Illinois AGRICULTURE in the Classroom℠

Let's Give 'Em Pumpkin to Talk About

Standard-Based Lessons for the Fall Harvest Season

National Agriculture in the Classroom Conference 2021

Table of Contents

Additional resources for these activities can be found at http://iaitc.co/naitc21

Science

Apple Chain

Grade Level
K-3

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have a better understanding of the life cycle of an apple tree.

Materials Needed
- 2 Red Paper Plates (per student)
- Colored Construction Paper
- Templates
- Stapler and Staples
- Tape
- Yarn
- Hole Punch

Standards
Common Core
CCSS.ELA-Literacy.RL.4.3; W.4.2

CCSS.Math.Content.4.MD.2

NGSS
K-LS1-1; 3-ESS2-1; 3-LS1-1; 3-LS3-1

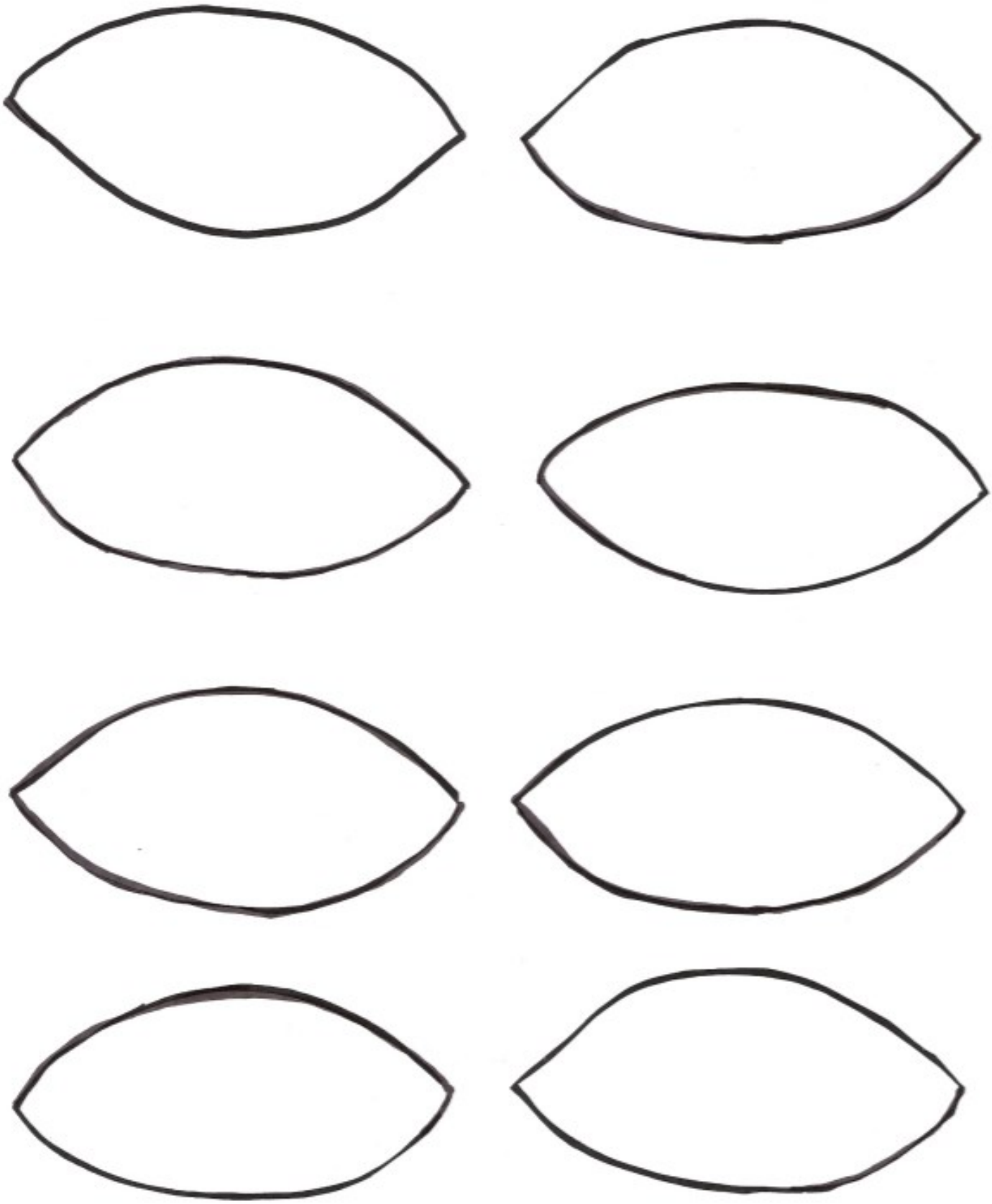
Lesson Summary
This lesson is designed to help students in sequencing and building models as well as help them understand the life cycle of an apple.

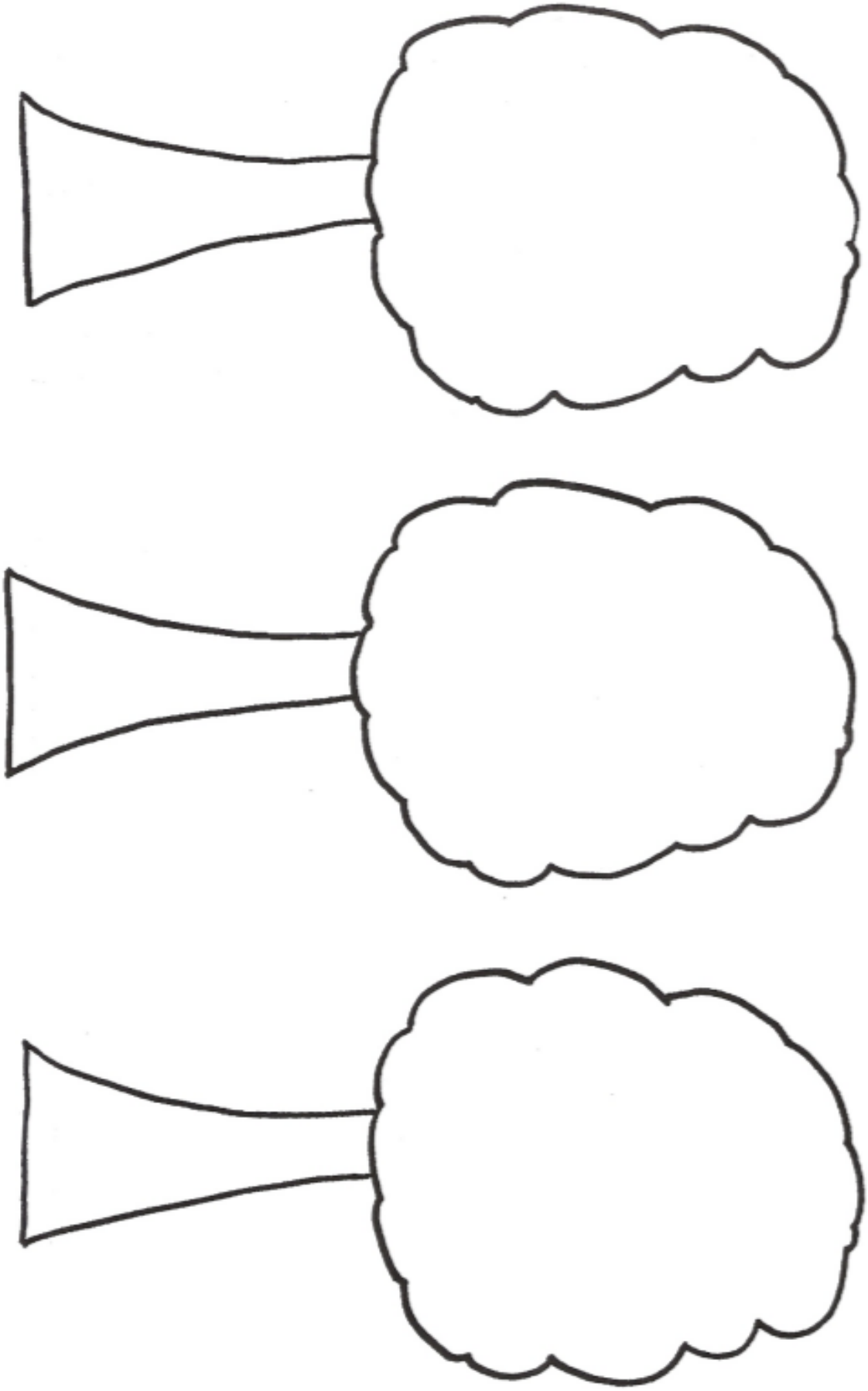
Suggested Sequence of Events:
1. Set Up: Print each template onto colored construction paper: seed (brown), tree (green), blossom (pink), bee (yellow), little apple (green). Cut out the shapes and then punch a hole on opposite sides of each template, except the seed which only needs one hole. Cut short strands of yarn-student will need five pieces each.
2. Read "Apples to Oregon" by Deborah Hopkinson to capture student interest.
3. Read through AITC Apple Ag Mag to learn about apples. Interactive online versions can be found on our website.
4. Complete the activity following the procedures:
    - Have students staple their 2 red plates together around 2/3 of the edge. Leave the other 1/3 open.
    - Have them tape one end of a piece of yarn to the inside of the stapled paper plates and extend the yarn out of the opening.
    - Add a stem to the red paper plates to make them look like an apple. Place this aside for now.
    - Ask students what shape is the start of a plant (seed). Then ask them what a seed grows into (tree). Use the yarn to tie these two shapes together. Repeat this until you get the chain completed.
    - Tuck the shapes into the red apple. Starting with the seed, slowly pull the shapes out of the apple and tell the story of how the apple grows.
5. Whole class discussion and reflection of activity. Pair students together and have them share their apple chain with their partner, telling the story of the apple life cycle!

