



## **Fright Night Lesson Plan for Homeschool**

### Overview

Raddish is designed by a dedicated team of teachers and chefs who believe the kitchen classroom is the tastiest place to learn. We love watching learning come alive when kids mix math, stir science, and taste culture!

Paired with the materials found in your Fright Night box, this lesson plan divides your box into 3 45-90 minute lessons you can use and adapt to support your homeschool study, pre-k – middle school. Depending on your timeframe and child's age and engagement, these can be taught together or separated for a longer lesson. Please refer to the curriculum provided in your box: recipe guides, activity card, and introduction card. Happy cooking! Happy learning!

### **Lesson 1: Stuffed Jack-O-Peppers and Pumpkin Math**

Activity Time: 90 minutes

### **Learning Outcomes**

- Students will use observation, estimation, and measurement with pumpkins.
- Students will complete both qualitative and quantitative assessments of their pumpkin.
- Students will learn the terms *circumference* and *referent*.
- Students will measure and estimate.
- Students will practice identifying appropriate situations for estimation vs. exact measurement.
- Students will learn how estimate differs from a guess.
- Students will learn the history of Jack-O-Lanterns.
- Students will create a biography of their pumpkin.
- Students will have the opportunity to carve Jack-O-Lanterns.
- Students will make and share Stuffed Jack-O-Peppers.



## Materials

- Recipe guide, ingredients, and tools listed within
- Pumpkins of varying sizes
  - One for the group/class and one for every student or pair of students
- Chart Paper and markers
- Measuring tools and equipment
  - String or measuring tape
  - Scale (kitchen one works best for small pumpkins)
  - Newspaper or plastic table cloths
  - Sharp knife (for parent or teacher)
  - Scooping tools
  - Strainer
  - Bag to collect seeds
- Pumpkin Observations Worksheet Packet
  - Qualitative Observations
  - My Pumpkin Biography
  - Quantitative Measurements
- Tools for Jack-O-Lantern Creation
  - Washable markers
  - Stencils
  - Carving tools

## Resources

- How Many Seeds in a Pumpkin by Margaret McNamara
  - Book narration: <https://www.youtube.com/watch?v=LmREE4Ht4Bk>
- <http://www.quickanddirtytips.com/education/math/how-to-find-the-volume-of-a-pumpkin>
- History of Jack-O-Lanterns (Note: this history involves religion and pagan history) <http://www.history.com/topics/halloween/jack-olantern-history>
- <http://teaching.monster.com/training/articles/1562-math-lesson-estimation-with-pumpkins>
- Jack-O-Lantern stencils: <http://www.hgtv.com/design/make-and-celebrate/handmade/41-printable-and-free-halloween-templates>

## Lesson Plan Adapted From

- <http://www.scholastic.com/teachers/classroom-solutions/2011/10/pumpkin-project-%E2%80%94-math-science-and-fun>



## 1. Introduction

- **Read** aloud *part* of How Many Seeds in a Pumpkin by Margaret McNamara
  - NOTE: Stop reading before the students in the book share their seed counts.
  - Alternative: Listen to the book narrated on Youtube:  
<https://www.youtube.com/watch?v=LmREE4Ht4Bk> (6:28)
- Bring the group pumpkin to the table. **Introduce** it to the class. Give it a name and a short biography (potentially real or fantastical)
  - Facts to share: the farm it grew up on, how far it traveled to be here today
- Give students 5 minutes to **brainstorm** words to describe this pumpkin.
  - Encourage them to touch and closely observe.
- **Write:** their answers on chart paper (they will use this vocabulary later).
- **Share** the history of Jack-O-Lanterns
  - The idea for Jack-O-Lanterns originated in Ireland, but they didn't grow pumpkins, so instead they used turnips, potatoes and beets.
  - When Irish people emigrated to North America they discovered that pumpkins worked much better!
- **Share:** We are eventually going to turn our pumpkins into Jack-O-Lanterns but first we are going to get to know our pumpkins much better.

## 2. What can you tell about your pumpkin?

- a. Have each student (or small group) pick a pumpkin.
- b. Have students complete the **Qualitative Observation Worksheet** (included)
  - i. Qualitative observations are made with your own **senses** without using measurement tools.
  - ii. Use the vocabulary words you came up with when describing the class pumpkin.
- c. Have students complete the **My Pumpkin Biography Worksheet** (included)
  - i. Give your pumpkin a name and make up a story for who your pumpkin is.
  - ii. This activity can be written, oral, or even incorporate drawing (a cartoon strip of your pumpkin in action.)
- d. Have students introduce their pumpkin to their teacher and classmates.



- e. **Share:** Before we get to actually measure our pumpkins we are going to make some estimates about its weight, size, number of creases, and number of seeds.
- f. Use the class pumpkin as a **model** and demonstrate estimation (making an educated guess).
- g. Have students fill in their estimates on the **Quantitative Observations of My Pumpkin worksheet** (included.)
  - i. **Circumference** – the distance all the way around the biggest part of a sphere
    - **Ask:**
      - a. How far around is the fattest part of the pumpkin?
      - b. What would be a good way to guess how big around it is?
      - c. How can we actually measure?
      - d. What tools would we need?
    - For younger students: Give them a long piece of string and instruct them to cut a piece they estimate would perfectly fit around their pumpkin.
    - For older students: Have them estimate using cm or inches.
    - Estimate, measure and chart.
  - ii. **Weight**
    - **Ask:**
      - a. How heavy is the pumpkin?
      - b. What would be a good way to guess how heavy the pumpkin is?
      - c. How can we actually measure it?
      - d. What tools would we need?
    - For younger students: use comparative weight, i.e. heavier than a basketball or lighter than a watermelon
    - For older students: use a scale and measure in pounds or kilograms
    - Estimate, weigh, chart.
  - iii. **Number of creases**
    - **Ask:** How do you estimate something when you can easily see and count it?



- Cover half of the pumpkin with a sheet of newspaper or cloth and allow students to see one side.
  - Have students estimate how many creases.
  - **Ask:** How did you come up with that estimate? Describe your strategy.
  - Count and chart.
- iv. **Number of seeds**
- **Ask:**
    - a. Can we make an estimate of how many seeds? Why or why not?
    - b. What information do we have before we cut the pumpkin open that may give us a clue as to how many seeds are inside?
  - For younger students: use descriptive language like tons, lots, a few
  - For older students: guess an actual number

### 3. To Estimate or not to estimate?

- a. **Ask:**
- i. Is it always okay to estimate?
  - ii. When is an estimate appropriate or not?
    - Examples: When ordering the right amount of pizza for a party? (appropriate) When giving the right amount of medicine to a sick child? (not)
  - iii. What are the benefits of estimating?
    - Possible answers: it saves time; it's not always possible to find an exact answer without a calculator; it is sometimes impossible or impractical to make an exact count.
- b. Have students work together to discuss the following situations and argue whether you need an estimate or an exact count. Encourage students to explain their thinking.
- i. It is your birthday and your father is making cupcakes for your party. He needs to know how many cupcakes to make.
  - ii. You are at the movies with a friend and want to give them half of your popcorn.



- iii. You want to buy new shoes and a shirt. You have \$25 and you need to know if you have enough money before you get to the checkout.
- iv. You and your friend decide to take turns on the swing so that you both get the same amount of time.
- c. Revisit the group pumpkin. If we want to estimate rather than guess how many seeds are inside, we need to have a strategy. Elicit student ideas.
- d. **Demonstrate** one example:
  - i. Cut open the pumpkin and take one scoopful of seeds out. This is called a **referent**.
  - ii. Count the removed seeds.
  - iii. **Ask:**
    - How many more scoopfuls of seeds remain in the pumpkin?
    - What's a reasonable estimate for the amount in the entire pumpkin?
    - How did obtaining a referent help us?
- e. **Share:** A good estimate is one that is reasonable and relatively easy to compute. The "best" estimate is not necessarily the one that is closest to the exact answer!
- f. Have students use their estimation strategy make a new estimate for the group pumpkin.
- g. Have students work together to come up with an efficient way to count the seeds in the pumpkin. Count.
- h. Chart.

#### 4. Estimate and Measure

- a. Now that students have practiced estimating and measuring with the group pumpkin, have them do it with their own.
- b. Have students complete the **Quantitative Observations of My Pumpkin worksheet** (included).
- c. Remind students of the information that they learned while estimating and measuring the group pumpkin.
  - i. **Ask:** How does this help you estimate for your own pumpkin?
- d. Help students cut open their pumpkins and provide them with scoops and strainers so that they can count their seeds. Remind them of some of the strategies they came up with earlier.
- e. Discuss their answers to the questions.



- f. Read or watch the rest of How Many Seeds in a Pumpkin by Margaret McNamara.
  - i. **Ask:** Were our results similar?

### Extension Ideas

- Write a poem about pumpkins using the vocabulary words.
- Older students: Calculate the volume of their pumpkin
  - <http://www.quickanddirtytips.com/education/math/how-to-find-the-volume-of-a-pumpkin>
- Research the history of Jack-O-Lanterns further
  - <http://www.history.com/topics/halloween/jack-olantern-history>

### 5. Create Your Jack-O-Lantern

Now that your students are pumpkin experts give them the opportunity to design and make their very own spooky, funny, or classic Jack-O-Lantern.

- a. Provide students with washable markers to draw on designs.
  - i. Spooky stencils for download: <http://www.hgtv.com/design/make-and-celebrate/handmade/41-printable-and-free-halloween-templates>
- b. Provide older students with suitable carving tools (under adult supervision) and cut out for younger students.
- c. Put in a battery operated candle and turn off the lights!
- d. Display the Jack-O-Lanterns along with the Pumpkin Math Worksheets Packet for a gallery walk while friends and family enjoy the Stuffed Jack-O-Peppers.

### 6. Kitchen Prep

- a. Read the Stuffed Jack-O-Peppers recipe card together.
- b. Identify and gather ingredients.
- c. Gather tools.
- d. Discuss kitchen safety. Specifically, oven safety (Visit [Raddishkids.com/pages/safety](http://Raddishkids.com/pages/safety))

### 7. Prepare Stuffed Jack-O-Peppers

- a. Ask children to read or describe each step.
- b. Together, follow the steps in the recipe.
- c. Give each child a turn to measure, stir and mix.



- d. While the Stuffed Jack-O-Peppers are baking read the Featured Culinary Skill-**Setting the Table**. Have students set the table and create a gallery of their Jack-O-Lanterns and Pumpkin Biographies for their friends and family to admire.
- e. When the Stuffed Jack-O-Peppers are ready, eat, taste and share!
- f. While you are eating have students share some Halloween Funnies from the Stuffed Jack-O-Peppers Recipe Guide.





## **Lesson 2: Graveyard Brownies and How Chocolate is Made**

Activity Time: 90 minutes

### **Learning Outcomes**

- Students will learn the steps needed to make chocolate from bean to bar.
- Students will learn the terms, *fermenting*, *winning*, *conching*, and *tempering*.
- Students will locate cocoa growing regions on a world map.
- Students will learn what is required in procedural writing.
- Younger students will use a combination of drawing, dictating, and writing to compose a procedural writing text in which they teach how chocolate is made.
- Older students will recall information from experiences and gathered information from print and digital sources; take brief notes on sources; and sort information into procedural writing text.
- Students will be provided with a checklist for successful procedural writing.
- Students will self- and/or peer-edit their work using a rubric.
- Students will make Graveyard Brownies to share with their friends and family.

### **Materials**

- Recipe guide, ingredients, and tools listed within
- Map of the World
- A variety of chocolate (some bars, baking chocolate, chocolate chips, etc.)
- Examples of procedural writing:
  - Raddish Recipe Guide or recipe from a magazine etc.
  - Rules and game play from a board game
  - Instruction booklet from a model kit (like Legos)
- How Chocolate is Made (included)
- Procedural Writing Worksheet (included)
- Checklist for Successful Procedural Writing (included)
- Procedural Writing Rubric (see recommended websites below)



## Resources

- Research, writing, and rubrics
  - KWL charts- purpose and uses <http://www.readwritethink.org/classroom-resources/printouts/chart-a-30226.html>
  - <http://www.mrmichaelbrodie.ca/docs/Language/Procedural%20Writing%20Rubric.pdf>
  - <http://www.worksheetplace.com/index.php?function=DisplaySheet&sheet=Procedural-Writing-Rubric&links=3&id=&link1=43&link2=154&link3=118>
  - <http://acrucialweek.blogspot.com/2012/01/peer-assessment-rubric-procedural.html>
- About chocolate
  - <https://miniyummers.com/how-is-chocolate-made-a-guide-for-kids/>
  - <http://www.ecolechocolat.com/en/how-chocolate-is-made.html>
  - <http://www.kids-cooking-activities.com/how-is-chocolate-made.html>
  - <http://cocoarunners.com/explore/bean-to-bar/>
  - <http://equalexchange.coop/products/chocolate/steps>
  - <http://www.amanochocolate.com/blog/removing-the-chaff-the-winnowing-of-cocoa-beans/>
  - <http://chocolatealchemy.com/alchemy-notebook-cocoa-bean-cracking-and-winnowing/>

## Videos about how chocolate is made

- How Chocolate is Made: <https://www.youtube.com/watch?v=fiMjr3Rwdjs> (4:35)
- Bean to Bar in 60 seconds: <https://www.youtube.com/watch?v=8Inkm6kUEZU> (1:19)
- How to Make Chocolate at Home: <https://www.youtube.com/watch?v=VrYzlnpn2pc> (5:05)



**1. Introduction- Where does chocolate come from?**

- a. **Bring** a few kinds of chocolate to the table, some bars, baking chocolate, chocolate chips etc.
  - i. **Ask:**
    - What do all of these things have in common?
    - Have you tasted any of these products before?
    - Do you like them? Why or why not?
    - Where does the chocolate come from? Where was it before that?
- b. **Tell** students that today we are going to learn how chocolate is made.
- c. **Create** a KWL chart to assess what students already know and what they are interested in learning. Create a chart like below. Leave it posted throughout the project.
  - i. **K** – Ask questions to elicit what students already think they know about how chocolate is made. Either have students or you write on the chart, or provide students with post it notes to put up.
  - ii. **W** – Ask what students want to learn. Have them pose questions they want to find the answers to.
  - iii. **L** – As students learn the answers to their questions or other interesting facts have them add to this column.

How Chocolate is Made		
What we <b>K</b> now	<b>W</b> ant to know	What we <b>L</b> earned
Example: chocolate is made in a factory	Where do factories get their ingredients from?	Ingredients are shipped by boat mostly from Africa.

**2. How Chocolate is Made**

- a. Show the students one or more of the following videos.
  - i. \*How Chocolate is Made\*:  
<https://www.youtube.com/watch?v=fiMjr3Rwdjs>
  - ii. Bean to Bar in 60 seconds:  
<https://www.youtube.com/watch?v=8Inkm6kUEZU>
  - iii. How to Make Chocolate at Home:  
<https://www.youtube.com/watch?v=VrYzlnpn2pc>



- b. Read the **How Chocolate is Made** sheet (included) and answer some or all of the questions using the websites provided, books, etc.

