



# Fall STEAM Education Kit

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Digital Guide

K - 2

Thank you for downloading The Land Trust's Fall STEAM Education Kit digital guide!

*The Land Trust for Tennessee's mission is to conserve the unique character of Tennessee's natural and historic landscapes and sites for future generations.*



# Fall STEAM Education Kit

## Teacher Guide

ACTIVITY	DESCRIPTION	MATERIALS
<p><b>Make a Nature Journal</b></p>	<p>Students fold paper and staple it to create a book, then decorate the cover with leaf rubbings from fallen leaves collected during a schoolyard walk. This journal can be used to record observations throughout the different activities.</p>	<ul style="list-style-type: none"> <li>• Paper</li> <li>• Construction paper (optional)</li> <li>• Stapler (one for class)</li> <li>• Scissors</li> <li>• Fallen leaves (collected by class)</li> <li>• Crayons (wrappers peeled)</li> </ul>
<p><b>Pumpkin Life Cycle</b></p>	<p>Students read <i>Seed, Sprout, Pumpkin, Pie!</i> by Jill Esbaum, then draw or color the life cycle of a pumpkin.</p>	<ul style="list-style-type: none"> <li>• <i>Seed, Sprout, Pumpkin, Pie!</i> by Jill Esbaum (<a href="#">Buy</a> or <a href="#">watch</a>)</li> <li>• Pumpkin Life Cycle Student Sheet</li> <li>• Optional: <i>Pumpkin Jack</i> by Will Hubbell (<a href="#">Buy</a> or <a href="#">watch</a>)</li> </ul>
<p><b>Pumpkin Dissection</b></p>	<p>Students will use their five senses to dissect a pumpkin as a class or in small groups. They will make observations and record measurements in their journals, and see evidence that a pumpkin is a fruit because it contains seeds.</p>	<ul style="list-style-type: none"> <li>• Pumpkin (or pumpkins)</li> <li>• Knife (for teacher)</li> <li>• Table coverings</li> <li>• Bowl (or bowls)</li> <li>• Journals and/or Student Sheet</li> <li>• Ruler or measuring tape</li> <li>• Scale (optional)</li> <li>• Optional: <i>Pumpkin Jack</i> by Will Hubbell (<a href="#">Buy</a> or <a href="#">watch</a>)</li> </ul>
<p><b>Pumpkin Gate Engineering</b></p>	<p>Students will read or listen to <i>Five Little Pumpkins</i> book or song, then engineer a 'gate' out of ordinary materials that will hold up a pumpkin.</p>	<ul style="list-style-type: none"> <li>• Small pumpkin (or pumpkins)</li> <li>• Materials for building, such as: toilet paper tubes, pipe cleaners, popsicle sticks, straws, paper, felt, tape</li> <li>• Journal and/or Student Sheet</li> </ul>



# Fall STEAM Education Kit

## Teacher Guide: Standards

<b>KINDERGARTEN</b>	
<i>Art</i>	K.VA.Cr2.A Through experimentation, build skills in various media and artmaking approaches, using developmentally appropriate craftsmanship.
	K.VA.Cr2.C Create art that represents natural and constructed environments.
<i>Math</i>	K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
	K.OA.A.2 Add and subtract within 10 to solve contextual problems using objects or drawings to represent the problem.
<i>Science</i>	K.LS1: From Molecules to Organisms: Structures and Processes 3) Explain how humans use their five senses in making scientific findings.
<i>Engineering</i>	K.ETS1: Engineering Design 1) Ask and answer questions about the scientific world and gather information using the senses. 2) Describe objects accurately by drawing and/or labeling pictures.
	K.ETS2: Links Among Engineering, Technology, Science, and Society 1) Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.

<b>FIRST GRADE</b>	
<i>Art</i>	1.VA.Cr1.B Use observation and investigation in preparation for making a work of art.
	1.VA.R1.A Compare images that represent the same subject.
<i>Math</i>	1.MD.A.2 Measure the length of an object using non-standard units and express this length as a whole number of units.
<i>Science</i>	1.LS1.1 Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts (taking in water and air, producing food, making new plants).
	1.LS1.2 Illustrate and summarize the life cycle of plants.
<i>Engineering</i>	1.ETS1: Engineering Design 1) Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.



# Fall STEAM Education Kit

## Teacher Guide: Standards

<b>SECOND GRADE</b>	
<i>Art</i>	2.VA.Cr2.A Experiment with various materials and tools to explore personal interests in a work of art or design, using developmentally appropriate craftsmanship.
	2.VA.R1.B Perceive and describe aesthetic characteristics of one's natural world and constructed environments.
<i>Math</i>	2.MD.A.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
	2.MD.A.3 Estimate lengths using units of inches, feet, yards, centimeters, and meters.
<i>Science</i>	2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles.
<i>Engineering</i>	2.ETS1.2 Develop a simple sketch, drawing, or physical model that communicates solutions to others.
	2.ETS1.4 Compare and contrast solutions to a design problem by using evidence to point out strengths and weaknesses of the design.



# Fall STEAM Education Kit

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## Make a Nature Journal

### Time Needed

60 minutes

### Grade Level

K - 2

### Key Vocabulary

- Living
- Non-Living

### Materials

- Paper
- Construction paper (optional)
- Stapler (one for class)
- Scissors
- Fallen leaves (collected by class)
- Crayons (wrappers peeled)

### Summary

Students will fold paper and staple it to create a book, then decorate the cover with leaf rubbings from fallen leaves collected during a schoolyard walk. This journal will be used to record observations during the following activities.

### Teacher Notes

Taking students on a schoolyard walk is a great way to get students out of the classroom to observe the natural world on your school grounds. You might be surprised at how much life you can find in your schoolyard, even if you don't think you have a very 'green' schoolyard.

Nature Journaling helps provide a valuable connection for students to the outdoors. Journals can be as simple as folded paper, or a purchased notebook. There are many online resources for nature journaling activities. The journal can be used during the activities in this kit as a supplement or replacement for the student sheets included with each activity. Use of these journals can be extended to the schoolyard by asking students to draw and identify the life stage of a plant they see when they are outside.

While we highly encourage doing the schoolyard walk and letting each student make their own journal, this activity can be modified to doing the leaf rubbings in a pre-existing science journal using leaves brought in by the teacher.

### Procedure

1. Each student will make their own journal. Give each student three to five pieces of plain white or recycled paper and have them cut it in half 'hamburger-style'. Stack the pieces of paper on top of each other and fold in half to create a book. Help students staple the binding and it's a journal!

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## Make a Nature Journal

### Procedure, Continued

2. Take the class on a schoolyard walk to collect fallen leaves. Plan a route that goes around different parts of the school, whether or not they seem 'natural.' Students can point out which parts are living and non-living, and look closely for small critters you might not usually pay attention to in the grass or mulch.
3. Guide students to focus on using their senses one at a time to gather information about their surroundings. If you have trees in your schoolyard, have each student collect one leaf from the ground. If leaves have not fallen yet, pick a few leaves from the tree for the whole class to use.
4. Back in the classroom, students can use the leaves to decorate the front of their journals. Leaf rubbings are done by putting the leaf under the piece of paper (fold journal over so the leaf is directly on the desk, and the cover is directly on top of that). Use a crayon that has the wrapper peeled off to color on the piece of paper with the side of the crayon. Watch this quick [video](#) to see an example.
5. Discuss signs of fall that they saw during their walk and what we can observe when the seasons change.

### Extensions

For more resources and information about Nature Journaling, check out [johnmuirlaws.com](http://johnmuirlaws.com).



# Fall STEAM Education Kit

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## Pumpkin Life Cycle

### Time Needed

40 minutes

### Grade Level

K - 2

### Key Vocabulary

- Seed
- Sprout
- Plant
- Flower
- Fruit

### Materials

- *Seed, Sprout, Pumpkin, Pie!* by Jill Esbaum ([Buy](#) or [watch](#))
- Pumpkin Life Cycle Student Sheet
- Optional: *Pumpkin Jack* by Will Hubbell ([Buy](#) or [watch](#))

### Summary

Students will read the book *Seed, Sprout, Pumpkin, Pie!* by Jill Esbaum and illustrate the life cycle of a pumpkin on their student sheet.