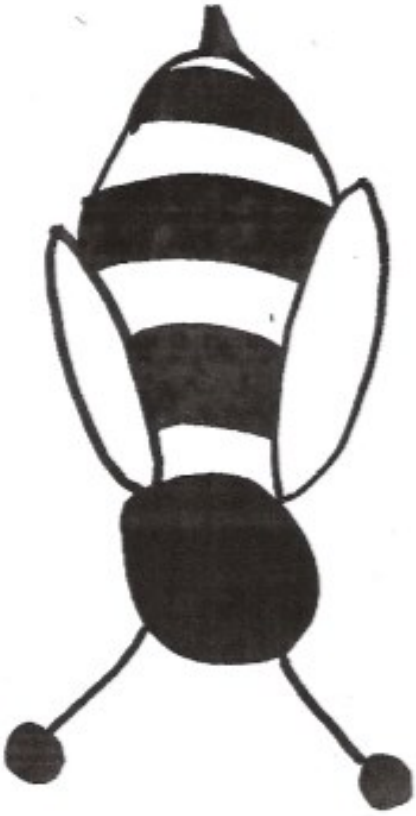
TEACHER RESOURCES

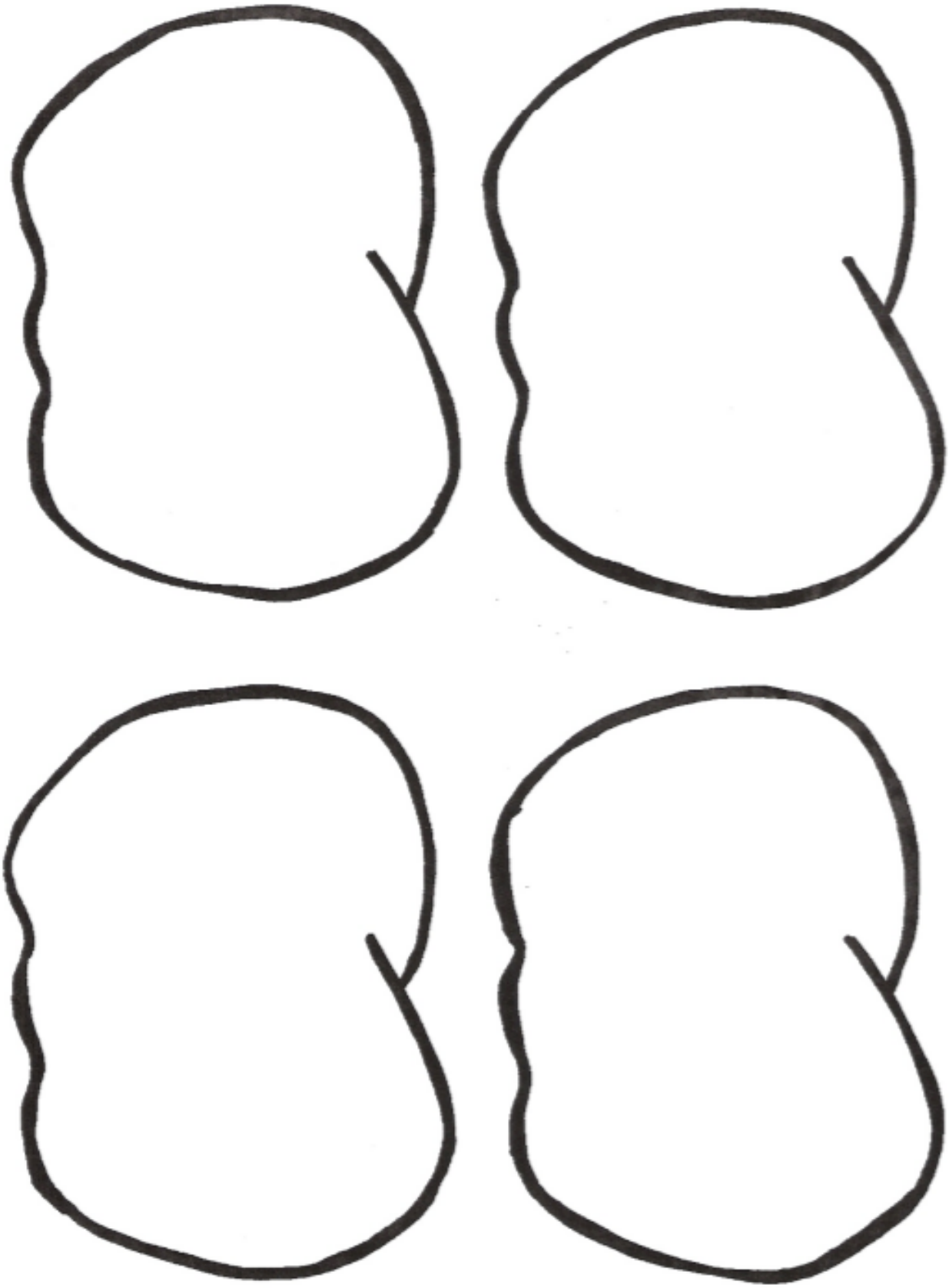
Extension Ideas:

- Read "From Seed to Apple" by Anita Ganeri. Look at the pictures and have students analyze the images.
- Have students label each shape on their apple chain.
- Have students create a comic strip showing the apple life cycle.
- Have students tell a story from the apple's perspective.
- Show a labeled diagram of an apple and/or apple tree.
- Introduce or teach about photosynthesis.
- Scientific Inquiry: Have students think more deeply about apple varieties. Do different types of apples taste different?
- Watch a time lapse video of an apple growing.
- Watch a video from a local farmer discussing apple growth and harvest.
- Take a field trip to an orchard and pick your own apples.
- Invite an apple farmer into the classroom.
- Have students research each step and write a paragraph explaining what happens at each phase. How long does each phase take?
- Measure and adjust the lengths of the yarn in between each shape to represent how long each phase takes.
- Take a closer look at bees and other pollinators. What is pollination? Why is it important for apples?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!









Social Studies | Literacy

Apple Pie Journey

Grade Level
3-6

Length of Lesson
50-60 minutes

Objective
After completing this activity, students will have a better understanding of how and where foods are grown and produced around the world.

Materials Needed
- Copy of *How to Make an Apple Pie and See the World* book by Marjorie Priceman
- Copies of student worksheets
- Crayons or colored pencils
- Individual World Maps (optional)

Standards
Common Core
CCSS.ELA-Literacy.RI.2.1- 4.1; RI.2-6.7; RI.4.2; RI.4.3; RI.4.6; RI.4.7; RF.4.4; W.4.3; W.4.7; SL.4.2

ISSS
SS.G.1.2; SS.G.1.K-3; SS.G.3.3; SS.G.4.5; SS.G.1.6-8

Lesson Summary
This lesson is designed to help students recognize and better appreciate that the ingredients from their favorite foods come from agriculture systems across the world.

Suggested Sequence of Events:
1. Read through the AITC Apple Ag Mag to learn more about trees. Interactive online versions can be found on our website.
2. Complete the activity by following these procedures:
    - Read *How to Make an Apple Pie and See the World*.
    - Ask your students if they have ever heard about any of the countries the main character visited. Ask them if they knew that other countries have farmers who produce food just like the U.S. does.
    - Pass out the student worksheet and explain that you're going to read the story to them again, but this time they will have a reading/listening purpose.
    - Pass out individual world maps if you have them. If individual world maps are not available, pull up a world map to project so all students can see.
    - Read through the directions on the student worksheets.
    - Read the story again, this time stopping to make sure students can identify the locations of the countries visited.
    - Have students ensure they followed all the directions on the worksheet.
3. Whole class discussion and reflection of activity.

TEACHER RESOURCES

Extension Ideas:

- Learn about the history of apple pies. Where were they first made?
- Research what variety of apple is best for baking. Are there different varieties that are better for specific uses?
- Have students re-write the story using a different recipe like a cheeseburger or banana split.
    - Once they're done with their story, have them get with a partner and track the voyage on a world map just like in this activity.
- Choose one ingredient from the story and have your students do a little more research to create a concept map. What countries farm this commodity? What farming techniques are used? What recipes around the world use this ingredient?
- Turn this activity into a stations activity to get your students up and moving. Give each station some information about the country being visited in the story.
- Have students identify the latitude and longitude of the places the main character visited.
- Learn how to say the names of the commodities in the languages from the countries visited in the story.
- Have students do a gallery walk with these images of what kids around the world eat for lunch in a week, available at https://time.com/what-kids-eat-around-the-world-in-one-week/.
- Watch this school lunches around the world video, available at https://www.youtube.com/watch?v=Po0O9tRXCyA.
- Use this interactive map from National Geographic to show students the different climate regions around the world and how those impact the food we eat. Map available at mapmaker.nationalgeographic.org.
- Go to agintheclassroom.org to contact your County Ag Literacy Coordinator for free classroom sets of our Ag Mags!

Apple Pie Journey

Student Worksheet

Directions: Complete the steps below using your blank world map!

1. Turn your map so that it is facing the correct direction. Then, draw a compass on the bottom, right side of the map. Make sure to label your compass with North, South, East and West.
2. As your teacher reads the story, locate the countries the main character visits and color in the country.
3. Label the countries. Make sure to spell their names correctly!
4. Draw the path of the route our main character takes.
5. Answer the questions below:

What countries did our main character visit?

Using your compass skills, navigate us through the route the main character took in the story.

The ingredients we use to make food are products that come from original sources. Match the ingredient our main character needed with its original source.

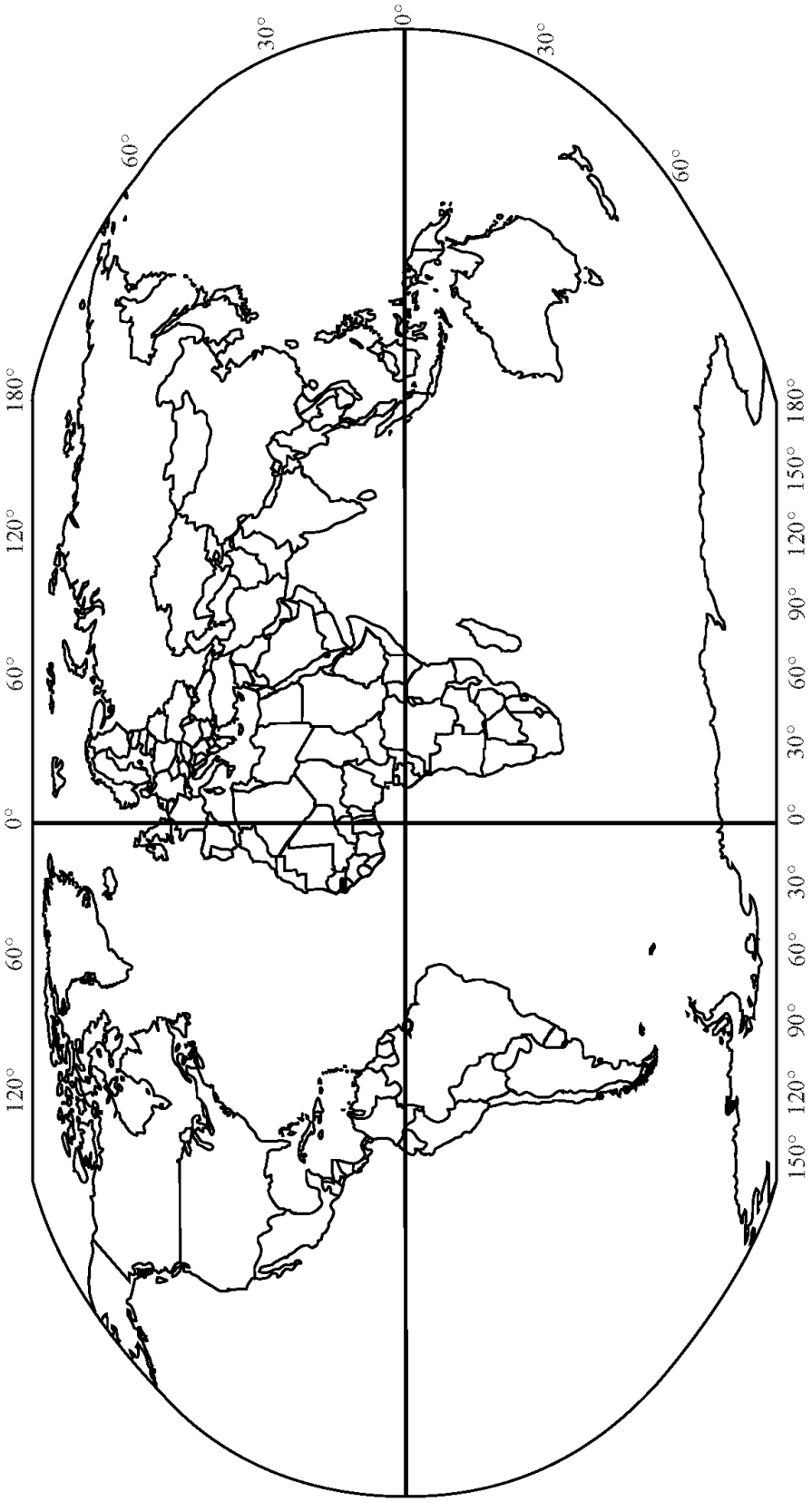
Sugar	Wheat
Eggs	Kurundu tree
Apples	Cow
Cinnamon	Seawater
Salt	Chicken
Butter	Sugar cane
Flour	Orchard

Social Studies

Literacy

Apple Pie Journey

Student Worksheet



Science

Exploding Pumpkin

Grade Level
2-8

Length of Lesson
50 minutes, split into two class periods

Objective
By the end of this lesson, students will have a better understanding of chemical reactions.

Materials Needed
- 1 cup of 20-40 volume Hydrogen Peroxide (6%-12% will work)
- 2 packets active dry yeast
- 6 tablespoons warm water
- 2 tablespoons of dish soap
- Cylinder or flask at least 500 ml
- Small mixing bowl
- Food coloring (optional)
- Large pumpkin carved as a jack-o'-lantern
- Funnel
- Safety goggles
- Gloves

Standards
NGSS
3-PS2-2; 5-PS1; MS-PS1

Lesson Summary
This lesson is designed for teachers to do as a demonstration for students. Students will learn about exothermic chemical reactions all while learning about pumpkins! If you are teaching a higher grade, this could be used as an inquiry experiment for students to complete in small groups.

**The hydrogen peroxide may not completely break down from the yeast and could cause irritation on the skin or eyes. Because this is an exothermic reaction, the foam will be very warm at first. Please use caution if your are having students complete this in small groups.

Suggested Sequence of Events:
1. Set up: Carve a pumpkin into a jack-o'-lantern with a simple face so the foam can easily spew out. Then set up your demonstration area with a table cloth set underneath your jack-o'-lantern for easy clean up.
2. Read "Pumpkin Jack" by Will Hubbell to snag student interest about pumpkins and jack-o'-lanterns.
3. Read through the AITC Pumpkin Ag Mag to learn more about the pumpkins! Interactive online versions can be found on our website.
4. Complete the activity following the procedures:
    - Carve a pumpkin jack-o'-lantern with a simple face so the foam can easily spew out.
    - Place the cylinder in the pumpkin and carefully add the dish soap and hydrogen peroxide. If you are using food coloring, add a couple drops into the dish soap.
    - In your small mixing bowl, mix your yeast packets with warm water for 30 seconds. It should be similar to the consistency of melted ice cream.
    - Pour the yeast solution into the cylinder in the pumpkin, step back, and watch the foam spew from the jack-o'-lantern!
    - All the materials are safe to drain, so simply rinse all the materials in the sink and compost the pumpkin.
4. Whole class discussion and reflection of activity.

TEACHER RESOURCES

Background Information:
When the yeast is added to the hydrogen peroxide, the yeast acts as a catalyst, quickly breaking down the hydrogen peroxide to oxygen gas and water. The bubbles form because of the reaction happening quickly and the oxygen then gets trapped by the dish soap bubbles which causes the foaming. This is an Exothermic Reaction and will cause the foam to be warm.

Extension Ideas:
- Watch this video as an introduction or demonstration of the activity. Available at http://iaitc.co/explode.
- Read "Pick a Pumpkin" by Patricia Toht. Dig deeper and learn about where the tradition of carving pumpkins came from.
- Learn about the growth of pumpkins and label a pumpkin diagram or model.
- Have students research the prefix and suffix of the term 'exothermic' and have them come up with a definition of that kind of reaction.
- Have students use our AITC scientific inquiry worksheet and test different variables. What would change the outcome of the foam?
- Where are pumpkins grown? Research geographical locations of pumpkin farmers in the United States and around the world.
    - Did you know that Morton, Illinois, is the Pumpkin Capital of the world? Learn more about Morton pumpkins and what they're grown for.
- Have a 'gourd' time and research other vegetables that are related to pumpkins.
- Squash Bees are very important pollinators for pumpkins! Learn more about squash bees and the process of pollination. Why is it important to protect pollinators? What other agricultural commodities rely on pollinators?
- Learn more about recipes that pumpkins are used for.
- Invite a pumpkin farmer into the classroom to talk about what it takes to grow pumpkins! Have your students prepare questions to ask.
- Take your class to a pumpkin patch to pick out their own pumpkins. Have them take the pumpkins home or paint them for classroom decorations!
- Learn more about yeast-is it alive?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

Science

Powder-Powered Pollination

Grade Level
K-3

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have a better understanding of the process of pollination.

Materials Needed
- Juice boxes
- Boxed Macaroni & Cheese
- Paper Flower Cutouts
- Black Pipe Cleaners
- Paper Plates
- Hand Lens (optional)
- Copies of student worksheet

Standards

NGSS
K-LS1-1; 2-LS2-2

Lesson Summary
This lesson is designed to give students a hands-on activity that shows how pollinators like butterflies pollinate flowers.

Suggested Sequence of Events:
1. Set Up: Collect materials for each student/group.
2. Read *Flowers are Calling* by Rita Gray to help students better understand why pollinators are attracted to certain plants.
3. Read through AITC Pollinator Ag Mag to learn about the importance of pollinators. Interactive online versions can be found on our website.
4. Pre-Activity Discussion: What is pollination? Why is pollination important to humans? Who pollinates the food that we eat? How do pollinators actually do this important work?
5. Complete the activity following the procedures:
    - Give each student or group of students a paper plate, hand lens, pipe cleaner, juice box, and paper flower.
    - Students should tape or glue the paper flower to the top of the juice box and insert the straw into the juice box.
    - As they do this, the teacher should come around and pour some of the cheese powder from the boxed macaroni onto each plate. Students can share plates to reduce the quantity needed.
    - Next, students should bend their pipe cleaners onto the pointer finger of their non-dominant hand to form the legs of their pollinator (see picture on next page).
    - Using the student worksheet as their guide, students should complete the remainder of the activity steps.
    - Students will “visit” the first flower on the paper plate and rub their “legs” onto the cheese powder.
    - Then, they should visit the next flower on the juice box. Students should drink nectar with their proboscis (straw) and then gently bounce their “legs” on the flower to allow some of the pollen to fall off.
    - As they do each step, students should record their findings on the student worksheet.
6. Whole class discussion and reflection of activity.

TEACHER RESOURCES

Extension Ideas:

- Have students color/draw on the flowers to reflect what they would be drawn to if they were pollinators.
- Read *Flower Talk: How Plants Use Color to Communicate* by Sara Levine to learn more about what attracts pollinators to different plants.
- Have students create a comic strip showing the process of pollination.
- Have students learn about the body parts of a butterfly by creating a version of our Bag Butterfly lesson and attach their butterfly wings (ziplog bag and tissue paper pieces) to their finger using another pipe cleaner.
- Find videos online of different pollinators collecting nectar and pollen from flowers.
- Use the leftover macaroni to complete our Commas in a Series worksheet. Students can glue the macaroni to represent where the commas should go.
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

Science

Powder-Powered Pollination

Student Worksheet

How do pollinators help plants grow?

Attach your new "legs" to your finger to turn into a butterfly! Take your butterfly to visit the flower on the table. Walk your butterfly legs through the pollen on the plate. What happens?

Draw what you see:

Tell a friend and then write what you see:

_____

_____

_____

_____

Next, land your butterfly on the other flower. Have your hungry butterfly use its proboscis (straw) to drink some nectar (juice). Gently tap your legs on the small flower. What happens?

Draw what you see:

Tell a friend and then write what you see:

_____

_____

_____

_____

What happened when your butterfly visited each flower? Why are these hungry butterflies and other pollinators important to our daily lives? Tell a friend and then write about how butterflies and other pollinators help plants grow.

