*Watch the Bozeman podcast entitled* [***Water: A Polar Molecule***](http://www.bozemanscience.com/water-a-polar-molecule)*before reading chapter 3.*

Define the following vocabulary terms below

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Polar Covalent Bonds |  |
| Polar Molecule |  |
| Cohesion |  |
| Adhesion |  |
| Surface Tension |  |
| Specific Heat |  |
| Heat of Vaporization |  |
| Evaporative Cooling |  |
| Solution |  |
| Solvent |  |
| Solute |  |
| Hydrophilic/Hydrophobic |  |
| Molarity |  |

**Concept 3.1: Polar covalent bonds in water molecules result in hydrogen bonding**

What is electronegativity and how does it affect the interactions between water molecules? (Figure 2.13, p.39)

Draw and label five water molecules interacting with one another (Figure 3.2, p.47). Indicate the difference between hydrogen bonding and polar covalent bonds.

**Concept 3.2: Four emergent properties of water contribute to Earth’s suitability for life**

Which type of bonding enables cohesion and adhesion to occur? Provide one example of how this impacts living things.

Water has a very high specific heat. What does that tell you about water’s hydrogen bonds? Provide one example of how this impacts living things.

How do the properties of water enable evaporative cooling? Provide one example of how this impacts living things.

Why is solid water less dense that liquid water? Provide one example of how this impacts living things.

Explain how a hydration shell forms when a solute is dissolving in water. Provide one example of how this impacts living things.

How do hydrophilic and hydrophobic substances interact with water?

**Concept 3.3: Acidic and basic conditions affect living organisms**

Draw and label a water molecule, hydroxide and a hydronium ion and explain the differences between the three of them.

What is the difference between an acid and a base? Explain for each and give an example.

Look at Figure 3.10 (p.54) what is the range of the pH scale? Where does water fall?

How can you find out how much more acidic a substance is from another? Once you find that out how much more acidic is battery acid than Urine? Show your work.

What is a buffer? Provide one example of how they impact living things.