### Teacher Notes

*Seed, Sprout, Pumpkin, Pie!* is a non-fiction book that shows how pumpkins grow from seeds. You can find a hard copy version on Amazon, or watch the read-aloud version on YouTube. After reading the book or watching the video, students can complete the Student Sheet and review the life cycle.

Two versions of the Pumpkin Life Cycle Student Sheet are included; one version where students draw in the stages and one that is just coloring. Choose the sheet most appropriate for your students.

The second book, *Pumpkin Jack* by Will Hubbell, is a fictional story that shows how the life cycle is completed by a pumpkin rotting and re-growing the following spring.

### Procedure

1. Read aloud the book *Seed, Sprout, Pumpkin, Pie!* and check for understanding by asking questions such as:
  - What do you plant in order to grow a pumpkin? *seed*
  - What do plants need to grow? *water, sunlight, air, nutrients*
  - What appears on a plant before the pumpkin grows? *flowers*
  - Which part of a plant is a pumpkin? *fruit (because it protects the seeds)*
  - What can you use pumpkins for? *baking, jack-o'-lanterns, eating the seeds*



# Fall STEAM Education Kit

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## Pumpkin Life Cycle

### Procedure, Continued

2. Students can then complete the life cycle sheet by either drawing the stages of the life cycle or coloring in the pictures.

### Extensions

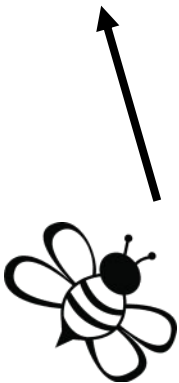
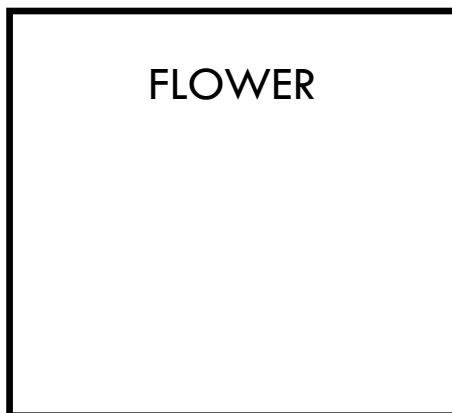
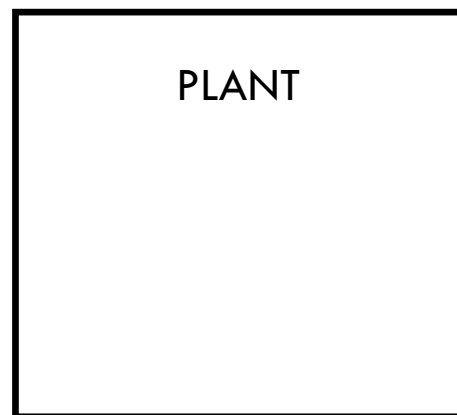
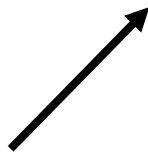
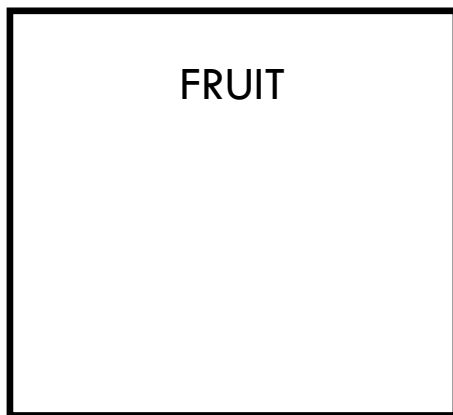
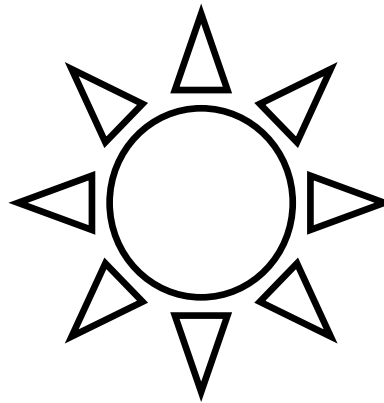
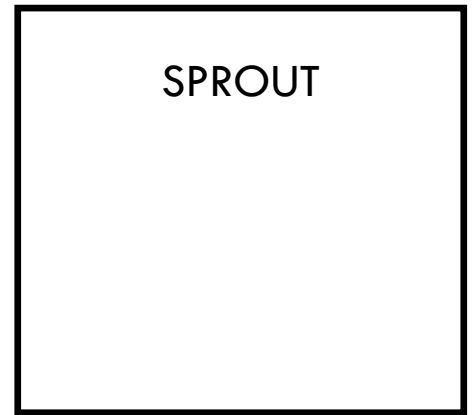
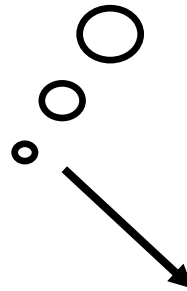
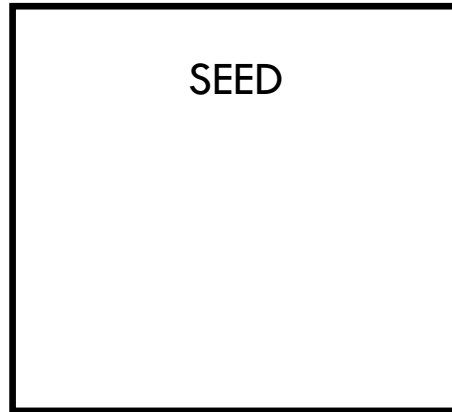
Read *Pumpkin Jack* and ask students if they have ever accidentally grown a pumpkin plant by throwing last year's pumpkin in the yard? The seeds in a pumpkin are very well protected so they can survive through the winter and re-grow in the spring!



# Pumpkin Life Cycle

Student Sheet NAME: \_\_\_\_\_

Draw the stages of the pumpkin life cycle as it grows from a seed into an orange fruit!

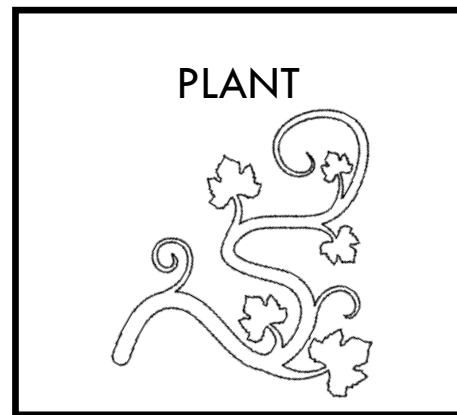
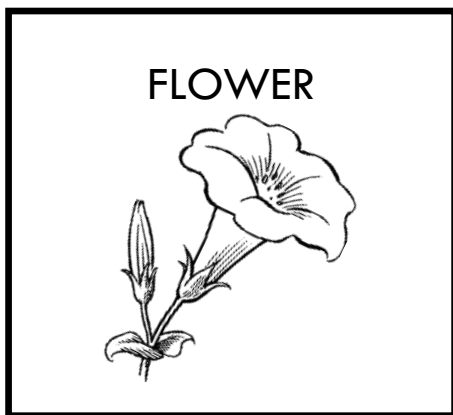
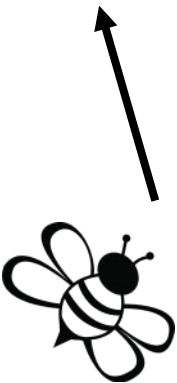
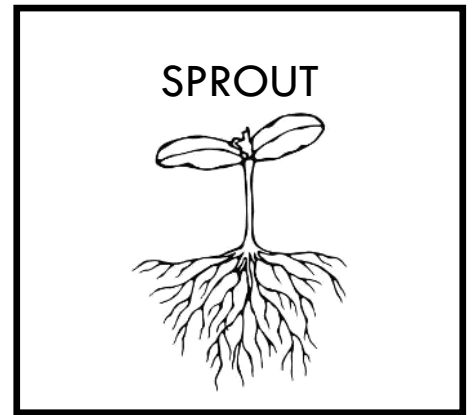
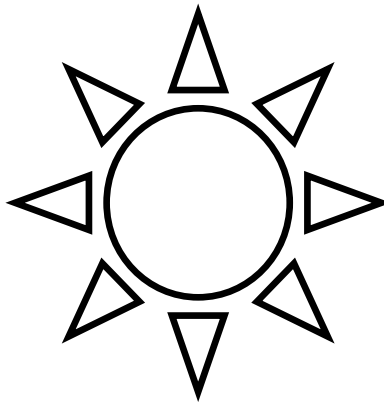
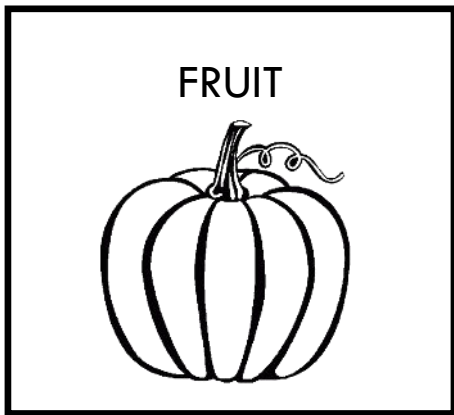
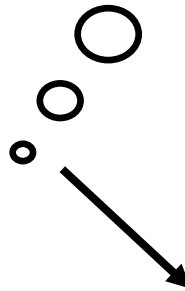
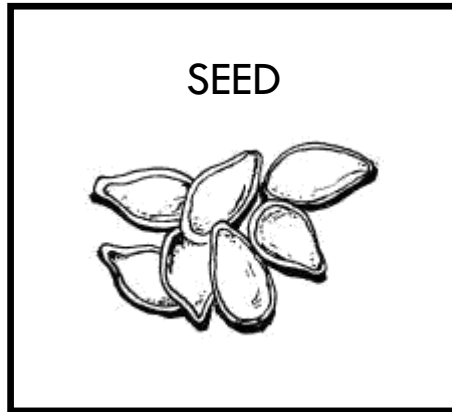