_____

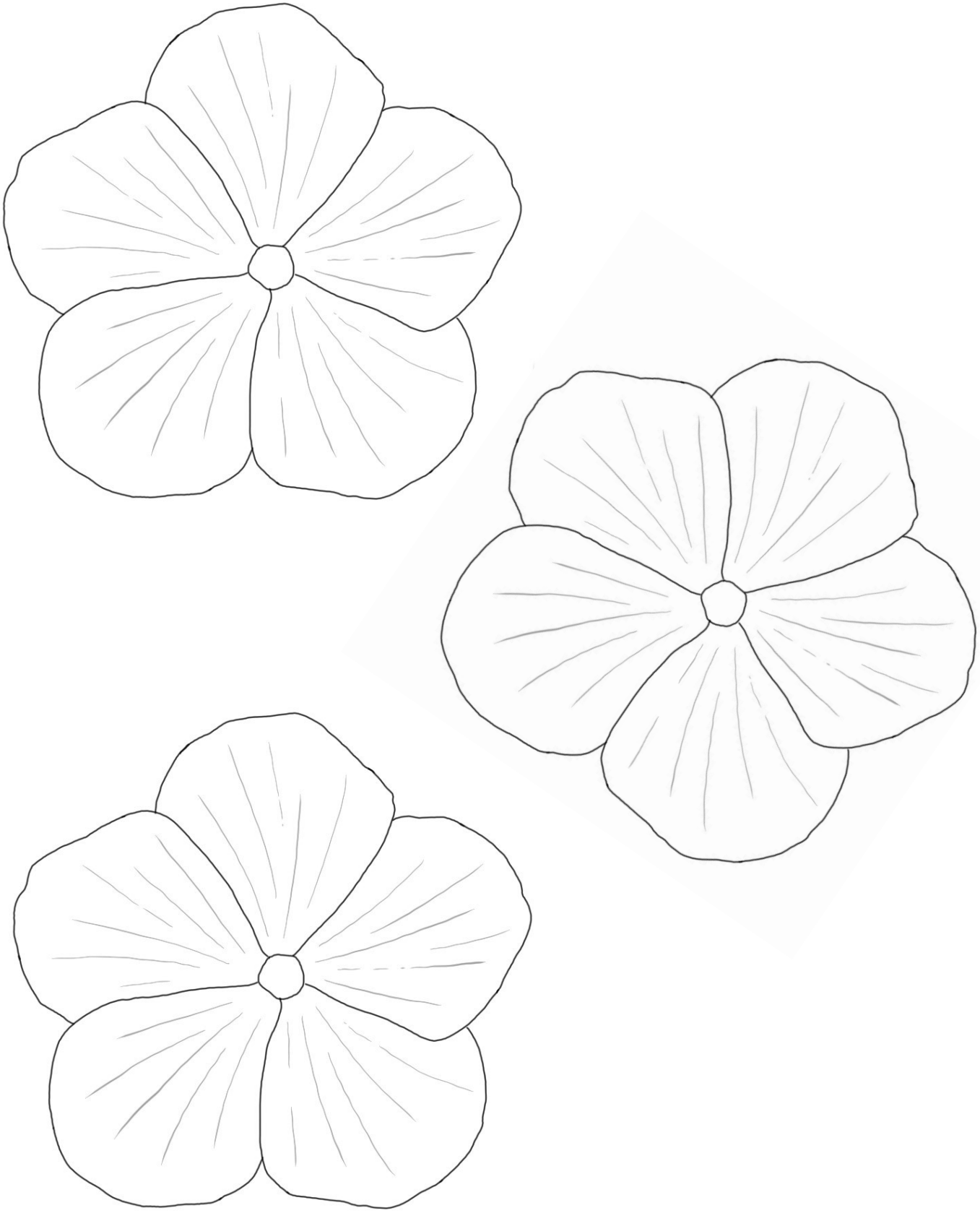
_____

_____

_____

Powder-Powered Pollination

Powder-Powered Pollination



Science

Powder-Powered Pollination

Commas in a Series Worksheet

Glue the leftover macaroni to each sentence wherever there is a missing comma.

1. Important pollinators include bees bats butterflies birds moths flies and small mammals.
2. The petals stamen pistil and sepal are some important parts of a flower.
3. Bee species include honeybees bumblebees squash bees carpenter bees and many more!
4. We can help pollinators by adding flowers plants and habitat to our yards.

Pumpkin Catapult

STEM

Grade Level
4-6

Length of Lesson
2 class periods

(1 day of building, 1 day of testing)

Objective
By the end of this lesson, students will learn more about the design and use of simple machines.

Materials Needed
- Large popsicle sticks
- Rubber bands
- Plastic Bottle Caps
- Hot Glue
- Assorted additional building materials
- Small pumpkin-shaped candy
- Protractors
- Container or bin ("wagon" for challenge)
- Copies of student worksheet

Standards
NGSS
4-PS3; 3-5-ETS1; MS-ETS1-1; MS-PS3-2

Lesson Summary
This lesson is designed to help students learn more about simple machines and provide opportunities to design and test their own pumpkin catapult. Additionally, there is a design for a large catapult made from PVC pipe that will launch small pumpkins up to 40 feet.

Suggested Sequence of Events:
1. Set Up: Teachers may also want to build their own example to inspire students' creations.
2. Read *The Great Pumpkin Smash* by Lori Haskins Houran to capture student interest and introduce the concept of catapults.
3. Read through AITC Pumpkin Ag Mag to learn about pumpkins. Interactive online versions can be found on our website.
4. Watch a short pumpkin harvesting video to show students some of the machines used to harvest processing pumpkins in Illinois. Here is one good example: https://youtu.be/5Ac98DrsKmY
5. Complete the activity following the procedures:
    - Discuss the concept of a catapult and the simple machines used to make a catapult work.
    - Pass out the student worksheets to each student and read the "STEM Challenge" together. Explain that they will be trying to catapult a candy pumpkin into a container.
    - After passing out the necessary building materials have students brainstorm how the pieces work together and then draw a blueprint. They should do this before they start building.
    - Provide students time to build, discuss, and test their creations. *See Background Information on the Teacher Resources page.
    - Complete the STEM Challenge as a class and see whose catapult can launch the candy pumpkin into the wagon!
6. Additionally, the teacher could construct a PVC Pumpkin Catapult and have students experiment with launching small pumpkins outside.
7. Whole class discussion and reflection of activity. Pair students together and have them share their catapult designs with their partner. What variables can be changed to make the pumpkins launch farther?

TEACHER RESOURCES

Background Information:
A part of STEM fields is the testing that takes place behind the scenes! Your students are trying to launch a candy pumpkin into a container placed at a specified distance, determined by you. Students will need to test their catapults to determine the force needed to launch the pumpkin the correct distance. Meaning, what is the best angle or how many posicle sticks need to be stacked for the correct force. They will choose two angles to test and complete three trials for each, then find the average of those trials for each angle. This will help them determine the angle they need for the challenge.

Extension Ideas:
- Have students define the bolded words on their student worksheets.
- Talk about why the pumpkin doesn't stay in the air, what happens to the pumpkin's motion when it hits the ground, and what causes the pumpkin to travel a further distance.
- Add another variable into their tests and have students use objects of different weights to compare results.
- Read "Pick a Pumpkin" by Patricia Toht. Look at the pictures and have students analyze the images.
- Have students write pumpkin facts from the AITC Pumpkin Ag Mag on their catapults.
- Have students create a comic strip including pumpkin facts.
- Watch a time lapse video of a pumpkin growing.
- Watch a video from a local farmer discussing pumpkin growth and harvest.
- Take a field trip to a pumpkin patch and pick your own pumpkins.
- Take a closer look at squash bees and other pollinators. What is pollination? Why is it important for pumpkins?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

Catapult made with instructions

Catapult designed by a 1st grader

PVC Catapult

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.

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!

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

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

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!

Reflection Questions:

1. Why do scientists and engineers revise their original designs? Did you have to revise yours?

2. For this activity, what worked well and what was challenging?

3. Did your catapult work for getting the pumpkin into the wagon? Why or why not?

4. How would adding a heavier or lighter object change the angle needed for making it into the wagon?

STEM

Pumpkin Catapult

Basic Instructions

Materials:

- Seven (7) large popsicle sticks
- Four (4) rubber bands
- Plastic bottle cap
- Hot glue

Follow these steps to build a basic pumpkin catapult:

1. Stack five (5) popsicle sticks together and wrap rubber bands around each end until tight.
2. Stack the remaining two (2) popsicle sticks together and wrap a rubber band around one end until tight.
3. Spread apart the two (2) popsicle sticks on the end opposite the rubber band and insert the stack of five (5) popsicle sticks in between.
4. Push the stack of five (5) sticks down until it reaches the rubber band holding the two (2) popsicle sticks together.
5. Wrap another rubber band around the spot where the two (2) stacks of popsicle sticks meet.
6. Carefully glue a plastic bottle cap to the upper popsicle stick to create a pumpkin basket for your catapult.
7. Allow to dry, then place a candy pumpkin inside the bottle cap.
8. Use your finger to pull down the popsicle stick. Release your finger and see how far your pumpkin flies!

Now that you have built a basic catapult, how can you improve the design? Can you make a more powerful catapult with a new design?

Pumpkin Catapult

PVC Catapult Instructions

Materials:

- Fourteen (14) feet of 1" diameter PVC pipe
- Five (5) 1" diameter PVC "T" connectors
- Seven (7) 1" diameter PVC 90 degree connectors
- PVC primer and glue (often sold together)
- One (1) bungee cord
- One (1) 3" bolt and nut
- Small plastic container

Tools: Hacksaw or power saw, tape measure, drill and drill bit, permanent marker

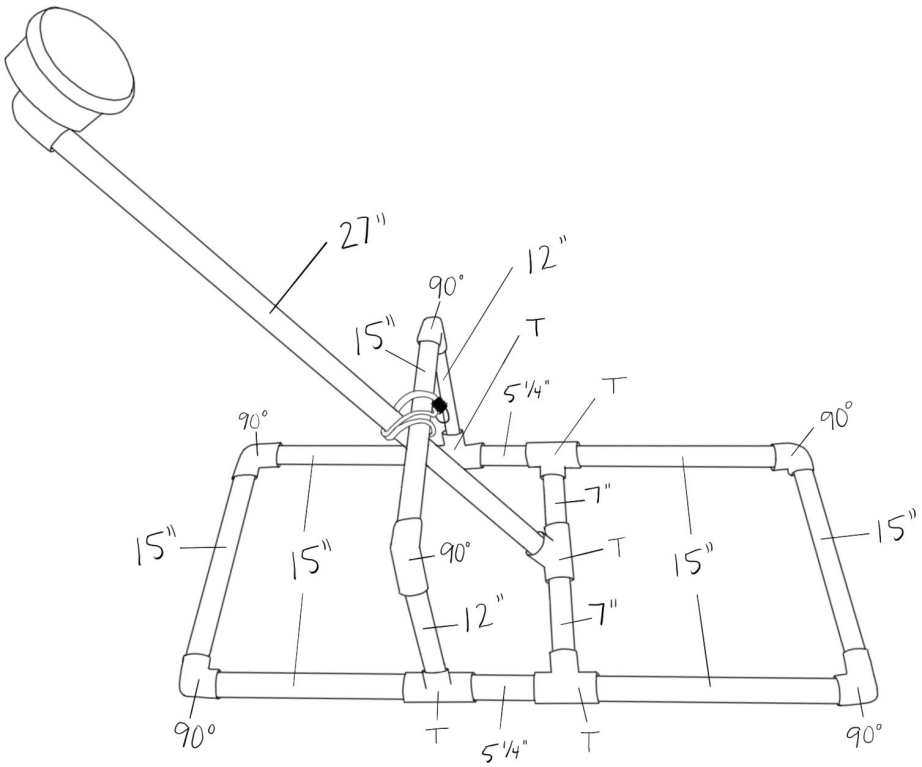
Follow these steps to build a PVC pumpkin catapult:

