit wegrowcorn.com.



Lab Overview

Your summer scientists will test their ideas about what plants need to grow and live by using corn plants as model organisms. Although many conditions such as amount of water, soil and temperature impact corn growth, this lab will focus on the impact light can have on the growth of a plant. At the end of the lab, the summer scientists will know how to conduct an investigation and how light impacts plant growth.

Materials List

- Corn seeds
- Planting pots
- Soil
- Measuring spoon
- Summer Scientist Handout
- Marker to label pots
- Paper and crayons
- Boxes, trashbags, materials to block light



This Summer Scientist lab is one of many free resources offered by Kansas Corn STEM. Funded by Kansas corn farmers through the Kansas Corn Commission, Kansas Corn STEM provides lessons, materials, online resources and more! Learn more at kansascornstem.com

Part One: Become a Summer Scientist!

What is a scientist?

Question: What is a scientist? Let your summer scientists share their ideas about what they think of when they think of a scientist.

Scientists are found in a lot of jobs and places all over the world. Without scientists we would not have the food, medicine, technology or simple items we use every day.

A scientist is a person who:

- Asks questions
- Explores the world around them and wonders why things are the way they are
- Listens to others' ideas
- Shares ideas
- Observes and wonders



What is an experiment?

Question: What is an experiment? Let children share their ideas about what they think an experiment is.

An experiment is when an idea is tested to see if it will work. Experiments have been used for many years to test ideas or to see why things in the world work as they do.

Example would be Isaac Newton. He did experiments to explain gravity. Norman Borlaug created a new type of wheat that saved one billion people from starvation.

Scientific Method

When scientists conduct an experiment, they use the "Scientific Method". This is a list of steps scientists use to make sure they do their experiment in the correct way. This explanation leads into the start of the children creating their own method.



The Scientific Method

Step 1 Ask a question

Step 4 Observe & Record

Step 2 Form a hypothesis

Step 5 Draw conclusions

Step 3 Experiment

Step 6 Did it answer your question?

Scientific Method Step 1 Ask a Question

Materials: Butcher paper or poster paper and markers.

- Each experiment starts out by asking a question you want to test out.
- For this experiment the question is: Do different types of light affect plant growth?

Brainstorming

- Ask children if they think light affects plant growth. (Write down responses to keep for the weeks to come)
- Ask children to come up with a list of different types of light they would like to use. Examples: Partial light, no light, grow lamp, clear bag over the pot, paper bag over the pot, etc. You can guide discussion based on supplies you plan to provide for the experiment, or you can showcase supplies they will use when it is time to set up the experiment.

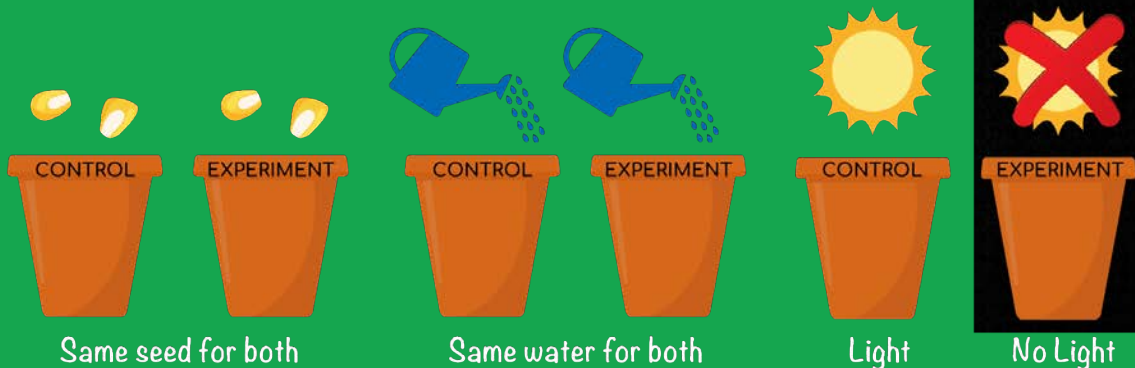
Scientific Method Step 2 Form a Hypothesis

- Make a prediction about how well your corn will grow with these different light sources. Hand out the Summer Scientist Handout to each child.
- Children will write down what light source they want to test in their group and then write down their hypotheses about how well their corn will grow.

