611-2232 (30-070) Viscosity tubes

Warnings: Do not use any petroleum distillates such as motor oil, kerosene or gasoline as damage to the plastic parts may occur. These also pose a hazard due to flammability.

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Designed for ages 13 and up. Item is not a toy. It may contain lead or small objects that can be choking hazards.

Additional Materials Needed: Fluids for viscosity comparison, such as: water, milk, corn syrup, pancake syrup, molasses, cooking oil, liquid soap.

Description of Viscosity:
Viscosity can be described as “the resistance to an object passing through a fluid”. Viscosity of a fluid is the measurement of its’ resistance as it is displaced. It can be thought of as "thickness” or “thinness” of a fluid, i.e. water is “thin” oil is “thicker” than water.

How to use Viscosity tubes:
The 4 tubes can be filled with different fluids and by using the magnet bar, 4 steel balls can be dropped at the same time into each fluid filled tube. The clear tubes allow the observer to see which balls fall though the fluid faster and which ones fall slower. The slower the steel ball falls in the fluid, the greater the viscosity of the fluid.

Before use, check the 4 bottom stoppers to ensure they are in tight and will not leak or fall out. Insert the 4 tubes into the rack provided. Fill the tubes with the fluids to be compared up to just above the line near the top of each tube. One tube can be left empty if desired to use air as one of the fluids. Drop one steel ball into each tube and insert the stoppers snuggly on the tope of each tube. With one hand on top of the 4 tubes, gently lay the rack down to allow the 4 steel balls to roll to the top ends of the tubes. Hold the magnet bar up to the tubes to keep the steel balls in place, and align the bar near the top stoppers to capture the 4 steel balls. Tilt the rack upright while holding the magnet stick in place. Carefully move the magnet bar in order to get the steel balls to the line near the top of the tube. With one hand on the top of the tubes, quickly pull the magnet bar away from the tubes to release the steel balls. Observe the rate at which the balls fall in the different fluids.

Note: If the steel balls are difficult to see through the fluid, try putting a light behind the tubes and dimming the class room lights or tilting the tubes to allow the balls to fall against one side of the tube.

Experiment 1: Fill 2 of the tubes with the same fluid such as pancake syrup and put 1 of the tubes in the refrigerator over night. Compare the viscosity of the fluid at room temperature to the colder fluid from the refrigerator.

Curriculum Fit: Viscosity, properties of fluids.

Other related Science First items:

611-2250 Hero’s fountain: The first century physicist, mathematician and inventor Heron, also known as Hero of Alexandria, is responsible for creating the world’s first artificial, stand alone fountain that required no energy input. Previous fountains had been built using hills to generate the necessary pressure, but Hero’s was unique because it could be placed on a tabletop, and also was completely vertical in design. It used a system of tubes and airtight chambers to make a fountain that was powered entirely by gravity. Some have called it the first perpetual motion machine. This is a misnomer because the fountain will eventually stop running as the chambers fill with water.

611-2240 Pascal’s ball: Our hollow sphere connected to a hand pump shows that water pressure transmits in all directions equally through ten equidistant nozzles. Sphere has 3" diameter and 250 mL capacity. With instructions.

611-2230 Pascal’s Law (equilibrium tubes): Our solid base holds 4 interconnected different-shaped tubes that show that liquid levels are independent of the shape of the containing vessel.