1. Begin by cutting your PVC pipes into the following lengths:
    - Seven (7) 15" long pieces
    - Two (2) 7" long pieces
    - Two (2) 5 1/4" long pieces
    - Two (2) 12" long pieces
    - One (1) 27" long piece (this can be shortened or lengthened to change the catapult's launching ability)
2. Follow the diagram on the following page to attach the pieces of your catapult. **Do NOT use the PVC glue at this time!**
3. Drill a hole through the 90 degree connector on the catapult's throwing arm large enough for your bolt to fit through.
4. Drill a hole through the bottom of your plastic container and then attach using the bolt and nut.
5. Before gluing, you may want to test out your catapult to see if you want a longer or shorter throwing arm. To test, wrap the bungee cord around the throwing arm and attach to the horizontal upright. The more you wrap it, the further your catapult should launch.
6. If you are happy with your throwing arm's ability, it's time to get ready to glue. Before disassembling your catapult, use a permanent marker to mark each pipe and connector union. Draw a straight line across each union. When you glue your pieces together, you will need to make sure you match these lines up again. This is a very important step, as you only get one chance to glue!

Pumpkin Catapult

PVC Catapult Instructions

7. Lay down cardboard to protect your surface from the PVC glue. It is recommended to do the gluing in a well-ventilated area. You should also wear rubber gloves to protect your skin.
8. Unscrew the bottles of PVC primer and glue. You should notice that the lids have brushes attached to them.
9. On each connector, rub the PVC primer brush on the interior where the pipe will be inserted.
10. Then, rub the PVC glue brush on the same spot.
11. Insert the correct PVC pipe, making sure to line up your permanent marker lines as you push the pipe in as far as it will go. Take your time with this step!
12. Continue for each piece until your catapult is reassembled.
13. Let dry thoroughly before using.
14. Students can experiment with this catapult as well. Try pumpkins of different weights and sizes and see if the distance changes. Set up a wagon and see if students can hit it. Try placing the catapult on different inclines to see if the trajectory changes.



Wheat Milling

Science Literacy

Grade Level
K-4

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have a better understanding of wheat as a plant.

Materials Needed
- Wheat Stalks (available at agclassroomstore.com)
- Salt or Pepper Grinder

Standards
Common Core
CCSS.ELA-Literacy.RI.K.10; RI.1.6

CCSS.Math.Content.K.CC.A.1

NGSS
K-LS1-1; 2-LS2-2; 3-LS1-3

Lesson Summary
This lesson is designed to help students identify the parts of a wheat plant while learning about its uses in various food products.

Suggested Sequence of Events:
1. Set Up: Gather enough wheat stalks for each student in your class or for small groups of students. Draw or print out a diagram of a wheat stalk as a guide for you and your students.
2. Read "Farmer George Plants a Nation by Peggy Thomas to capture student interest.
3. Read through the AITC Wheat Ag Mag to learn more about wheat. Interactive online versions can be found on our website.
4. Complete the activity following the procedures:
    - Show students wheat stalks.
    - Go over the parts of the wheat stalk with the students to familiarize them with the parts so they can understand the directions for dissection.
        - Stalk—the entire plant.
        - Head—the part of the wheat plant that contains the kernels.
        - Beard—the bristle-like parts of the wheat plant that cover and protect the kernels.
        - Kernel—the seed from which the wheat plant is grown or that people harvest from the wheat plant to grind into flour.
        - Stem/Straw—the part of the wheat plant that supports the head and is known as straw after harvest.
    - Dissect the wheat using the following steps:
        - Break the head off the stem.
        - Make a straw out of the stem by breaking it to avoid the nodes.
        - Lay the wheat head flat on a hard surface and pat with your hand to shake out the kernels.
        - Have the students count their kernels.
    - Put the kernels of wheat into a salt or pepper grinder and have the students mill their wheat into flour. What simple machines are being used?
    - Talk about different ways to grind wheat. The Native Americans did it using rocks, etc. Have students design their own method of grinding wheat and then test their machines.

TEACHER RESOURCES

Extension Ideas:

- Read "Bread Comes to Life" by George Levinson. Then, have students find the gluten in wheat by chewing the kernels. Before there was chewing gum in the store, farmers made their own with grains of wheat!
- Ask the students to list some of the foods that can be made using flour. *(Bread, cake, cookies, brownies, pasta, crackers, etc.)*
- Have students listen to "The Little Red Hen" by Paul Galdone.
    - Bring in seeds, stems, flour, and bread and put them down in a random order. Have student pay attention to the steps the hen takes to plant her wheat . Have students work together to put items in the correct order.
- Have students label and color a wheat stalk.
- Discuss what wheat needs to grow (Light, water, air, and nutrients). Then, help students plant their own wheat.
    - As their wheat grows, you can continue to discuss this lesson by asking these questions:
    - How many days did it take for the wheat seeds to sprout?
    - What do the wheat plants look like?
    - What do the plants need to grow?
- Watch a video of wheat being harvested.
- Watch a video from a local farmer discussing wheat growth and harvest.
- Invite a wheat farmer into the classroom.
- Have students research each step of growing wheat and write a paragraph explaining what happens at each phase. How long does each phase take?
- Bring in different types of bread (sweet, rye, sourdough, white, etc) and have students sample each type. After sampling have students write about which kind they liked the best and why.
- Encourage students to try making their own bread at home.
- Have students do IAITC's Soil Sam lesson, using wheat seeds for the "hair."
- Go to agintheclassroom.com to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

Ode to a Vegetable

Literacy

Grade Level
4-8

Length of Lesson
45-60 minutes

Objective
By the end of this lesson, students will be able to create multiple forms of poetry.

Materials Needed
- Copy of *Ode to an Onion*, by Alexandria Giardino

Standards

Common Core
CCSS.ELA-Literacy.RL.4.5; RL.5.2; RL.5.4; RL.5.4; RL.6.4; RL.7.4; W.4.9; W.5.9; W.4.3; W.5.3; W.6.3; W.7.3

Lesson Summary
This lesson is designed to introduce or strengthen students' skills of writing poetry. Students will write multiple "odes" to vegetables using simple, common poetic forms. This lesson would work well in a larger poetry unit.

Suggested Sequence of Events:
1. Read through the AITC Seasons Ag Mag to learn more about specialty crop and vegetable production in Illinois.
2. Read *Ode to an Onion*, by Alexandria Giardino, to learn the (fictional) story behind Pablo Nerudo's poem "Ode to an Onion."
3. Depending on the age of your students, you may also choose to read some or all of Nerudo's poem, available both online and in the back of *Ode to an Onion.*
4. Complete the activity following the procedures:
    - Ask students to make a list of their favorite vegetables.
    - Next, have them choose a few of their vegetables and make a list of the qualities of each. You may also choose to have them practice using word webs or other graphic organizers utilized in your classroom.
    - Share the types and examples of different poetic forms provided (or choose your own) and ask students to choose a poetic form to use to write their "Ode to a Vegetable" poem.
    - For older students, and if time allows, you might have students write poems in more than one form.
4. Whole class discussion and reflection of activity. Ask students to share their "odes" to the small groups or the whole class. Discuss the different poetic elements and styles used by each student.

TEACHER RESOURCES

Background Information:

- Ode poems were originally written in Ancient Greece and were meant to be performed publicly. Later, English romantic poets used this form to express emotions using rich, descriptive language. In the present day, the term "ode" is used to describe an outpouring of praise for something. Modern odes have evolved over time to reflect many different styles and forms. There are many online resources to learn more about odes and read examples.
- Chilean poet Pablo Nerudo wrote a total of 225 odes, all of them about ordinary, everyday objects. They serve as a great example for students of how we can write poems about *anything!* Some of these odes were also about food, including tomatoes, corn, and artichokes. All are available at various places online and would serve as excellent resources for this lesson.

Extension Ideas:

- Incorporate this lesson into a larger poetry unit and/or study of poetic elements.
- Have students who chose the same vegetable compare their poems.
- Have students research other poetic forms and try to re-write one of their poems using this new form.
- Have students create other poems using their choice of any of our AITC Ag Mag topics.
- Invite a specialty crop farmer who grows vegetables into your classroom to talk about pig farming.
- Create a "Poetry Garden" bulletin board in your classroom to display students' poetry.
- Incorporate student poems into your school garden project. Poems can be laminated and attached to stakes and placed in the garden near plantings of each vegetable.
- Go to agintheclassroom.org to contact your County Ag Literacy Coordinator for free classroom sets of our Ag Mags!

If students need some inspiration, share these examples with them:

- *Acrostic Poem: the first letter of each line is arranged vertically to spell a word, usually the topic of the poem.*

Example:
Can words capture the beauty of a carrot?
After months of growing, only just now ready to be pulled, no
Ripped, from the clutches of the warm brown earth, quickly brushed off and
Ready to snap between the molars of a hungry gardener.
Other vegetables stand no chance, when compared to the
Tremendous technicolor beauty of a fresh orange carrot,
Shaded from the sun for so long, but now ready to serve its final purpose.

