Spooky Kitchen
Homeschool Lesson Plan

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 Spooky Kitchen box, this lesson plan divides your box into three 45-90 minute lessons. You can use these lessons for students from pre-K – middle school and adapt them to suit your needs. Depending on your timeframe, child's age, and their engagement, these lessons can be taught together or separated.

Please refer to the curriculum provided in your box: recipe guides, activity card, and introduction card.

Happy cooking! Happy learning!

Lesson #1: BOO-NANA BREAD
& FRUIT RIPENING SCIENCE IS BANANAS!
Activity Time: 45 minutes

LEARNING OUTCOMES

- Students will **observe, examine, and categorize** fruits.
- Students will **taste, describe,** and **enjoy** a fruit snack.
- Students will **learn** the terms *mature* and *ripe* in relation to growing fruit.
- Students will **learn** the terms *climacteric* and *non-climacteric.*
- Students will **predict** how to set up an experiment given a set of materials.
- Students will **hypothesize** the outcome of a scientific experiment.
- Students will **evaluate** the outcome of their experiment and **apply** scientific learning to **explain** the results.
- Students will **read** and **practice** with **Featured Culinary Skill** - Baking Quick Breads.
- Students will **make** and **share** Boo-Nana Bread.

FRUIT RIPENING SCIENCE IS BANANAS!

Teacher Prep:

- Collect Materials:
  - Recipe guide, tools, and ingredients listed
  - For Introduction:
    - Variety of fruits for snacking and observing
    - Cutting board
    - Knife
  - For Two Kinds of Fruit:
    - List of Climacteric and Non-Climacteric Fruits (included – see page 25-26)
  - For Experiment:
    - chart paper or white board
    - 7 very green bananas
    - 1 very ripe banana
    - 2 small (lunch size) paper bags
    - 1 resealable plastic bag
    - plastic wrap
    - marker

Lesson: Fruit Ripening Science is Bananas!

- Introduction: Fruit Bowl Discussion
  - Bring a selection of whole fruits to the discussion.
    - Place the fruits in a container and cover with a towel.
  - Challenge the students to guess what is in the bowl.
    - If they get stuck provide them with clues.
      - They are edible.
      - They are a category of food, etc.
  - Reveal what is in the bowl and ask the students to name each fruit.
    - If there are some new fruits either challenge them to figure out ways and avenues of research or teach them what the fruit is.
  - Cut the fruit up so that students can observe what it looks like inside.
    - Discuss:
      - Parts of the fruit (skin, peel, seeds, pith, core, stone, stem etc.)
      - Sort fruit into categories (citrus, stone, melon, berry, etc.)
  - Snack on the fruit and have students discuss what they notice:
    - Sweet, crunchy, juicy, floral, etc.
    - Open up a discussion about favorite fruits and why.

- Tell the students that today they will learn about the science of how and why fruits ripen, and they will conduct a fruit ripening experiment.

- Information: Two Kinds of Fruit
  - **Review** the categories that the students sorted fruit into earlier.
  - **Reveal** that there is another way farmers and scientists categorize fruits.
  - **Inform** students that they will need to learn a bit of vocabulary to be able to distinguish between these two categories.
  - **Teach** the terms:
    - *Mature* – When a fruit is mature it means that it is physiologically ready to ripen. In other words, all the parts of the fruit have grown up and completed all of their jobs.
    - *Ripe* – When a fruit is edible with peak flavor and texture. This is when the fruit is at its absolute best of crunch, or softness and juicy taste.
  - Hopefully all fruit isn't picked until it is mature (ready), but some fruits are:
    - *Non-climacteric* – These fruits will not ripen any further. They may get softer but in fact they are only on their way to rotting.
    - *Climacteric* – These fruits will continue to ripen after maturing, either on the plant or even after it is picked.
      - Fun fact: avocados only ripen once they are picked!
  - **Share** the List of Climacteric and Non-Climacteric Fruits (included – see pages 25-26).
  - Tell the students that next they will conduct an experiment with climacteric fruits to explore the science behind ripening.

- Experiment Instructions: Science is Bananas! (Sourced from Vicki Cobb)
  - **Collect** materials as listed above.
  - **Ask**:
    - How can you tell a ripe banana from an unripe banana?
      - The ripening process is shown by changes in:
        - Color (green to yellow)
        - Texture (firm to soft)
        - Odor (none to strong)
        - Taste (bitter to sweet)
    - How do you think a banana ripens?
      - **Write** down student's ideas and try and **sort** them into two categories without labeling them. Categories are:
        - Banana is doing the ripening
        - The environment is doing the ripening.
  - **Review:** The two questions we want our experiment to answer are:
    - Is ripening fruit a self-contained system (is it built into the banana), or is the rate (speed) of ripening affected by the environment?

