

## Lab Framework

**Text:** Applied Mathematics/CORE

**Unit number and title:** Unit 3 – Measuring in English and metric units

**Short Description:** Students are learning how to measure volume

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## Lab Title Measure volume

### LAB PLAN

**TEACHER:** Teacher Prep/ Lesson Plan

- **Lab Objective**

1. Record and measure volume.
2. Use appropriate units and procedures to calculate volume.
3. Use 1-inch cubes to calculate volume.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

This unit builds on the skills taught in Unit 1: *Learning Problem solving Techniques* and Unit 2: *Estimating Answers*.

- **Vocabulary**

measuring, volume, measurement, cubic inches, cubic

- **Materials List**

1. A large number of 1-inch cubes made of wood or plastic
2. A collection of different-size rectangular household boxes (examples: cereal boxes, tea bag boxes, saltine cracker boxes...)
3. Rulers
4. Pencil and paper
5. Work sheet (text of work sheet provided in **The Lesson** section below); alternatively, the instructions/questions could be posted on chart paper or a transparency for all to see/follow

- **GLEs (State Standards) addressed**

Math: (Math)

Reading: (Reading)

Writing: (Writing)

- **Leadership Skills**

- **SCAN Skills/Workplace Skills**

- **Set-up information**

For this lab, you might pair up students *or* they can work individually.

Distribute to each student or student-pair two different-sized boxes. The boxes should be fairly manageable in size, since students are going to fill them with 1-inch cubes.

It might be a good idea to number the boxes and to create a master answer key that has on it each box number and its volume.

Have students use the 1-inch cubes to measure volume. Provide each student with a work sheet with the instructions and questions below on it (or post the text below on chart paper or a transparency and have students respond on paper). The work sheet will lead students to "discover" the meaning of volume.

- **Lab organization** (-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)  
Students can work in pairs or individually.
- **Teacher Assessment of student learning** (scoring guide, rubric)  
Performance assessment and worksheet
- **Summary of learning** (to be finished after student completes lab)  
-discuss real world application of learning from lab - Discuss the various careers that my make use of finding volume and how to calculate it.  
-opportunity for students to share/present learning- Have pairs of students share their answers from their worksheet.

Introduce students to the way of writing volume. For example a box that is 4 inches wide, 6 inches long, and 2 inches high has a volume of...

$4 \times 6 \times 2 = 48$  *cubic inches* or  $48 \text{ in.}^3$

- **Optional activities**  
Now that students know how to figure the volume of a container without manually placing 1-inch cubes in it, provide either much bigger boxes and different shaped containers for students to use as they calculate volume.
- **Career Applications**  
Discuss the various careers that my make use of finding volume and how to calculate it.

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**LAB TITLE: Measuring Volume**

**STUDENT INSTRUCTIONS:**

- **Statement of problem addressed by lab**

For this lab, you can work with one other person or you may chose to work alone. You will be given different-sized boxes. Use the 1-inch cubes to measure volume. Use the with a work sheet provided with the instructions and questions below on it. The work sheet will lead you to "discover" the meaning of volume.

- **Grouping instructions and roles**

If students prefer to work in pairs, one person can place the cubes in the boxes while the other is the recorder. Both can take turns measuring and recording on the worksheet.

- **Procedures – steps to follow/instructions**

You are given two different-sized boxes. Fill the box with 1-inch cubes.

Use your ruler and the formula provided to measure volume.

For example a box that is 4 inches wide, 6 inches long, and 2 inches high has a volume of...

$$4 \times 6 \times 2 = 48 \text{ cubic inches or } 48 \text{ in.}^3$$

- **Outcome instructions**

When you are finished with your measurements, please make sure the boxes are placed in the proper container and your worksheets have both names on it and are placed in my inbox.

- **Assessment instructions (peer-teacher)**

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NAME: \_\_\_\_\_

NAME: \_\_\_\_\_

### Work Sheet Investigating Volume

1. Fill up one box with the 1-inch cubes.

2. How many 1-inch cubes does it take to fill up/make up the length of the box? \_\_\_\_\_

3. How many 1-inch cubes does it take to fill up/make up the width of the box? \_\_\_\_\_

4. How many 1-inch cubes does it take to fill up/make up the height of the box? \_\_\_\_\_

5. Count the number of 1-inch cubes it takes to fill the box. Write down the total number of cubes. \_\_\_\_\_

6. Write this formula for finding volume:

$$V = L \times W \times H \text{ (Volume = Length} \times \text{Width} \times \text{Height)}$$

7. Use a ruler to measure (in inches) the length, width, and height of the box.

8. Multiply the length by the width by the height.

9. What is your answer for the volume of the box? \_\_\_\_\_

10. Is your answer to #5 the same as your answer to #9? \_\_\_\_\_

11. Does that mean the volume is the amount of cubes it takes to fill a box?  
\_\_\_\_\_

12. Look up the definition of volume in a dictionary and write it down.

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