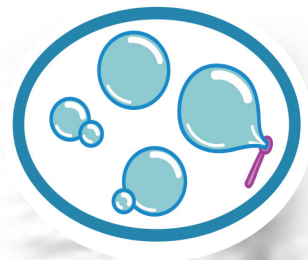


# Bubbles

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## Instructor Required

1. Define the following terms:
  - a. Soap bubble
  - b. Hydrophilic
  - c. Hydrophobic
  - d. Surface tension
  - e. Minimum energy
  - f. Minimum surface
2. How do the following weather factors affect the life of a bubble and how?
  - a. Humidity
  - b. Temperature
  - c. Wind
  - d. Precipitation
3. Make a model or drawing of a soap molecule. Show why the molecule is either hydrophilic or hydrophobic.
4. List safety rules about bubble blowing
5. Surface Tension
  - a. Explain what causes surface tension.
  - b. Conduct an experiment to determine if soapy water has higher or lower surface tension.
6. Wands:
  - a. Explain what types of material work best for the loop of large bubble wands.
  - b. Construct a wand to make large bubbles.
7. Components:
  - a. What water quality works best for bubbles? What impurities negatively affect bubble quality?
  - b. What soaps are best for bubble solution?
  - c. What is the purpose of glycerin or corn syrup in a solution?
  - d. Learn a formula for a bubble solution and mix a batch of bubble solution.
  - e. Evaluate your bubble solution and make a better recipe if necessary
8. Experiments:
  - a. Show what happens when bubbles meet bubbles? How does this illustrate minimal energy and minimal surface?
  - b. What causes colors in a bubble? Demonstrate constructive and destructive interference.
  - c. What shape are bubbles and why? Do an experiment to illustrate the answer.

## Skill Level 2

New in 2015