

WAMC Lab Template

Math Concept(s): Unit Conversion

Source / Text: None

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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):

This lab will take place prior to my Medical Math Conversions lesson. The lab and following lesson will be used in a Biomedical Science class. It could be used in a Chemistry class prior to a unit on dimensional analysis. It could also be used in any math class.

Lab Plan

Lab Title: Household Measurements

Prerequisite skills: Students should know how to express measurements from a given measurement tool to the appropriate decimal.

Lab objective:

- 1) Students will determine equivalence of common household measurements:
Tbsp/tsp/cup/oz.
- 2) Students will use these equivalences to convert one measurement to another in the following Medical Math Conversions lesson.

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

Mathematics K–12 Learning Standards

- HS.N-Q.1 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.
- HS.N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standards for Mathematical Practice: :

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

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

- HST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

K-12 Science Standards

- Science and Engineering Practices
 - Planning and Carrying Out Investigations
 - Using Mathematics and Computational Thinking

- Obtaining, Evaluating, and Communicating Information

[NCHS National Health Standards \(2019\)](#)

- 1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare.
 - c. Conversions: household measurements (Tbsp/tsp/cup/oz)

Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (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		
<u>21st Century Skills</u> (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>	<u>Productivity and Accountability</u>
<input type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<u>Leadership and Responsibility</u>
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Guide and Lead Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	<input type="checkbox"/> Be Responsible to Others
<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

- Each group will need a Tablespoon, teaspoon, measuring cup, measuring cup with increments in ounces, and water.

Set-Up Required:

- Place one of each household measuring device at each station.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams.
- 3.B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

Cooperative Learning:

- Students will work in groups 3 or 4. One student will serve as the group manager, another will be the materials gather, another will be the recorder, and the final student will be the communicator. The communicator role can be assigned to the group manager if there are only.

Expectations:

- It is expected that students will develop and implement a plan to determine the equivalencies for common household measurements.

Timeline:

- This lab should be a one hour lab to be followed by a one hour lesson on using equalities to convert between household measurements from one unit to another.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- It is common to need to convert household measurements from one unit to another. For example you may need to convert teaspoons to tablespoons if you want to increase the servings in a recipe.

Career Applications

- Health science professionals also need to convert measurements from one unit to another including common household measurements

Optional or Extension Activities

- This lab and lesson could be followed by lessons involving common conversions used in health sciences.
 - Height (inches/meters)
 - Weight/mass (pounds/grams)
 - Length (inches/meters)
 - Volume (ml/cc)
 - Temperature (F/C)

Household Measurements Lab Handout

Challenge

How many teaspoons are in tablespoons? If you want to increase the number of portions generated by a recipe you may need to convert quantities measured in tablespoons or even ounces. Work with your team to create a procedure that allows you to complete the table.

_____ tsp = _____ Tbs

_____ tsp = _____ oz

_____ Tbs = _____ oz

_____ tsp = _____ cup

_____ Tbs = _____ cup

_____ oz = _____ cup

Before you begin, assign the following roles to your team members.

- Group manager - keeps the group on task and manages the groups time
- Manipulator - does the majority of the manipulation of supplies
- Recorder - records information and records the group procedure
- Communicator - will share a portion of the groups procedure with the whole class

As a group, brainstorm and record your group's plan for filling in the table above.

Procedure

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

Formative Assessment

Use this rubric to have students self assess their ability to Collaborate with Others. After the student completes their self assessment they should pair-share with a another group member their self evaluation.

21st Century Skills				
Collaborate with Others				
	4 Exceeds Standard	3 Meet Standard	2 Approaching Standard	1 Not at Standard
3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams	Consistently listens to others. All statements, responses and body language, are respectful and appropriate. Always listens to, shares with, and supports the efforts of others.	Listens to, shares and supports others. Statements and responses are respectful and appropriate body language was exhibited.	Most statements, responses and body language are respectful; occasionally had a negative tone. Does not always listen to, share with, and support the efforts of others.	Statements, responses and/or body language were consistently not respectful. Rarely listens to, shares with, and supports the efforts of others
3.B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal	Always listens to ideas and demonstrates compromise allowing the group to meet its full potential.	Is willing to compromise with group to accomplish a common goal.	Attempts to compromise with group to accomplish a common goal, but sometimes interferes group from meeting its full potential.	Typically does not compromise with group to accomplish a common goal, and often interferes with group from meeting its full potential.
3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	Motivates all members to share in contributions equally by valuing all members' ideas and contributions.	Participates and contributes to group's work equally. Values all members' ideas and contributions.	Attempts to share responsibility of groups' work, but ends up completing most of the work, without utilizing input of others in group.	Either does most or very little of the group's work and does not share or respect others' ideas.

Summative Assessment

Check to determine if the students' equalities are reasonable. Use this rubric to assess the groups written procedure.

21st Century Skills				
Communicate Clearly				
	4 Exceeds Standard	3 Meet Standard	2 Approaching Standard	1 Not at Standard
3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts	Worked creatively to craft and present a comprehensive multimedia presentation that uses both verbal and nonverbal communication.	Communicated thoughts and ideas by crafting and presenting a multimedia presentation using both verbal and nonverbal communication.	Creates a multimedia presentation but does not effectively address/communicate using both verbal and nonverbal communication	Either creates a multimedia presentation but does not present, or fails to complete the multimedia presentation, thus does not communicate using both verbal and nonverbal communication