        - Does the kind of packaging bananas are in affect how fast they ripen?
- **Show** students the materials and have them **predict** how the experiment will be set up.
- **Collaborate** with the students to **create** the following banana environments:
    1. Leave one banana exposed to the air.
    2. Put two green bananas in a paper bag. Fold the top of the bag tightly to seal out air. Mark what is in the bag.
    3. Put one green banana and one very ripe banana in the other paper bag. Fold the top of the bag tightly. Mark what is in the bag.
    4. Put two green bananas in a sealable plastic bag. Seal it closed.
    5. Wrap one green banana in several layers of plastic wrap, making sure that it is tightly sealed at each end.
- **Ask** students to make a *hypothesis* (an idea you can test) about which order the bananas will ripen in.
- **Leave** the fruit alone for 4 or 5 days to ripen. Do not open any of the bags during that time, but you can peak at the ones that aren't in the paper bags.
- **Open** the bags and **examine** the fruit.
- **Ask:**
    - Which fruit is still green?
    - Which is most yellow?
    - Which is most brown?
    - Was your hypothesis correct?
    - Why do you think the bananas ripened at different rates?
    - Can we answer our initial questions?
        - Is ripening fruit a self-contained system (is it built into the banana), or is the rate (speed) of ripening affected by the environment?
        - Does the kind of packaging bananas are in affect how fast they ripen?
- **Science of ripening:**
    - Ripening fruit "breathes" or respires. This means that it is taking in oxygen and giving off carbon dioxide. Oxygen is needed for the chemical reaction involved in ripening.
    - Ripening fruit gives off a gas called *ethylene.*
        - *Ethylene* is not only a product (made by) ripening fruit, but also stimulates (speeds up) the further ripening of the fruit. In other words, the more ripe a banana is the faster it keeps ripening!
        - Paper bags tend to keep in ethylene, but they are porous (have holes) enough to allow oxygen to pass through.
- **Challenge** students to use this knowledge about oxygen and ethylene to explain the differing rates of ripened bananas in each of the 5 conditions.
    - Have students share their reasoning either in writing or orally.

- Understanding the results:
    - The banana exposed to the air has an unlimited supply of oxygen, so it will turn brown most quickly. You may even notice that the side of the banana that rests on the counter will ripen the fastest, because it has the closest contact with its own ethylene.
    - The green bananas in the paper bag should ripen faster than the bananas in the plastic bag because they have more oxygen.
    - The green banana in the paper bag with the ripe banana should ripen the most quickly because it has both oxygen and extra ethylene from the ripe banana.
    - The banana that is tightly wrapped in plastic has no oxygen supply and should ripen the most slowly. However, if all the air is not sealed out of the package, this banana will ripen first. It will have oxygen and be closely in contact with its own ethylene.

Extension:

- **Watch** How Supermarkets get Fruit to Ripen Faster- Earth Lab (3:54)
    - https://www.youtube.com/watch?v=jzjBAAv9nxc
- **Try** a similar experiment with avocados
    - https://www.education.com/science-fair/article/ripening-avocados/?source=related_materials&order=1
- **Brainstorm** a list of as many fruits as you can. Extra challenge try and taste them all!

COOKING BOO-NANA BREAD

Kitchen Prep

- Read the Boo-nana Bread recipe card together.
- Identify and gather ingredients.
- Gather tools.
- Read the **Featured Culinary Skill - Baking Quick Breads.**
- Discuss kitchen safety. Specifically, Hand Washing safety (Visit Raddishkids.com/pages/safety).

Prepare Boo-nana Bread

- Ask children to read or describe each step.
- Together, follow the steps in the recipe.
- Give each child a turn to measure, mash, and stir.
- When the Boo-nana Bread is ready, eat, taste and share!
- While your friends and family are eating, explain the science of ripening fruit. You can teach them about ethylene gas and how to use a ripe banana to make their other fruit ripen faster!

RESOURCES

- Books
  - Science Experiments You Can Eat by Vicki Cobb
- Websites
  - https://empressofdirt.net/fruits-ripen-after-picking/
  - https://www.education.com/science-fair/article/ripening-avocados/?source=related_materials&order=1
  - https://www.educationworld.com/a_lesson/showbiz_science/showbiz_science059.shtml

- Videos
  - How Supermarkets get Fruit to Ripen Faster- Earth Lab (3:54) https://www.youtube.com/watch?v=jzjBAAv9nxc

Lesson #2: HAUNTED HUMMUS and PITA CHIPS & THE POWER OF PROTEIN
Activity Time: 45-60 minutes

LEARNING OUTCOMES

- Students will **play** with and **discuss** the importance of balance in their bodies and their diet.
- Students will **learn** what protein is and how it helps their body.
- Students will **watch** videos to further support understanding.
- Students will **have the choice** of **creating** a Protein Power informational poster, **writing** a Just So story about a protein rich food, **charting** their food group intake over 5 days, or **making** an advertisement or commercial about the Power of Protein.
- Students will **read** and **practice** with **Featured Culinary Skill** - Food Processor Safety.
- Students will **make** and **share** Haunted Hummus and Pita Chips.

THE POWER OF PROTEIN

Notes for the Teacher:

- Do you remember learning about the food groups when you were in school? Maybe it was the Food Wheel or Pyramid. Today the USDA uses MyPlate- the idea being that people can see what is on their plate and eat foods in balance.
- Why do they use food groups?
    - Food scientists have discovered how much of certain vitamins, minerals, and other components of food that our bodies need for optimal functioning.
    - Food groups simplify these dietary recommendations.
        - It's much easier to remember to eat two cups of fruit a day than having to measure 75 milligrams of vitamin C and 25 grams of fiber!
- Helping your students eat a balanced diet can be a confusing and frustrating battle.
    - How much is a serving for a three-year-old verses an 8 year old?
    - Is an egg a protein? or is it dairy? And what is the difference?
    - Please see these two resources that can help you to understand in real terms how much of what foods will provide your students with the vitamins and nutrients that they need for their growing bodies.
        - Why is Protein Important for Kids' Growth
            - https://www.nutritionnews.abbott/pregnancy-childhood/kids-growth/why-is-protein-important-for-kids-growth/
        - MyPlate Plan Calculator
            - https://www.choosemyplate.gov/MyPlatePlan
        - What's MyPlate All About? Infographic
            - https://choosemyplate-prod.azureedge.net/sites/default/files/printablematerials/2013-WhatsMyPlateAllAboutInfographic.pdf

Teacher Prep:

- Collect Materials:
    - Recipe guide, tools, and ingredients listed
    - MyPlate graphic
        - https://choosemyplate-prod.azureedge.net/sites/default/files/audiences/ColoringSheet.pdf
    - For The Power of Protein:
        - Protein Facts (included – see page 27)
    - For Protein Power Poster Activity:
        - Grocery flyers, magazines, or food images printed from the internet
        - Large poster board, cardstock, or construction paper
        - Scissors, glue
        - Marker, crayons
    - For "How the …" Story Writing:

- Writing paper
- Pencil
- Access to research materials about protein rich foods

- For Meal Charting Activity:
  - For Younger Students: Food Chart (included – see page 28)
  - For Older Students: Chart with Serving Sizes
    - https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlatePlan_2000cals_Age14plus.pdf
      - Review page 1 of this document for serving size descriptions useful for young students.
- For Amazing Advertisement:
  - Food magazines
  - Youtube advertisements for food
  - Choose one:
    - Print advertisement making materials; poster, food images, markers, glue etc.
    - Live advertisement making materials; food, costume, recording equipment (phone), script

- Read
  - Protein Facts (included – see page 27)
- Watch
  - Fit Kids 104 Proteins (0:40)
    - https://www.youtube.com/watch?v=4u-eZ0HHN_U
  - PBS Kids Fizzy's Lunch Lab- Protein Power Up (4:10)
    - https://www.youtube.com/watch?v=_DoatevglZo

Lesson: The Power of Protein

- Introduction: What is Balance?
  - Ask students to:
    - stand up and make yourself feel like a tree with your feet rooting firmly to the floor
    - now lift one foot off the floor.
    - next, close your eyes!
  - Discuss what that experience was like.
  - Ask :
    - What were you just doing?
    - What did it feel like to try and balance?
    - What kind of work or effort did it take? (physical strength, endurance, concentration)

- Are there times when you feel wobbly like that during the day?
    - At what times? Or in what situations?
- **Explain** that inside of us there is a constant battle to keep all of our body systems working in balance.
- **Ask** what do you think our bodies need to achieve this balance?
    - **Accept** all answers. You might be surprised what you learn about what is important to them!
        - Sleep/rest, water, activity/movement, food, etc.
- **Tell** students that today they are going to learn about one category/group of foods that are very important in being strong and able to balance, protein!

