**The Flow Rate of Fluids**

**Purpose:** The purpose of the lab is to determine the flow rate of various household liquids.

**Hypothesis:** I think that the fluids will finish in the following order:

 I think that the relationship between viscosity and flow rate is…

**Materials List**:

* Liquids - cooking oil, corn syrup, dish soap, maple syrup, vinegar, milk/cream, ethyl alcohol, coke, hydrogen peroxide, Ranch salad dressing
* 2 large tinfoil trays
* Masking Tape
* Ruler
* Stop watches

**Procedure:**

1. Cut a large piece of parchment paper that will cover the back of one of the tinfoil trays.

2. Divide the piece of paper into 3 columns. Draw a start line at the top of the paper.

3. Use a ruler to measure 50cm and draw a finish line on the parchment paper.

4. Measure out a small portion of each liquid in the cups provided.

5. Race 3 liquids at a time. Choose 3 students to pour each liquid.

6. Give a stopwatch to 3 people. Each person watches one liquid, and times how long it takes to cross the finish line.

7. Record the time it took the liquid to travel 50cm. Calculate the flow rate.

8. Graph your results.

**Observations:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fluid** | **Time (s)** | **Flow Rate (cm/s)** | **Ranked Viscosity** | **Ranked Flow Rate** |
| **Cooking oil** | 0.84 | 59.5 | 5 | 5 |
| **Vinegar** | 0.34 | 147 | 9 | 1 |
| **Cream/Milk** | 0.94 | 53 | 4 | 6 |
| **Ethyl Alcohol** | 0.37 | 135 | 8 | 2 |
| **Maple Syrup** | 0.96 | 52 | 3 | 7 |
| **Corn syrup** | 52 | 0.96 | 1 | 9 |
| **Dish soap** | 17 | 2.9 | 2 | 8 |
| **Coke** | 0.62 | 81 | 7 | 3 |
| **Hydrogen peroxide** | 0.63 | 79 | 6 | 4 |

**Analysis Questions:**

4. Two possible **sources of error** that might have affected our results during the demonstration were…

5. a. The liquids that were the **most difficult to measure** were… because…

 b. We could have **done the following things to the ramp** to make it easier to measure these liquids:

6. **Comparative Bar graph** – Graph the flow rates of each of the fluids we tested in class.

**Conclusions**:

I conclude that my original predictions about the flow rates of the fluids were \_\_\_\_\_\_\_\_\_\_\_ accurate. In fact, I got all of them correct/wrong except…

I conclude that flow rate and viscosity of fluids are related in the following ways: