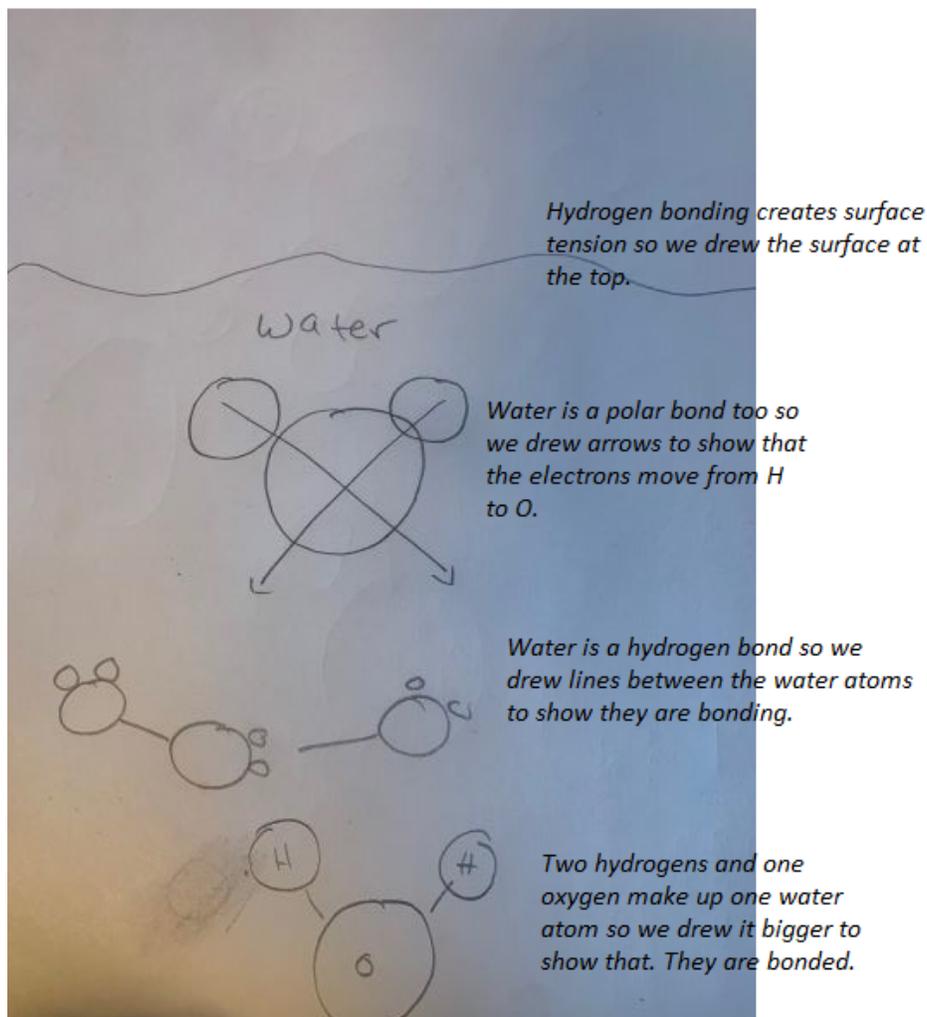


# Ciara and Jordan

## Student Explanation



### Misconception: Does Not Fully Understand Surface Tension

While this model is very unspecific, they do understand a lot of the concepts but did not create the model appropriately. They **do NOT fully understand what causes surface tension.**

They DO have a strong understanding on polarity, hydrogen bonds, electronegativity.

### Possible Questions and Responses

- Why are the arrows pointing the way they are?
  - To show polarity. Electrons are moving from Hydrogen to Oxygen. They are sharing electrons but the electrons spend more time with Oxygen.
- Explain more about the lines that bind the water molecule?
  - The molecules are attracted. Hydrogen bonds to oxygen of the other atom.
  - Oh, I guess we didn't draw it exactly right.
- What is the squiggly line on the top and why did you draw it?
  - Its the surface of water. Isn't that how its supposed to be drawn?
- What creates surface tension?
  - Hydrogen bonds? We're not sure.

# Angela and James

## Student Explanation

These are the molecules in the air, oxygen and nitrogen

The line is the surface of the water.

**+/- Symbols =** in one water molecule, the hydrogen is positive and the oxygen is negative, so we put those labels.

Water bonds really strongly with each other through hydrogen bonds but it doesn't bond with the molecules in the air. That creates surface tension

**MISCONCEPTION:** They do not have a full understanding of polarity nor partial charges. They think that in one water molecule, Hydrogen is positively charged while oxygen is negatively charged. They have a surface level understanding that hydrogen bonding within the water and the lack of interaction with the outside air is what causes surface tension.