- Information: The Power of Protein
    - **Share** that the food groups that we usually divide all foods into are:
        - fruits
        - vegetables
        - grains
        - dairy
        - protein
    - **Ask** students to think of examples of foods for each group.
    - **Tell** the students that today the focus is on protein.
    - **Ask:**
        - What proteins did you think of?
            - For more ideas, watch this video:
                - Protein Foods- Teaching Resource (2:40) https://www.youtube.com/watch?v=jiCru2fDeSE
        - Why do you think your body needs proteins? What do proteins do?
    - **Watch:**
        - Fit Kids 104 Proteins (0:40)
            - https://www.youtube.com/watch?v=4u-eZ0HHN_U
        - PBS Kids Fizzy's Lunch Lab- Protein Power Up (4:10)
            - https://www.youtube.com/watch?v=_DoatevglZo
    - **Review** together what was learned from the videos:
        - Protein is a nutrient for our bodies.
        - Proteins grow, maintain, and replace the tissues in our body.
        - Our muscles and organs are made of protein.
        - We get protein from meat, nuts, eggs, cheese, yogurt, milk and some dark green vegetables.
            - **Optional** – Read the "Protein Facts" sheet (included – see page 27)

- Instructions for Activities: Protein at Play
  - Protein Power Poster
    - **Collect** materials as listed above.
    - **Review** what foods fit in the protein category and why proteins are important for the body health.
    - **Ask** students to create a poster to help others know what they have learned.
    - **Provide** students with materials and support to create a Protein Power Poster.
    - **Have** students **share** and **display** their posters.
  - How the … Story Writing
    - **Collect** materials as listed above.
    - **Share** short folktales such as:
      - How the Leopard Got His Spots
        - (2:20) https://www.youtube.com/watch?v=LrR7uVQKkoM
    - **Invite** students to **write** a story to **explain** how a protein food (beans, cheese etc.) got an attribute that it possesses.
      - For example: How the Fava Bean Found its Fiber
    - **Support** students in **researching** facts about protein and **imagining** a short story about how that came to be.
    - **Assist** students with **editing** and **publishing** their story to be shared.

  - Chart Your Meals
    - **Print** resources:
    - For Younger Students: Food Chart (included – see page 28)
    - For Older Students: Chart with Serving Sizes
      - https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlatePlan_2000cals_Age14plus.pdf
        - Review page 1 of this document for serving size descriptions useful for young students.
    - **Review** with students what a serving size is.
    - **Model** how to chart one meal by **sorting** food into food groups and then **measuring** into servings.
    - **Demonstrate** how to fill in the chart.
    - **Evaluate** at the end of 5 days how successful the students were at eating a balanced diet.
    - **Ask** students:
      - Was it difficult to eat all of the things you were supposed to?
      - What was the hardest? Easiest?
      - What group did you eat more than was recommended? Less than?

- Amazing Advertisement
    - Collect materials as listed above.
    - Have students **look** through magazines or on YouTube for food advertisements.
    - **Display** or watch the ads.
    - **Discuss** how the advertisers have used words and images to get you to buy their products.
        - Does a good-looking ad mean that the food is good for you?
    - **Challenge** students to **create** an advertisement for a protein-rich food.
    - **Encourage** students to **research** the qualities of the food, and **create** an ad with words, and images that sell their product to consumers.
    - **Display** or **show** the finished advertisement.

Extension:

- **Repeat** the above lesson focusing on a different food group.
- **Use** food images to **practice** sorting into food groups.
- **Involve** students in **meal planning** and put them **in charge** of making sure that all of the food groups are represented.

COOKING HAUNTED HUMMUS and PITA CHIPS

Kitchen Prep

- Read the Haunted Hummus and Pita Chips recipe card together.
- Identify and gather ingredients.
- Gather tools.
- Read the **Featured Culinary Skill - Food Processor Safety.**
- Discuss kitchen safety. Specifically, Oven safety (Visit Raddishkids.com/pages/safety).

Prepare Haunted Hummus and Pita Chips

- Ask children to read or describe each step.
- Together, follow the steps in the recipe.
- Give each child a turn to cut, drizzle, and blend.
- When the Haunted Hummus and Pita Chips are ready, eat, taste and share!
- While your friends and family are eating, teach them about the amazing power of protein and share the projects that you created.

RESOURCES

- Websites
  - www.sciencekids.co.nz/sciencefacts/food/proteins.html
  - https://www.usda.gov/media/blog/2017/09/26/back-basics-all-about-myplate-food-groups
  - https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlatePlan_2000cals_Age14plus.pdf
  - https://choosemyplate-prod.azureedge.net/sites/default/files/audiences/ColoringSheet.pdf
  - https://www.nutritionnews.abbott/pregnancy-childhood/kids-growth/why-is-protein-important-for-kids-growth/
  -
- Videos
  - Fit Kids 104 Proteins (0:40)
  - https://www.youtube.com/watch?v=4u-eZ0HHN_U
  - PBS Kids Fizzy's Lunch Lab- Protein Power Up (4:10) https://www.youtube.com/watch?v=_DoatevglZo
  - Protein Foods- Teaching Resource (2:40) https://www.youtube.com/watch?v=jiCru2fDeSE
  - How the Leopard Got His Spots (2:20) https://www.youtube.com/watch?v=LrR7uVQKkoM

