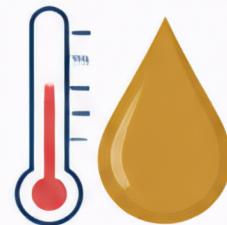


Testing the Effect of Temperature on the Viscosity of Motor Oil

Viscosity is a fluid's resistance to flow. In this experiment, you will test how temperature affects the viscosity (thickness) of motor oil.



QUESTION

How does temperature affect the viscosity of motor oil?

HYPOTHESIS

I think that as the temperature of the motor oil increases, its viscosity will _____
because _____

MATERIALS

- Motor oil (one type, e.g., SAE 10W-30)
- 50 mL plastic syringe (without needle)
- Bottle cap with a small hole (2–3 mm diameter)
- Beaker or jar
- Water (for ice bath and warm water bath)
- 2 containers or bowls (for water baths)
- Thermometer (°C)
- Stopwatch
- Paper towels

PROCEDURE

1. Poke a 2–3 mm hole in the center of a bottle cap.
2. Push the plunger into the syringe to the 50 mL mark.
3. Attach the prepared cap tightly to the syringe tip.
4. Prepare water baths at different temperatures: 0°C (ice water), 20°C (room temp), 40°C, 60°C, 80°C. Use a thermometer to check and adjust as needed.
5. Place the syringe (filled with oil and capped) into the first water bath for 10 minutes to reach that temperature.
6. Hold the syringe over the beaker. Start the stopwatch and allow the oil to drain out.
7. Stop the timer when the oil stops dripping.
8. Record the time in the data table.
9. Repeat steps 5–8 for each temperature.
10. For accuracy, repeat each temperature 2 more times and calculate the average time.

CONCLUSION

My conclusion: _____

VARIABLES

Independent Variable: Temperature of the oil (°C)

Dependent Variable: Viscosity of the oil
(measured by flow time in seconds)

Controlled Variables:

- Type and amount of motor oil
- Size of orifice (hole in cap)
- Distance from orifice to container
- Same container
- Same timing method

DATA TABLE

Temperature (°C)	Flow Time (seconds)			Average Time (seconds)
	Trial 1	Trial 2	Trial 3	
0				
20				
40				
60				
80				

ANALYSIS

1. How did the flow time change as the temperature increased?

2. What does this tell you about the viscosity of motor oil at different temperatures?

3. How might this affect how a car engine works in cold weather vs. hot weather?

SAFETY

- Do not ingest motor oil.
- Clean up spills immediately.
- Ask an adult for help when using hot water.