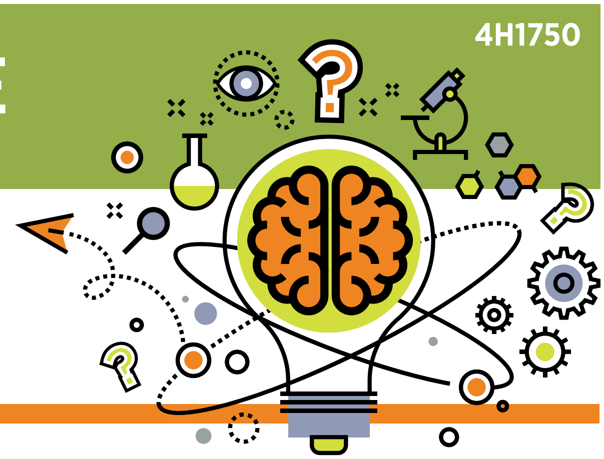
TEACHING SCIENCE

...when you don't know diddly-squat



What size pizza should you buy?

Purpose:

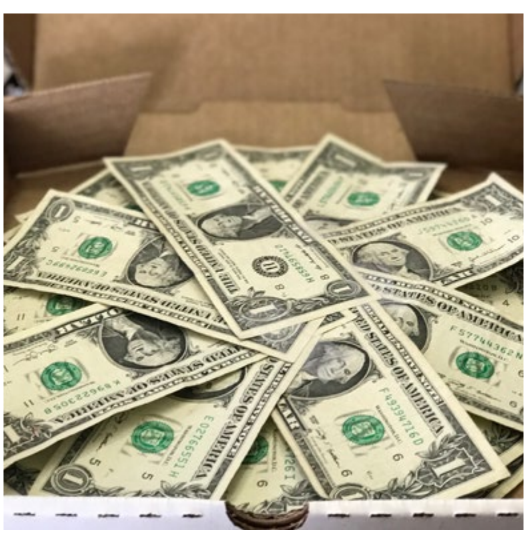
The purpose is **not** to teach specific content, but to teach the process of science – asking questions and discovering answers. This activity encourages young people to try to figure things out for themselves rather than just read an answer on the internet or in a book. As a leader, try not to express your opinion, but let the youth engage in arguments based on evidence.

Time required:

20 minutes

Materials:

- ❏ Round pizzas of different sizes (potentially from different pizza shops or frozen brands)
- ❏ Rulers or tape measures
- ❏ Calculator (optional)



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SCIENCE PRACTICE: Asking questions and defining problems

1. Discuss: *Many people like pizza. It is often the go-to food to feed young people for a party. What size pizza should you buy? How many pizzas? What will give you the best value for your dollar? How do you determine best value? Is it total pizza? Is it cost per slice? Do you include the crust or not? Does it depend on the style of crust? Is thickness of crust important? How about the amount of toppings?*

SCIENCE PRACTICE: Planning and carrying out investigations

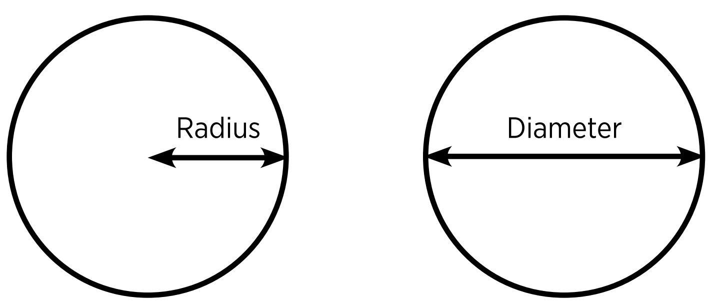
2. Create the pizza data chart "Advertised Sizes Compared to Actual Sizes" before participants begin collecting data. Buy or bake round pizzas of multiple sizes. Have participants use rulers or tape measures to measure the diameter of the pizzas – both with and without the crust. Diameter is the distance across a circle going through the center. The diameter is the longest distance across the circle. Ask: *Is the pizza size the same as what is advertised? How do you ensure you get an accurate diameter?* Note: Eating pizza can be a strong incentive to get youth to do math.

SCIENCE PRACTICE: Using mathematics and computational thinking

3. To determine pizza area, square the radius and multiply by π (**pi**) (3.14). (Radius is half the diameter.)

$$A = r^2\ (3.14) \qquad A = r^2\ (\pi)$$

See the examples of calculations given in the chart on the following page.



