### Procedure

Proceed to each station as directed by your teacher. Record observations and answer the questions for the experiment at each station. If you are instructed to move to the next station before you are done answering the questions, you may finish answering the questions for homework.

#### Station 1

1. Squeeze a drop of water onto your hand. Describe the shape of the water drop.
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2. Squeeze a drop of isopropyl alcohol onto your hand. Describe the shape of the drop.
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##### Questions:

1. Which has stronger surface tension, water or isopropyl alcohol? \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which has stronger attractions between molecules, water or isopropyl alcohol? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Explain how your observations support your answer.
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#### Station 2

1. Measure the temperature of the water . Put a drop of water on the back of your hand. How does it feel? (warm or cold?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Measure the temperature of the isopropyl alcohol (rubbing alcohol). The water and isopropyl alcohol should both be at room temperature. Put a drop of isopropyl alcohol on the back of your hand. How does it feel? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

##### Questions:

1. Which felt colder on your skin, the water or the isopropyl alcohol? \_\_\_\_\_\_\_\_\_\_\_
2. Which has a higher heat of vaporization, water or isopropyl alcohol? \_\_\_\_\_\_\_\_\_\_
3. Explain how your observations support your answer.

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**Station 3**

1. Place the thermometer in ice water. Observe what happens to the volume of the red liquid inside the thermometer.
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2. Place the thermometer in the warm water. Observe what happens to the volume of the red liquid inside the thermometer.
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##### Questions:

1. What is thermal expansion?
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2. What is the relationship between the speed of the particles and ability of the particles to attract each other?
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3. Explain how your observations support your answer.

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#### Station 4

1. Shake the bottle of baby oil and water. Do the liquids stay mixed?

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##### Questions:

1. Are the water molecules attracted to or repelled by the oil molecules?
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2. Given that water is polar and “like dissolves like,” is baby oil polar or nonpolar?

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1. Explain how your observations support your answer.

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#### Station 5

1. Observe the ice water. Does the ice float or sink?

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##### Questions:

1. What is more dense, solid ice or liquid water?

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1. Explain how your observations support your answer.

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1. Draw a sketch that shows how water molecules form an ice crystal. (Hint: use 6 water molecules to form a hexagon.)
2. How does this arrangement affect the density?

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#### Station 6

1. Carefully place the steel pin on top of the water. Can you make the steel pin float?

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##### Questions:

1. The density of liquid water is 1.0 g/mL and the density of stainless steel is 7.5 g/mL. If steel is more dense than water, why can the steel pin float on water?

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#### Station 7

1. Observe the viscosity of cold corn syrup and warm corn syrup. Which is more viscous, cold or warm corn syrup?

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##### Questions:

1. Are the corn syrup molecules more attracted to each other when cold or hot? \_\_\_
2. Explain how your observations support your answer.

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#### Station 8

1. Apply a strong force to the cornstarch and water mixture by grabbing or patting it. Describe the viscosity of the cornstarch and water mixture when a strong force is applied.

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1. Let the cornstarch and water mixture slip through your fingers. Describe the viscosity of the cornstarch and water mixture when a weak force is applied.

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1. Wash your hands with soap and water.

##### Questions:

1. Are the cornstarch molecules more attracted to each other when a strong or weak force is applied? Explain how your observations support your answer.

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#### Station 9

1. Put a small amount of water in a microplate. Observe the shape of the mensicus. Carefully turn the microplate upside down. Does the water fall out?

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##### Questions:

1. What are stronger, the cohesive or adhesive forces? Explain how your observations of the meniscus support your answer.

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1. Why does the water stay in when the microplate is turned upside down?

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**Station 10**

1. Use a pipet to carefully fill a 10 mL graduated cylinder above the rim. Draw and label a sketch of what you see.

##### Questions:

1. Why can you fill the graduated cylinder higher than the rim?

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#### Station 11

Observe the drinking bird.

##### Questions:

1. Explain how the drinking bird works. Be sure to include the following terms – thermal expansion, capillary action, heat of vaporization.

#### Station 12

1. Gently stick your finger (or the bottom of a test tube) into the lycopodium powder and water mixture. Does your finger get wet? \_\_\_\_\_\_\_\_\_
Wash your hands with soap and water.

##### Questions:

1. Do the lycopodium molecules attract or repel the water molecules? Is lycopodium powder polar or nonpolar? How does the lycopodium powder affect the surface tension of the water? Explain why your finger doesn’t get wet.