POPPY SCHOLARS · CHEMISTRY IN THE EARTH SYSTEM

Home lab 3 · Unit 3 · about 40 minutes

# How many drops can a penny hold, and what does that say about the attractions between molecules?

Name _____ Date _____

## MATERIALS

*You supply everything. Tick each item as you gather it.*

- ☐ 5 pennies or other identical coins
- ☐ A dropper or a drinking straw to make drops of equal size
- ☐ Water, water with a drop of dish soap in 50 mL, 70 percent rubbing alcohol, and cooking oil
- ☐ Paper towels, a small tray, paper and pencil

## SAFETY

Rubbing alcohol is flammable and poisonous: keep it away from flames, do not drink it, and keep it from children and pets. Do not touch your eyes while working. Wash your hands afterward.

## PROCEDURE

1. Dry a penny and place it flat on a tray. Fill the dropper with water.
2. Add drops one at a time to the center of the penny, holding the dropper at the same height (about 1 cm). Count each drop. Stop when the first drop spills over the edge, and record the number that stayed on.
3. Dry the penny and repeat for 3 trials. Use a clean dry penny each time you change liquids.
4. Repeat the whole procedure for soapy water, rubbing alcohol and cooking oil.
5. Compute the mean number of drops for each liquid and rank the liquids from most to fewest.
6. Draw a molecule of water and a molecule of isopropyl alcohol and label where each can form attractions to its neighbors.

## RECORD YOUR DATA

| Liquid | Trial 1 | Trial 2 | Trial 3 | Mean |
|---|---|---|---|---|
| Water | | | | |
| Soapy water | | | | |
| Rubbing alcohol (70%) | | | | |
| Cooking oil | | | | |

## LAB REPORT

Write a report that gives your table and ranking, shows one mean calculation, and explains the ranking in terms of the attractions between molecules and of what soap molecules do at the surface of water. Say what other property of the liquids, besides the attractions, could change how many drops stay on the coin.

*Report the numbers you actually got, even when they disagree with the lesson. Write on the lines, or type your report on the website and send it to a teacher there.*

**Question and hypothesis** *State the question in your own words, what you expect to happen, and why you expect it.*

**Method** *What you changed, what you measured, what you kept the same, and how many trials you ran.*

**Observations** *Describe what you saw, including anything unexpected. Your data tables are added to the report automatically.*

**Calculations** *Show each calculation step by step, with units.*

**Claim and reasoning** *Answer the question using your numbers, then explain why, using the science from the unit.*

**Limits and next step** *What could have affected your results, and one change you would make next time.*