- *Autobiographical Poem: usually written from the point of view of the author, but this version asks students to pretend they are the vegetable.*

Structure of the poem:

Line 1: __ Your name
Line 2: _, _, _ 3 personal characteristics or physical traits
Line 3: Brother or sister of__ or son/daughter of
Line 4: Who loves__, __, and __ 3 people, things, ideas
Line 5: Who feels__ about__1 emotion about 1 thing
Line 6: Who needs__, __, and __ 3 things you need
Line 7: Who gives __, __, and __3 objects you share
Line 8: Who fears__, __, and __3 items
Line 9: Who'd like to see, __1 place, or person
Line 10: Who dreams of __ 1 item or idea
Line 11: A plant of _____ (location, etc.)
Line 12: Nickname, or repeat your name from Line 1

Example:

Green bean
Long, skinny, very green
Cousin of the less beloved lima bean
Who loves warm soil, full sun, and summer rain
Who feels hatred about caterpillars
Who needs long sunny days, no frost, and busy pollinators
Who gives fresh summer flavor to eaters, nitrogen to the soil, and shade to the earthworms
Who fears pesky weeds, erratic hoes, and unexpected cold snaps
Who'd like to see George Washington Carver
Who dreams of symbiotic relationships with soil bacteria
A plant of gardens around the world
Green bean

- *Color Poem: this form is usually used to teach metaphor by using a color as the subject of the poem, but in this version students will have their vegetable serve as the subject.*

Structure of the poem:

_____ looks like _____.

_____ sounds like _____.

_____ smells like _____.

_____ tastes like _____.

_____ feels like _____.

Example:

Zucchini looks like a caveman's club, always ready against a foe.
Zucchini sounds like the thunderous claps of a summer rainstorm.
Zucchini smells like the final bell on the last day of school.
Zucchini tastes like the bright summer solstice sunlight.
Zucchini feels like a newborn lamb, nestled in the straw.

- *Concrete/Shape Poem: words are arranged on the page so that they form a shape, sometimes the subject of the poem. This can be accomplished either on the computer or handwritten on a sheet of paper, depending on the students' age and ability.*

Example:

Corn:
cultivated
for centuries
by Native Nations,
grown around the
world to feed all the
people and animals of
the Earth. Corn is also
used in thousands of things
from starch to sweetener to
ethanol. There are three types
of corn: field, sweet, and popcorn.
Each ear of corn allows the corn to
hear for miles and miles. No, I am
only kidding, the ears just hold the kernels, equal
to about 800 arranged in 16 rows. Pollinated not by
insects, but by the wind, knocking the pollen down to land on
the waving silks: one for every. single. kernel. Here in IL corn is a pretty
big deal. Farmers plant about 12 million acres every year, which means they
then harvest about one hundred and twelve billion pounds of corn from the
fields each fall. That's a lot of corn! Knuckleheads might say that this corn is
boring. But they're wrong! Corn fields are full of life, of technology housed
in the seeds, in the tractors, in the combines, and in every aspect of the
farm. Corn is a part of our lives every day, whether we realize it or not.
What can possibly be boring about THAT? The history of our country
is tied up in this simple grain. Corn has cultivated civilizations and
it's a big part of ours. The world needs more poems about corn.

Specialty Crop Self Portrait

Art

Grade Level
1-5

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will be able to recognize various fruits and vegetables while identifying shapes and patterns.

Materials Needed
- Colored pencils, markers, and/or crayons
- Glue or tape
- Scissors
- Copies of head templates
- Copies of specialty crop templates

Standards
Illinois Visual Arts
VA:Re7.2.1-5; Cr1.1.1-5; Cr2.3.1-2; Cn11.1.1-5

Lesson Summary
This lesson is designed to challenge students to analyze shapes and organize a visual space by creating a self portrait using a variety of specialty crops!

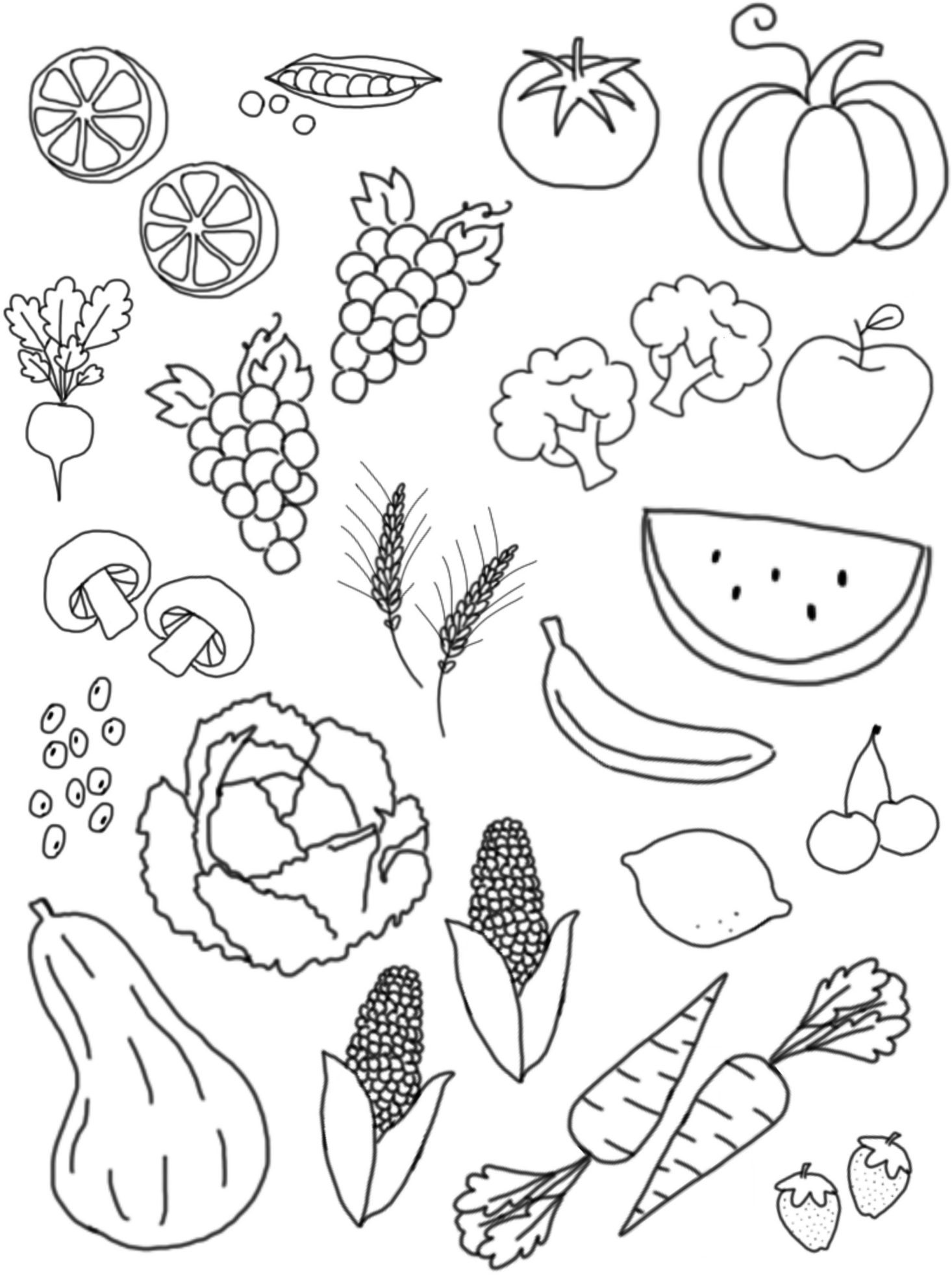
Suggested Sequence of Events:
1. Read *We Are Growing* by Laurie Keller to snag student interest.
2. Read through the IAITC Specialty Crop Ag Mag to learn about pigs and pork. Interactive online versions can be found on our website.
3. Complete the activity following the procedures:
    - Talk to students about what a self portrait is.
    - Share the background information about Giuseppe Arcimboldo from the Teacher Resources page and show them pictures of his art. Then explain that they will be creating their own crop self portraits.
    - Pass out one of the head templates and a copy of the specialty crop template to each student.
    - Then, have them color their fruits and veggies from both templates and cut them out.
    - Students can play around with their shapes and choose which fruits and vegetables they want to use for different facial features.
    - Once they've decided what specialty crops they want to use, have them use glue or tape to secure the shapes in place.
    - Have fun and be creative!
4. Whole class discussion and reflection of activity. Display student artwork around the room or in the hallway!

