**“Testing the Viscosity of Common Liquids”**

**Quick Review:**

**Physical Properties: Density, Viscosity, Shape, Color, Smell, Texture….**

**Chemical Properties: Conductivity, Flammability, Reactivity….**

**Scientific Method: Constant** (stays the same during all experiments) **Control** (to compare results against) **Dependent Variable** (what you measure/your result) **Independent Variable** (what you are testing…the thing you change to get a result)

**Background**: The resistance to flow of a liquid is called viscosity. One example of the importance of a liquid’s viscosity is motor oil in a car engine. The viscosity of motor oil in your family car is very important because it keeps the engine lubricated. It must cling to the moving parts and not run off leaving the parts dry and unlubricated. If the engine is not properly lubricated, it will be damaged eventually. The motor oil must maintain its viscosity in all types of weather from extreme heat in the summer to freezing cold in the winter. The viscosity of a liquid can be determined by comparing the depth of the liquid in centimeters to the time it takes for a bead to travel that depth in seconds. You can use the formula : Speed = depth / time

**Viscosity Lab Summary:**

1. Create a hypothesis.
2. Calculate the speed of each of the liquids, at ROOM temperature, HOT temperature, and then COLD temperature.
3. Answer the Concluding Questions.
4. Graph the speed data for each liquid, at each temperature (Bar graph). Include a title, and make sure both of your axis are labeled.

**Hypothesis:**Which liquid (soap, motor oil, water, vegetable oil) will have the greatest viscosity and why?

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**Data Table**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Room Temperature**  | **Hot Water Bath** | **Cold Water Bath** |
| **Substance** | **Depth****of****Liquid** **(cm)** | **Time****(s)** | **Speed****cm/s** | **Depth****Of** **Liquid****(cm)** | **Time****(s)** | **Speed****cm/s** | **Depth****Of** **Liquid****(cm)** | **Time****(s)**  | **Speed****cm/s** |
| **Motor Oil** | 10.0 | 45 |  | 10.0 | 38 |  | 10.0 | 86 |  |
| **Soap** | 9.8 | 34 |  | 9.8 | 31 |  | 9.8 | 53 |  |
| **Water** | 10.2 | 6 |  | 10.2 | 3 |  | 10.2 | 11 |  |
| **Vegetable Oil** | 10.6 | 17 |  | 10.6 | 11 |  | 10.6 | 24 |  |

**GRAPHING:** Create a Bar Graph to represent the speed data for each liquid, at each temperature. Include a title, and make sure each axis is labeled. Make sure that you have labeled each of your bars on your graph. Your scale should be set up so that the graph covers the entire grid.



**Review Questions:**

1. What is a chemical property?
2. List 3 examples of chemical properties.
3. What is a physical property?
4. List 3 examples of physical properties.
5. Is viscosity a chemical or a physical property?

**Concluding Questions:**

1. In which liquid (and at which temperature) did the bead move the slowest?
2. In which liquid (and at which temperature) did the bead move fastest?
3. Did you prove your hypothesis? Explain why or why not.
4. What effect does temperature play in the viscosity of a liquid?
5. What happens to the particles of a substance when you heat it up?
6. What happens to the particles of a substance when you cool it down?
7. In this experiment, what were the constants? List at least 3 of them.
8. What was the independent variable?
9. What was the dependent variable?
10. Another property of matter is Density. Density=mass/volume. If an object has a mass of 10 grams and a volume of 2 mL, what is its density?