# Pumpkin Life Cycle

Student Sheet NAME: \_\_\_\_\_

Color in the stages of the pumpkin life cycle as it grows from a seed into an orange fruit!

Did you know?  
You can cook  
pumpkin seeds  
and eat them!





# Fall STEAM Education Kit

## Pumpkin Dissection

### Time Needed

60 minutes

### Grade Level

K - 2

### Key Vocabulary

- Dissection
- Observation
- Stem
- Rind
- Pulp
- Seeds

### Materials

- Pumpkin (or pumpkins)
- Knife (for teacher)
- Table coverings
- Bowl (or bowls)
- Journals and/or Pumpkin Dissection Student Sheet
- Ruler or measuring tape
- Scale (optional)
- Optional: *Pumpkin Jack* by Will Hubbell ([Buy](#) or [watch](#))

### Summary

Students will use their five senses to dissect a pumpkin. They will make observations and record measurements in their journals, and see evidence that a pumpkin is a fruit because it contains seeds.

### Teacher Notes

It is important to frame this lesson as a scientific dissection (rather than just carving pumpkins!) A dissection is something done by scientists when they want to learn about the inside of an object. Many students have probably seen the inside of a pumpkin, but may not have taken the time to think about the science of what is inside and the parts of the pumpkin itself.

As a fruit, the role of the pumpkin is to protect the seeds that are inside. Encourage students to identify the parts of the pumpkin, how they help protect the seeds, and how we can use them!

The pumpkin dissection can either be done as a class with one pumpkin, in small groups, or individually. This can be a messy activity, so it may be helpful to cover tables and desks with plastic tablecloths or newspaper.

This activity can be done with any type of pumpkin, but a larger pumpkin will be easier for students to see.

### Procedure

1. To prepare, cut a circular hole in the top of each pumpkin around the stem, as you would to make a jack-o'-lantern. Pre-cut this hole for any pumpkins the students will be dissecting.
2. If students are working in groups, let them know that before they take the top off of their pumpkin to dissect it, they will record measurements and observations of their pumpkin. These can be recorded in their Nature Journal or on the Student Sheet. As a scientist, they should include as much detail as possible in their observations.

## Pumpkin Dissection

### Procedure, Continued

3. Measurements can include: width, circumference, length of stem, weight, height. Students can do a scientific drawing of the outside of the pumpkin, then of the inside. Emphasize that they should include a lot of detail in a scientific drawing.
4. Once students show initial measurements and observations, they can look inside of the pumpkin to identify the different parts. This is when they can get their hands dirty pulling out the strings and seeds to put in the bowl.

