**Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Course and Section Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lab Assignment: Properties of Water**

**Instructions:** After completing the *Properties of Water* lab on [this website](https://camosunbiolabs.opened.ca/biology-103-labs/properties-of-water/), answer the questions below. Please type your responses in different coloured font into the spaces provided. Submit your assignment as directed by your instructor.

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**Part 1: Water Volume**

1. What did you PREDICT would happen to the water level in the bottle, based on your understanding of the properties of water? Explain your reasoning. (2 marks)

2. Paste the photos of your bottle before and after freezing in the space below. Include a descriptive figure caption (Figure 1. DESCRIPTION) below the images. (2 marks)

3. Record your **qualitative** and **quantitative** observations in the space below. (2 marks)

4. State whether or not your predictions were supported by your results, and explain based on the photos from Question #2 above. (1 mark)

5. Provide one reason why this property of water is significant for life on Earth. (1 mark)

**Part 2: Surface Tension**

1. Paste the photo of your bowl with a paper clip on the water’s surface in the space below. Include a descriptive figure caption (Figure 2. DESCRIPTION) below the image. (2 marks)

2. Explain why the paper clips were able to sit on the surface of the plain water, even though they are denser than water (consider the properties of water and the types of molecular bonds involved). (1 mark)

3. How did the number of paper clips on the surface of water compare between plain water and salt water? Explain what changed regarding the chemical properties of water (don’t think buoyancy, think about the strength of ionic and hydrogen bonds). (2 marks)

4. Soap molecules are **amphipathic**, meaning they have both **polar** and **non-polar** properties. How did the number of paper clips on the surface of water compare between plain water and soapy water? Explain what changed regarding the chemical properties of water (think about what is happening to the hydrogen bonds). (2 marks)

**Part 3: Cohesion and Adhesion**

1. Paste the photos of your paper towel strip before and after water movement in the space below. Include a descriptive figure caption (Figure 3. DESCRIPTION) below the images. (2 marks)

2. What you observed in this experiment is a phenomenon called **capillary action**. Given that the paper towel fibers have **polar** properties, explain how the **adhesion** and **cohesion** of water caused this phenomenon. (2 marks)

3. Name and describe one other real-life example of the capillary action of water. (1 mark)