

Date Received: 9-9-08

Lab #2

SI Units

I. Pre-Lab

Problem/Purpose: The purpose of this experiment was to practice expressing measurements in SI units, reading a thermometer, measuring liquid volume by using a graduated cylinder, measuring mass by using a balance, and determining the density of two liquids.

Hypothesis: If we combine the oil and water after comparing their density, then the oil and water will separate and the oil will rise to the top because oil is less dense than water.

Experiment Planning:

- a.) The independent variable was the color sand we used.
- b.) The dependent variable was the temperatures of the sand.
- c.) The variable we needed to hold constant was the light source.
- d.) Our sample size will be 1 up of each color sand and we did 10 trials when measuring the sands' temperatures.

II. Materials: Graduated cylinder (100 ml), light-colored sand (75 ml), dark-colored sand (75 ml), 2 clear plastic cups, 2 Celsius thermometers, gloves, light source (lamp), balance, stopwatch, water (25 ml), corn oil (25 ml), clear plastic cup.

III. Procedure

(MEASURE SAND TEMPERATURE)

1. First, my group and I measured 75 ml of light-colored sand and poured it into a plastic cup, and repeated this with the dark-colored sand and another cup. 2. We inserted a thermometer into each cup, making sure the zero line on the thermometer was level with the sand. 3. We measured the temperature of each cup of sand before we turned on the lamp, and wrote it in the data table. 4. We put the cups under the lamp, started the stopwatch, and checked the temperature of the sand every minute for ten minutes. 5. As we checked the temperatures, we recorded them in the table.

(COMPARE THE DENSITY OF OIL AND WATER)

6. We labeled one clean plastic cup "oil" and labeled another "water". 7. We used a balance to measure the mass of each plastic cup and recorded the value in our data table. 8. We used a clean graduated cylinder to measure 25 ml of corn oil and then poured it into the plastic cup labeled "oil". 9. We used the balance to measure the mass of the cup containing the corn oil, and recorded the mass in our data table. 10. We then repeated steps 8 and 9 with water and the cup labeled "water". 11. We found the mass of the oil by taking the mass of the cup and oil together and subtracted the mass of the cup alone. 12. We found the density of the oil by taking the mass of the oil and dividing it by the volume of the oil. 13. We repeated steps 11 and 12 with water and recorded all of the measurements. 14. We combined the oil and water in the clear cup and recorded our observations. 15. Finally, we cleaned up our materials and washed our hands.

IV. Results

What happened in our experiment was we measured sand temperature and compared the density of oil and water. We took the temperature of the sands every minute for 10 minutes and recorded our data. We used a balance to find the masses and densities of water and oil. We found the densities by taking the mass and dividing it by the volume.

| | Sand Temperature | |
|------------|-------------------------|--------------------|
| | Temperature (degrees C) | |
| Time (min) | Dark-colored sand | Light-colored sand |
| Start | | |

**DATA TABLE REMOVED BY MRS.
ROBERTS BEFORE POSTING**

We observed that the dark-colored sand absorbed the heat more than the light-colored sand because light is attracted to darker colors.

Density of Two Liquids

DATA TABLE REMOVED BY MRS. ROBERTS BEFORE POSTING

What we observed when combining the oil and water was that the oil and water separated and the oil rose to the top. We could also see bubbles because of the fat in the oil. This is what it looked like:



That is what happened and what we observed in our experiment.

V. Conclusion

The purpose of the experiment was to practice expressing measurements in SI units, reading a thermometer, measuring liquid volume by using a graduated cylinder, measuring mass by using a balance, and determining the density of two liquids.

What happened was we measured sand temperature and compared the density of oil and water. I accept my hypothesis because the water and oil did separate and the oil rose to the top because oil is less dense than water, which we figured out while doing this experiment.

I think this happened because the oil was less dense so it rose to the top of the glass above the water. Analysis question number two: The relationship between color and heat absorption is that

the darker the color, the more heat it will absorb. Question three: The color of my clothes might affect how warm I am on a sunny day because if I am wearing dark colors, I might be warmer than if I wore light colors because dark colors absorb light more which transfers into heat. Question four: Our observation is related to the densities calculated because we found that the oil was less dense and it rose to the top of the glass. The water was more dense so it went to the bottom. Question five: If I observed ice floating in water, I would infer that ice was less dense than water.

I have pretty good confidence in our results. Some factors or errors that may have affected our results would be if we misread the thermometers when measuring the temperatures of the sands. If we had misread them, then our results would be different.

Two concepts I have learned after doing this lab are that anything that is less dense than water floats in water, and that darker colors absorb more heat than lighter colors. Two new questions I now have are "What would happen if something had the same density as water and they were combined in a glass?" and "Why do darker colors absorb more heat?". What I learned applies to a real life situation because if I went to a baseball game when it was really hot and sunny outside, I would know to wear lighter colors to stay cooler. A future experiment that would help me learn more would be to see what would happen if we combined water and another liquid with the same density.