### 3. Write a “How To” Book

- a. **Show** some examples of “how to” or procedural writing. For example, the Graveyard Brownies Recipe Guide, instructions from a board game or Lego set, etc.
- b. **Share:** This kind of writing is called procedural writing because you are teaching or instructing someone how to do something from beginning to end.
- c. **Model** procedural writing
  - i. Choose something to write a “How to” about. Example: Jump Rope
  - ii. Ask students questions to elicit what you would do first, then, next, and finally.
  - iii. Write down their ideas and help them to put them in order. Perhaps expanding on some or collapsing others into one step.
  - iv. Try out the steps to see if anything is missing. Edit so it makes sense.
  - v. Use the **Checklist for Successful Procedural Writing** (included)

Example: How to Jump Rope

1. Stand where you have lots of room.
2. Hold one end of the rope in each hand.
3. Let the center of the rope touch the ground behind you.
4. Swing the rope up over your head.
5. Jump over the rope when it hits the ground in front of you.
6. Repeat.

- d. Tell students that they will be writing a “How To Make Chocolate Book”
- e. Provide students with Procedural Writing Worksheet (included) and remind them to look back at the KWL chart, the answers to the questions from the Steps in Chocolate Making worksheet, and perhaps re-watch some of the videos.
  - i. For younger students: the book can be pictorial with them dictating what is happening and you writing a sentence or two about each step. Also young students can condense steps together.



- ii. For Older students: They can use the **Procedural Writing Worksheet** (included) or take notes in a way that works for them. Decide how much information you want them to include about each step. They can draw or copy pictures from the web to add to their book.
  - iii. Make sure that all students refer to the Checklist for Successful Procedural Writing (included).
- f. For younger students: Have students self- or peer-**edit** their work using the **Checklist for Successful Procedural Writing**.
- g. For older students: Have students self- or peer-**edit** their work using a rubric. Some examples can be found here:
- i. <http://www.mrmichaelbrodie.ca/docs/Language/Procedural%20Writing%20Rubric.pdf>
  - ii. <http://www.worksheetplace.com/index.php?function=DisplaySheet&sheet=Procedural-Writing-Rubric&links=3&id=&link1=43&link2=154&link3=118>
  - iii. <http://acrucialweek.blogspot.com/2012/01/peer-assessment-rubric-procedural.html>
- h. Have students share their How to Books with their friends and family.

#### Extension Ideas

- Explore the following questions:
  - Who are the people that farm cocoa beans for chocolate making?
  - What does “fair trade” mean?
- Create a “What is your favorite chocolate?” survey to give to your friends and then graph the results.
- Sort your Halloween chocolate bars and graph the results.
- Write a procedural “How To...” for another task.

#### 4. Kitchen Prep

- a. Read the title page together.
- b. Identify and gather ingredients and tools.
- c. Read the **Featured Culinary Skill – Oven Safety** on the Graveyard Brownies recipe guide.

#### 5. Prepare Graveyard Brownies

- a. Ask children to read or describe each step.



- b. Give each child a turn measuring and mixing.
- c. Once the Graveyard Brownies are ready Eat, Taste and Share!
- d. While you are eating, teach your friends and family what you have learned about chocolate making from bean to bar.



### **Lesson 3: Spider Web Soup and Arachnids**

Activity time: 45-90 minutes

#### **Learning Outcomes**

- Students will learn about arachnids.
- Students will learn the difference between an arachnid and an insect and graph this knowledge on a Venn diagram.
- Students will learn basic spider facts: body structure, web building, etc.
- Younger students will use art and writing to show their learning.
- Older students will research one particular spider species and use interview and note-taking techniques as well as listening and speaking skills.
- Students will make Spider Web Soup.

#### **Materials**

- Recipe guide and ingredients and tools listed within
- Chart paper and markers

*For Introductory Activity:*

- Black construction paper
- Hairspray

*For Younger Students:*

- Art supplies
  - Paper plates
  - Yarn or string
  - Markers
  - Marshmallows and pretzel sticks
  - Playdough and pipe cleaners
  - Googly eyes or white paper
  - Costume making materials

*For Older Students:*

- Pencil and paper
- Internet access- [http://www.educationworld.com/a\\_lesson/interview-with-the-spider.shtml](http://www.educationworld.com/a_lesson/interview-with-the-spider.shtml)
- Optional Books



- Diary of a Spider by Doreen Cronin
  - How Spider Saved The Baseball Game by Robert Kraus
  - Anansi the Spider by Gerald McDermott
  - Miss Spider's Tea Party by David Kirk
  - Spiders by Gail Gibbons
  - Sophie's Masterpiece by Eileen Spinelli
  - Spiders by Aaron Carr
  - Are you a Spider by Judy Allen
  - Spiders by Nik Bishop
  - Eensy, Weensy Spider by Joanne Oppenheim
  - The Very Busy Spider by Eric Carle
- Videos
    - Spider Web Slow Motion  
(2:27) <https://www.youtube.com/watch?v=4Y9K1H6Yn6o>
    - World's strongest spider web  
(2:47) <https://www.youtube.com/watch?v=Ar3veHKBYvU>
    - Diary of a Spider read aloud (6:04)  
<https://www.youtube.com/watch?v=et9oHM62UF4>

## Resources

Kid Friendly Websites about Spiders

- <http://www.kidzone.ws/lw/spiders/facts.htm>
- <http://www.sciencekids.co.nz/sciencefacts/animals/spider.html>
- <http://kids.sandiegozoo.org/animals/arthropods/spider>
- <http://easyscienceforkids.com/all-about-spiders/>
- <http://mrnussbaum.com/spiders-for-kids/>
- Insect body parts: <http://bijlmakers.com/insects/insect-bodyparts/>
- Spider body parts: <http://bijlmakers.com/spiders/spider-bodyparts/>

