DENSITY OF LIQUIDS LAB – PART 1 & 2

Name: _____ Date: _____ Period: _____

Purpose*:* To investigate a number of liquids in order to determine which liquid has the _____ density, and which has the _____ density. This information will help you to correctly add small amounts of each liquid to a container without _____ them together.

Research & Ideas:

What do you think makes a lava lamp work the way that it does?

_____

_____

What is Density: _____

A substance with a density of 1.43g/mL has a _____ density than a substance with a density of 0.78g/mL. Water has an overall density of _____g/mL

Materials per Group:

- Regular Test Tubes with colored water (6)
- Small Test Tubes (4)
- Plastic Beakers (2)
- Pipette (2)
- Test Tube Rack
- Colored Pencils

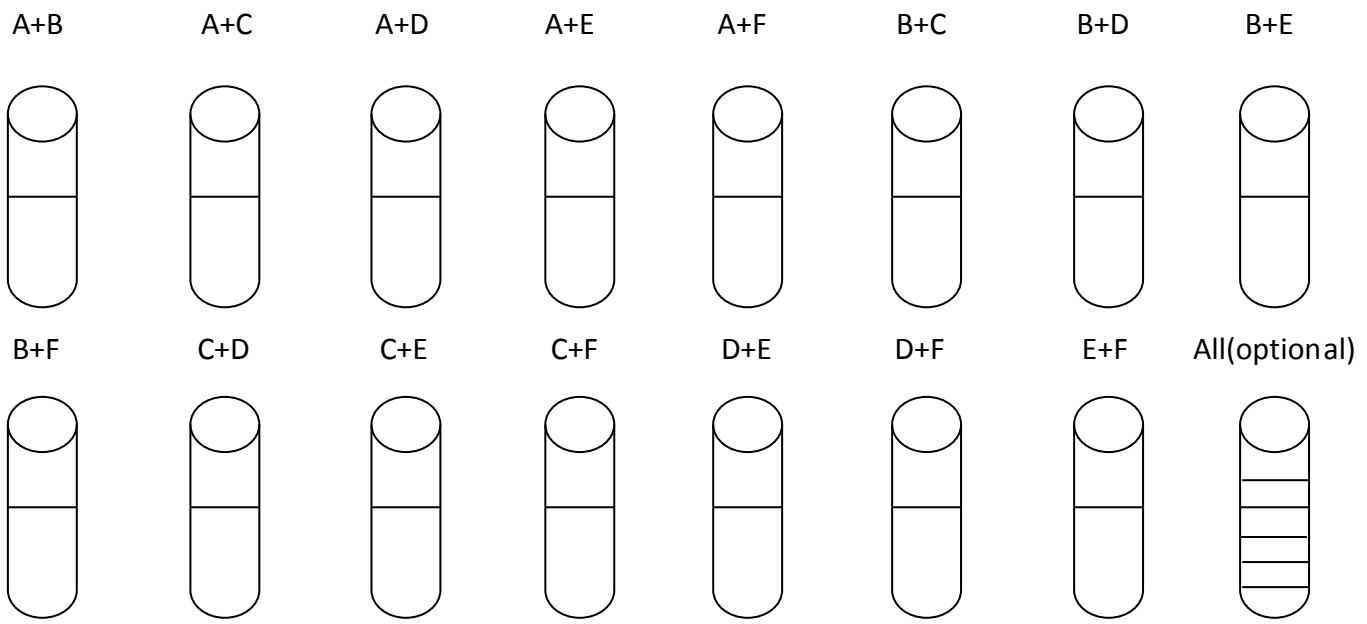
Experiment: Safety Issues:

- **You MUST wear safety goggles throughout the entire exp.**
- **Do not remove your goggles until your recycler collects them.**
- **Only use the required amount of substances, don't be wasteful.**
- **One of these chemicals is strong, so do not inhale directly.**

Procedures*: Remember Safety First!!!*

EXPERIMENT 1:

1. **Check for and gather your 6 test tubes labeled A-F: A = red, B = green, C = colorless, D = yellow, E = orange, and F = blue.**
2. **Using a pipette, add approximately .5mL of colored liquid into smaller test tubes using the siphoning method explained by your teacher.**
3. **Carefully add .5mL of the other colored liquid to the bottom of the same test tube using the siphoning method; TRY YOUR BEST TO NOT MIX THE LIQUIDS TOGETHER! USE SMALL QUANTITIES AND RELEASE THE LIQUID SLOWLY**
4. **Color the test tubes below to identify which liquid was at the top of the mixture and which liquid went to the bottom.**



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Data Analysis:

*Based on your findings, fill in the chart below. Indicate the correct letter and provide the **color** in the column by listing them in order from **LEAST DENSE TO MOST DENSE**.*

Test Tube Letter	Color of Liquid	Density (ranking)
		Least Dense
		2nd
		3rd
		4th
		5th
		Most Dense

Conclusion: *Based on your experiment, answer the following questions.*

1. What are 2 things that you can learn or practice from conducting this lab? Explain. _____

_____

_____

_____

2. What do you think the identity of the liquids you tested was? Explain why you think so.

_____

_____

3. What would happen, or what did happen, if you did not use the pipette correctly to distribute the liquids?

_____

4. Explain the necessary steps to follow in order to successfully separate the liquids without mixing them.

_____

_____

_____

5. The actual content was colored _____ _____. Based on your experiment and findings, what do you think was the major difference between each of the colored liquids? Explain in complete sentences.

_____

_____

6. Draw a model showing the amount of particles in each different test tube based on comparative densities.

A. B. C. D. E. F.

7. Explain a different method we could have used to identify the order of how the liquids would stack.

_____

_____

8. Why was color added to the liquids? What would the experiment be like if the colors were not added?

_____

_____

Experiment 2: Layering Liquids (Now you try it!)

Purpose: To use what you understand about density in order to correctly pour and layer _____ different liquids in a container without _____ them together based on their _____.

Research: Discuss with your table group, and describe below, how you will accomplish the task of layering seven different liquids without mixing: _____

_____

_____

Materials per Group:
- Ring Stand w/clamp
- 25ml Graduated Cylinder
- Small Test Tubes with samples (7)
- Disposable Cups (7)
- Mass Scale (counter)
- 7 liquids (20 mL each)
- Medium glass Beaker

Procedures: *Remember Safety First!!!*

1. **Measure only 20mL of each liquid into the disposable cups. Hint: Use water first to mark 20mL.**
2. **Identify each liquid's density before pouring any of the raw ingredients.**
3. **Pour the liquids slowly into the glass beaker without touching the wall on the way in.**
4. **This experiment is to be designed and completed entirely by you and your group. PLEASE DON'T BE WASTEFUL. Please be careful not to spill the liquids. In case of a spill, clean up immediately in order to avoid ant infestations.**

Pre Lab Assessment/Predictions:

1. View each sample. What do you predict are the seven liquids that we are using for this experiment?

A. _____ B. _____ C. _____

D. _____ E. _____ F. _____

2. Observe/Examine each of the samples (A-G). Record your observations about each sample. Next, with your team, DISCUSS and rank the order of samples from the least → most dense and EXPLAIN your reasoning for the ranking of each samples density.

Table 1: Observations of Liquid Samples A-G

Sample and possible identity	Physical Description: (color, thickness, appearance, odor, etc…) Please **do not** taste the sample.	**Predicted ranking of density** (1 = least dense, 7 = most dense)	Reasoning (explanation) for Ranking	Actual Identity of sample (last)
A.				
B.				
C.				
D.				
E.				
F.				

4. Design the experiment procedures you will follow to test your prediction. Be thoughtful & explain each step.

a._____

b._____

c._____

d._____

e._____

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Experiment: *After your procedures are approved by the teacher, complete the experiment below.*

1. Complete the data table by calculating each measurement for each of the seven liquids. Round your density calculation to the nearest hundredths place (Second decimal): Mass of empty paper cup: _____

Name of Liquid	Mass of liquid	Volume	Density
A.			
B.			
C.			
D.			
E.			
F.			
G.			

2. Next, create a "Density Column" by carefully adding each liquid layer to the glass beaker. Use your calculations to determine each layer of the column. Be careful with your pouring and clean up any spills.

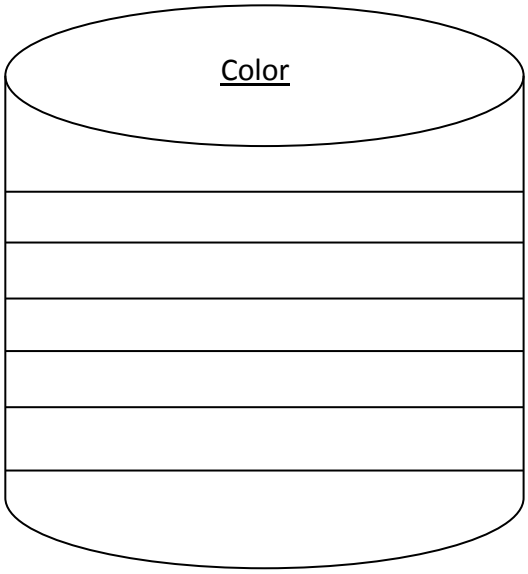
Analysis:

3. Label and color the "container" below with the correct layers of liquid. Provide the name (left) and the specific density (right) of each layer. When finished, clean up your environment and lab equipment.

Color

Liquid

_____
_____
_____
_____
_____
_____



Density (with unit)

_____
_____
_____
_____
_____
_____

Reflection:

4. Describe the success and/or failures that your group experienced when attempting to place the liquids correctly into the "density column." _____

_____

_____

_____

_____