Let Learning Grow With STEM, Books, and Agriculture

Presented By: Lee Deal

Illinois AGRICULTURE in the Classroom℠

INTRODUCTION

Intro

Illinois AITC

Lessons + Ag Mags + Presentations + Resources

↓

90 County-Level Coordinators

↓

200,000+ Illinois Students

WHAT IS STE(A)M?

Question

Science Technology Engineering (Art) Math

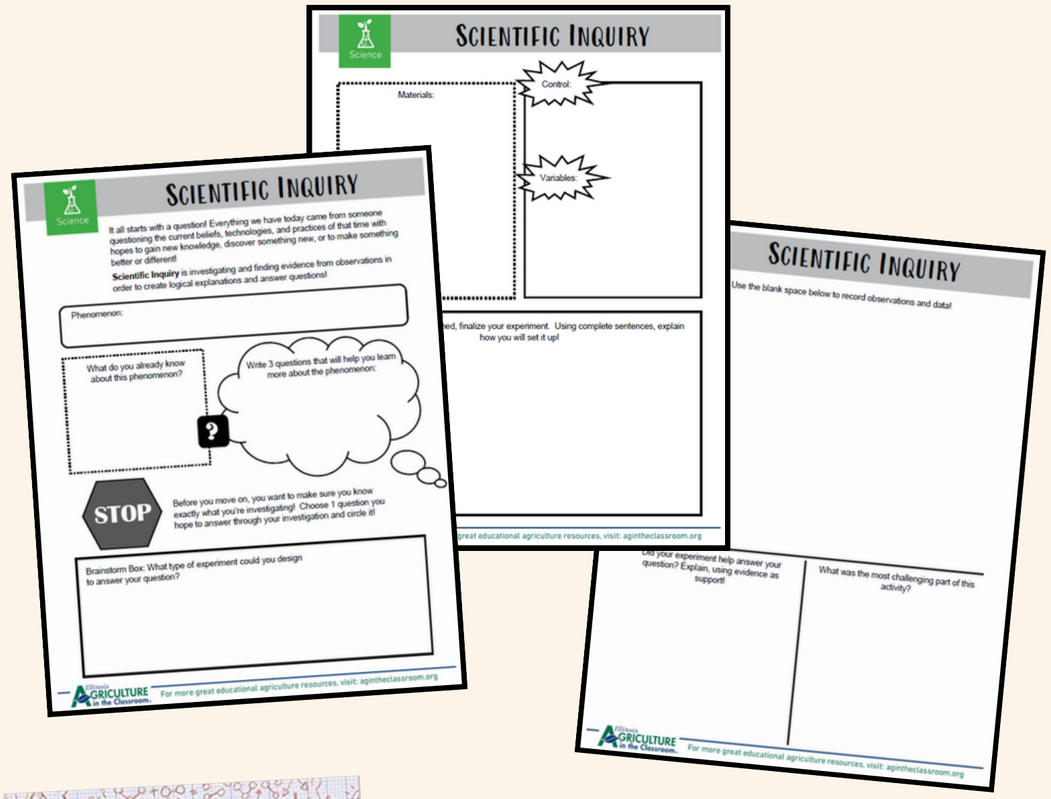
STEM is a philosophy of education with an interdisciplinary approach that combines academic concepts with real life skills. It embraces teaching skills and subjects in a way that resembles real life. This also shows how each subject compliment and support each other.

Project & Inquiry Based

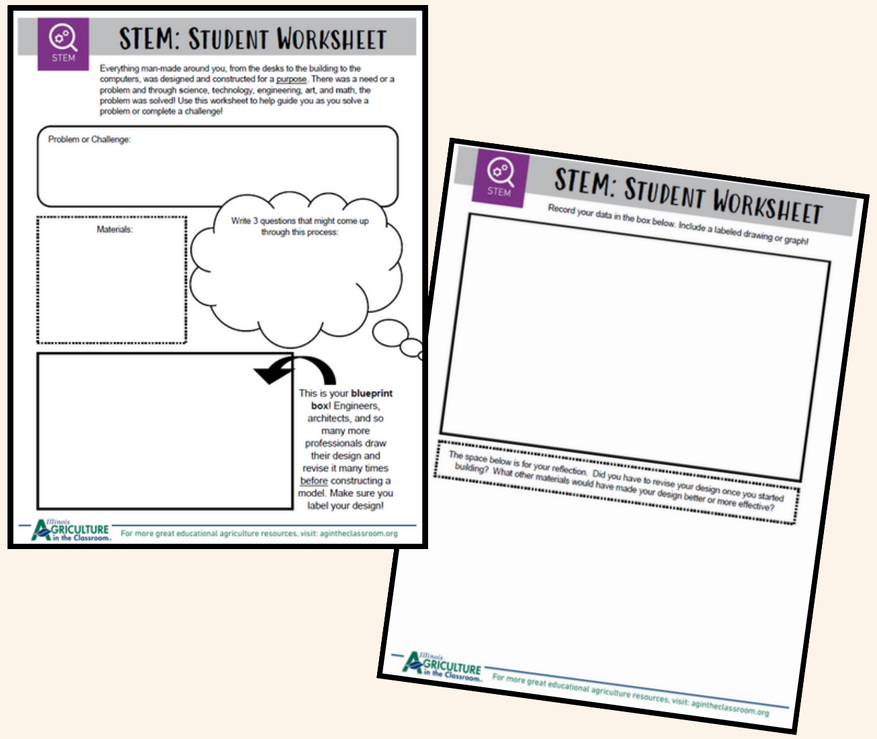
This challenges students to critically think, empowers them to use their creativity, and encourages them to think outside of the box. All of this contributes to students identifying and trying to solve real-world problems. It allows them to take initiative and find purpose in education and their work.

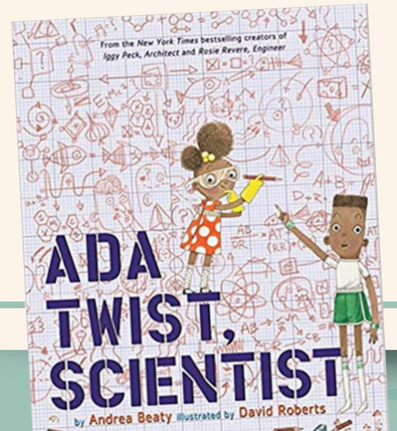
While STEM is focused on designing, engineering, and testing, it is more importantly about inventing ways/things to improve what we have in the present. What do we have now and how can we make this better/more efficient/more effective.

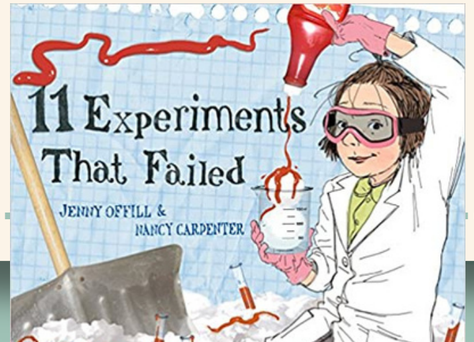
Starting With a Phenomenon



Starting With a Problem or Challenge







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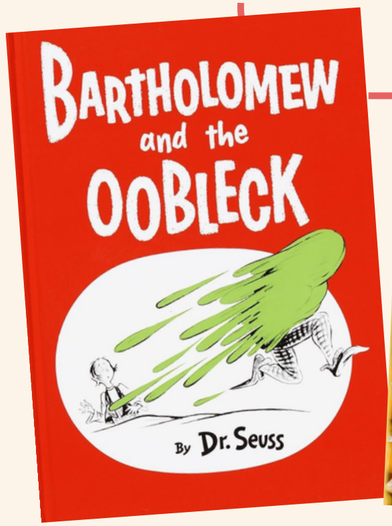
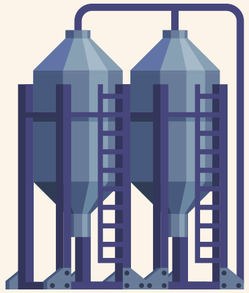
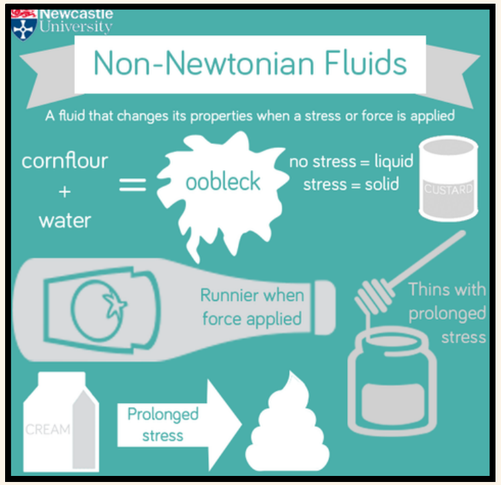
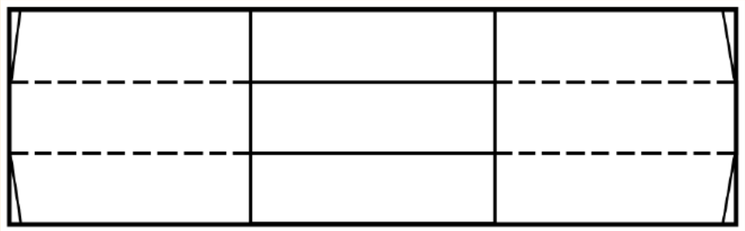


