

SI Units

PURPOSE- The purpose of this lab was to learn how to use SI units. This included expressing measurements in SI units, reading a thermometer, measuring liquid volume by using graduated cylinders, measuring mass by using balances, and determining the density of two liquids.

HYPOTHESIS- If you place a dark object and a light object under a heat lamp for a period of time, then the dark object will heat faster than the light object because heat is more attracted to dark-colored objects and dark-colored objects will absorb more heat.

EXPERIMENT PLANNING-

- A) The Independent Variable in this lab was the sand color, either dark or light.
- B) The Dependent Variable was the sand temperature.
- C) The variable that we had to hold constant was the amount of heat we used.

MATERIALS-

- 100 mL graduated cylinder
- 75 mL of light-colored sand
- 75 mL of dark colored sand
- 2 plastic cups
- Thermometers, Celsius, alcohol-filled
- Heat resistant gloves
- Light source
- Ring stand or lamp support
- Balance
- Stopwatch
- 25 mL of water
- 25 mL of corn oil
- Cup, clear plastic
- Graph paper
- Safety goggles

PROCEDURE-

1. We began by measuring 75 mL of light-colored sand and placing it in a plastic cup. We repeated this procedure with the dark-colored sand, and we placed a thermometer in each cup.
2. We then placed each cup of sand under a heat lamp for 10 minutes. After every minute, we measured the temperature (in degrees Celsius) of each cup of sand.
3. Then we moved on to the next part of the lab. We labeled one plastic cup "oil" and another "water." We measured the mass of each cup on a balance, and recorded our results.

4. Next we measured 25 mL of corn oil and put it into the cup labeled “oil”. We placed the cup on a balance and measured the mass.
5. We repeated this procedure with the water.
6. We then found the mass of the oil by subtracting the mass of the empty cup from the mass of the cup and the oil together.
7. Next we found the density of the oil, by using the following formula:
$$\text{Density of Oil} = \frac{\text{mass of oil}}{\text{Volume of oil}}$$
8. Then we found the mass and density of the water.
9. Last, we mixed the oil and water together in the cup, and recorded our observations.

DATA AND OBSERVATIONS/RESULTS- In this lab, we discovered that dark colors heat more than light colors. We also discovered that oil is less dense than water, and therefore, when the two are mixed together, the oil floats on top of the water.

DATA TABLES HAVE BEEN REMOVED AS THEY WERE HAND DONE

CONCLUSION- The purpose of this experiment was to learn more about SI units, and how to use them. We did this by measuring temperature, mass, and density. In this lab, our results supported our hypothesis, showing that overall, the dark-colored sand heated more than the light-colored sand. I think our results happened because dark colors absorb heat more, which is why the dark sand ended up with a warmer temperature than the light sand. A lapse that may have affected our results was misreading the thermometer. This may have affected our results because if we misread the thermometer, then we may have had the wrong numbers and that would have given us inaccurate data. Our investigation was limited, because it did not tell us why darker colors absorb more heat. Two concepts I have learned after doing this lab is that dark colors absorb more heat than light colors, and that oil is less dense than water. Two new questions I have after doing this lab are

- Why is heat more attracted to dark colors than light colors?
- Why are some objects more dense than others?

What I learned applies to a real life situation, because on a hot day I will now know to wear light-colored clothes rather than dark-colored ones. I am still questioning how

heat and colors work together, and a future experiment that could help me understand this would be one involving an explanation of why dark colors heat more than light colors.