Worksheet: Surface Tension and Soap Films

Name: _____ Group name: _____

In this lab you will study surface tension in water and soapy water and its effects. Please **perform the experiments in the trays provided** to reduce spillage. Leave the bonus assignments for last, if you still have time.

1. Fill a gray plastic cup to the brim with water. Carefully add water to the plastic cup by emptying eye-droppers below the surface of the water.

   - Observe the shape of the water surface ("**meniscus**") as you add more and more water by looking horizontally at the cup. Draw the shape below. How can you explain this shape?

   - Add more and more water until the cup overflows. Estimate the height of the meniscus above the cup edge just before it collapses.

     Maximum height of the meniscus: _____ _____

   - Again start adding water using eye-droppers until a well-visible meniscus forms (but don't let it collapse). Carefully add a single drop of soap. What happens? Why?

   - **Bonus**: from the _____ you would expect the meniscus to look like a spherical dome or cap. Why is this not the case here? (Hint: tilt the glass sideways. Why does it spill? What forces do the water molecules feel?)

2. Use a bubble wand and the soap bubble solution to blow a bubble.

    - Observe the bubble and record all your observations. Include observations about shape and motion.

    - **Bonus**: Can you put your finger through the soap bubble without popping it? What do you need to do to achieve this?

3. Use the eye-dropper to put a single drop of pure water on the table. Then place a drop of soapy water on the table near the water drop.

    - How and why are they different?

    - **Bonus**: How does soap help clean your clothes? (Hint: think about the drop shapes again...)

4. Use the plastic framework kit to build the first two geometric shapes as shown on the next page: a **tetrahedron** and a **cube**. Insert the shape into the beaker of soapy water.

   - Describe the surfaces they form.

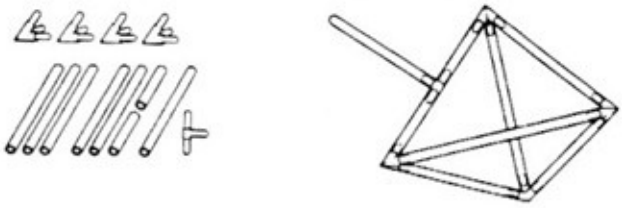
   - Puncture one of the film surfaces – how does the shape change?

   - What rules or common features exist in all of the films that you have observed (“bubble laws”)?

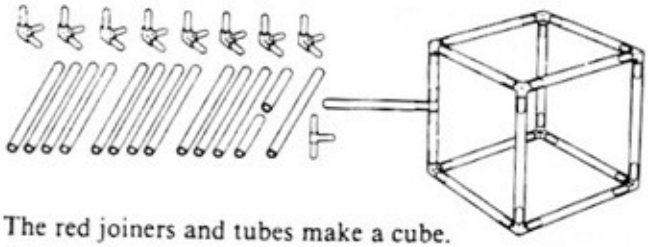
Note: you only need to make the tetrahedron and the cube

Bonus: also study the other two shapes.

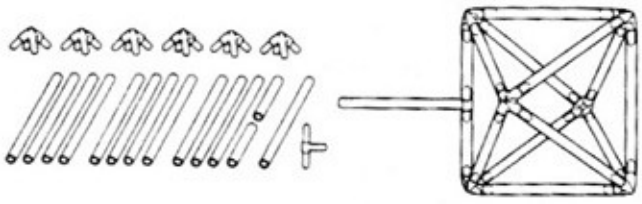
Assembly of the plastic frameworks



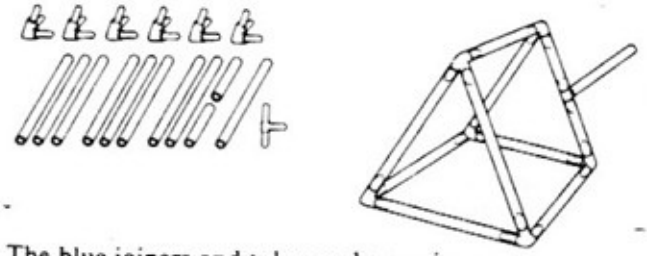
The grey joiners and tubes make a tetrahedron.



The red joiners and tubes make a cube.
White joiner for handle.



The green joiners and tubes make an octahedron.



The blue joiners and tubes make a prism.