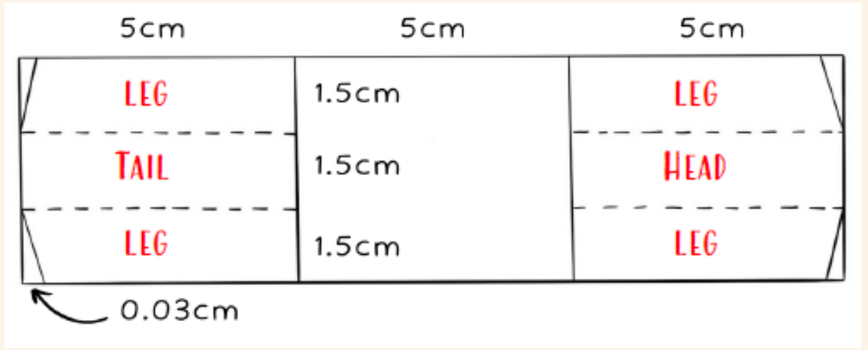


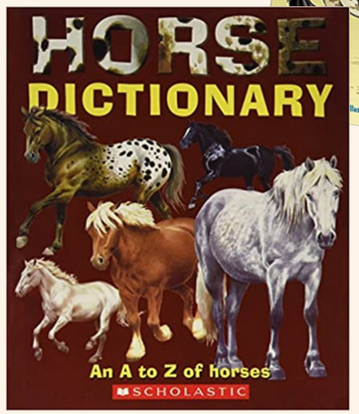


Chapter 1

WALKING PAPER HORSE





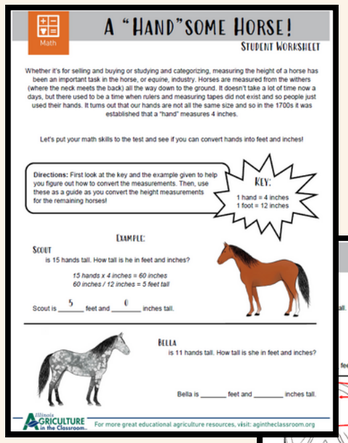


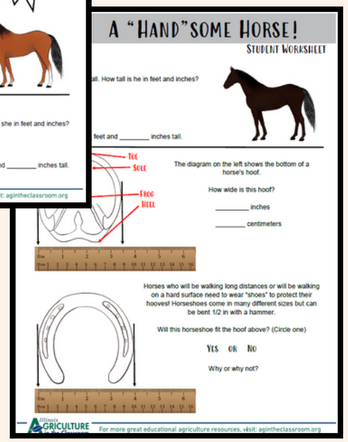
Chapter 2

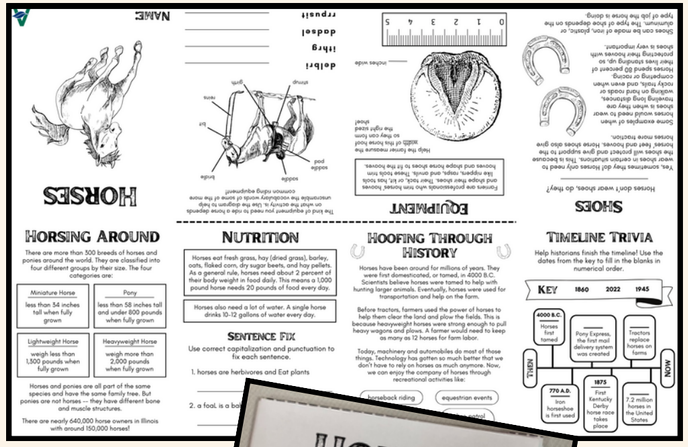
Possible Concepts to Explore

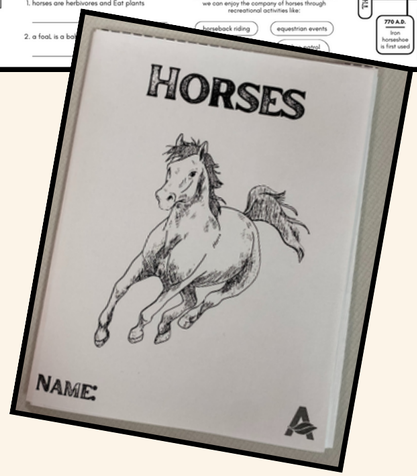
- Force
- Gravity
- Friction
- Movement
- History
- Sports
- Measurements & Conversions
- Genetics & Animal Features
- Livestock & Raising Animals
- Changes Over Time

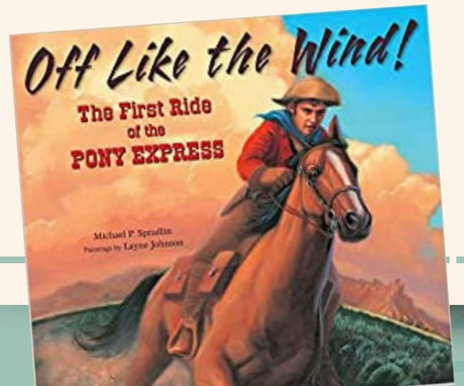
Horses "Zine"

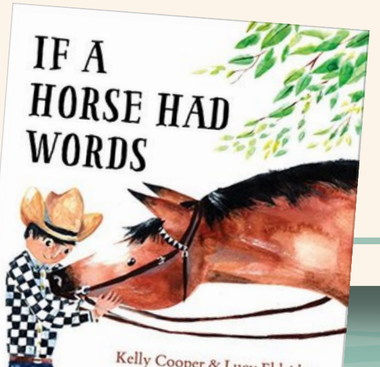


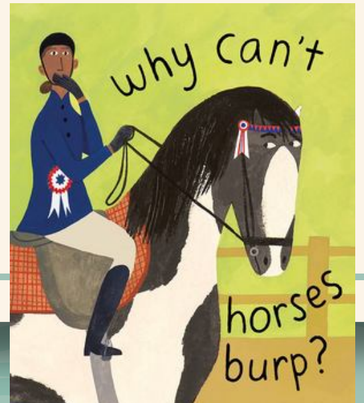


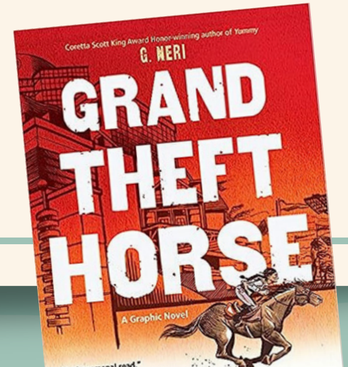




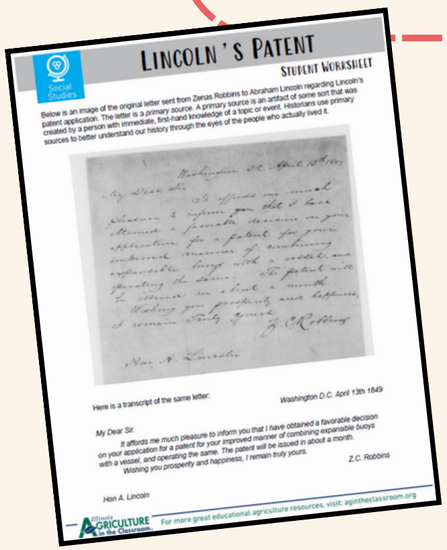








TIN FOIL FLATBOAT



Social Studies

Lincoln 's Patent

Student Worksheet

Below is an image of the original letter sent from Zenas Robbins to Abraham Lincoln regarding Lincoln's patent application. The letter is a primary source. A primary source is an artifact of some sort that was created by a person with immediate, first-hand knowledge of a topic or event. Historians use primary sources to better understand our history through the eyes of the people who actually lived it.

Here is a transcript of the same letter:

Washington D.C. April 13th 1849

My Dear Sir.

It affords me much pleasure to inform you that I have obtained a favorable decision on your application for a patent for your improved manner of combining expansible buoys with a vessel, and operating the same. The patent will be issued in about a month.

Wishing you prosperity and happiness, I remain truly yours.

Z.C. Robbins

Hon A. Lincoln

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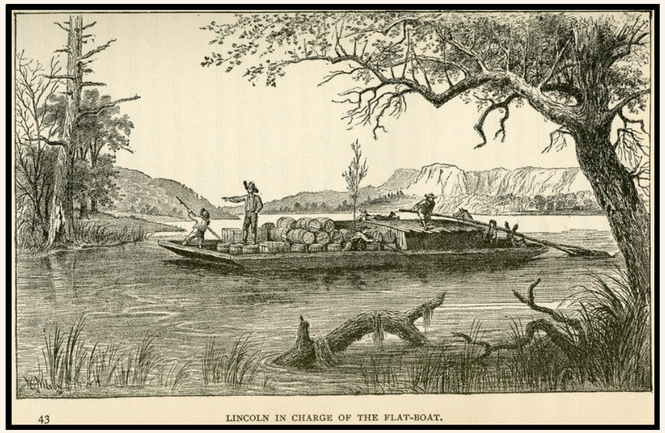


43 LINCOLN IN CHARGE OF THE FLAT-BOAT.

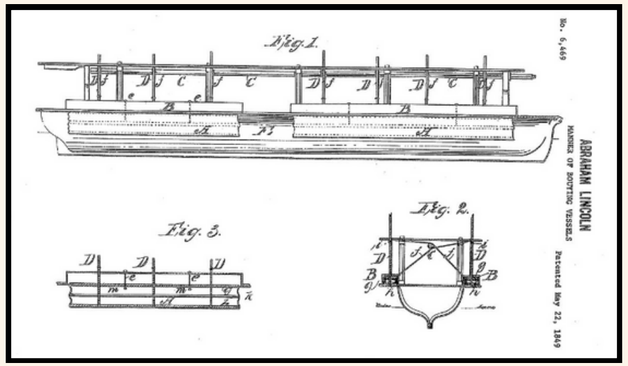


Fig. 1.

Fig. 2.

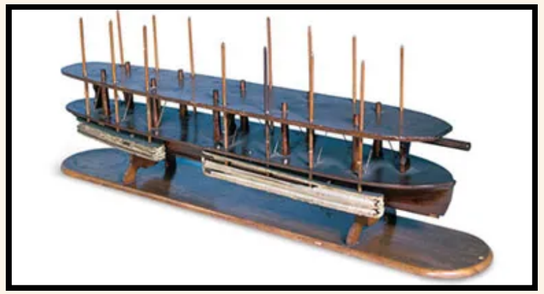
Fig. 3.

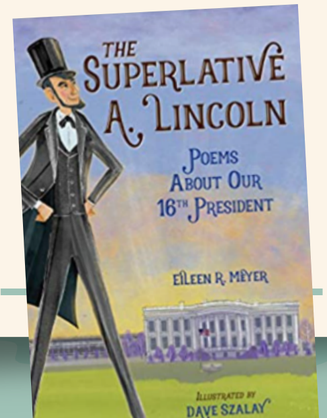
No. 6,469

ABRAHAM LINCOLN

MANNER OF BUOYING VESSELS

Patented May 22, 1849

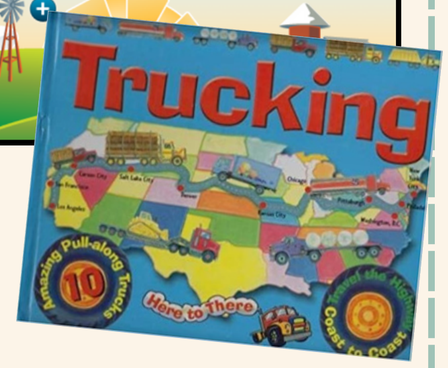


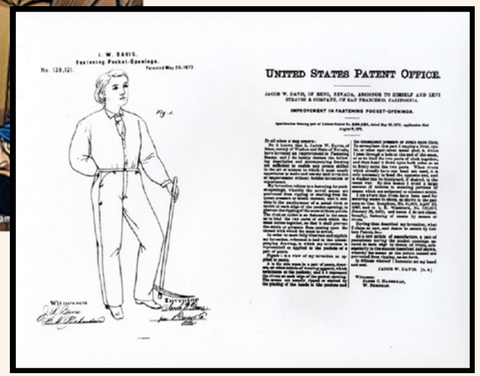


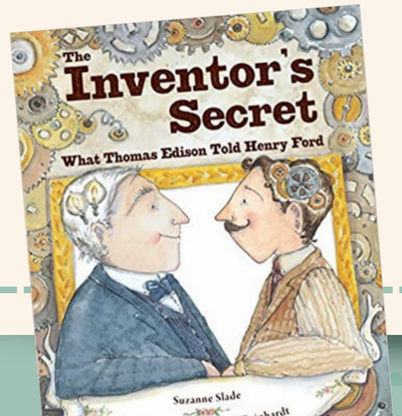
Chapter 3

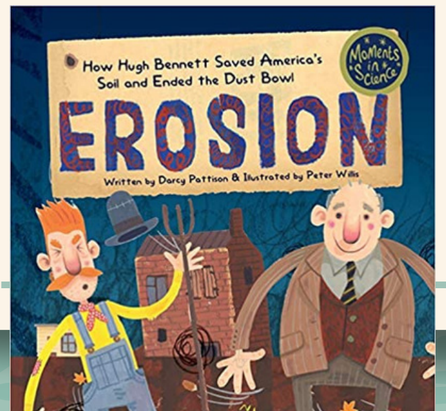
Possible Concepts to Explore

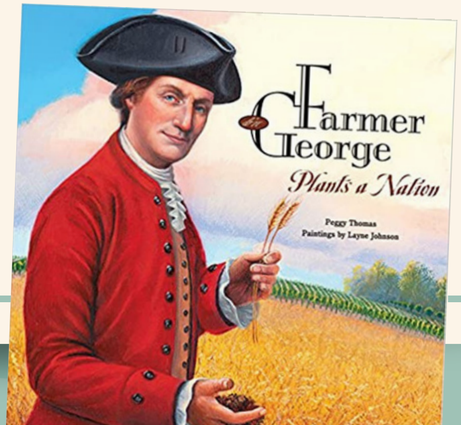
- Primary and Secondary Sources
- Inventions
- Process of Patent for Inventions
- Supply Chain
- Transportation
- Soil Erosion
- Presidents – Their Impacts in Agriculture



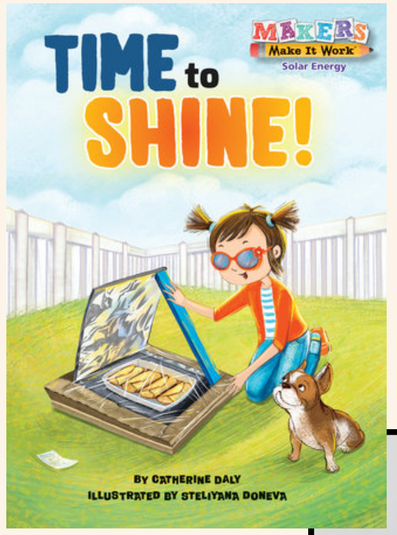


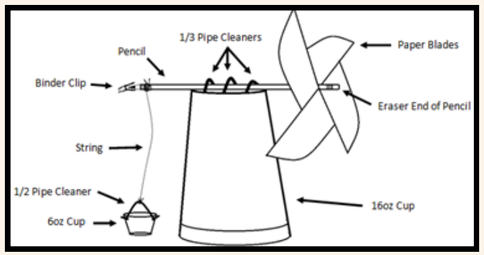


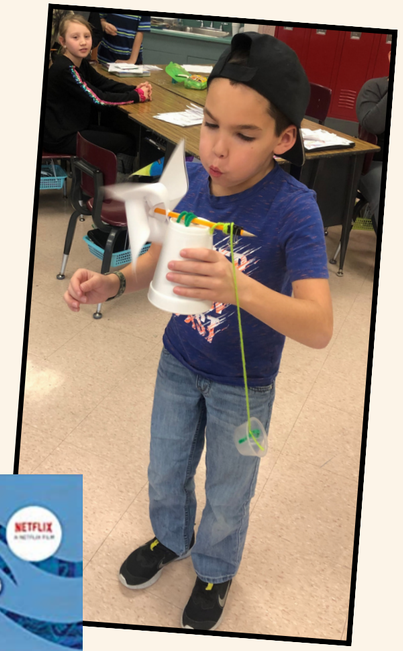


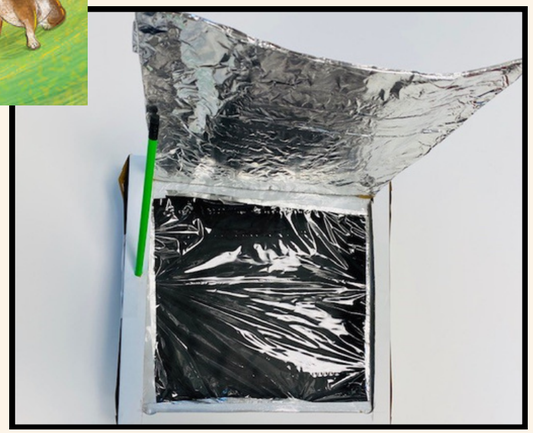


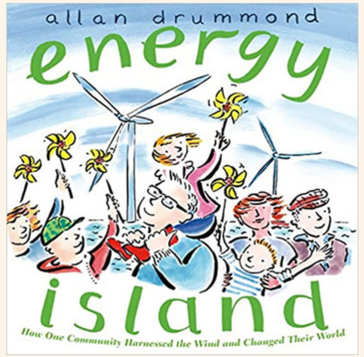
SOLAR OVEN & A WINDY LIFT

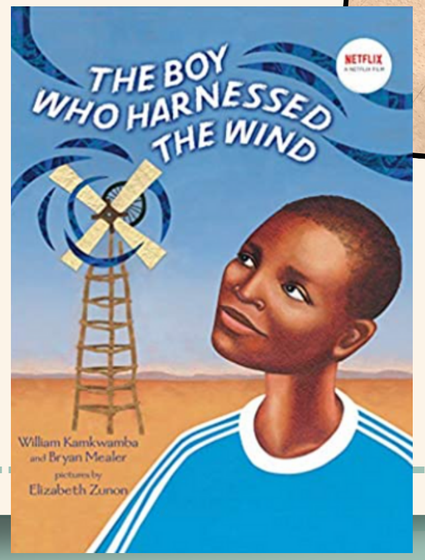












Chapter 4

BUILD A BEE HOTEL

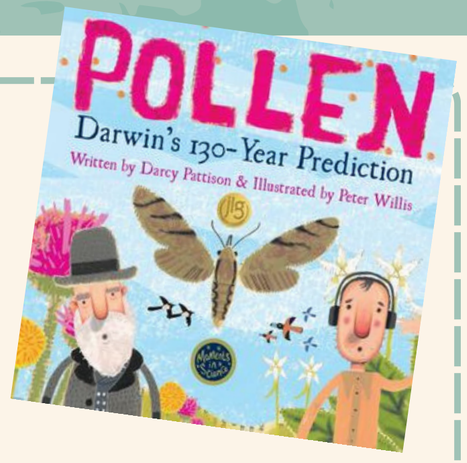
Chapter 5

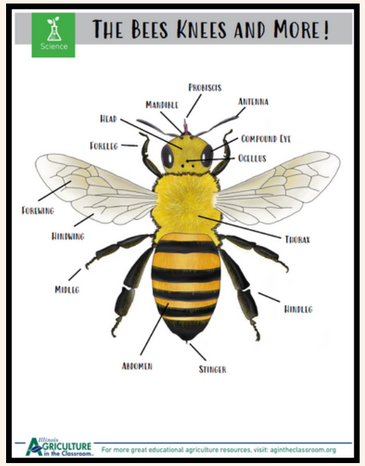
ground dwelling bees nests

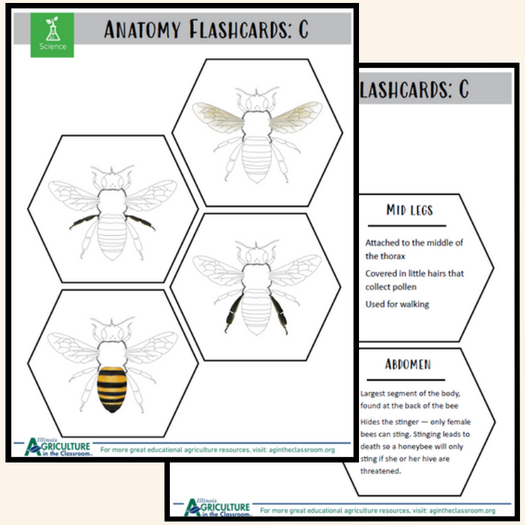
manmade bee hive

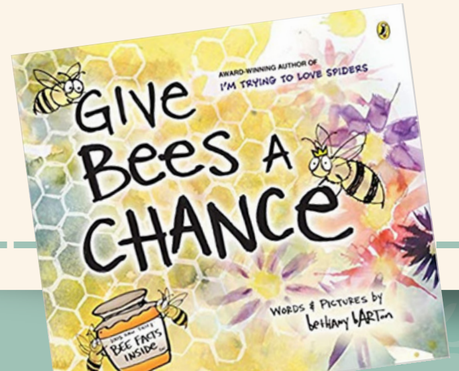
Possible Concepts to Explore

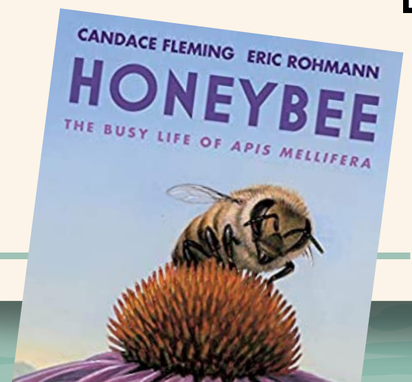
- Habitats
- Native species
- Other pollinators
- Process of pollination
- Insect anatomy
- Life cycles
- History
- Honeybees and honey
- Symbiosis/adaptations
- Beekeeping





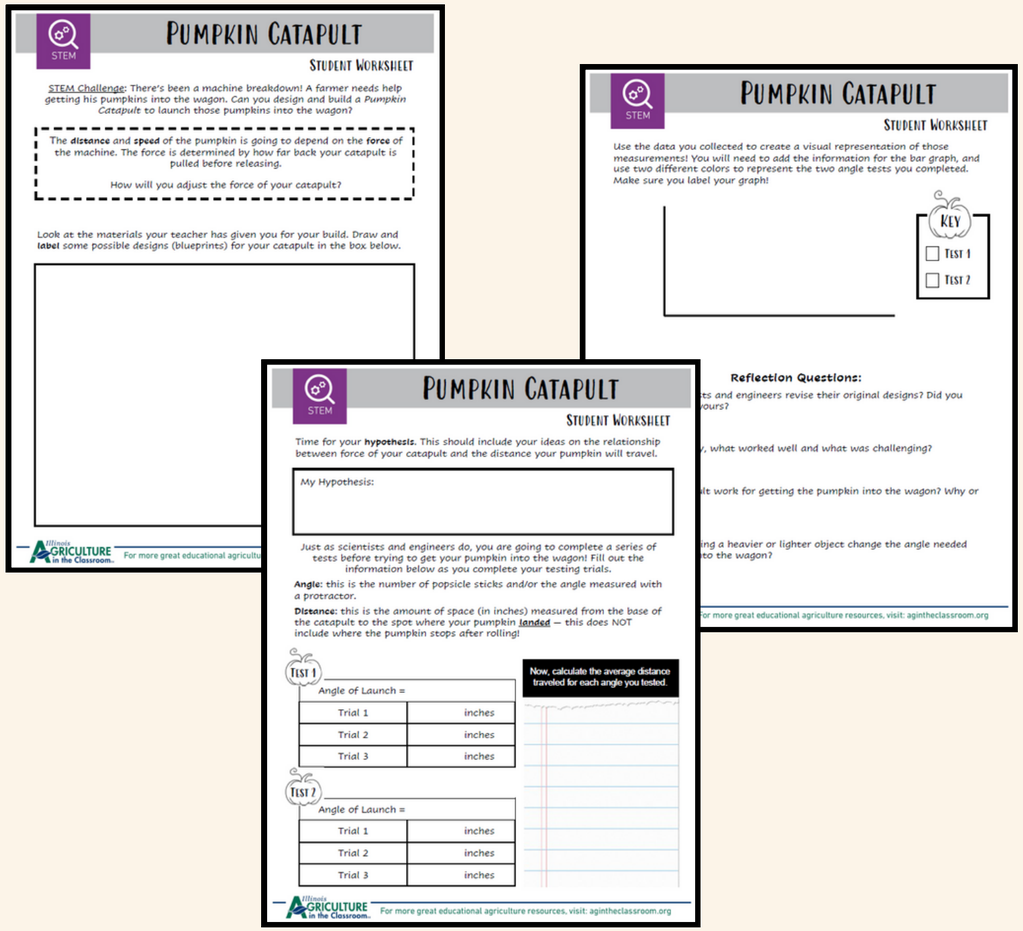






PUMPKIN CATAPULT

Chapter 6



PUMPKIN CATAPULT

STUDENT WORKSHEET

STEM Challenge: There's been a machine breakdown! A farmer needs help getting his pumpkins into the wagon. Can you design and build a *Pumpkin Catapult* to launch those pumpkins into the wagon?