Discuss the Experiment

- This experiment has a control plant and experimental plants. (See graphic below)
- The control plant, planted by the facilitator, will use the same type of soil, the same pots, the same amount of corn seeds, the same amounts of water each day, and the prescribed amount of light.
- The experimental plants will have the same soil, pots, seeds and water as the control plant. The variable for the experimental plants is light.

Control vs Experiment



Part Two: Testing Our Ideas

Lesson Time: (45 minutes, then 2-4 weeks of growing and observing)

Introduce the topic and elicit prior learning with questions such as:

- “Last time we met, we talked about experiments and the scientific method. Let’s share what we remember from last time.”
- Hand out the Summer Scientist Handout. Have your summer scientists share what light source they will be using and their hypothesis.
- Watch the Farmer Bill video “Summer Scientist: Does Corn Need Light?”



Farmer Bill
Video Link: Does Corn Need Light?



Scientific Method Step 3 Experiment

Set up the experiment

- Show your scientists the materials they have to plan an investigation (planting pots, soil, measuring spoons for water, items to block light, etc.), and tell them how much time they will have (consider 2-4 weeks for seeds to germinate and grow)
- They will set up their pots just like Farmer Bill did. (You can replay this video as a step by step for children to follow when planting their corn.)
- After your scientists have planted their corn, review the variables between the control plant and experimental plants. (soil, number of corn seeds, the amount of water and light each day).
- The facilitator will plant their own seeds following the same steps as the children. The facilitator’s plant will be the control.

Start the investigation

- Water the plants with the amount of water for optimal growing conditions.
- Have your summer scientists set their corn pots in their lighting conditions. Remind children that this is the experimental part, this is what we are testing. Can corn grow with different types of light?
- On the Summer Scientist Handout or in a journal, have children draw a picture of what their seed looks like now, and what they think it will look like at the end of the investigation.
- The facilitator will put their pot in full sunlight to be the “control” corn plant. This corn plant will mimic what a corn plant gets in a farm field—full sunlight. During the next several weeks, the summer scientists will compare their plants to this control plant.

Planting directions and optimal growing conditions

- Fill each pot with unpacked soil to top of pot. Around 1 1/2 cups. Pack soil lightly until it is down to the first line/ring of the pot.
- Add 5 tablespoons of water.
- Plant 2-3 seeds in each pot approx. 1/2 to 1 inch deep.
- Place the control plant in or near a window with access to light.
- Try to place all plants in areas with similar temperatures.
- Touch soil of every pot daily. If it is moist, don’t add water. If it is dry, add two tablespoons. (Note: based on light conditions, some may need less water to keep moisture the same in all pots.)

Scientific Method Step 4 Observe & Record

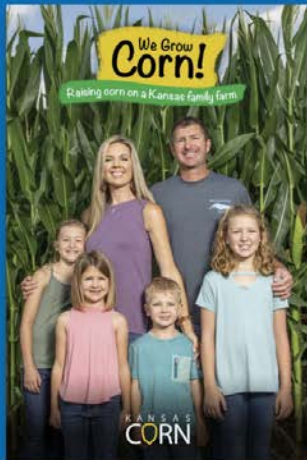
Observe and record results over 7-28 days

- Have your scientists water their pots as directed with measuring spoons over the next 7-28. Make sure your scientists touch their soil daily and only add water when it feels dry.
- Provide brief (3-5 minute) observation times during the days/weeks for scientists to observe (draw) and record (describe) the progress (or lack of progress) of their plants on the handout.
- As you start to see the plants grow, watch the “Experiment Check-in” video with Farmer Bill.

▶ Farmer Bill
Video Link: Experiment Check-in



While You're Waiting for the Corn to Grow ...



Check out the “We Grow Corn” book in your Summer Scientist Lab Kit!

The Activity Guide inserted in the book features six activities, bonus activities and resources that can be found at wegrowcorn.com

Part Three: Analyze Our Findings

Lesson Time: (30-40 minutes)

Scientific Method Step 5 Analyze Findings

- After 7-28 days, assemble your scientists with their plants and the Summer Scientist Handout.
- Take a look: How did the plants in each of their conditions do? What do they look like at the end of the investigation?
- Discuss and explain: “What were the best growing conditions? How do you know? What is your evidence?”
- Record: Show by drawing and text the best growing condition that was tested.
- Report and record findings: Have your scientists take turns reporting their findings, making note of their findings about each variable on the white board.