Advertised Sizes Compared to Actual Sizes

Advertised pizza diameter	Pizza cost	Number of slices	Cost per slice	Actual pizza diameter (including crust)	Actual pizza area (including crust)	Cost/area (including crust)	Actual pizza diameter (not including crust)	Actual pizza area (not including crust)	Cost/area (not including crust)
14 inches (example)	$4.99	8	$4.99/8 = $0.62375 per slice	13.5 inches	$3.14*6.75^2$ = 143 square inches	$4.99/143 = $0.033 per square inch	12 inches	$3.14*6^2$ = 113 square inches	$4.99/113 = $0.044 per square inch
16 inches (example)	$6.99	10	$6.99/10 = $0.699 per slice	16.25 inches	$3.14*8.125^2$ = 207.29 square inches	$6.99/207.29 = $0.034per square inch	15 inches	$3.14*7.5^2$ = 176.63 square inches	$6.99/176.63 = $0.040 per square inch

SCIENCE PRACTICE:
Analyzing and interpreting data

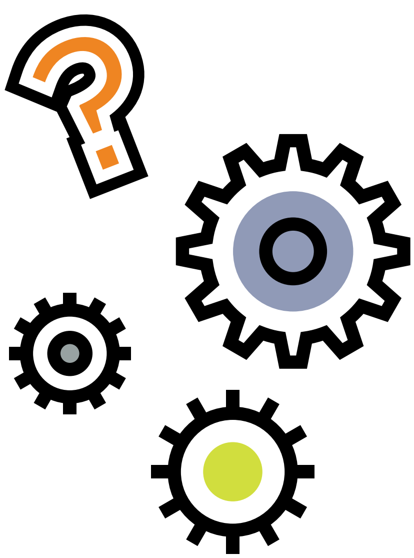
4. *Does the pizza with the best value per slice also have the best value per area? Do you use the pizza area including the crust or not when determining the best value? Is the store accurate in how they advertise their pizza sizes?*

SCIENCE PRACTICE:
Engaging in argument from evidence

5. *What pizza is the best value? Why? If you got pizzas from different stores, will the information you gathered affect where you buy your pizza?*

SCIENCE PRACTICE:
Constructing explanations and designing solutions

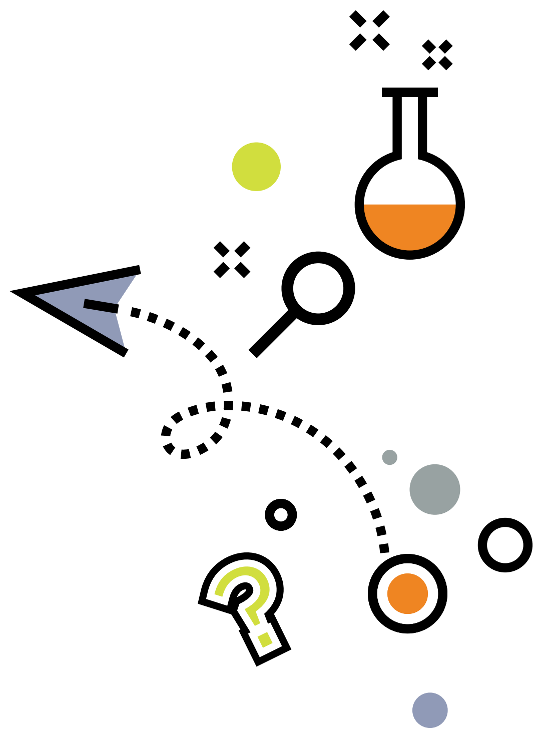
6. *Based on what you observed, is there a standard way you should determine which pizza to buy? Is there a maximum pizza size? If you were the store owner, would this affect which pizzas you sell?*



Other thoughts:

- *Do you think the size of the pizza changes how many slices people eat? Do you think people eat the same number of slices from a smaller pizza as they eat from a larger pizza? Or do people eat the same number of slices regardless of how big they are? Could you set up an experiment to test this?*
- *When looking at value, do you take into account the taste, or the amount or quality of toppings?*
- *Could you repeat this experiment with other foods to determine their value? With candy, do you go by weight or number of pieces? When purchasing meat, do you include the weight of the bones? How would costs and value compare if you made a pizza from scratch at home?*
- *Could you repeat this experiment with square or rectangular pizzas?*

You do not need all the answers to teach science. You simply need an inquisitive mind and to be willing to carry out an investigation.



Science & Engineering Practices:

These eight Science and Engineering Practices come from *A Framework for K–12 Science Education* (National Research Council, 2012, p. 42). These research-based best practices for engaging youth in science are connected to in-school science standards that all children must meet.

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Reference

National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press.

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