The **distance** and **speed** of the pumpkin is going to depend on the **force** of the machine. The force is determined by how far back your catapult is pulled before releasing.

How will you adjust the force of your catapult?

Look at the materials your teacher has given you for your build. Draw and **label** some possible designs (blueprints) for your catapult in the box below.

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PUMPKIN CATAPULT

STUDENT WORKSHEET

Use the data you collected to create a visual representation of those measurements! You will need to add the information for the bar graph, and use two different colors to represent the two angle tests you completed. Make sure you label your graph!

KEY

TEST 1

TEST 2

Reflection Questions:

ts and engineers revise their original designs? Did you yours?

, what worked well and what was challenging?

lt work for getting the pumpkin into the wagon? Why or

ing a heavier or lighter object change the angle needed to the wagon?

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PUMPKIN CATAPULT

STUDENT WORKSHEET

Time for your **hypothesis.** This should include your ideas on the relationship between force of your catapult and the distance your pumpkin will travel.

My Hypothesis:

Just as scientists and engineers do, you are going to complete a series of tests before trying to get your pumpkin into the wagon! Fill out the information below as you complete your testing trials.

Angle: this is the number of popsicle sticks and/or the angle measured with a protractor.

Distance: this is the amount of space (in inches) measured from the base of the catapult to the spot where your pumpkin ***landed*** — this does NOT include where the pumpkin stops after rolling!

Now, calculate the average distance traveled for each angle you tested.

TEST 1

Angle of Launch =

Trial 1	inches
Trial 2	inches
Trial 3	inches

TEST 2

Angle of Launch =

Trial 1	inches
Trial 2	inches
Trial 3	inches

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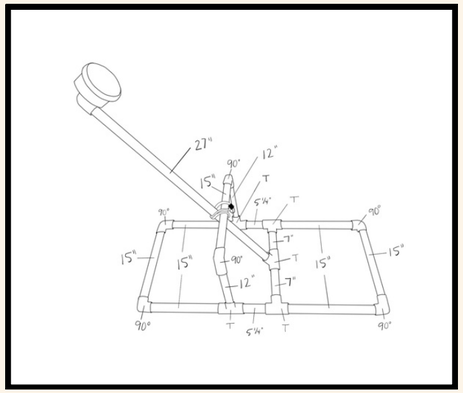
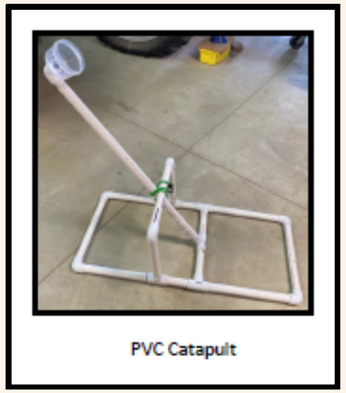




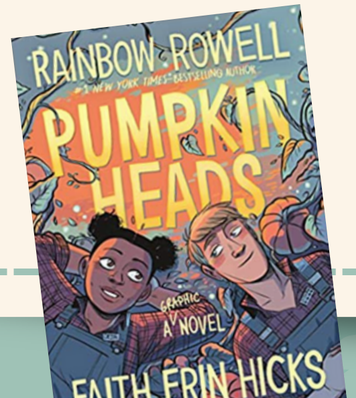
PVC Catapult

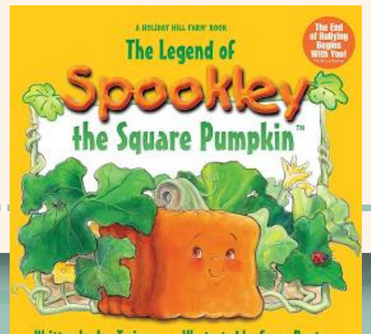
Possible Concepts to Explore

- Trial and Error – Collecting Data
- Kinetic/Potential Energy
- Simple Machines
- Force and Gravity
- Plant Life Cycles
- Plant Parts
- Nutrition and Cooking
- Supply Chain
- Harvesting Processes and Machinery
- Holiday Traditions and History

Exploding Pumpkin

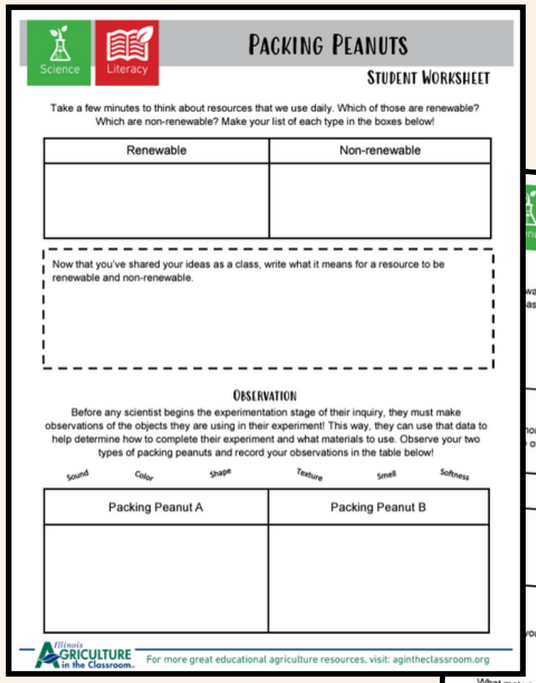
3D Pumpkin





CORN PACKING PEANUTS

Chapter 6.2



Science Literacy

PACKING PEANUTS

STUDENT WORKSHEET

Take a few minutes to think about resources that we use daily. Which of those are renewable? Which are non-renewable? Make your list of each type in the boxes below!