Lesson #3: JACK-O'-POT-PIE
& SERIOUS SECRETS OF THE CIRCLE and PI DISCOVERED

Activity Time: 60 minutes

LEARNING OUTCOMES

- Younger students will **read or listen** to the book Color Zoo by Lois Ehlert.
- Younger students will **explore** the properties of circles in their environment.
- Younger students will **strengthen their understanding** of the concept of circles by **creating** their own **definition.**
- Younger students will **hunt** for circles in print.
- Younger students will **cut, glue, arrange, and draw** circles to **create** art.
- Older students will **read** Sir Cumference and the Dragon of Pi by Cindy Neuschwander.
- Older students will **learn** the terms *pi, circumference, diameter, radius, geometry,* and *symmetry.*
- Older students will **explore** why formulas exist and how they help when figuring out problems.
- Older students will **measure and calculate** the circumference and diameter of gathered circular objects.
- Older students will have the **opportunity to choose** between a number of pi inspired art projects.
- Students will **read** and **practice** with **Featured Culinary Skill** - Knife Safety Rules.
- Students will **make** and **share** Jack-o'-Pot-Pie.

SERIOUS SECRETS OF THE CIRCLE

YOUNGER STUDENTS

Notes for the Teacher:

- Teaching Pi to young children is ridiculous right?! Well, yes and no.
    - Before any student can hope to learn Pi they have to understand and in fact internalize the underlying qualities that make up a circle.
- How do you teach what a circle is?
        - Lots and lots of hands on exploration.
- In this lesson you will provide your students with many opportunities to touch, draw, fill in, find, and talk about circles.
- Learning shapes not only helps children identify and organize visual information, it helps them learn skills in other curriculum areas including reading, math, and science. For example, an early step in understanding numbers and letters is to recognize their shape. Learning shapes also helps children understand other signs and symbols.

Teacher Prep:

- Collect Materials:
    - Recipe guide, tools, and ingredients listed
    - Color Zoo by Lois Ehlert
    - Cut out of circles on cardstock or cardboard (varying sizes is a great idea)
    - Circular-shaped objects (not spherical do not bring balls, apples, etc.)
        - Buttons
        - Slice of orange, cucumber etc.
        - Clock
        - Plate
        - Coins
        - Pizza
        - Ring
        - Wheel
    - White board or flipchart paper for recording findings
    - For Circle Art:
        - Large heavy-duty paper for a base
        - Cut out circles
        - Construction paper in a variety of colors.
        - Tin foil, wrapping paper, tissue paper, etc.
        - Scissors
        - Glue
        - Crayons, markers etc.
    - For Picture Book Hunt:
        - Students' favorite books

- Magazines
- Grocery store flyers, etc.
- Markers or post it notes

- Read
  - Color Zoo by Lois Ehlert

Lesson: Serious Secrets of the Circle

- Introduction: CIRCLES ARE EVERYWHERE
  - **Read** the book Color Zoo by Lois Ehlert
    - **Use** a piece of white paper to slide between each page as you read.
      - **Put** the white paper behind the first page.
      - **Ask** the students, "What shape do you see?" (a circle)
      - **Slide** the paper out of the book to reveal an animal made from the circle shape.
      - **Ask** "Can you guess what animal this is?"
  - **Discuss** how everything in our world is made up of shapes.
  - **Provide** the students with a cut out of a circle and **challenge** them to look around the room and discover how many circles they can find.
  - **Tell** the students that today they are going to be shape detectives and the case that they have to solve is the Serious Secret of the Circle!

- Information: What can we find out about circles?
  - **Collect** a wide variety of circular-shaped items. See list in materials section above.
  - **Remind** the students that they are Shape Detectives and that their job today is to learn everything that they can about THE CIRCLE!!!!
  - **Provide** the circle items to the students and allow them time to freely explore.
  - **Observe** what they do with the circles:
    - How do they handle them?
    - What do they talk about? What words do they use?
  - **Ask** the Shape Detectives to tell you what they learned about circles.
    - **Take** their answers very seriously!
    - **Record** their findings using words and drawing on a whiteboard or flipchart.
  - **Tell** the Shape Detectives that you need their help to take all of the information that they found out about circles to make a definition that you can share with others that might need to solve a case about circles in the future.
    - **Definition of a Circle** might include:
      - It is curvy
      - No sharp points
      - No straight lines

- No corners
- It spins or rolls
- It is flat
- If you fold it in half it covers itself up. It is symmetrical.