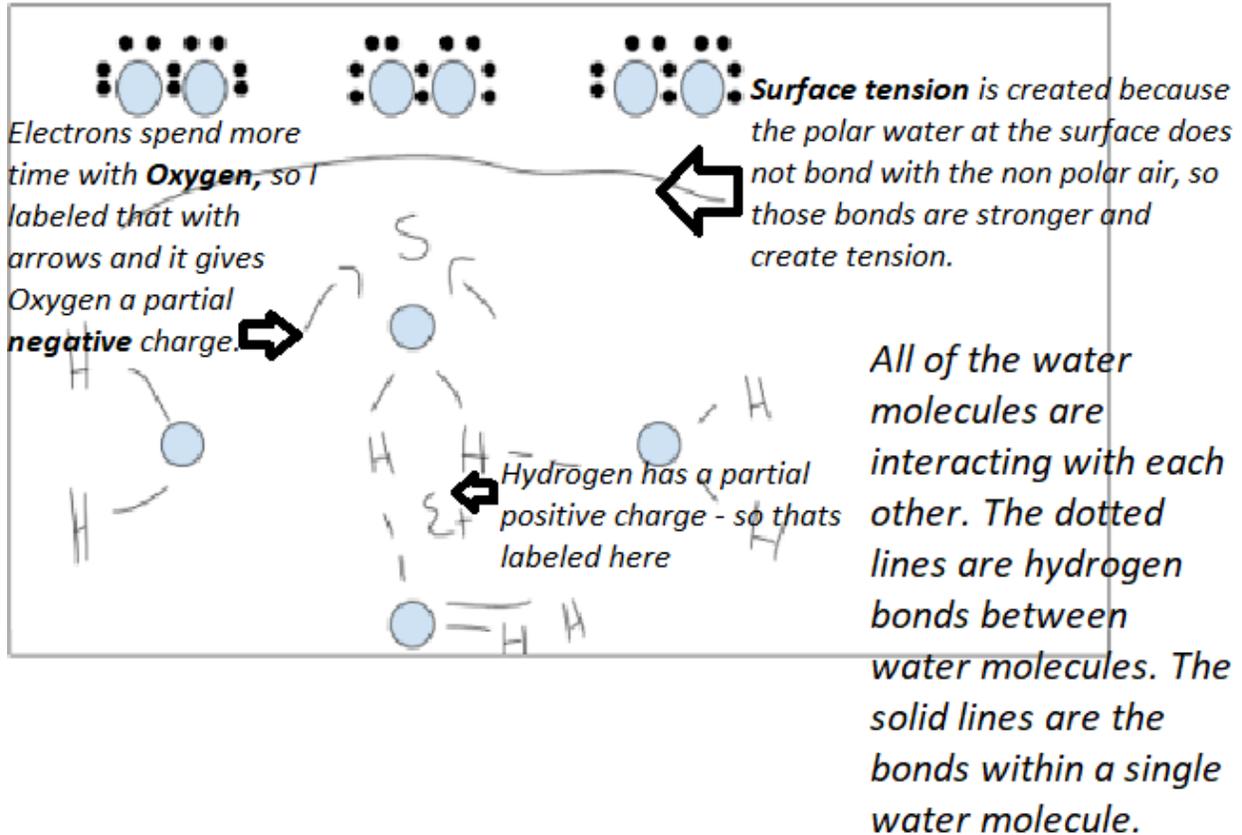
### Possible Questions and Responses

- Why did you label the H with a + and the O with a -?
  - Hydrogen has a positive charge and O has a negative charge.
- How do they get that charge?
  - Umm, because of the electrons.
- Is the water polar or nonpolar?
  - I think its polar because of the negative and positive charges?
- Why is water a hydrogen bond?
  - Anything that bonds with hydrogen is a hydrogen bond, and oxygen is bonding with hydrogen in a water molecule.

# Stephanie

## Student Explanation

At the top is the air molecules, which are non polar bonds and do not bond with the water molecules



**What the student did:** Stephanie has the strongest understanding of all concepts and the most detailed model but it is still lacking some details and clarity. She can, however, articulate all of the concepts clearly and will be the one to help her peers out if prompted by teachers.

### **POSSIBLE QUESTIONS THAT CAN BE ASKED TO THE GROUP?** (Any student can answer)

- Why does water have a bent shape?
  - Students do not know/are unsure.
- In most of your models, the O and H atoms are different sizes, why is that?
  - Oxygen is much larger than Hydrogen.
  - Oxygen has 8 electrons in its inner and outer shell
  - Hydrogen only has 1 electron.
- Most of you indicated the surface with a wavy/squiggly line, why is that?
  - That's just the way the surface looks?