Renewable	Non-renewable

Now that you've shared your ideas as a class, write what it means for a resource to be renewable and non-renewable.

OBSERVATION

Before any scientist begins the experimentation stage of their inquiry, they must make observations of the objects they are using in their experiment! This way, they can use that data to help determine how to complete their experiment and what materials to use. Observe your two types of packing peanuts and record your observations in the table below!

Sound Color Shape Texture Smell Softness

Packing Peanut A	Packing Peanut B

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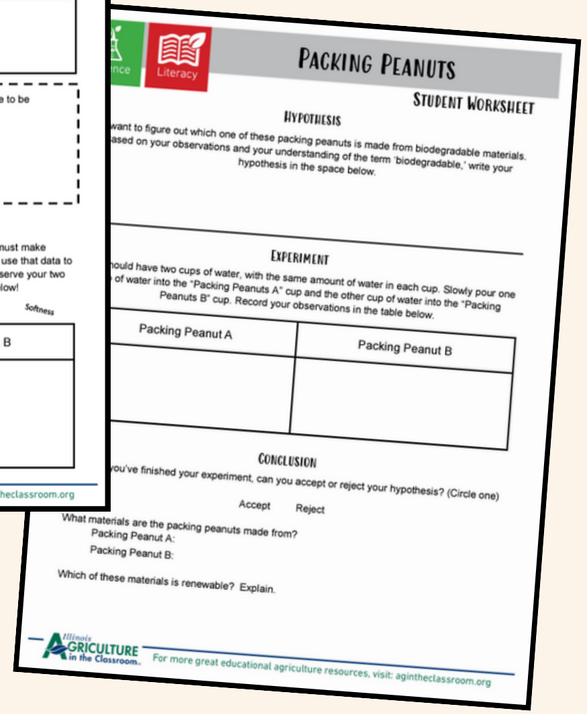

Literacy

PACKING PEANUTS

STUDENT WORKSHEET

HYPOTHESIS

want to figure out which one of these packing peanuts is made from biodegradable materials. ased on your observations and your understanding of the term 'biodegradable,' write your hypothesis in the space below.

EXPERIMENT

ould have two cups of water, with the same amount of water in each cup. Slowly pour one of water into the "Packing Peanuts A" cup and the other cup of water into the "Packing Peanuts B" cup. Record your observations in the table below.

Packing Peanut A	Packing Peanut B

CONCLUSION

ou've finished your experiment, can you accept or reject your hypothesis? (Circle one)

Accept Reject

What materials are the packing peanuts made from?

Packing Peanut A:

Packing Peanut B:

Which of these materials is renewable? Explain.

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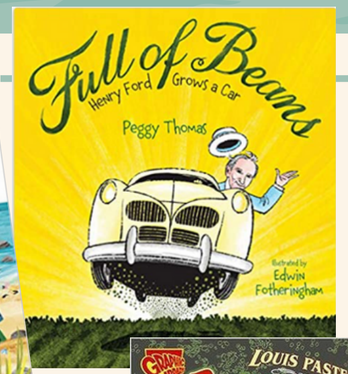
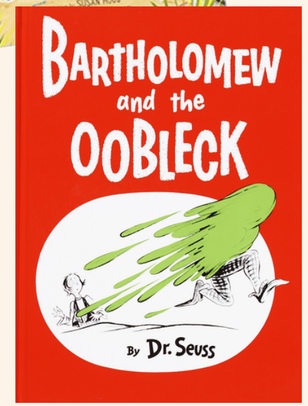
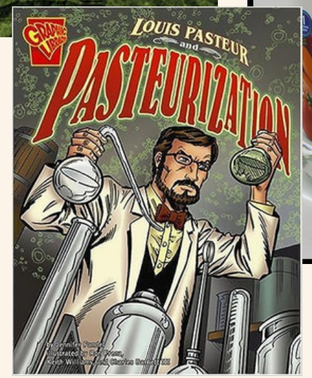
Possible Concepts to Explore

- Sustainability and Conservation
- Renewable vs. Non-renewable Resources
- Nutrition and Cooking
- Simple Machines
- Inventions
- History and Historical Figures
- Energy
- Architecture
- Plant Growth







Milk Plastic

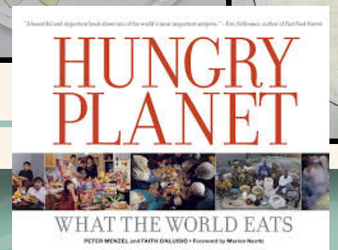
Beanie Baby

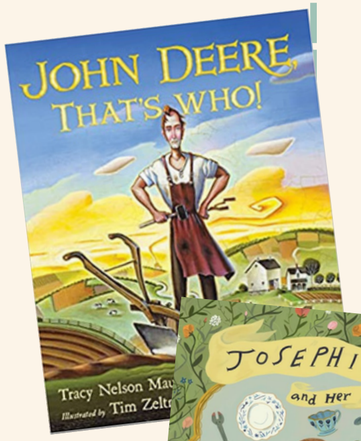
TEDTalk: Sitting On Soybeans

Circle of Earth Bracelet

Colors on Your Plate

Pizza Process





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