

Lab Framework

Text:CORD

Unit number and title: UNIT 3 – UNIT CONVERSION

Short Description: How to convert units (dimensional analysis)

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Lab Title AIR DENSITY

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
Students will be able to determine the density of air inside various balloons inflated to various volumes
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
Density formula; use of scale; conceptual understanding of mass vs. weight
- **Vocabulary**
Density; Mass; Weight; Volume
- **Materials List**
Balloons; Scale (to measure mass)
- **State Standards addressed**
Math: (Math)
Reading: (Reading)
Writing: (Writing)
- **Leadership Skills**
Handling supplies; Reading and record keeping; Presentaiton
- **SCAN Skills/Workplace Skills**
Understanding how to read, measure, and calculate using common unit conversions
- **Set-up information**
Form lab groups of 3 to 4. Distribute 3 different size balloons to each group. Set up mulpitple scale stations depending upon the number of students in the class
- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)
Groups of 3 with a materials leader; record and measurement leader; presenter. Groups are expected to coordinate lab procedure amongst each other, form hypothesis and generate conclusion based upon lab results. Prepare and present results over 3 classes
- **Teacher Assessment of student learning** (scoring guide, rubric)
Students will be assessed on whether the results support or refute the hypothesis and their ability to reflect upon and justify results from the lab based upon comparisons to real world items (car tire)
- **Summary of learning** (to be finished after student completes lab)
-discuss real world application of learning from lab
-opportunity for students to share/present learning

Students will share results from lab via group presentations

- **Optional activities**
Submerge each balloon in fluid and compare buoyancy capacity of various size balloons
- **Career Applications**
Mechanic; Aerospace Engineer; Pharmacist

Washington Applied Math Council

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LAB TITLE: How much does air weigh?

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
Does air have weight? How can you determine the density of an object?
- **Grouping instructions and roles**
Groups will be made using the following categories: Materials/Supplies; Record keeping/Measurement; Calculations; ALL Members present
- **Procedures** – steps to follow/instructions
Use a scale and record the mass or weight of the empty balloons. Inflate the balloons with air and tie them closed. Use the scale to measure the inflated mass or weight. Find volume using measured diameter. Find the density of air in each balloon.
- **Outcome instructions**
Compare the air density of each balloon. Describe any conclusions based upon balloon size vs. air density.
- **Assessment instructions** (peer-teacher)
Students will review the conclusion of another group and compare with their own findings. Students will assess based on what justifications the group included in their results.

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Lab Data Collection

Student: _____ Date: _____

Unit: 3

Lab Title: How much does air weigh?

Criteria: Write the problem/objective in statement form

Determine the density of air inside a balloon

Data Collection: Record the collected/given data

Balloon Name	Empty mass (g)	Inflated mass (g)

Calculations: Complete the given calculations to solve for an answer(s)

Summary Statement:

Air has mass, thus it has weight. Assuming two balloons are the same, the balloon inflated to a larger volume will have a higher density of air.

Other Assessment(s)

Unit exam on conversion; Understanding area vs. volume vs. length using units

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