



Kansas Corn: Staying Alive!

This lab is made possible with the support and content contributions of the Kansas Corn Commission.



Kansas Corn: Staying Alive!

Grade Level: 3rd

Lesson 1: Sprouting Ideas (20-30 minutes)

Key Question

- What does corn need to grow and survive?
- How can we find out?

Learning Objectives

- The children will propose and justify answers to the question, “what does corn need to grow and survive?”
- The children will propose and justify answers to the questions, “how can we find out?”

Materials

- Corn Seeds

Guided Teaching

Introduction

Introduce the topic and assess children for prior understanding:

- Begin by holding up a corn seed and asking, “what does this corn seed need to grow and survive?”
- Provide your child time to think and then share their responses.
- Listen to your child’s responses and ask them to justify all responses but do not indicate any judgment.
- Go deeper to explore the effects that different environmental conditions have on plant growth.
 - “Can plants germinate/grow in materials other than soil?”
 - “Can plants germinate/grow without sunlight?”
 - “Can plants germinate/grow with liquids other than water?”
 - “What are the ideal conditions for a plant to grow?”

Do not signal right or wrong answers. Just let them discuss their ideas and guide the flow with such prompts as:

- “Can you say more about that?”
- “Why do you think that?”
- “Who agrees/disagrees with this idea and why?”
- “Does anyone have a different idea?”
- “Is that true all the time?”

Investigation

Have your child come up with the idea of investigation using real plants. Once students have answered and justified their answers above, pose the next questions:

Kansas Corn: Staying Alive!

Grade Level: 3rd

- “You mentioned that a corn seed HAS TO HAVE soil, water and sunlight to grow. How do you KNOW it has to have these materials? What is your evidence?”
- Listen to your child’s responses and guide them toward the realization that in order to KNOW something, one must collect data to prove it.
- Pose the next question: “How could we PROVE the corn seed HAS TO HAVE soil, sunlight and water to germinate and grow?”
- Record their ideas on a piece of paper.

Reflect

- Reflect and conclude: “You have come up with some very interesting ideas about how we could prove corn seeds HAVE TO HAVE soil, water and sunlight to grow! I want you to think about these ideas tonight. I keep wondering if a corn seed HAS TO HAVE these to grow. How can we prove that it does or does not need these in its environment? Think about this until we do the next activity.
- If you complete the “How Does It Grow?” unit, the children should mention the use of the scientific method to conduct an experiment. You can refer back to those steps if you choose.

Early Elementary Activity

Science Activity

- Taking a corn kernel, see if you can dissect the seed to see what is inside. You will need parent help with the dissection. Here is a link to help with this process: <https://abc11.com/abc11-science-club-basf-experiment/1769308/>

Art Activity

- Do some research: Look up a corn kernel diagram online. Do you recognize any of the parts labeled in the diagram? Make your own diagram on a blank piece of paper.

Upper Elementary Activity

Science Activity

- Taking a corn kernel, see if you can dissect the seed to see what is inside. You will need parent help with the dissection. Here is a link to help with this process: <https://abc11.com/abc11-science-club-basf-experiment/1769308/>

Art Activity

- Do some research: Look up a corn kernel diagram online. Do you recognize any of the parts labeled in the diagram? Make your own diagram on a blank piece of paper. If you are not familiar with some of the kernel part names, look them up! What did you learn?

Kansas Corn: Staying Alive!

Grade Level: 3rd

Lesson 2: Planting Seeds (30-40 minutes, with follow up observations for 7-28 days)

Key Question

- “How can we prove that a corn seed does or does not need soil to germinate and grow?”

Learning Objectives

- The children will plan and conduct an investigation to understand what type of soil a corn seed needs to grow and be successful.
- The children will make observations and record their findings to construct an evidence-based account that corn needs soil to germinate and grow.

Materials

A gift card has been provided to help buy any materials you do not have at your home.