Lesson Plan for Older Students based on:

- [http://www.educationworld.com/a\\_lesson/interview-with-the-spider.shtml](http://www.educationworld.com/a_lesson/interview-with-the-spider.shtml)



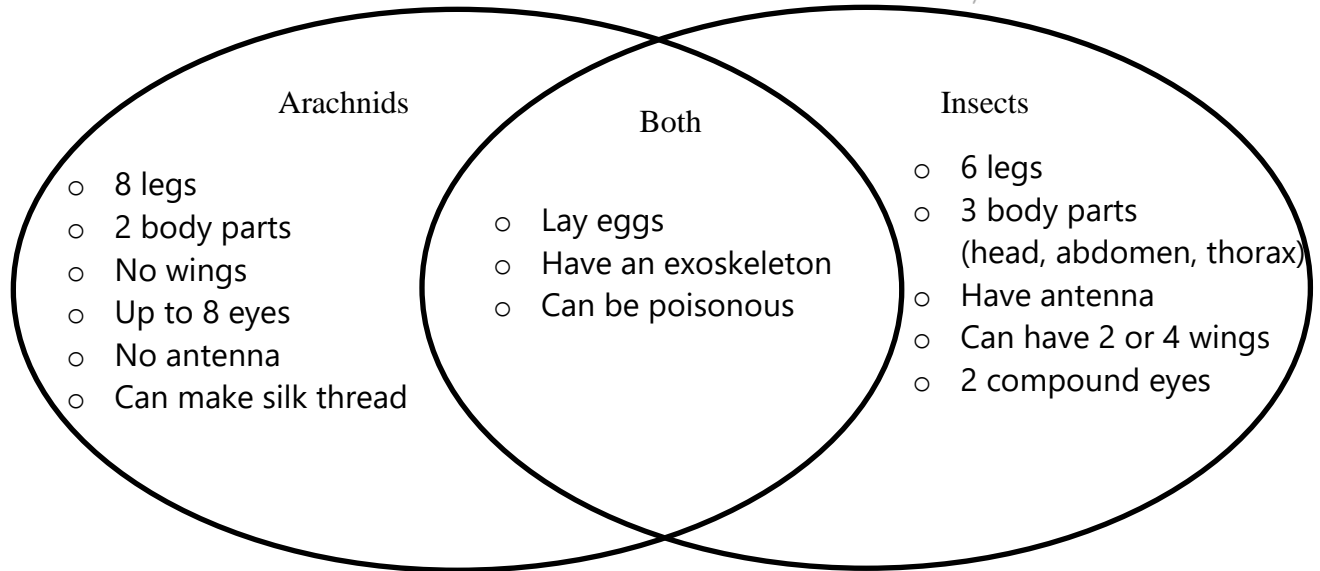


## 1. Introductory Activity- Spider Web Construction

- a. Read Science of Spiders Webs section on the Spider Web Soup Recipe Guide
- b. Capture a spider web
  - i. Take a piece of black construction paper. Spray it with hairspray.
  - ii. Go for a walk in your neighborhood and find a spider web to catch. Make sure there isn't a spider in it!
  - iii. Lay the piece of black paper on top of the web. It should then attach itself to the paper.
  - iv. Collect the webs and display them for students to observe, describe, and compare/contrast.
- c. Watch the videos
  - o Spider Web Slow Motion  
(2:27) <https://www.youtube.com/watch?v=4Y9K1H6Yn6o>
  - o World's strongest spider web  
(2:47) <https://www.youtube.com/watch?v=Ar3veHKBYvU>

## 2. Arachnids vs. Insects

- a. **Share:** Spiders are arachnids, not insects.
  - i. **Ask:** Do you know the differences between the two?
- b. **Draw** a Venn diagram on a large piece of chart paper with one circle labeled spider/arachnid and the other labeled insects. Explain that the center section where the circles overlap are the things that are the same for both spider/arachnids and insects.
- c. Have students come up with one example for each section of the graph.
  - i. For younger students: Read books together (see book list and Kid Friendly Websites listed above) and fill in the Venn diagram together.
  - ii. For older students: Provide them with books and/or internet access and have them fill in more facts as they discover them.
  - iii. Note questions that come up for further inquiry.



### 3. What do you know about spiders?

- a. **Younger Students** – Have students display their new learning in a number of ways. Provide students with access to books, internet (see Kid Friendly Websites listed above), and pictures while they create art to show what they have learned.
  - i. Create a spider out of playdough and pipe cleaners (or marshmallows and pretzel sticks) Label and/or tell about the different body parts and what they do.
    1. **Ask:** How is a spider different from an insect?
  - ii. Use a paper plate, a hole-puncher, and some yarn to make a web. Have students make a spider out of paper or other materials.
    1. **Ask:** What are the different parts of the spider? How do they make webs?
  - iii. Create a spider costume and make up a play that shows the spider's body parts and what it does in a day.
- b. **Older Students**- Interview With The Spider (Lesson plan found at [http://www.educationworld.com/a\\_lesson/interview-with-the-spider.shtml](http://www.educationworld.com/a_lesson/interview-with-the-spider.shtml))
  - i. Students will research one particular spider and take notes on what they learn.
  - ii. Students will write questions to ask someone else about what they learn about their spider and present what they learn from their classmate's research.



