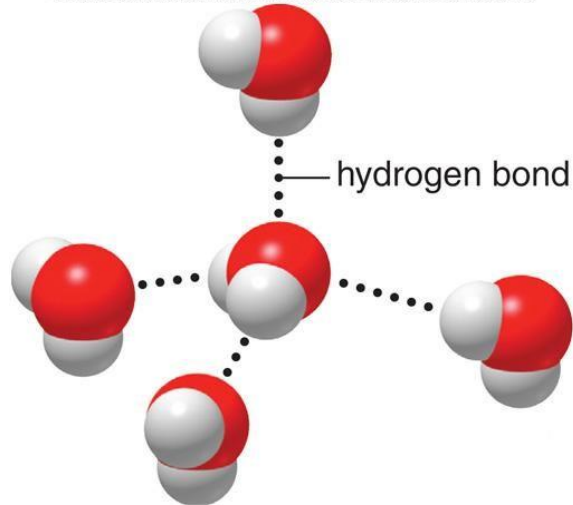


1. On the central molecule, **label** oxygen (O) and hydrogen (H). Now, **add + and -** signs to indicate the charged regions of *each* molecule. Then, **indicate** the hydrogen bonds.

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2. Water is considered a polar molecule. **What** does this mean?
3. **Explain** *hydrogen bonding*. **How** many hydrogen bonds can a single water molecule form?
4. **Distinguish** between *cohesion* and *adhesion*.
5. **Which** property is demonstrated when you see beads of water on a waxed car hood?

6. **Which** property explains the ability of a water strider to walk on water?
  
7. The calorie is a unit of heat. **Define** *calorie*.
  
8. Water has a high *specific heat*. **What** does this mean? **How** does water's specific heat compare to alcohol's specific heat?
  
9. **Explain** how hydrogen bonding contributes to water's high specific heat.
  
10. **Summarize** how water's high specific heat contributes to the moderation of temperature. **How** is this property important to life?
  
11. **Define** *evaporation*. **What** is the *heat of vaporization*? **Explain** at least three effects of this property on living organisms.
  
12. Consider what would happen if ponds and other bodies of water accumulated ice at the bottom. **Describe** why this property of water is important.

13. **Explain** *why* ice floats. **Why** is 4 degrees Celsius the critical temperature?

14. Review and **define** these terms:

**solvent**

**solution**

**solute**

15. Consider coffee to which you have added sugar. **Which** of these is the solvent? **Which** is the solute?

16. **Explain** why water is such a fine solvent.

17. **Distinguish** between *hydrophobic* and *hydrophilic substances*. **Give an example of each.**

18. Oil will float on top of water. **Explain** this property in terms of hydrogen bonding.

19. Can you prepare 1 liter of a 0.5-molar *glucose* solution? **Show your work here.**

20. **Define** *molarity*.

21. **What** two ions form when water dissociates?

22. **What** is the concentration of each ion in pure water at 25 degrees Celsius?

23. Water has a pH of 7. pH is defined as the negative log of the hydrogen ion concentration  $[H^+]$ . **Explain** why water is assigned a pH of 7?

24. **Define:**

**acid**

**base**

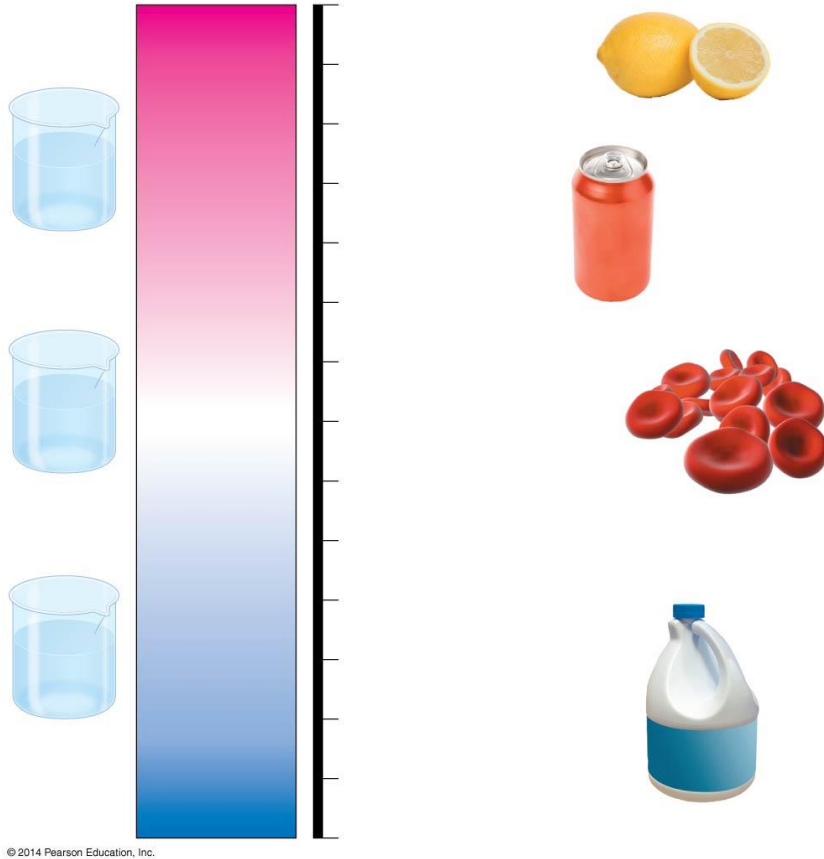
25. Because the pH scale is logarithmic, each numerical change represents a 10X change in ion concentration.

a. **How** many times more acidic is a pH of 3 compared to a pH of 5?

b. **How** many times more basic is a pH of 12 compared to a pH of 8?

c. **Explain** the difference between a pH of 8 and a pH of 12 in terms of  $H^+$  concentration.

26. On the pH scale label pH 1-14. **Label** *neutral*, *acid*, and *base*. **Indicate the locations** of pure water, urine, gastric juice, and bleach.



27. **How** do *buffers* moderate pH change?

28. Exercise will result in the production of CO<sub>2</sub>, which will acidify the blood. **Explain** the buffering system that minimizes blood pH changes.

29. **Discuss** how CO<sub>2</sub> emissions affect marine life and ecosystems.