- Corn Plant Growth Worksheets (page SI-5)
- Glue
- Scissors
- Pencils
- Corn seeds
- Planting containers
- Soil (and other material such as sand, rocks)
- Balance scale and gram pieces to measure soil/other materials amounts
- Water

NOTE: You can choose to have your students keep a science journal instead of making copies of the worksheets.

Guided Teaching

Introduction

Introduce the topic and activate prior learning. Begin with the questions posed during the conclusion of the previous lesson:

- “How can we prove a corn seed does or does not need SOIL to germinate and grow?”

Get out the Corn Plant Growth Worksheets. Working together to come up with the answers to the questions.







Kansas Corn: Staying Alive!

Grade Level: 3rd

Page S1

- Question: How can we create an experiment to test or focus questions?
 - Write out the steps *Remember the focus question is: I wonder if a seed has to have soil to grow?
 - “What steps can we take to create and plan an investigation to test our ideas?” Example: The children can pick a different type of soil to plant their seeds in. The children can also plant a control plant that would show the growth of a corn plant as it would be growing in a farm field, soil.
 - If you have the supplies, you can pick multiple types of soil to plant kernels in. Soil examples: rock, wood chips, chunked up styrofoam, torn up paper, pencil shavings, etc.
- Question: What materials do we need to conduct this investigation? Record what is needed on page S1.
- Question: Draw a picture below of what you think this experiment will look like once it is set up.

MATERIALS:

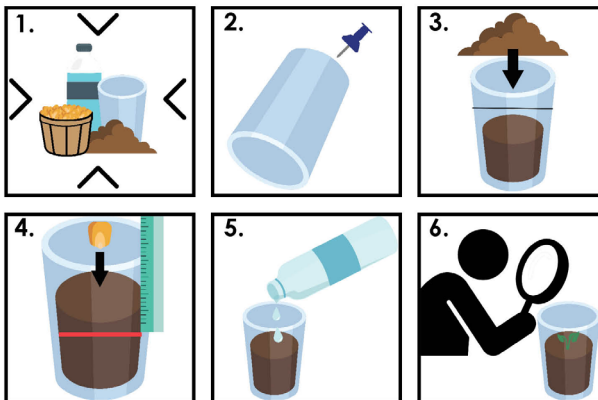
-  Corn seeds
-  Push pin
-  Water
-  Ruler
-  2 oz. clear plastic cups
-  Potting soil or other material

Planting Corn Seeds to drive student-led inquiry!



INSTRUCTIONS:

1. Gather materials.
2. Use a push pin to make 4 drainage holes in the bottom of the cup.
3. Fill the container $\frac{3}{4}$ full with potting soil or other material.
4. Place the seed 1 inch down from the soil's surface.
5. Water seed until soil is damp, approx. 2 tablespoons. Monitor dampness daily; water as needed.
6. Observe growth each day.



Instructions for planting corn seeds

- As mentioned above, make sure to plant a control plant in the soil wafers provided.
- Be sure to label planting containers with the amount of water that was decided to be a good amount of water daily.
- Guide your child in how to use measurement tools correctly and emphasize the importance of keeping amounts constant so they can conduct a fair test among the conditions.

Kansas Corn: Staying Alive!

Grade Level: 3rd

Planning and Conducting

- Use the data collection pages to collect observations throughout the growing process. These can be found on page S3.
- Looking over the data collection sheet, talk about what makes good quality data collection.
- Set up a schedule for the duration of the investigation (7-28 days) for observations to take place. Observations can be made every few days in the “Corn Plant Growth Data” sheets.

Observe and Record Results

- Have your child water the soil everyday throughout the next 7-28 days as needed. Should be damp to the touch. Don't over water.
- Provide a brief (3-5 minutes) observation time during those days/weeks for your child to observe and record the progress or lack of progress, of their plants.

Conclude

- Prompt your child to collect data, make accurate observations and record the data. Keep wonder alive by showing deep interest in their observations, asking them what they have found, what data they are collecting and if they have any preliminary thoughts based on their evidence? Refer back to the investigation question: “How can we prove that corn seed does or does not need soil to germinate and grow?”