### Extensions

1. Before doing their dissection, ask students to predict how many seeds they think they will find inside of their pumpkin. Have them count the seeds to check their accuracy!
2. Read *Pumpkin Jack* by Will Hubbell and discuss what will happen to their pumpkins as they decompose. If your school composts, be sure to put your dissected pumpkins into the compost bin. Or if you have a garden, save some of the seeds, dry them out, and plant them next spring!





# Pumpkin Dissection

Student Sheet NAME: \_\_\_\_\_

Scientists do *dissections* to learn about the inside of a plant or animal. Record your observations about your pumpkin below.

## Observations:

I see... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I hear... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I smell... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I feel... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I taste... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Draw the outside of your pumpkin:

Draw the inside of your pumpkin:



# Pumpkin Dissection

Student Sheet NAME: \_\_\_\_\_

Scientists do *dissections* to learn about the inside of a plant or animal. Record your observations and measurements below before you dissect your pumpkin.

## Measure:

Height \_\_\_\_\_

Width \_\_\_\_\_

Circumference \_\_\_\_\_

Length of Stem \_\_\_\_\_

Weight \_\_\_\_\_

Number of Seeds \_\_\_\_\_

Scientific Drawing (outside):

Can you identify these parts on the pumpkin?

- Stem
- Skin
- Ribs
- Pulp
- Seeds
- Strands

Scientific Drawing (inside):



# Fall STEAM Education Kit

## Pumpkin Gate Engineering

### Time Needed

60 minutes

### Grade Level

1 - 2

### Key Vocabulary

- Engineer
- Design
- Structure
- Trial

### Materials

- Small pumpkin (or pumpkins)
- Materials for building, such as: toilet paper tubes, pipe cleaners, popsicle sticks, straws, paper, felt, tape
- Journal and/or Student Sheet
- Optional: *Five Little Pumpkins* (Book: [buy](#) or [watch](#), song: [watch](#))

### Summary

Students will read or listen to *Five Little Pumpkins* book or song, then engineer a 'gate' out of ordinary materials that will hold up their pumpkin.

### Teacher Notes

This activity has an engineering and problem-solving focus. It is best for older students and may be easiest with a smaller, miniature pumpkin. One pumpkin can be shared by the entire class, as each group will be engineering their structure then do testing as a class and refine their structure.

Younger students may need more guidance, or it can be done as a class demonstration rather than in small groups, with modifications to the structure being made by the class as you go.

### Procedure

1. Collect a variety of supplies from the materials list and divide students into 'engineering' groups.
2. If you would like, show or read the *Five Little Pumpkins* book or song to the students to provide some context for building their 'gate' structure.
3. Explain that during this activity each student will be an engineer. They will be going through the design process to build a structure that will hold up a pumpkin. Let the students see, touch and hold the pumpkin to feel how heavy it is prior to building their structure.
4. Once the students are in groups, distribute the student sheets and building supplies so that each group has enough to engineer their own 'gate'. The amount and type of supplies you give them will determine how difficult this project will be and how creative they will have to get!



# Fall STEAM Education Kit

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## Pumpkin Gate Engineering

### **Procedure, Continued**

5. Students can then work in their group for a limited amount of time (i.e. 20 minutes) to construct a design that they believe will hold up the pumpkin. Do not let students test their structure until the end of this time so they are challenged to build the best structure they can. Students should then draw a picture of their structure on the Student Sheet.
6. Have a class testing time, where each group gets to place the pumpkin on top of their 'gate' to see if it holds!
7. Ask students about the strengths and weaknesses of their structure. Circle any weak spots on the diagram of your structure. Do a second design phase where they have a chance to improve anything they want to change.

### **Extensions**

1. If doing this activity as an entire class, challenge the class to build a gate that can hold all five miniature pumpkins!





# Pumpkin Gate Engineering

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Using the materials provided, build a structure that will hold the pumpkin on top. You will do two trials.

Trial 1: Draw your structure.

**Test 1:** Did it hold the pumpkin?

- No: Circle the parts above that didn't work and try again. Draw it below!
- Yes: Great work! Can you build a structure that holds two pumpkins?

Trial 2: Draw your structure.

**Test 2:** Did it hold the pumpkin?

Yes

No