Scientific Method Step 6 Did it answer your question?

- Do different light sources affect plant growth?
- As a group, talk about how the summer scientists' plants look DIFFERENT compared to the facilitator's "control" plant.
- What is different about it? Is it the height of the plant, the color? Is the plant standing straight up or is it leaning? Talk about why they think the plant looks different from the control plant.

What did you learn as a summer scientist?

- Was your hypothesis correct? Talk in a small group about how your hypothesis was correct or incorrect.
- Watch the Farmer Bill video: "Does Light Affect Plant Growth?"

▶ **Farmer Bill**
Video Link: Does Light Affect Plant Growth?



Conclusion

After watching the Farmer Bill video discuss your findings again and have your scientists add additional explanations on why their plants look the way that they do. Ask: Did any of you have results like Farmer Bill? Can you better explain why your plant looks the way it does?

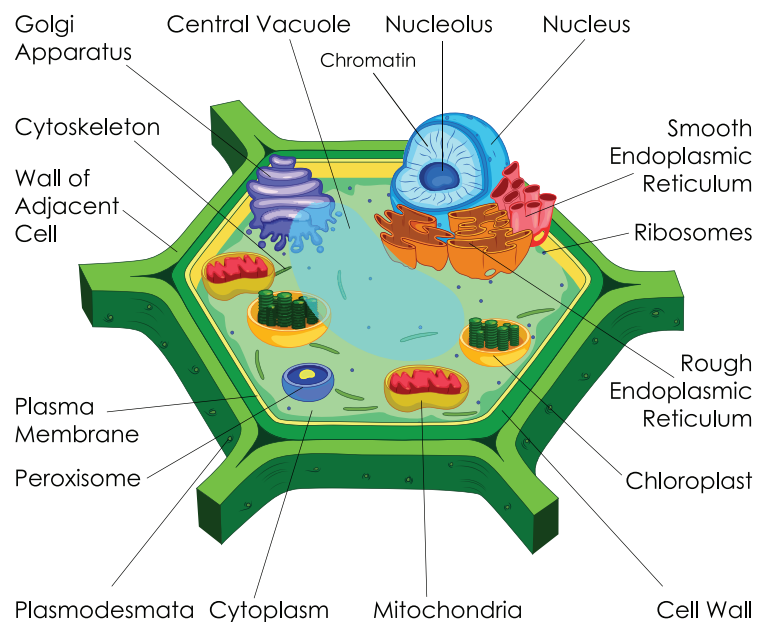
Ask your scientists end their investigation, have them refer to their Summer Scientist Handout and write down their final analysis. Ask: "Do different types of light affect plant growth? Look back to the responses you collected on the first day to share how their experiment helped them better answer the question. Why do you think farmers plant their corn only in certain times of the year? Do you think the amount of light the corn plant will have access to makes a difference? (Note: farmers plant in the spring when there begins to be more light available for the corn to grow; light also provides heat to the ground in the spring which the corn seed needs to sprout. You did not test temperature, but these two factors are linked when trying to get a plant to start growing.)

Why Plants Are Green

Looking at just one observation factor, the color of the plant, plants are green because their cells contain chloroplasts that absorb sunlight and turns it into energy for the plant. Inside those chloroplasts is chlorophyll which absorbs deep-blue and red light, and it reflects the color green.

- **Healthy Plant**—Adequate sunlight, produced adequate chlorophyll making it dark green.
- **Light green plant**—Plants did not produce as much chlorophyll causing the plant to be light in color.
- **White plant**—Plant had no light and did not produce chlorophyll.

Plant Cell



Does Corn Need Light?

Name: _____

What is the question?

Explain the light source you are testing.

Hypothesis (What you think will happen)

Prediction













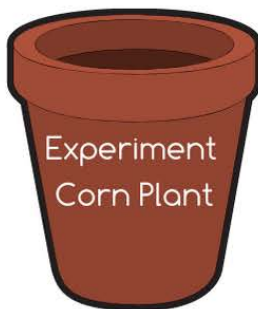


Recording Sheet

Day: Notes: 	Day: Notes: 	Day: Notes: 
Day: Notes: 	Day: Notes: 	Day: Notes: 

Final Results

Explain your results:



Was your hypothesis right?

What did you learn?