NAVSEA
SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS

#SeaworthySTEM

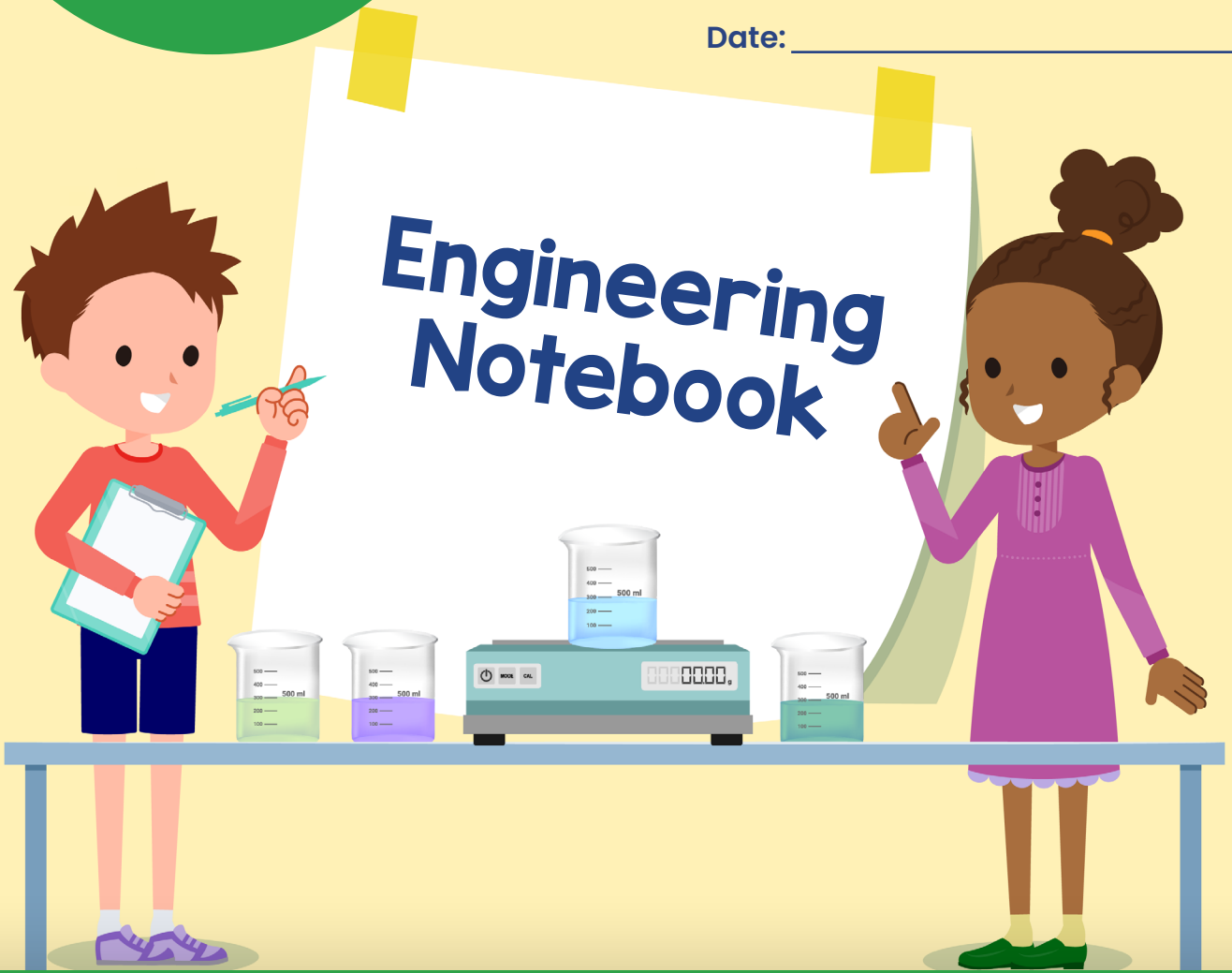
Comparing Mass and Density

Grades 6-8

Student Activity Workbook

Name: _____

Date: _____



Seaworthy STEM™ in a Box Series

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SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS

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Comparing Mass and Density

Part 1: Data

In today's lab experience, you will explore how the volume and mass of liquids are related to each other. The measurements that you take will help you build a mathematical model that describes this physical phenomenon.

Procedure:

1. Obtain a balance, graduated cylinder, and beakers of 2 different liquids.
2. You get to choose which volumes you want to measure. Try to cover a wide range of volumes, but the samples sizes you choose are up to you. Take at least 5 – 10 data points per liquid you test.
3. Be sure to record the mass of YOUR graduated cylinder before you begin.
4. When you are done, return your supplies to the counter. Clean up any spilled materials and wash your hands.

Graduated Cylinder Empty Mass: _____ g

Liquid 1: _____

Volume (ml)	Mass (g)

Liquid 2: _____

Volume (ml)	Mass (g)

2 Part 2: Analysis

Procedure:

1. Use the graph paper on the following pages and two different colored pencils or pens.

2. Set up a set of axes to make a scatter plot with the mass and volume data you gathered. Plot the volume on the x-axis and the mass on the y-axis.

3. Be sure to give your graph a meaningful title and include the units of measure on the axis labels.

4. Look at the ranges of masses and volumes and set up an appropriate scale. Remember to use even increments on your scales. Your scales should look like number lines!

5. Start with your first liquid and use the volume and mass as and (x, y) ordered pair. Plot all the data points for this liquid using one colored pencil.

6. Do you notice any sort of trend? The trend in your data is best represented by a "best fit line" that goes through the middle of your data points. Use a ruler to draw your best fit line. Try to have about as many points above the line as you have below it. *(*Something to think about: Should your line go through the origin (0,0)? What would this mean?)*

7. Use the other colored pencil to plot the data points and best fit line for the 2nd liquid on the same set of axes.

8. Calculate the slope of each of your best fit lines in the space below. Remember to include units of measure!!

Liquid 1 Slope Calculation

Liquid 2 Slope Calculation

STEM Related Career:

- Chemical Engineer
- Mechanical Engineering

Fun Fact!

Did you know that the Navy has an entire team of environmental scientists who have helped develop a three-tier action plan to minimize any environmental effects from possible oil spills. The Navy's policy is to respond to any possible Navy spills and to undertake direct and immediate action to minimize the spill's effect. Their knowledge of liquids having different densities aids them in this process.

Notes

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Comparing Mass and Density Engineering Notebook

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