  - Optionally, **watch** the video:
    - I'm a Circle Educational Song by Jack Hartmann (2:42) https://www.youtube.com/watch?v=YRWbpsREIVU

- Instructions for Activity: Circles Are Everywhere
  - Circle Animal Art
    - **Collect** materials as listed above.
    - **Use** Color Zoo by Lois Ehlert as an example to challenge students to **create** works of art using circles.
    - **Tell** students that they can **make** animals, buildings, vehicles, plants, whatever they like, but they have to use only circles!
    - **Provide** students with the circles or tools to make circles of different sizes.
    - **Have students create** their picture completely before providing them with glue, so that they can experiment before committing.
    - After the base shape is made and glued down, **give** the students other art materials to enhance or create backgrounds for their art.
    - **Display** the art and have students **explain** why they chose to make what they did and how circles fit their choice.

  - Circle Hunt in Print
    - **Collect** materials as listed above.
    - **Provide** students with print materials and post-it-notes or some other way for them to mark the circles they find.
    - **Challenge** students to count the number of circles that they find in each book/magazine etc.
      - Perhaps, have a winning book that has the most circles in it.
    - **Review** the circles that students find and **create a list** with simple drawings of the circular things found in print.
      - **Post** this list in the classroom to be ongoingly added to.

Extension:

- **Repeat** this lesson for other shapes (square, triangle etc.)
- **Paint** with circles. See activity here:
  - https://teaching2and3yearolds.com/toddler-circle-art-with-paper-tubes/
- **Read** other books about circles
  - So Many Circles, So Many Squares by Tana Hoban
  - Around the Park: a Book About Circles by Christianne Jones

- Hey Spot: Spotted Animals of The World by Baby Professor
- Circles by David A. Adler

PI DISCOVERED

OLDER STUDENTS

Notes for the Teacher:

- Source and read the book Sir Cumference and the Dragon of Pi by Cindy Neuschwander.
    - To prepare your understanding of the vocabulary of Pi:
        - Watch the video
            - Math Understood: Sir Cumference and the Dragon of Pi https://www.youtube.com/watch?v=h7TR7zFOEZg

Teacher Prep:

- Collect Materials:
    - Recipe guide, tools, and ingredients listed
    - Sir Cumference and the Dragon of Pi by Cindy Neuschwander
    - For the lesson:
        - A piece of string
        - Ruler
        - Pencil and paper
        - Items from around your environment that are circular:
            - Cans, pie tin, CD, plate etc.
    - For Activities (choose one or more)
        - For Skyline Graph:
            - graph paper
            - markers, crayons, colored pencils or paint
            - a ruler
            - a print out of pi
                - http://s203671238.onlinehome.us/wp-content/uploads/2011/04/pi-long.pdf
        - For Line Art Graph Activity:
            - Graph Paper (1-inch recommended)
            - Markers (10 colors to represent 0-9)
            - Ruler
            - Printout of Pi's digits
                - http://s203671238.onlinehome.us/wp-content/uploads/2011/04/pi-long.pdf
            - Color codes- students make a legend of one color that belongs to each number so that they can keep track. For example green = 1, red = 2 etc.
        - For Circular Art Graph Activity:
            - Paper
            - Markers (10 colors to represent 0-9)
            - Pencil
            - Eraser

- Protractor
- Large circular object
- Printout of Pi's digits
- Color codes- students make a legend of one color that belongs to each number so that they can keep track. For example green = 1, red = 2 etc.

- Read
  - Sir Cumference and the Dragon of Pi by Cindy Neuschwander
- Watch
  - Math Understood: Sir Cumference and the Dragon of Pi https://www.youtube.com/watch?v=h7TR7zFOEZg

Lesson: Pie or Pi

- Introduction: Pi and Math Vocabulary
  - **Read** Sir Cumference and the Dragon of Pi by Cindy Neuschwander
    - **Pause** while reading to explain the math vocabulary in the story:
      - **circumference** (C)- the measure of the distance around the outside of a circle or the perimeter of a circle
      - **diameter (d)**- the distance from one edge of a circle through the center of the circle to the opposite edge of the circle
      - **radius (r)**- the measure from the center of a circle to the outside edge of a circle
      - **geometry**- mathematics of the properties, measurement, and relationships of points, angles, surfaces, and solids.
      - **symmetry**- when both halves of an object or shape are identical
      - **pi** (π) or 3.141592653589… is a repeating non-terminating decimal (it continues on and on)
        - Pi is the ratio of the circumference of a circle to its diameter; its value is about 3.14
        - People actually have contests to see how many digits of pi they can memorize and recite without error!
  - **Write** the math vocabulary and definitions above on a poster and **post** in the room for later reference. **Draw** pictures to help visual learners.
  - **Discuss** how fiction can be used to teach other subjects.
  - **Ask:**
    - Do you think reading this story will help you to better remember all the different math vocabulary used to calculate pi?
    - Can you ever imagine a time when knowing how to figure out pi could help you or someone you care about?

- **Tell** the students that today they will use what they learned in Sir Cumference and the Dragon of Pi by Cindy Neuschwander to **practice** with one formula that works every time to **solve** pi and then **create** another formula on their own that works. Finally, students will be free to **express** their creative side with some pi art projects.

- Information: Playing with Formulas - Pi Discovered!
  - **Return** to page 21 in the book where Radius measured a bunch of different things?
  - **Ask** the students to look at the information on the page and explain, using their own words, how Radius figured out the value of pi?
    - Did he do it the same way every time?
    - What math operations (addition, division, etc.) did he use to figure it out?
    - Is there a way to write how he figured it out so that others can use his trick?
      - The short way to write a math rule that always works is called a formula.
      - The formula to figure out pi is pi=circumference divided by diameter
  - **Provide** students with collected circular materials, string, ruler, paper, pencil and calculator.
  - **Challenge 1:** Do what Lady Di did on page 21
    - Draw, measure, label and calculate using circumference and diameter to prove to themselves and perhaps non-believers that pi is always 3.14.
  - **Challenge 2:** Figure out the circumference if you only know the diameter.
    - For example, a large sewer pipe in the ground that you could measure the diameter (6 feet across) but its buried in the ground so you can't access the edge to measure the circumference.
      - How can you use the formula you already know, pi=circumference divided by diameter, to make a formula that figures out circumference when you know pi (3.14) and diameter (6)
        - Circumference = pi x diameter
  - **Challenge 3:** What if you only know the radius?
    - For example, a slice of pie with a big piece cut out of it where the slice starts from the center of the pie and reaches to the crust. The length of that slice is 5 inches.
      - **Ask:** What do we know about radius?
        - It is half the length of the diameter or 2 X radius = diameter also that diameter divided by 2 = radius
      - Provide students with time to ponder, struggle and experiment, support where necessary.
      - Have students **share** their thinking and approaches with one another.
      - One way to solve the problem is
        - Radius (5inches) X 2= 10 inches

- Diameter= 10 inches
- From before, we know that Circumference = pi X diameter
  - C= 3.14 X 10 inches
  - C= 31.4 inches
  - The circumference of that pie is 31.4 inches!

- Activity Instructions: Art Activities Using Pi (choose one or more)
  - **Pi Skyline** (sourced from What Do We Do All Day https://www.whatdowedoallday.com/math-art-for-kids-pi)
    - **Read** and **familiarize** yourself with the instructions from the website above
    - **Collect** materials as listed above
    - **Support** students as necessary to graph the numbers of pi.
    - **Get artistic** by turning your graph into a cool city skyline or turn it into a garden or cave full of stalagmites.
    - **Display** student pi graph art.

  - **Pi Line Art Graph** (sourced from http://www.pinkstripeysocks.com/2014/03/pi-day-activity-make-two-pieces-of-pi.html)
    - **Read** and **familiarize** yourself with the instructions from the website above.
    - **Collect** materials as listed above.
    - **Support** students as necessary to graph the numbers of pi.
    - **Get artistic** by mounting the art on contrasting colored card stock.
    - **Display** student pi graph art.

  - **Pi Circle Art Graph** (sourced from http://www.pinkstripeysocks.com/2014/03/pi-day-activity-make-two-pieces-of-pi.html)
    - **Read** and **familiarize** yourself with the instructions from the website above.
    - **Collect** materials as listed above.
    - **Support** students as necessary to divide their circle into 36 degree sections, and plot their lines.
    - **Display** student pi graph art.

Extension:

- **Create** Pi Bracelets http://www.pinkstripeysocks.com/2014/03/pi-day-activity-make-pi-day-bracelets.html
- **Write** a Pi Word Challenge – how many words can you list that start with "pi"
- **Research**: What professions use the calculation of pi in their work?

COOKING JACK-O'-POT-PIE

Kitchen Prep

- Read the Jack-o'-Pot-Pie recipe card together.
- Identify and gather ingredients.
- Gather tools.
- Read the **Featured Culinary Skill - Knife Safety Rules.**
- Discuss kitchen safety. Specifically, Knife safety (Visit Raddishkids.com/pages/safety).

