Lab #: 2

Date Received: 9-9-08

Name:

SI UNITS

	unit name	unit symbol	derived from	quantity	named after
all lower case unit symbols	meter	m		length	
	kilogram	kg		mass	
	second	s		time	
	candela	cd		luminous intensity	
	mole	mol		amount of substance	
	liter	ℓ, L	$10^{-3}\cdot m^3$	volume	
	ohm	Ω	$W\cdot A^{-2}$	resistance	Georg Simon Ohm
leading capital letter in unit symbol	ampere	A		electric current	André-Marie Ampère
	kelvin	K		thermodynamic temperature	William Thomson (Lord Kelvin)
	hertz	Hz	s^{-1}	frequency	Heinrich Hertz
	newton	N	$kg\cdot m\cdot s^{-2}$	force	Sir Isaac Newton
	joule	J	$N\cdot m$	energy	James Joule
	watt	W	$J\cdot s^{-1}$	power	James Watt
	volt	V	$W\cdot A^{-1}$	voltage	Alessandro Volta

Problem/Purpose:

The purpose of this lab was to understand how the metric system works. SI units are just an easy way to measure things because they work in multiples of ten.

Hypothesis:

If both the light and dark colored sand are put under the light at the exact period of time, then the dark colored sand will have a higher temperature because scientists have proven that light is more attracted to darker objects or things.

Experimental Planning:

Independent Variable - The two types of sand.

Dependent Variable - The temperature.

Variables you need to hold constant - The same amount of heat and the same amount of sand in each plastic cup, the same sized plastic cups, and the thermometer has to stay in each cup.

How many trials will you do? - You have to record the temperature of each cup every minute for the total of ten minutes.

Materials:

☺ graduated cylinder, 100 mL
☺ sand, light-colored, 75 mL
☺ sand, dark-colored, 75 mL
☺ cups, plastic, (4)
☺ thermometers, Celsius, alcohol-filled (2)

☺ gloves, heat-resistant
☺ light source
☺ ring stand or lamp support
☺ balance
☺ stopwatch
☺ water, 25 mL
☺ corn oil, 25 mL

Procedure:

A. Measure Sand Temperature

1. We put on our safety goggles and gloves.

2. We used a graduated cylinder and measured 75 mL of both light-colored and dark-colored sand, except we did them both separately. After we finished measuring one-colored sand, we would pour it into a plastic cup. We did the same to the other-colored sand.

3. We leveled both of the sand cups and put a thermometer into each of the cups. Each of the cups were side by side.

4. We used the thermometer to record the temperatures of each cup of sand, before they were put under the lamp.

5. Emily Hillman put both of the cups under the light at the same time, and she used a stopwatch to record each temperature for every minute, onto our lab paper.

B. Compare the Density of Oil and Water

5. While Emily Hillman was recording the temperatures for every minute, Megan and I used a balance to weigh two empty plastic cups,

because we thought that by doing this, we would finish the lab quicker. We then recorded the results.

6. We put 25 mL of oil and poured it into one of the cups. We repeated this step with water.

7. We balanced the cup of oil, and then balanced the cup of water. Then, we recorded the results.

8. We then figured out the density of each cup. This was easy to do, because we used the method " I love density." We then recorded these results.

9. We mixed the oil and water together, and then recorded the results.

10. Lastly, we cleaned up our area and materials.

Data and Observations (Results) :

Sand Temperature

	Temperature (degrees C)	
Time (min)	Dark-colored sand	Light-colored sand
Start	25 C	26 C
1	25 C	26 C
2	26 C	27 C
3	26 C	27 C
4	26 C	27 C

5	26 C	27 C
6	27 C	27 C
7	27 C	27 C
8	28 C	28 C
9	27 C	27 C
10	28 C	28 C

Density of Two Liquids	
a. Mass of empty oil cup	6.5g
b. Mass of empty water cup	6.5g
c. Mass of cup and oil	29.5g
d. Mass of cup and water	30.5g
e. Volume of oil	25 mL
f. Volume of water	25 mL

Calculating Actual Mass

Oil Item c - Item a =	23g
Water Item d - Item b =	24g
g. Density of oil	1.18 g/mL
h. Density of water	1.22 g/mL

Oil and Water Combined in a Plastic Cup

Results: There are a lot of bubbles. The two different liquids separate. The oil is on top and the water is on the bottom.

Conclusion:

The purpose of this lab was to understand how the metric system works. SI units are just an easy way to measure things because they work in multiples of ten. When I look at my results, I have to reject my hypothesis. In my hypothesis, I predicted that the dark colored sand would have a higher temperature under the light, even both the cups were put under the light, at the same exact time. However, in my results, the chart shows me that most of the higher temperatures, was the light colored sand. The other part of the time, both cups had the same temperature. I think my hypothesis was incorrect because the darker sand could have been a bit damp and cold when we started the

lab. I can only think of this solution as to why I was wrong. I do not think that we made any results that could have affected my results. I think that we may have calculated the density of the oil and the water wrong. Other than that, I have a lot of confidence in my results because I can trust that Emily Hillman did a wonderful job at recording the temperatures of the sand, for each minute, while Megan and I were doing the density of oil and water part of the lab, so we could finish the lab quicker. After doing this lab, two concepts I have learned is that one scientific statement, doesn't apply to everything. Another concept is that you need to be open to many other reasons, as to why you were wrong. These life-long lessons can apply to a real-life situation because if you are watching the news, and the weatherman says that it is going to be sunny and warm all day, and you plan your day based on that weather, you need to be open to other plans for the day, if the weatherman was incorrect. Some future experiments that would help me understand more would be to put a piece of black material and white material of the same size, under a light, at the same period of time. Another future experiment would be to make your own prediction of the weather, and then to listen to the weatherman's prediction. Then, you could compare both of your predictions, and wait and see who was correct or incorrect.