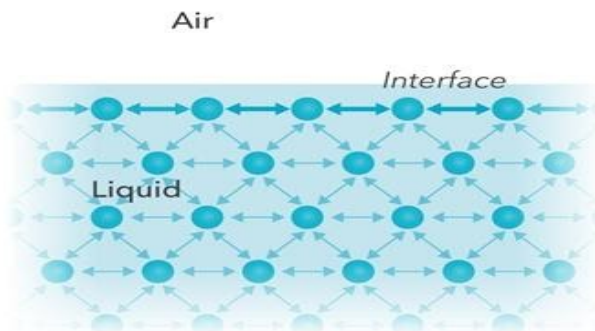


# Surface Tension

## Talking Points:

- Liquids are made up of molecules.
- Surface tension is the attractive force between molecules, or force that pulls molecules toward each other, on the surface of a liquid.
- Molecules below the surface of a liquid have their forces balanced. But since the molecules at the surface don't have any molecules above them they exhibit stronger forces with the other molecules next to them at the surface, giving rise to surface tension.
- Drawing the picture below may help illustrate this concept to the kids. Explain that the arrows represent attractive forces. Note the **thicker** horizontal arrows at the surface:



## Demo Materials:

- Bowls
- Water and Milk
- Paper Clips
- Dish soap
- Food Coloring (3-4 Different Colors)
- Q - tips

## Part 1:

### Demo Instructions:

1. Prepare a small bowl.
2. Fill the bowl with water.
3. Carefully place four paper clips on the surface of the water, causing them to float. This may be difficult at first, don't worry if it takes a couple tries to float.

4. Place a few drops of soap into the bowl away from the paper clips. This will ensure that the wave doesn't disturb the surface tension. The paper clips sink!

## Part 2:

1. Prepare a small bowl.
2. Pour enough milk in the bowl to completely cover the bottom to the depth of about  $\frac{1}{4}$  inch. Allow the milk to settle before moving on to the next step.
3. Add a total of 4 drops of food coloring, each a different color, to the center of the bowl.
4. First try to place the cotton swab in the middle of the food coloring. Nothing should happen. Now place a drop of liquid dish soap on the other end of the cotton swab. Place the soapy end of the cotton swab back in the middle of the milk and hold it there for 10 to 15 seconds. Look at that burst of color! It's like the Fourth of July in a bowl of milk!
5. Add another drop of soap to the tip of the cotton swab and try it again. Experiment with placing the cotton swab at different places in the milk. Notice that the colors in the milk continue to move even when the cotton swab is removed.

## Wrapping up:

You can explain to the students that surface tension is the reason we sometimes see rain bead up on a window, or ball up into a spherical shape on waxy leaves outside. Surface tension is also the reason that water striders/bugs are able to float on water even though they are denser than water.