Early Elementary Activity

Math Activity

- Learn how to measure with a ruler. As their corn plant starts to grow, it will be important for your child to measure their plant daily for their observations. Talk to your child about inches and centimeters and what the numbers represent on each side (it is suggested just to stick to whole numbers while measuring).
- Ruler activity: a series of lines can be drawn on a paper for your child to measure on their own. When your child writes down the measurement, encourage them to write the label as well.

Upper Elementary Activity

Math Activity

- Further your ruler knowledge! As their corn plant starts to grow, it will be important for your child to measure their plant daily for their observations. Talk to your child about measuring to the nearest $\frac{1}{4}$ and $\frac{1}{2}$ inches. Ruler activity: give your child a scavenger hunt of materials or items they need to measure around the house. Encourage them to write the label as well.

Kansas Corn: Staying Alive!

Grade Level: 3rd

Lesson 3: Reaping the Harvest (30-40 minutes)

*This should take place after the growing.

Key Question

- What does a corn seed need to germinate and grow?

Learning Objectives

- The children will construct an explanation based on evidence on what type of soil the seed needs to germinate and grow.
- The children will be able to argue based on evidence that corn needs an environment that provides it with a good rich soil to survive well.

Materials

- Corn Plant Growth Worksheets with data recorded based on observations over the last couple of weeks
- Plants from the investigation

Guided Teaching

Procedures for Instruction

Introduce the topic and activate prior learning.

- “What did we set out to do?”
- “What question were we trying to answer in our investigation?”
- “How did we go about trying to prove that plants need soil to survive?”

Share and Discuss Findings

Have your child look at their Corn Plant Growth Worksheets. Based on their data, answer the questions.

- “What does a corn seed need to germinate and grow?”
- “Can plants germinate and grow in materials other than soil?”
- “What are the ideal conditions for a corn plant to grow?”
- “If conditions in a plant’s environment change, how would that impact the plant’s growth?”
- “Are there conditions in which some plants can grow but not others?”

Conclusions

Page S6 provides the conclusion questions.

- “You planned and conducted an investigation to determine what a corn plant needs to germinate and grow and you formed a conclusion based on very convincing evidence! You are becoming a scientist!”

Kansas Corn: Staying Alive!

Grade Level: 3rd

- “Some of you changed your ideas about what plants need based on the data you collected. How many of you changed your ideas? Scientists often have to change their ideas based on the evidence they find!”
- “We have new questions and I can see that we could continue to investigate many of these new questions. That is what scientists do- they conduct investigations to find evidence to answer questions!”

Early Elementary Activity

Writing Activity

- Have your child write a conclusion to the experiment. They can use the questions from the conclusion section to help lead their writing. They can also write about their prediction and what was correct or different from the outcome.

Science Activity

- Do some research! Research the benefit of compost and what makes up the rich soil in a compost bin. Would compost be good for your plant to grow in? How is compost soil different from regular soil found in your yard?
- Hand out the “Secret of Corn” Mystery of Corn reader. Have the children learn more about the importance of soil.

Upper Elementary Activity

Writing Activity

- Have your child write a conclusion to the experiment. They can use the questions from the conclusion section to help lead their writing. They can also write about their prediction and what was correct or different from the outcome.

Science Activity

- Do some research! Which type of soil was the best for your corn plant? Do some research to figure out why. For example: if you planted your corn plant in chunks of Styrofoam, your plant probably did not grow well because there was nothing to keep the moisture in the container. Research to see what farm fields have in it to make their crops successful.
- Hand out the “Secret of Corn” Mystery of Corn reader. Have the children learn more about the importance of soil.

Corn Plant Growth

Focus Question: I wonder if a seed has to have soil to grow?

How can we create an experiment to test our focus question? (Steps)

What science tools and materials will we need? (List)

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Draw a picture below of what you think this experiment will look like once it is set up.

Science is ALL about wondering, experimenting, and making observations!

How do I OBSERVE ...

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How do I make QUALITY observations?

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