SfS Away from the Classroom!

C14: Viscosity (Recommended for Grades 3-8)

Please use the following resources to learn about viscosity.

Watch this Video: https://www.youtube.com/watch?v=1AESWxko4nI

Answer these questions:

- Which is more viscous: milk or honey?
- What happens to the viscosity of honey when it is heated?
- 6-8th grade: Can you describe, on a molecular level, why fluids have different viscosities?

Activities: Follow these directions to test the viscosity of glue at different temperatures!

You will need:

• Glue • 3 small bowls • 4 spoons • Paper towels	• Cookie sheet • Waxed paper • Tape • Marker	• Ruler • Timer (a cell phone is fine) • Kitchen freezer • Books • Lab partner

Setup:

1. Line your cookie sheet with a piece of waxed paper and use the tape to hold it in place.
2. Draw 2 lines with the marker; 1 inch from each of the long edges of the tray. Label one “start” and the other “finish”).
3. Place a paper towel under one long side of the tray, closest to the “finish” line to catch any spills & set up your stack of books under the opposite long side of the tray, closest to the “start” line.
4. Add 2 spoonfuls of the glue into each of the 3 small bowls.
5. The first bowl will be your room temperature glue so leave it on your work surface with one spoon.
6. The second bowl will be your warm glue. Hold it tightly between your hands for 10 minutes and have your lab partner hold a spoon the same way (set your timer). You are using the heat of your hands to heat up the glue and the spoon.
7. Put the third bowl and spoon into the freezer for 10 minutes. This will be your cold glue.

Experiment:

1. With the tray resting flat on the table, drop a spoonful of each glue (one cold, one warm, and one room temperature) onto the waxed paper just outside of the marker “start” line closest to the stack of books.
2. With your timer ready, lift the tray onto the stack of books as you start the timer (your lab partner can help with this part).
3. Write down the time each type of glues reach the “finish” line.
4. Which glue moved the fastest (low viscosity)? Which glue moved the slowest (high viscosity)?
5. How does the viscosity relate to the temperature of your glue?
6. Try the same experiment with a different liquid or compare two different liquids at the same temperature.

6-8th grade challenge:

1. Measure the distance between the two lines on the waxed paper.
2. Use this equation to calculate the velocity of each: velocity = distance ÷ time.
3. How does the velocity of each liquid compare to the viscosity of each liquid?

Make observations & use Claims, Evidence, and Reasoning!

1. **Claim**: Viscosity of a liquid decreases when temperature increases.
    - **Evidence**:

    - **Reasoning**:

2. **Claim**: The most viscous fluid I tested today was _____.
    - **Evidence**:

    - **Reasoning**: