

# Second Grade Lesson

## *The Little Red Hen: The Importance of Planning a Harvest*

### **Description:**

Harvesting is an important part of farming. Harvesting loss can be detrimental to the income of a farmer. Saving more of the crop will have greater returns for both the farmer and the consumer. In this lesson, students will design and engineer a device to efficiently harvest a crop.



### **Agriculture Jobs:**

Agricultural Engineer, Soil and Plant Scientist, Agricultural Inspector, Agricultural Manager

### **Essential Vocabulary:**

**Crop:** a cultivated plant that is grown as food, especially a grain, fruit, or vegetable

**Harvest:** the process or period of gathering in crops

**Harvesting:** gather (a crop) as a harvest

Math Standards	Standards for Math Practice
<p><b>2. MD. A. 1:</b> Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p> <p><b>2. OA. B. 2:</b> Fluently add and subtract within 30 using mental strategies.</p> <p><b>2 MD. B. 5:</b> Add and subtract within 100 to solve contextual problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown to represent the problem.</p> <p><b>2 NBT. B. 7:</b> Add and subtract within 1000 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.</p>	<p><input checked="" type="checkbox"/> MP1: Make sense of problems and persevere in solving them.</p> <p><input type="checkbox"/> MP2: Reason abstractly and quantitatively.</p> <p><input type="checkbox"/> MP3: Construct viable arguments and critique the reasoning of others.</p> <p><input checked="" type="checkbox"/> MP4: Model with mathematics.</p> <p><input checked="" type="checkbox"/> MP5: Use appropriate tools strategically.</p> <p><input checked="" type="checkbox"/> MP6: Attend to precision.</p> <p><input checked="" type="checkbox"/> MP7: Look for and make use of structure.</p> <p><input type="checkbox"/> MP8: Look for and express regularity in repeated reasoning.</p>

Science Standards	Sci. & Eng. Practices	Crosscutting Concepts
<p><b>2. ETS1:</b> (1) Design a solution to a real-world problem that includes specified criteria for constraints. (2) Apply evidence or research to support a design solution.</p> <p><b>3. LS2.1:</b> Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Asking Questions/Designing Problems</li> <li><input type="checkbox"/> Developing &amp; using models</li> <li><input type="checkbox"/> Controlled investigations</li> <li><input type="checkbox"/> Data analysis &amp; interpretation</li> <li><input type="checkbox"/> Math &amp; computational thinking</li> <li><input checked="" type="checkbox"/> Constructing explanations &amp; designing solutions</li> <li><input type="checkbox"/> Engaging in argument from evidence.</li> <li><input type="checkbox"/> Obtaining, evaluating &amp; communicating information</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Pattern</li> <li><input type="checkbox"/> Cause and effect</li> <li><input type="checkbox"/> Scale, proportion, and quantity</li> <li><input type="checkbox"/> Systems and system models</li> <li><input type="checkbox"/> Energy and matter</li> <li><input checked="" type="checkbox"/> Structure and function</li> <li><input type="checkbox"/> Stability and change</li> </ul>

### Teacher Background Knowledge:

Farming is a growing occupation in Tennessee. Some farmers grow crops, and those crops have to be harvested. Harvesting takes place when fruits, vegetables, and grains have finished growing. Student will explore different ways crops have been harvested throughout history. Students will work in small groups to design and engineer a device to help increase harvest efficiency.

### Engage:

Start this lesson by showing the front cover of the book *The Little Red Hen* by Lyn Calder & Jeffery Severn (Lexile 470L). Ask students: "What do you think this book is about?" Read the story to the students. After reading, ask students what problems did Little Red Hen experience while trying to harvest her crop? Discuss and identify how Little Red Hen depended on her surroundings to meet her needs.

## Explore/ Explanation:

Divide students into groups of three-four and have them look at pictures of different ways to harvest (handpicking, wagon and mule, combine, etc.). Have students make observations and share how harvesting has transformed throughout the decades.

In the book *The Little Red Hen*, Hen harvested her crop by hand and gathered the produce in a basket. Farmers use technology to harvest crops. This technology is constantly changing and being improved on to make harvesting more efficient. When we harvest more food, we feed more people. Over 200 hundred years ago, teams of horses pulled wagons while famers bundled produce. Today, agricultural engineers integrate technology to improve work and make farming more efficient.

Students will use at least three of the materials provided and no more than two feet of masking tape. The teacher will set up a 3'x3' area and spread out "the harvest", allowing each device two minutes of harvest time.

## Elaborate:

Tennessee has farming across the state. Different crops are farmed, and many farmers have a large amount of harvest loss during the harvesting process. Loss of harvesting directly affects a farmer's income and the amount of food available. Students will use the [Engineering Design Process](#) to design a device to harvest crops quickly and efficiently. Students will need to sketch and label the parts of their harvesting device.

**Possible Materials:** masking tape, small (three ounce) paper cup, craft sticks, paper clips, toothpicks, straws. Optional materials might include: Hexbug, remote control cars, or any toy automatons.

## Evaluate:

Students will talk with group members and record what worked, what did not work, and what could be improved. If time allows, have students redesign and retest. Ask the following questions:

- Were you successful in creating a device to harvest your crop?
- If you were not successful, what changes could be made to your design?
- What design feature did your device have that made it unique and produce the best results?

## References:


AgBot Harvest STEM Challenge. Retrieved from  
[https://ohio4h.org/sites/ohio4h/files/imce/4h\\_science/STEMPathwaysAgBotHarvestCurriculum5.14.15.pdf](https://ohio4h.org/sites/ohio4h/files/imce/4h_science/STEMPathwaysAgBotHarvestCurriculum5.14.15.pdf)

Calder, L., & Severn, J. (1993). *Little Red Hen*. New York: Golden Book.



# Engineering Design Process


**Ask:** *What is the problem?*




**Imagine:** *Brainstorm possible solutions.*



**Plan:** *Think, sketch, and label your ideas*



**Create:** *Use your plan to build your idea and test it. How well did it work?*



**Improve:** *Modify your design to make it better.*