Prepare Jack-o'-Pot-Pie

- Ask children to read or describe each step.
- Together, follow the steps in the recipe.
- Give each child a turn to cut, melt, and roll.
- When the Jack-o'-Pot-Pie is ready, eat, taste and share!
- While your friends and family are eating, tell them interesting things about circles. For older students, they can also share the relationship between circumference, diameter, radius and the magic of pie. Explain how you created the cool artwork you have displayed.

RESOURCES

- Books
  - Sir Cumference and the Dragon of Pi by Cindy Neuschwander
  - Color Zoo by Lois Ehlert
  - So Many Circles, So Many Squares by Tana Hoban
  - Around the Park: a Book About Circles by Christianne Jones
  - Hey Spot: Spotted Animals of The World by Baby Professor
  - Circles by David A. Adler

- Websites
  - https://www.hellowonderful.co/post/celebrate-pi-day-with-these-7-fun-crafts/
  - http://www.pinkstripeysocks.com/2014/03/pi-day-activity-make-two-pieces-of-pi.html
  - https://teaching2and3yearolds.com/teaching-circles-to-toddlers-and-preschoolers/
  -
- Videos
  - I'm a Circle Educational Song by Jack Hartmann (2:42) https://www.youtube.com/watch?v=YRWbpsREIVU
  - Math Understood: Sir Cumference and the Dragon of Pi https://www.youtube.com/watch?v=h7TR7zFOEZg

Non-Climacteric Fruits – Fruits That Do Not Ripen After Picking

Some of these fruits may soften after they are picked as they begin to break down, which actually means they are in the process of rotting.

It is best to taste test these fruits before buying them because the flavour will not get any better.

Bell pepper
Berries
Blueberry
Blackberry
Blackcurrant
Cherry
Citrus fruit
Coconut
Cucumber
Eggplant
Figs
Gooseberry
Grape
Grapefruit
Lemon
Lime
Longan
Loquat
Lychee
Mandarin
Muskmelon
Olive
Orange
Peppers
Pineapple
Pomegranate
Prickly Pear
Rambutan
Raspberry
Strawberry
Summer squash
Tamarillo
Tangerines
Watermelon

Climacteric Fruits – Fruits That Can Ripen After Picking

These fruits are picked after maturing on the tree but will then continue or begin (in the case of avocado) to ripen after.

Apple
Apricot
Avocado
Bananas
Cantaloupe
Chile pepper
Date
Guava
Honeydew melon
Jackfruit
Kiwi
Mango
Mulberry
Nectarine
Papaya
Passionfruit
Pawpaw
Peach
Pear
Persimmon
Plantain
Plum
Quince
Sapodilla
Sapote
Tomato

Protein Facts

- Protein is essential for life. After water, protein is the most plentiful substance in the body. It is crucial to all cells.
- Proteins grow, maintain, and replace the tissues in our bodies. Therefore our muscles, organs, and immune systems are mostly made of protein.
- Protein is a long chain-like molecule that is made up of small units known as amino acids, joined together by peptide bonds.
- The word protein comes from the Greek word 'proteios' which means "primary" or "in the lead."
- Like carbohydrates and fats, proteins are a major nutrient for the body due to the energy (calories) they provide.
- Once protein is digested it is broken down into its amino acids. These amino acids can then be reused to make the proteins your body needs to maintain muscles, bones, blood, and body organs.
- There are over 20 slightly differing amino acids. Our bodies can produce around 13 of these, but there are 9 amino acids that our body cannot make itself. These are called essential amino acids and we obtain these by eating certain protein-rich foods.
- Complete proteins have all amino acids - these are meat, poultry, fish, dairy products, eggs, and soy. Incomplete protein sources include nuts, grains, fruits, and vegetables. Therefore it is important for vegetarians to pair meals wisely in order to get all essential amino acids in their daily diet.
- Keratin is a type of protein that our hair, nails, and skin are made of.
- Taking on too much protein can be dangerous to the body, it is a strain on the liver and kidneys causing them to work extra hard to get rid of the extra protein.
- Like other energy sources, too much protein can also lead to weight gain.
- The protein contained in eggs is considered to be the highest quality protein of all foods.
- Insects actually contain very high levels of protein, more than many other high-protein foods.

Sourced from www.sciencekids.co.nz/sciencefacts/food/proteins.html

Food Chart

- Keep track of all the foods that you eat each day for 5 days.
- Put a tally mark or check mark in the box each time you eat a serving.
- Evaluate how you did at the end of the week.

Food Group Daily Recommendation	Day 1	Day 2	Day 3	Day 4	Day 5
Fruits 2 cups					
Vegetables 2 ½ cups					
Grains 6 ounces					
Protein 5 ½ ounces					
Dairy 3 cups					