

WAMC Lab Template

Math Concept(s): Scale and Proportion, writing equations

Source / Text:

Developed by: Olivia Hernandez E-Mail: ohernandez@masd209.org Date:

Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

-

Lab Plan

Lab Title: Chocolate Chip Lab

Prerequisite skills: Basic knowledge of scale factor, proportional relationships, unit rates

Lab objective: Develop students knowledge of scale and proportion, determining appropriate units of measure, and writing equations for real world, entrepreneurial situations

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

2. HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

3. HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- Initiate and participate effectively in a range of collaborative discussions

K-12 Science Standards

- Make observations and measurements to identify materials based on their properties

Technology

-

Engineering

Washington

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
21st Century Skills (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Leadership and Responsibility
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> Be Self-Directed Learners	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input type="checkbox"/> Solve Problems		<input type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Baking ingredients- flour, sugar, brown sugar, butter , vanilla, baking soda, eggs, chocolate chips, salt
- Measuring spoons
- Mixing bowls
- Baking sheets
- Parchment paper or nonstick spray
(other equipment will be provided through us working in food science lab)

Set-Up Required:

- Preheating ovens to 350
- Prerarranging groups of 3 students and assigning to station

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Students will be working in groups and expected to be equal participants in the process of baking cookies. They will be assigned roles such as Head Chef, Prep cook, dishwasher

Cooperative Learning:

- ❖ Following the completion of the assessment attached where students are expect to convert a recipe into the appropriate units of measurement, students will then get into

<https://wa-appliedmath.org/>

groups, use one student's final answers and work together to bake one-third of a batch of cookies all together.

Expectations:

- ❖ My expectation for this lab is to show students a practical, everyday, application to help them understand scale and proportional relationships. Also I expect students to accurately identify an appropriate and reasonable unit of measure based on materials provided

Timeline:

- ❖ The math write up portion (conversions) should take students 20 minutes. Students will then get into assigned groups and decide which ONE student's recipe they are going to use to take to the food science lab where they will work with their group to make a one-third batch of cookies. They will choose between 3 roles (Head chef, sous chef, dishwasher)

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab



Career Applications

- ❖ Any food industry

Optional or Extension Activities

- ❖ You could build on this activity by involving price of ingredients and asking students to determine cost using unit rates. You could then ask them to use that cost to write an equation for the cost with the number of batches being the variable.

<https://wa-appliedmath.org/>

Washington

Applied Math Council

Chocolate chip cookies

1 oz = $\frac{1}{8}$ cup
1 oz = 6 tsp
1 oz = $\frac{1}{4}$ stick of butter

Directions: convert all measurements to either cups or teaspoons (You determine what makes more sense)

Ingredients

Original	converted
* 24 oz all purpose flour	_____
* $\frac{1}{6}$ oz baking soda	_____
* $\frac{1}{6}$ oz sea salt	_____
* 8 oz unsalted butter	_____
* 4 oz granulated sugar	_____
* 10 oz lightly packed brown sugar	_____
* $\frac{1}{3}$ oz vanilla	_____

<https://wa-appliedmath.org/>

* 2 eggs

* 16 oz chocolate chips

Instructions:

1. Preheat oven to 350°F. Line baking sheets with parchment paper.
2. In a medium bowl, combine the flour, baking soda, and salt.
3. In the bowl of an electric mixer, beat the butter, granulated sugar, and brown sugar until creamy, about 2 minutes. Scrape down the sides and bottom of the mixing bowl. Add the vanilla and eggs and beat until combined, scraping the bowl down as needed. Gradually beat in the flour mixture. Stir in the chocolate chips.
4. If time permits, wrap dough in plastic wrap and refrigerate for at least 24 hours but no more than 72 hours. This allows the dough to “marinate” and makes the cookies thicker, chewier, and more flavorful. Let dough sit at room temperature just until it is soft enough to scoop.
5. Divide the dough into 3-tablespoon sized balls using a large cookie scoop and drop onto prepared baking sheets.
6. Bake for 11-13 minutes, or until golden brown. Cool for 5 minutes before removing to wire racks to cool completely.

<https://wa-appliedmath.org/>