

11.4 Surface Tension of water

Subjects: Properties of liquids, surface tension

Description: A paper clip floats on water. Dish soap is added and the paper clip sinks.

Materials:

600 mL Beaker

Water

Paper clip

Dish soap in dropper bottle

Sulfur (optional –located on general chemical storage shelf) or pepper

Procedure:

Note: Display the demo using the camera

1. Fill the beaker with water
2. Carefully place a paperclip flat on the surface of the water. (Optional: Sprinkle sulfur or pepper on top of the water surface)
3. Touch the surface of the water with your finger and note that the paperclip still doesn't sink.
4. Add a drop of dish soap. The paperclip will sink.

Discussion:

Molecules at the surface of the liquid are not entirely surrounded by other molecules like the molecules beneath the surface are. This leads to a net inward force of attraction, contracting the surface area and making the surface act like a "skin". Surface tension is a measure of the energy needed to break this tension. The surface tension on the water is enough to hold the paperclip and keep it from breaking the surface. Adding a drop of liquid detergent provides enough energy to break the surface tension of the water, allowing the paper clip to sink.

Safety: None

Disposal: The solution can be washed down the sink.

References:

1. L. Summerlin, J. Ealy; *Chemical Demonstrations: A Sourcebook for Teachers*; Volume 1; 1985; p. 135 (sulfur variation)
2. L. Summerlin, C. Borgford, J. Ealy; *Chemical Demonstrations: A Sourcebook for Teachers*; Volume 2; 1987; p. 19 (needle version)
3. Kotz, Treichel, Townsend; *Chemistry & Chemical Reactivity*; 7th Edition; Instructor's Edition; Brooks/Cole; P. 578
4. B.Z. Shakhashiri; *Chemical Demonstrations: A Handbook for Teachers of Chemistry*; Volume 3; Wisconsin; 1989; p. 301-304 (Procedure B variation)