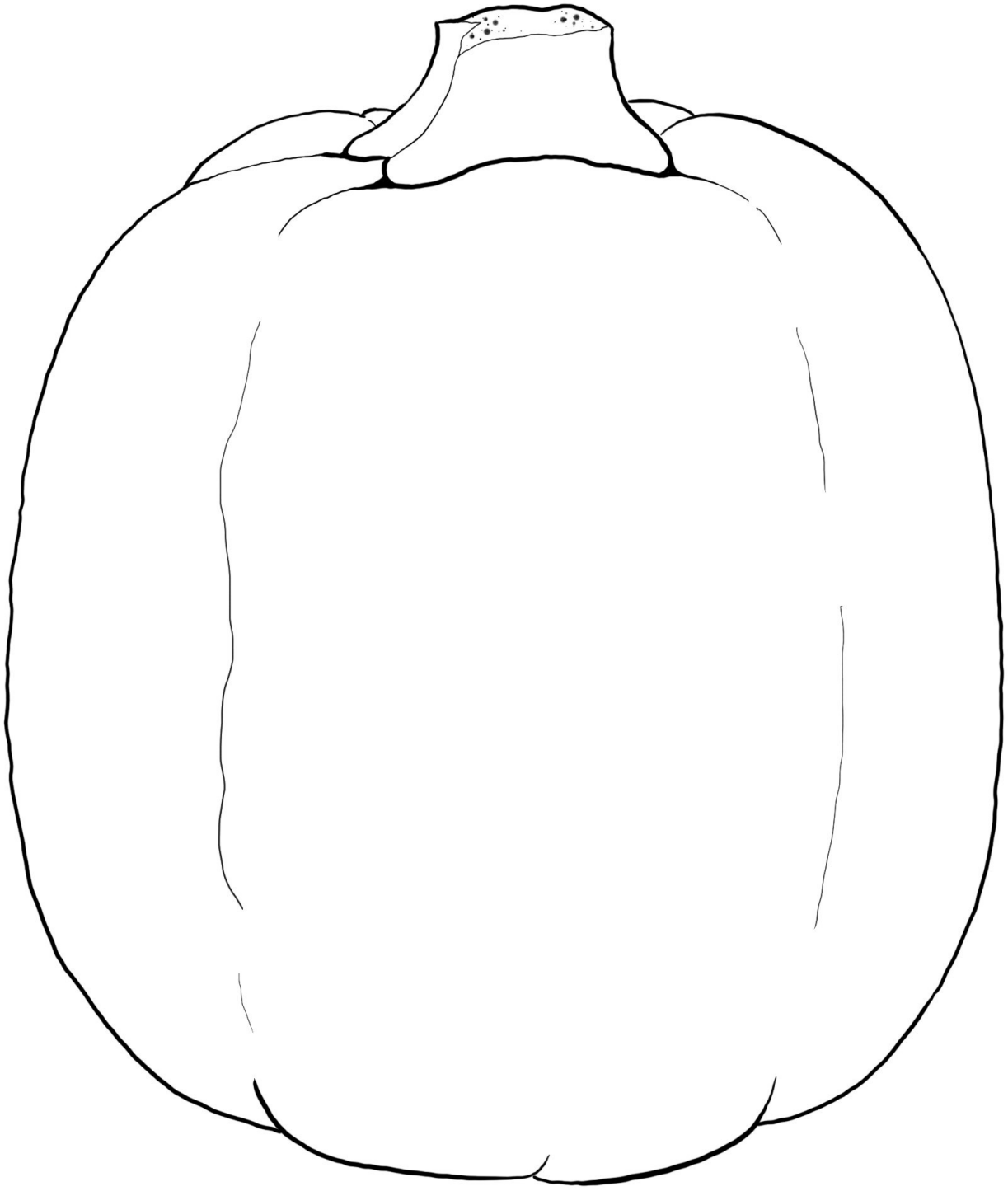
TEACHER RESOURCES

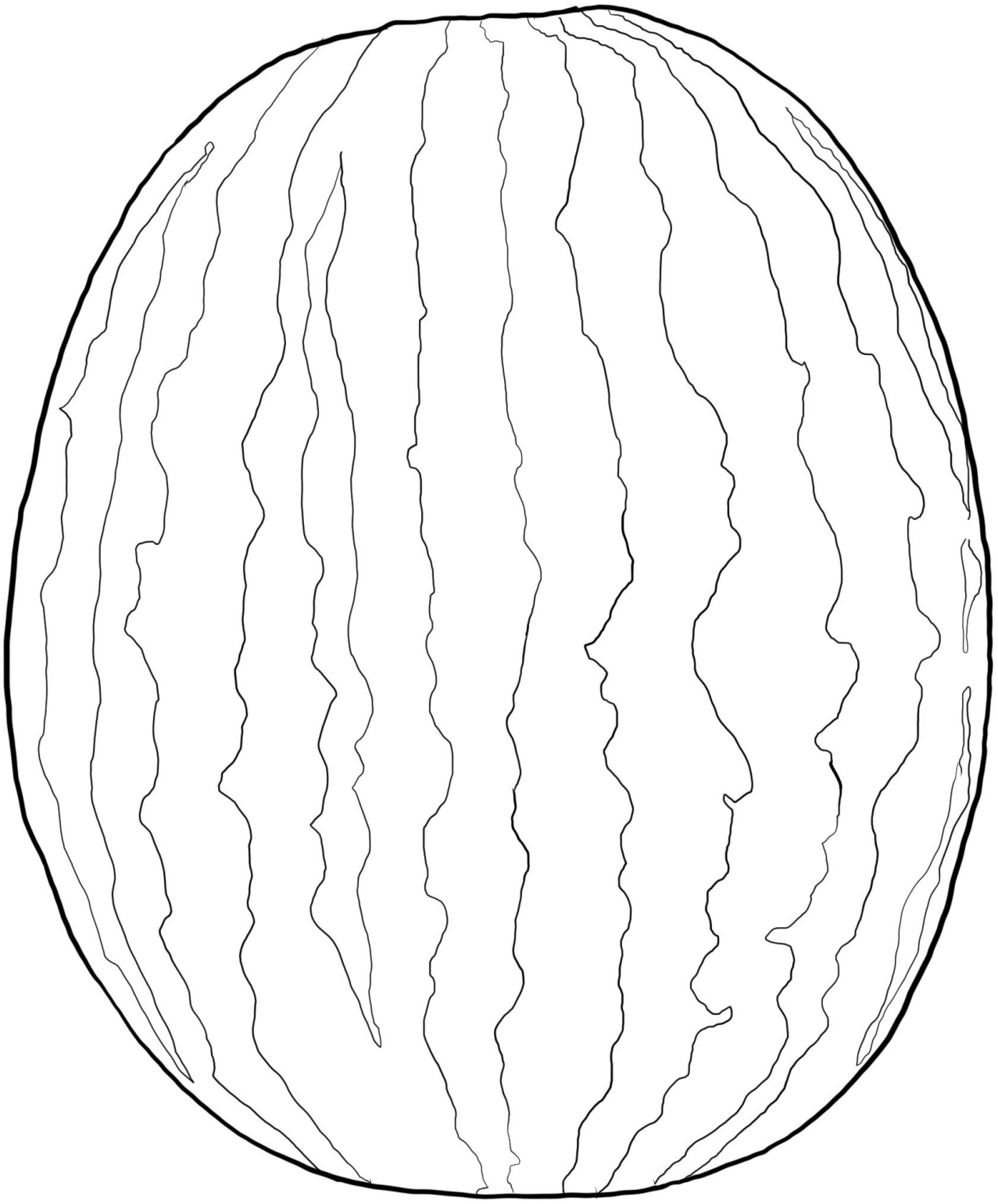
Background Information:
Giuseppe Arcimboldo was an Italian painter who painted many portraits, among other things. These were no ordinary portraits though! Arcimboldo painted collections of objects that when arranged in the right way, formed the likeness of a portrait! Here are some of his paintings:

Learn more about Giuseppe Arcimboldo and view more of his imaginative portraits here: https://www.giuseppe-arcimboldo.org/

Extension Ideas:
- Talk about why students chose the fruits and vegetables they did. What is their favorite fruit and vegetable?
- Compare the artwork of various artist's self portraits. Observe the shapes used for various facial features.
- Learn more about the crops your students used for their self portraits. Where are those crops grown? Are any of them grown in Illinois? Which state produces the most of those various crops?
- Learn about locally grown foods and farmers markets. Challenge students to complete the AITC Farmers Market Scavenger Hunt worksheet.
- Learn more about gardening and grow vegetables or flowers in your classroom.
- Have students design their own garden. What would the dimensions be? What would they plant in their gardens?
- Learn more about pollinators and their role in agriculture.
- Go to agintheclassroom.org to contact your County Ag Literacy Coordinator for free classroom sets of our Ag Mags!







Lincoln's Patent

Social Studies

Grade Level
4-8

Length of Lesson
45-60 minutes

Objective
By the end of this lesson, students will learn more about how to use primary sources to research our past.

Materials Needed
- Internet access
- Copies of student worksheets

Standards
IL Learning Standards for Social Science
SS.H.2.4-5
SS.H.3.6-8.LC
SS.H.3.6-8.MdC

Lesson Summary
This lesson is designed to help students learn more about Lincoln and his patent for a device to lift boats higher in the water. Students will also learn about the importance of primary sources in researching our past.

Suggested Sequence of Events:
1. Prior to the Lesson: Students should know basic facts about Abraham Lincoln's life, and they should be familiar with what a patent is prior to starting this lesson. See the Teacher Resources page in this lesson for additional ideas and resources related to this background knowledge.
2. Complete the activity following the procedures:
    - Read through the introduction on the Teacher Resources page and show the video.
    - Once students are familiar with Lincoln's patent, pass out the student worksheets to allow students to analyze the letter sent from the Patent Office to Lincoln regarding his patent.
    - Give students time to complete the analysis questions.
    - STEM Extension: If time allows, ask students to re-think Lincoln's invention using technology we have available today. How could they rethink and repurpose inventions since Lincoln's time to come up with a new and improved version of his patented invention?
        - Pass out the "Rethinking Lincoln's Patent" worksheet and ask students to draw and explain their ideas on the page.
3. Whole class discussion and reflection: Ask students to share what they learned through closely reading this primary source. How are primary sources useful to those studying our history?

TEACHER RESOURCES

Introduction:

Abraham Lincoln, the 16th President of the United States, is the only U.S. President with a patent. Lincoln's patent was for a flotation system used to lift longboats stuck in sandbars. There is no evidence that Lincoln's patent was ever actually used on a boat. Let's watch this short video from the National Museum of American History to learn more about Lincoln's invention and see a model that Lincoln had made to earn his patent: https://vimeo.com/152478552 (2:22 long)

Background Information Resources:

- According to the United States Patents and Trademark Office (USPTO), a patent is, "a property right granted by the government to an inventor for a new, useful, and nonobvious invention." The USPTO has an excellent student website with patent-related resources: https://www.uspto.gov/kids/
- The USPTO also has a great video about how the patent application process works, and the importance of patents to innovation in our world, which can be found here: https://youtu.be/3T-NBDGovno
- Smithsonian Magazine has an excellent article on Lincoln's patent that would provide additional background knowledge, available here: https://www.smithsonianmag.com/history/abraham-lincoln-only-president-have-patent-131184751/#:~:text=Lincoln's%20patent%2C%20No.,an%20Illinois%20congressman%20in%20Washington.

