

Name:

Date:

Class:

## Investigating the Effects of Additives on Surface Tension - Part 2 Worksheet

Remember that we have agreed upon the following concepts for this investigation:

- Vaping additives that change the surface tension of alveolar fluid can have negative health effects.
- Pure water will act as alveolar fluid and soap will act as a vaping additive.
- Relative surface tension can be observed by looking at the shape of a drop of a fluid.
- Concerning the shape of a drop, the contact angle of a drop can be measured.

With your group: You now need to design and carry out a procedure to determine the volumetric ratio between soap and water to achieve a contact angle of 80 degrees.

Your group will have access to the following supplies:

- 1 roll of Teflon (PTFE) tape
- 1 pair of scissors
- up to 5 droppers, each filled with a different volumetric ratio of soap to pure water as requested by your group

Some things to keep in mind while designing your procedure:

- You must determine the volumetric ratio between soap and water to achieve a contact angle of 80 degrees within 5 tries, because you only get up to 5 droppers and each dropper can only be used once.
- Reference the data from the "Investigating the Effects of Additives on Surface Tension - Part 1" sheet; it should help you determine a good volumetric ratio between soap and water range to work with.

| Volumetric ratio of soap to water | Contact angle (degrees) |
|-----------------------------------|-------------------------|
| 1:2                               | 40                      |
| 1:100                             | 59                      |
| 1:800                             | 104                     |
| Pure water                        | 113                     |

- You do not have to get all five droppers filled with different volumetric ratios of soap to pure water at once; you could get one, try it out, and then go from there.

**Turn this sheet over**

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Write out your general procedure in the space below:

Procedure for determining the volumetric ratio between soap and water to achieve a contact angle of 80 degrees

Use words and/or drawings.

Have your teacher check your procedure and then get the supplies for your group once the procedure is approved.

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Carry out your teacher-approved procedure and record your data in the space below:

Data for determining the volumetric ratio between soap and water to achieve a contact angle of 80 degrees