### Extension Ideas

- Go on a spider hunt in your backyard or neighborhood.
  - Count how many you find.
  - Try to identify what species they are.
  - Draw pictures or take photos.
  - Map where you found them.
- Research another kind of spider that you are interested in.
- Read [Diary of a Spider](#) by Doreen Cronin or listen on Youtube (6:04)  
<https://www.youtube.com/watch?v=et9oHM62UF4>
  - Make your own Diary of a Spider

### 4. Kitchen Prep

- a. Read the title page together.
- b. Identify and gather ingredients and tools.
- c. Discuss kitchen safety, in particular stove top safety. (Visit [Raddishkids.com/pages/safety](http://Raddishkids.com/pages/safety))

### 5. Prepare Spider Web Soup

- a. Ask children to read or describe each step.
- b. Give each child a turn smashing, blending and squeezing.
- c. While the Spider Web Soup is cooking read Making Soup in the Featured Culinary Skill section of the recipe guide.
- d. Once the Spider Web Soup is ready gather your family and friends together to Eat, Taste and Share!
- e. While people are appreciating your web design in the soup teach them about how spiders spin webs. Share your other spider art and research.

## Qualitative Observations of My Pumpkin

**Qualitative** observations are made with your **senses** without using measurement tools.

<b>Sense</b>	<b>Observation (write, draw, or both)</b>
Smell	
Touch	
Sound	
Sight	

What can you learn from these observations?

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Will these observations help you predict how many seeds are in your pumpkin? Why or why not?

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# Pumpkin Biography

My Pumpkin's name is \_\_\_\_\_

My Pumpkin's Life Story

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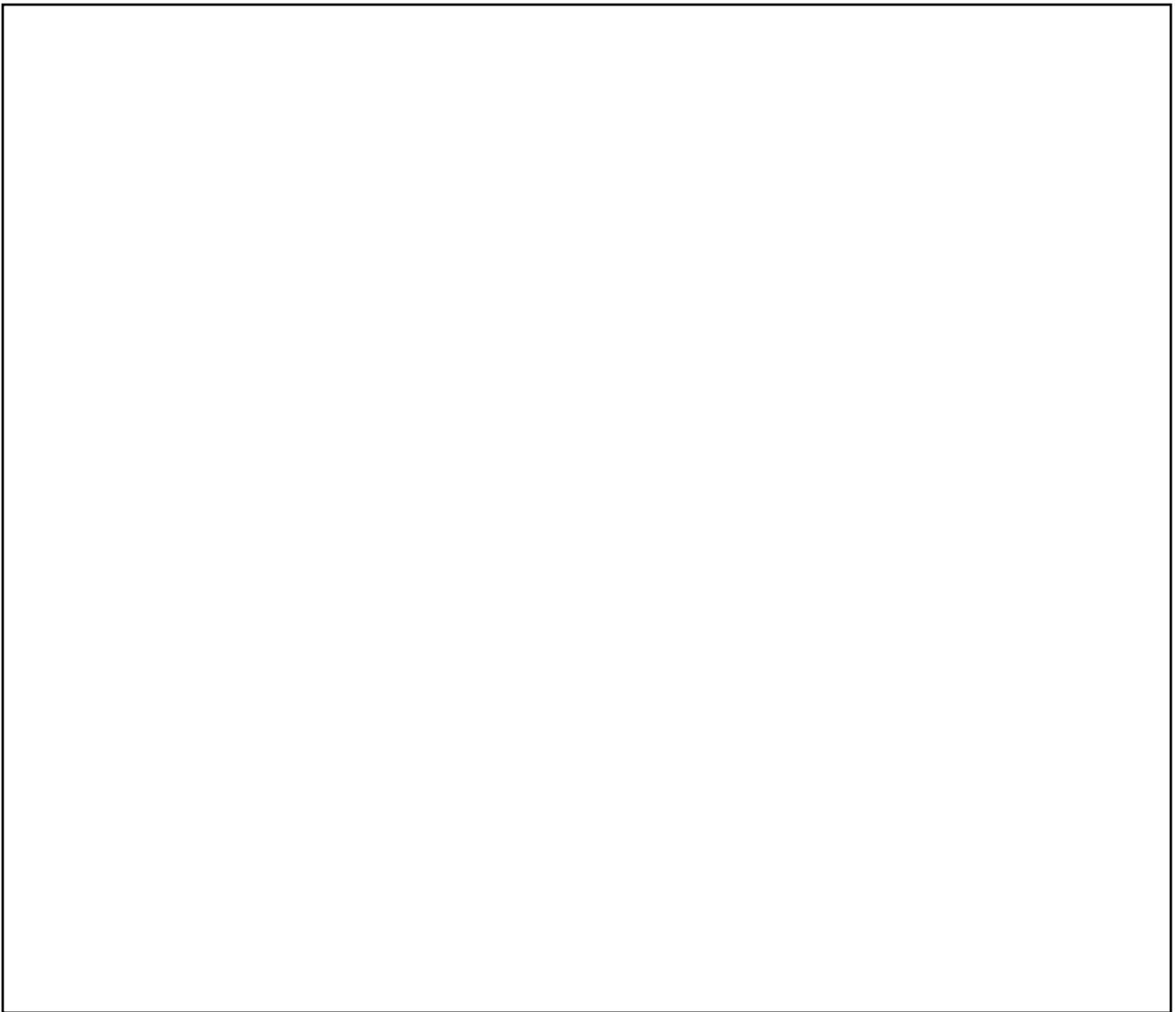
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My Pumpkin's Portrait