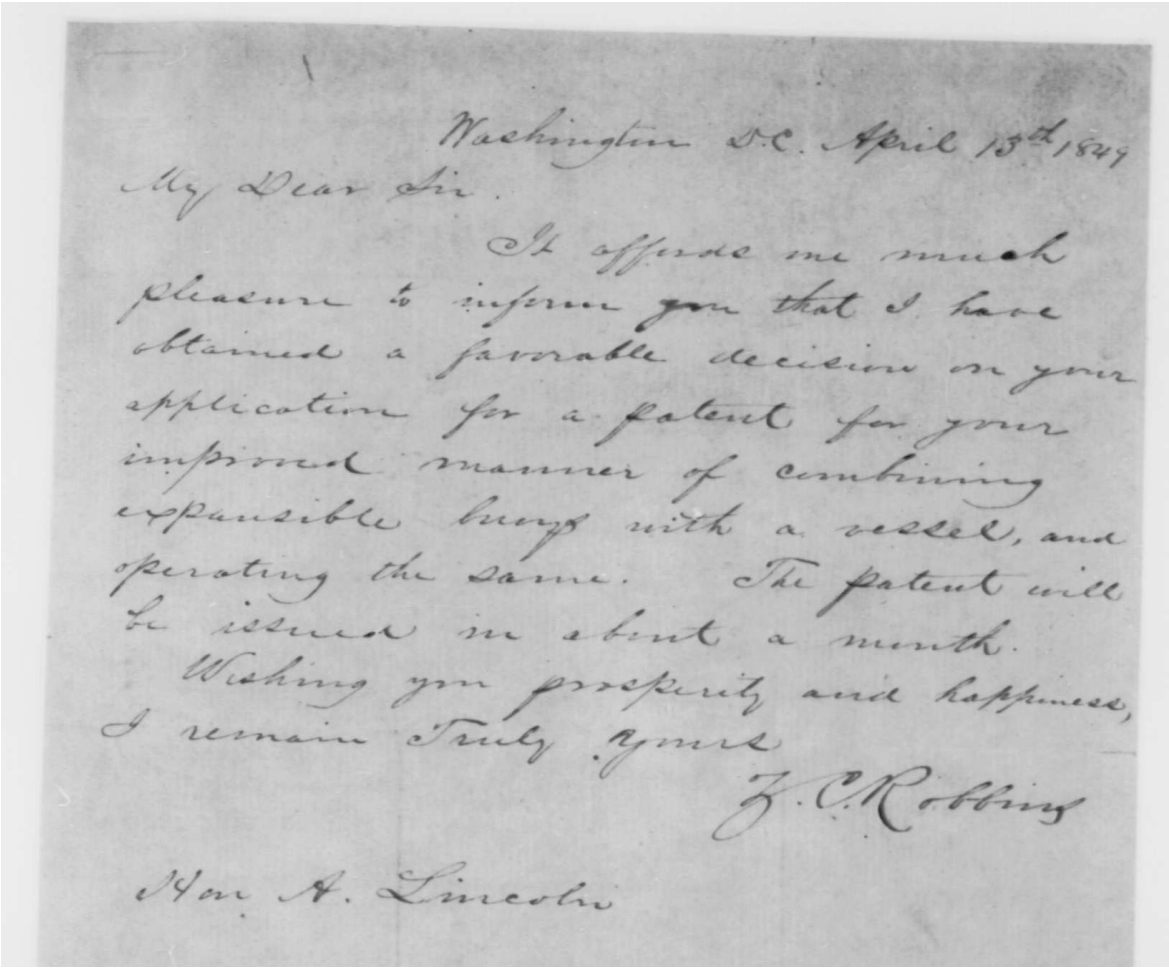
Extension Ideas:

- Have students take on the perspective of Abraham Lincoln and write a return letter to Zenus Robbins. What questions or comments would Lincoln have after reading the letter?
- Have students infer the story surrounding the letter and create a non-fictional comic strip.
- Although Lincoln was never a farmer himself, he understood the importance of agriculture to our growing nation. His patent for a flotation device to assist longboats stuck on sandbars was created because of the importance of transporting agricultural goods along Illinois rivers. There are many good books about Lincoln. We especially like *The Superlative A. Lincoln*, by Eileen R. Meyer, which has a great poem about Lincoln being the "most distracted farmer." We also love *Lincoln Clears a Path: Abraham Lincoln's Agricultural Legacy*, by Peggy Thomas.
- Visit the United States Department of Agriculture (USDA) website to learn more about Abraham Lincoln's agricultural legacy. One of his most important accomplishments was forming the USDA. https://www.nal.usda.gov/topics/lincolns-agricultural-legacy
- River transportation is still an important issue in Illinois. Today, our rivers have locks and dams to allow large barges to transport goods up and down our rivers. Have students learn more about these vital transportation systems and how they impact our lives in unseen ways.
    - Compare Lincoln's patent to machinery and infrastructure, like locks and dams, that we use today.
    - Have students share why riverways are an important part of agriculture.
- Our Illinois History Ag Mag would pair well with this lesson. An online interactive version is available on our website.
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

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.



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

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

Lincoln's Patent

Student Worksheet

Analyzing a Primary Source: Hand Written Letter

You are going to complete a close reading of Zenas Robbins' letter to Abraham Lincoln. A close reading is a careful, critical analysis of a passage or text to develop a better understanding of the meaning of the text without relying on other information.

Use the questions below to help you analyze this text. You will need to read the letter more than once to fully understand it and answer all the questions. You may use either the original letter or the typed transcript to complete these questions.

Read Through #1

The first time reading through the text is to help you become familiar with the general features and ideas.

Read the letter. As you're reading, underline any words you don't recognize.

Find the date the letter was written and circle it.

Who wrote the letter?

Does the author of the letter know Abraham Lincoln? What evidence in the letter supports your answer?

Lincoln's Patent

Student Worksheet

Read Through #2

The second time reading through the text challenges you to dig deeper and focus on more specific or individual parts.

Read the letter again. Choose one sentence or phrase that you find interesting or important and write those words in this box.

Why did this sentence/phrase attract your attention?	How does this sentence/phrase help you understand what this letter is about?

Final Analysis

1. Write one question you still have about the letter.

2. How could you find the answer to this question?

3. What was the purpose of this letter?

4. Why might this letter be considered an important historical document?

Rethinking Lincoln's Patent

Student Worksheet

Lincoln used his personal experiences, along with the knowledge and technology available during his time to come up with the idea for his longboat flotation device. Progress in every part of our lives is due to hard-working and hard-thinking people who invent, create, and build new products and ideas.

Though Lincoln's patent was likely never actually used on a boat, it is possible that his ideas had an influence on someone else who was trying to solve a similar problem. We never know how our ideas will be used by others to make the world a better place!

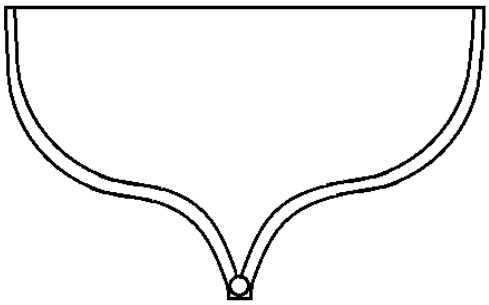
Instructions: Your challenge today is to rethink Lincoln's patent using the knowledge and technology available today in our society. Lincoln's goal was to create a flotation device that would allow a longboat stuck on a sandbar in the river to lift itself out of the water enough to continue to float down the river. How can you improve on Lincoln's patent? Draw and label your design on the images of a longboat on the following page.

Written Reflection: When you have finished your design, write a descriptive paragraph that explains your invention, how it works, and why it is an improvement over Lincoln's design.

Rethinking Lincoln's Patent

Student Worksheet

Instructions: Draw and label your new and improved longboat flotation device below for both the side view (top picture) and the front view (bottom view).



Our Favorite Ag-Themed Books

Apples

The Year Money Grew on Trees
by Aaron Hawkins

Apple Orchard Riddle
by Margaret McNamara

Apples to Oregon
by Deborah Hopkinson

Pumpkins

Pumpkinheads
by Rainbow Rowell

Pumpkin Jack
by Will Hubbell

Squashed
by Joan Bauer

Corn

Popcorn Country: The Story of America's Favorite Snack
by Cris Peterson

Corn is Maize: The Gift of the Indians
by Aliki

Corn
by Gail Gibbons

Water

Water is Water
by Miranda Paul

Cloudette
by Tom Lichtenheld

Hey, Water!
by Antoinette Portis

Over and Under the Pond
by Kate Messner and Christopher Silas Neal

Dairy

Clarabelle
by Cris Peterson

Chuck's Ice Cream Wish: Tales of the Dairy Godmother
by Viola Butler

Milk Makers
by Gail Gibbons

Pollination

Monarch Butterfly
by Gail Gibbons

Butterflies Belong Here
by Deborah Hopkinson

Honeybee: The Busy Life of Apis Mellifera
by Candace Fleming

The Secret Life of Bees
by Sue Monk Kidd

Wheat

The Thing About Luck
by Cynthia Kadohata

Farmer George Plants a Nation
by Peggy Thomas

Bread Lab!
by Kim Binczewski

Pork

Pigs and Pork in the Story of Agriculture
by Susan Anderson and JoAnne Buggey

Welcome to Our Farm
by Jon Scieszka

Pig 05049
by Christien Meindertsma

Soybeans

Full of Beans: Henry Ford Grows a Car
by Peggy Thomas

Auntie Yang's Great Soybean Picnic
by Ginnie Lo

Pod to Plate: The Life Cycle of Soybeans
by Julie D. Blunier

Soil

Up in the Garden and Down in the Dirt
by Kate Messner and Christopher Silas Neal

Erosion: How Hugh Bennett Saved America's Soil and Ended the Dust Bowl
by Darcy Pattison and Peter Willis

Jump into Science: Dirt
by Steve Tomecek and Nancy Woodman

Beef

Beef Cattle in the Story of Agriculture
by Susan Anderson and JoAnne Buggey

Little Joe
by Sandra Neil Wallace

Beef Princess of Practical County
by Michelle Houts

Social Emotional Learning

The Bad Seed
by Jory John

Spookly the Square Pumpkin
by Joe Troiano

Different Just Like Me
by Lori Mitchell

Our School Garden
by Rick Swann

History

The Great American Dust Bowl, by Don Brown

Lincoln Clears a Path: Abraham Lincoln's Agricultural Legacy
by Peggy Thomas

George Washington Carver for Kids, by Peggy Thomas

The Hundred-Year Barn, by Patricia MacLachlan

In the Garden with Dr. Carver, by Susan Grigsby

Thomas Jefferson Grows a Nation, by Peggy Thomas

Gardening/ Urban Gardening

Stepping Stones, by Lucy Knisley

Plant a Little Seed, by Bonnie Christensen

The Curious Garden, by Peter Brown

City Green, by DyAnne DiSalvo-Ryan

Farmer Will Allen and The Growing Table
by Jacqueline Briggs Martin

Seedfolks, by Paul Fleischman

Underrespresented Groups

Prairie Lotus
by Linda Sue Park

Measuring Up
by Lily LaMotte

The Girl Who Thought in Pictures
by Julia Finley Mosca

By Any Means Necessary
by Candace Montgomery

The Old Truck
by Jerome Pumphrey

Return to Sender
by Julia Alverez

A Song for Lena
by Hilary Horder Hippely

Fry Bread
by Kevin Maillard

When the Shadbush Blooms
by Carla Messinger

Thirteen Moons on a Turtle's Back
by Joseph Bruchac

Find Us Online!

www.agintheclassroom.org

Follow Us on Social Media!

@agintheclassroom

@ilaitc

@ilagclass

IAITC