



This is a resource from CPALMS ([www.cpalms.org](http://www.cpalms.org)) where all educators go for bright ideas!  
Resource ID#: 48866

Primary Type: Lesson Plan

## Which Brand of Chocolate Chip Cookie Would You Buy?

In this activity, students will utilize measurement data provided in a chart to calculate areas, volumes, and densities of cookies. They will then analyze their data and determine how these values can be used to market a fictitious brand of chocolate chip cookie. Finally, they will integrate cost and taste into their analyses and generate a marketing campaign for a cookie brand of their choosing based upon a set sample data which has been provided to them.

### General Information

**Subject(s):** Science, Mathematics, English Language Arts

**Grade Level(s):** 9, 10, 11, 12

**Intended Audience:** [Educators](#)

**Instructional Time:** 3 Hour(s)

**Suggested Technology:** Basic Calculators, Microsoft Office

**Freely Available:** Yes

**Keywords:** MEA, model eliciting activity, problem solving, area, volume, density, data analysis, inference

**Instructional Component Type(s):** [Lesson Plan](#), [Problem-Solving Task](#), [Data Set](#), [Model Eliciting Activity \(MEA\)](#), [STEM Lesson](#)

**Resource Collection:** STEM Lessons - Model Eliciting Activity

### Lesson Content

**Lesson Plan Template:** Model Eliciting Activity (MEA)

#### Formative Assessment

The comprehension questions/readiness questions and reflection questions can be used as formative assessment (for questions, see the Readiness questions section). Comprehension and readiness questions will indicate whether the students understand the problem and the problem context, and reflection questions are meant to elicit students' thinking as they are working through the problem. The comprehension/readiness questions are asked of students after they read the first client letter (see Reading Passage 1). The teacher can ask the class to respond to these questions and ensure understanding before students begin working with the data.

#### Feedback to Students

Students' responses to the reflective questions can indicate whether scaffolding is needed. The reflection questions are asked by the teacher as students are working in their groups on parts 1 and 2 of the MEA. These questions can reveal any misunderstanding or issues that students have as well as guide them to think about what they are doing. Additionally, peer dialogue among the students within their groups provides them with the opportunity to discuss and critique each other's ideas, modify existing ideas, and generate new ones.

#### Summative Assessment

Quality Assurance Rubric, developed by Purdue University's Case Studies for Kids Project. Accessible at the following link:

<https://engineering.purdue.edu/ENE/Research/SGMM/CASESTUDIESKIDSWEB/basics.htm#Assessment>

#### Learning Objectives

- Calculate the area of a circular object given its diameter.
- Calculate the volume of a cylindrical object given its diameter and thickness.
- Calculate the density of an object from its mass and volume.
- Evaluate the pros and cons needed to make a real-life decision.
- Develop a procedure for solving a problem with changing parameters.

- Analyze data and draw conclusions based on your analysis.
- Support claims with logical reasoning and relevant evidence.
- Understand that several factors need to be considered when solving multifaceted problems and determine the most important factors needed to make viable decisions.
- Make logical decisions to provide a solution to a problem.
- Communicate an outcome or solution clearly to others.

### Prior Knowledge

- Formulas for area, volume, and density
- Units for area, volume and density
- Definitions of area, volume, and density.

### Instructional Suggestions

#### Part 1 (Day 1)

1. Provide a KWL activity on mass, area, volume, and density and provide a review as needed.
2. Students receive client letter 1 (Reading passage 1) and dataset 1.
3. The teacher can ask the readiness/comprehension questions (see Readiness questions) to the class or have students complete them individually on paper. After students understand the task, they can begin to work in teams of approximately 3-4.
4. In teams, students work on the problem and respond to the client with the requested deliverables.
  - As students are working, the teacher circulates to each team to ask the first set of Guiding/Reflective Questions and address any issues that may arise. Groups are required to brainstorm multiple ways of solving the problem, deliberate and discuss these ideas, and then choose the one that best fits according to their analysis.
  - Teachers can provide guidance using the reflective questions to help students determine the important factors and start thinking about how they can present their solution.