## Quantitative Observations of My Pumpkin

**Quantitative** observations are made using **measurement** tools.

Pumpkin Name	Weight		Circumference		Number of Creases		Number of Seeds	
	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual
Group Pumpkin								
My Pumpkin								

Which pumpkin has the largest circumference? \_\_\_\_\_ smallest? \_\_\_\_\_

Which pumpkin is the heaviest? \_\_\_\_\_ lightest? \_\_\_\_\_

Which pumpkin has the most creases? \_\_\_\_\_ least? \_\_\_\_\_

Is the pumpkin with the largest circumference the heaviest? Explain using your data.

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Do bigger pumpkins have more creases than smaller pumpkins? Explain using your data.

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Do heavier pumpkins have more creases than smaller pumpkins? Explain using your data.

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Which pumpkin has the most seeds? \_\_\_\_\_

Using your data can you make a connection between circumference, weight, and or number of creases with the amount of seeds? How could this help you to estimate in the future?

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# How Chocolate is Made

*Below you will find information on each step in the chocolate making process with research questions to explore further. Students will need to do additional research, using library books or the provided resource websites, in order to be able to answer the questions.*

## Growing and Harvesting

The cacao tree is also known by its scientific name, *Theobroma cacao*. *Theobroma* is a Greek word that means "food of the gods." The cacao tree is an evergreen found in over 50 tropical countries.

Once the cacao pods are ripe, they are **harvested** (cut down from the trees), typically with machetes or, for the higher pods, using long poles with a cutting edge.

### Questions to research:

- What climate do the trees need to grow?
- Where in the world do they grow?
- How big do the trees get?
- How do the cacao pods grow? How big do the pods get?
- How long does it take for a pod to ripen?
- How many harvest are there a year?
- Why are the pods not cut down using machines?
- What is contained inside the pod?

## Removing, Fermenting and Drying

Once the pods have been harvested from the cacao tree, they are opened with a machete or a wooden club. The beans, still surrounded by the pulp, are **removed** and piled on top of large leaves.

Once the beans are removed from the pods they are **fermented**, which removes the pulp, stops the bean from germinating, and begins flavor development.

After fermentation, the beans are **dried** in order to bring down the humidity (wetness) of the beans to between 6-8%. The beans are usually dried in the sun, on mats or patios. They are continually raked and stirred while they are drying. If the beans are dried for too long they get brittle. If they are not dried long enough they may become moldy. Once dried, cacao beans can be stored for 4-5 years and then transported around the world.

### Questions to research:

- What kind of leaves are often used?
- Where do they leave the beans to ferment?
- How long is the fermentation process?
- Why do you think it is important that the beans do not germinate?
- Why do you think fermentation is essential to the chocolate making process?
- How long are the beans dried for?
- What do the farmers use to dry the beans? Why?
- Why do the beans get stirred while they are drying?
- How long are beans usually dried?

## Roasting and Winnowing



When the dried cacao beans reach the processing plant they are first cleaned to remove any debris. Next, they are **roasted** to darken their color and further bring out the flavor of the cacao. The beans are roasted at different temperatures and for different lengths of time, depending on the humidity, size and desired flavor for the beans.

After roasting, the beans are winnowed to remove the shells from around the bean.

**Winnowing** is the process of taking away the shells and the bits of fiber that are part of the cocoa bean and leaving behind only the roasted cocoa nib, which is the key ingredient for making chocolate. Big chocolate companies have fancy machines that vacuum separate the shells and fibers from the cocoa nibs. However, the winnowing process can be easily achieved on a smaller scale with the use of a bowl and a hair dryer!

#### Questions to research:

- Why is it important to remove any debris before roasting?
- How do you think roasting changes the flavor of the cacao?
- Why do you think humidity and size of the beans affect the roasting time?
- How does the humidity left in the bean aid in the shell coming off?
- How do you think that leftover shells and fibers would affect the flavor of the chocolate?
- What is the important element in the winnowing process? (Whether achieved by a fancy vacuum machine or a hair dryer)

### Grinding

The cocoa nibs are **ground** into a paste called chocolate liquor (no alcohol content) or sometimes called cocoa mass. Chocolate liquor can be used at this stage to make chocolate or processed more to separate out the fat and cocoa butter from the cocoa solids.

#### Questions to research:

- What is the purpose of grinding?
- What tools are used for grinding?
- What other uses are there for cocoa butter?

### Conching

To make chocolate bars, chocolate liquor and cocoa butter are combined with other ingredients such as sugar, vanilla and milk (for milk chocolate). This mixture is then conched, mixed and aerated (filled with air) at high temperatures. This **conching** process thoroughly blends the ingredients and further develops the flavors that you can taste in the finished product. This process takes a long time, anywhere from 24-72 hours. Some companies use soy lecithin, an emulsifier, to help blend the ingredients faster.

#### Questions to research:

- What is the purpose of conching?
- How do you think conching works to develop flavors?
- How many days does conching take?
- Why do you think some companies use soy lecithin? Do you think this has an effect on the flavor of the chocolate? Check the label of your favorite chocolate bar to see if it contains soy lecithin.

### Tempering and Molding

After the conching is complete, the chocolate is tempered through a slow decrease in temperature. **Tempering** involves cooling the chocolate, then warming it, then cooling it and warming it and so on until it reaches the correct temperature. This process creates an even crystallization of the ingredients throughout the chocolate. Tempering is what gives chocolate its smooth texture.

After the chocolate is tempered it is ready to have your favorite ingredients mixed in, whether that is nuts, dried fruit, or cookie pieces. The chocolate is then poured into **molds** which form the shape of the finished bar. The chocolate cools until it becomes a solid and is then removed from the bars to be wrapped and shipped to you.

#### Questions to research:

- How does tempering the chocolate affect the way the chocolate will melt in your mouth?
- What temperature does tempering need to bring the chocolate down to?
- How long does the chocolate need to stay in the molds?
- What tools are used to get the chocolate into molds?
- What shape would you like to mold your chocolate into?
- What would be your favorite additional ingredients in a chocolate bar?

#### Research Resources:

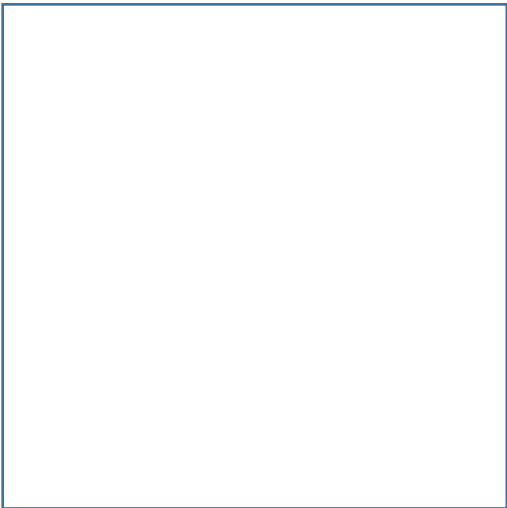
- <https://miniyummers.com/how-is-chocolate-made-a-guide-for-kids/>
- <http://www.ecolechocolat.com/en/how-chocolate-is-made.html>
- <http://www.kids-cooking-activities.com/how-is-chocolate-made.html>
- <http://cocoarunners.com/explore/bean-to-bar/>
- <http://equalexchange.coop/products/chocolate/steps>
- <http://www.amanochocolate.com/blog/removing-the-chaff-the-winnowing-of-cocoa-beans/>
- <http://chocolatealchemy.com/alchemy-notebook-cocoa-bean-cracking-and-winnowing/>

Procedural Writing Worksheet

How to \_\_\_\_\_



First \_\_\_\_\_  
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Then \_\_\_\_\_

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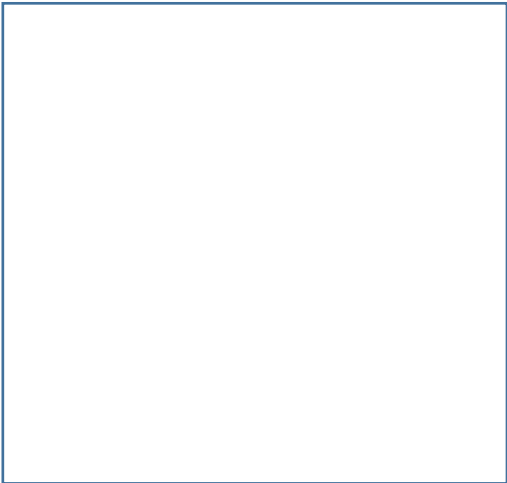
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After \_\_\_\_\_

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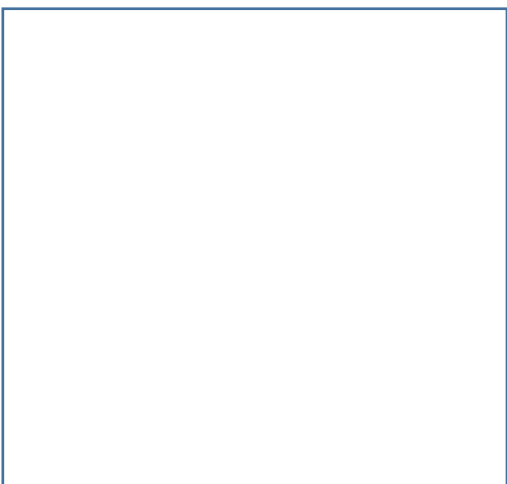
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Next \_\_\_\_\_

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Finally \_\_\_\_\_

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# Successful Procedural Writing Checklist

- State the goal
  - What are you making or doing in this procedure?
  
- Explain the materials needed
  - How much or how many are needed in each step?
  
- Create step by step instructions
  - Make sure instructions follow a sequence.
  - Use words like:
    - First, second, third
    - In the beginning, next, finally
  
- Use the present tense