

Science Lesson Planning Template

Context Issues of the Lesson

Unit or Lesson Title:	Crops: How much moisture is necessary to grow?
Grade Level	4 th Grade
Topic/Theme/Nature of the Investigation:	How much soil moisture is essential to growing corn in Kansas?
NGSS Performance Expectation(s)	<p>4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p>RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.</p> <p>W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic</p>
NGSS Dimension 1 component	<p><u>Planning and Carrying Out Investigations</u></p> <p>Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.</p> <ul style="list-style-type: none"> • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. <p><u>Analyzing and Interpreting Data</u></p> <p>Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible</p>

	<p>and feasible, digital tools should be used.</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning.
NGSS Dimension 2 component	<p>ESS2.A: Earth Materials and Systems</p> <p>Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.</p>
NGSS Dimension 3 component	<p>Patterns</p> <p>Patterns can be used as evidence to support an explanation.</p> <p>Cause and Effect</p> <p>Cause and effect relationships are routinely identified, tested, and used to explain change.</p>
Duration:	1 week

Planning Stages Within the 5-E Inquiry Model

Engage (Day 1)

PURPOSE:

- to convey the context of the lesson(s)/unit by conveying an important Key Question
- to engage students in investigations that reveal their thinking to themselves and the teacher
- to record the initial ideas of students
- to engage their interest

What is the teacher doing? What are the students doing?

At the beginning of this mini lesson the teacher will project the video below.

https://mydasdata.larc.nasa.gov/EarthSystemLAS/output/679B66FEAB4BA18DC528A8476BA3C973_plot_image.png

(This link is just a picture of the video set up through mydasdata.)

Before playing the video the teacher will ask the students to divide a piece of notebook paper in half. On one half they will label it I NOTICE..... On the other half they will label it I WONDER.....

Then there will be a class discussion about the things they noticed and wondered about. The teacher will record their answers on tablet paper on the board.

The teacher will then explain that they are going to be doing some research about the soil moisture in Kansas, the amount of moisture that it takes to grow corn, and whether Kansas can naturally grow corn or if it needs the help of outside sources.

Explore (Day 2-3)

PURPOSE:

- to test ideas and develop knowledge using explorations, investigations, experiments
- to modify and record ideas as they change due to activities
- to develop new questions and testable hypotheses

Activities (list)	Driving Question
<p>Procedure:</p> <p>Day 2:</p> <ol style="list-style-type: none"> The teacher will explain that for the next two days we will be using Data cubes to help us gather information about the moisture in Kansas soil and whether it is compatible to growing corn. If the class has never done a data cube before the teacher will need to model the steps using a data cube. If the class has background knowledge on data cubes they may move forward. The teacher will divide the class into partners. With their partner the students will gather the data literacy cube template and the data cube question sheet. <p>https://mynasadata.larc.nasa.gov/sites/default/files/2019-10/Final%20MND%20data%20cube%20only.pdf</p> <ol style="list-style-type: none"> After putting their cube together they will collect the following map form their teacher about the soil moisture in the United States.(link below) The students will work through the questions using the map of soil moisture for the United States. The teacher will circulate and answer any necessary questions. At the end of the class period the teachers and students will discuss their findings from the map. <p>data literacy cube.pdf</p> <p>Day 3:</p> <ol style="list-style-type: none"> The teacher will review with the students the process and 	<ol style="list-style-type: none"> How can we determine if the soil in Kansas has enough moisture to grow corn? Does Kansas need to use outside sources to grow corn? <p>Materials:</p> <p>Data cube copies Chart paper Worksheets for data cube questions My Nasa data website Soil moisture maps</p>

<p>finding from the day before.</p> <ol style="list-style-type: none"> 2. The teacher will explain that today they will be looking at the graph and graphing data cube to learn about how much water is necessary for corn to grow. 3. The students will put together their new graph cube. https://mynasadata.larc.nasa.gov/sites/default/files/2019-10/Final%20MND%20graph%20cube%20only.pdf 4. They will need to gather their new graph so they may work through the process of answering their questions. data literacy cube.pdf 5. The teacher will be monitoring as the students are working together on their question set. 6. At the end of the class period the students and teacher will discuss their findings. 	
<p>Student Communication Product: (written report, oral presentation, poster, etc.) (consider showing “Models” of student products to help student identify characteristics of quality)</p> <p>The students will record their results on their data cube question worksheets. (In above links)</p> <p>The teacher will record group findings from the group discussion on the chart paper at the front of the room.</p>	
Explain	
<p>PURPOSE:</p> <ul style="list-style-type: none"> • to answer the Key Question through student explanations • to provide students with relevant vocabulary, formal definitions and explanations of concepts 	
<p>Content Media: (written material, video, teacher lecture, technology)</p>	

As a whole group the class will review their findings. The students will explain the process they went through to develop their findings.

The teacher will pose both of the questions for the students:

1. How can we determine if the soil in Kansas has enough moisture to grow corn?

The students will discuss the process and what their findings were. The teacher will ask if they think that every year is the same as the year pick to study. They will discuss why or why not. The teacher will also ask if the students feel that Kansas is the best possible place to grow corn based on soil moisture alone. As a group discuss possible places that would be better than Kansas to grow corn.

2. Does Kansas need to use outside sources to grow corn?

The class will discuss that is Kansas wants to grow corn what are some other options for us to do so successfully. They will need to discuss the various types of corn possible to grow in Kansas and if one is better than the other.

Student Communication Product: (assessment, unit test, written report, oral presentation, poster, etc.)

The students will need to write a one page summary of the activity they just completed. They will need to make sure they include their thoughts on growing corn in Kansas.

Rubric for summary:

[Rubric for corn summary.docx](#)

Elaborate

PURPOSE:

- to extend students' conceptual understanding through application or practice in new settings

Activities:

Have the class brainstorm other crops they are interested in looking at.

Also could have students look at precipitation and whether it is the same as soil moisture and if that would make a difference in choosing to grow corn as a crop.

Content Media: (written material, video, teacher lecture, technology)

Guide students into choosing one of the above projects and guide them in find out their information.

Student Communication Product (assessment): (unit test, written report, oral presentation, poster, etc.)

The students will make persuasive posters on what crop they think is the best for growing in Kansas.

Evaluate	
PURPOSE: To determine the amount of moisture in soil that will produce a successful crop.	
Skill/Reasoning Learning Objectives	Assessment Instrument
<i>The students will:</i> Determine if corn will be a successful crop to grow in Kansas.	Summary
Knowledge Learning Objectives	Assessment Instrument
The students will: 1. Study maps and graphs. 2. Compare and summarize their findings.	Summary posters

References:

Evans, R., Cassel, D., & Sneed, R. (n.d.). Soil, Water and Crop Characteristics Important to Irrigation Scheduling. Retrieved November 19, 2020, from <https://content.ces.ncsu.edu/soil-water-and-crop-characteristics-important-to-irrigation-scheduling>

My NASA Data. (n.d.). Retrieved November 19, 2020, from <https://mynasadata.larc.nasa.gov/>

My NASA Data. (n.d.). Retrieved November 19, 2020, from <https://mynasadata.larc.nasa.gov/data-literacy-cubes-graphs-maps-and-data-tables>

Next Generation Science Standards. (2020, November 06). Retrieved November 19, 2020, from <http://www.nextgenscience.org/>