#### Part 2 (Day 2)

1. Students receive the client letter 2 (Reading Passage 2) and dataset 2, along with their work from part 1.
2. Teams test, evaluate, and revise their first procedure as necessary with the second dataset and provide the requested deliverables as specified in the second letter.
3. As teams finish with step 6, they should begin preparing their presentations.

#### Part 3 (Day 3)

- The teams will now present their results to the rest of the class. Peer critique using the Peer Presentation Rubric (see Summative Assessment, Peer Rubric) and classroom discussion follow.

### Guiding/reflective Questions

1. Why do you think that?
2. How do you know if you have an answer to the problem?
3. Would your solution work in a different situation?
4. What are the most important things to consider in your procedure?
5. What are the strengths and weaknesses of each?
6. Do you agree or disagree with your classmates' ideas? Why or why not?

### Reading Passage 1

[Letter 1 Which Brand of Chocolate Chip Cookie Would You BuyR.docx](#)

### Readiness Questions

1. What is the problem? (analysis of diameters, thicknesses, masses, and number of chocolate chips of different brands of chocolate chip cookies)
2. Who is the client? (Baked Goods Marketing)
3. What is the client asking your team to do? (to choose a brand of chocolate chip cookie and design a marketing campaign based upon one or more of the data values provided)
4. What things do you need to include in your solution? (characteristics that make a given brand marketable)
5. How do you calculate the area of a circular object? ( $\pi r^2$ ) ( $r = \text{half the diameter}$ )
6. How do you calculate the volume of a cylindrical object? ( $\pi r^2 h$ ) ( $r = \text{half the diameter}$ ,  $h = \text{thickness}$ )
7. How do you calculate the density of an object? (mass/volume)
8. Do you think there is more than one correct answer to what the client is asking? Why or why not? (Yes, because the data can be analyzed in multiple ways.)

### Data Set 1

[Data Set 1 Which Brand of Chocolate Chip Cookie Would You Buy.docx](#)

### Comprehension/readiness questions

See Readiness Questions.

### Reading Passage 2

[Letter 2 Which Brand of Chocolate Chip Cookie Would You BuyR.docx](#)

### Data Set 2

[Data Set 2 Which Brand of Chocolate Chip Cookie Would You Buy.docx](#)

### Additional Instructions or Materials

Provide students with reference materials for calculating surface area, volume, and density.

### Reflection question 2

1. How important is consumer cost in comparison to the other factors you are considering?
2. How important is taste in comparison to the other factors you are considering?

### Accommodations & Recommendations

**Accommodations:**

Accommodations for students with limited language proficiency include having the class read the letters out loud or having peers read the letters to them.

**Extensions:**

Allow students to perform measurements, calculations, and evaluations on various brands of real chocolate chip cookies. Compare and contrast their results with the data from this activity.

**Suggested Technology:** Basic Calculators, Microsoft Office

## Source and Access Information

**Contributed by:** Michael Weiss

**Name of Author/Source:** Michael Weiss

**District/Organization of Contributor(s):** Miami-Dade

**Is this Resource freely Available?** Yes

**Access Privileges:** Public

**License:** [CPALMS License - no distribution - non commercial](#)

## Aligned Standards

| Name                                | Description  |
|-------------------------------------|--|
| <a href="#">LAFS.1112.RST.3.8:</a>  | Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.  |
| <a href="#">LAFS.1112.WHST.3.9:</a> | Draw evidence from informational texts to support analysis, reflection, and research.  |
| <a href="#">LAFS.910.RH.3.7:</a>    | Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.   |
| <a href="#">LAFS.910.RST.3.7:</a>   | Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.   |
| <a href="#">LAFS.910.SL.2.4:</a>    | Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.  |
| <a href="#">LAFS.910.WHST.3.9:</a>  | Draw evidence from informational texts to support analysis, reflection, and research.  |
| <a href="#">MAFS.912.N-Q.1.1:</a>   | Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. ★  |
| <a href="#">MAFS.912.S-IC.2.6:</a>  | Evaluate reports based on data. ★<br>Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.   |
| <a href="#">SC.912.N.4.2:</a>       | <p><b>Clarifications:</b><br/>Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified. Discuss ethics in scientific research to advance society (e.g. global climate change, historical development of medicine and medical practices).</p> <p>Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.</p> |