



Choices.... *We All Have To Make Choices*

1. _____ Did life on Earth first appear in *water* or on *land*?
2. _____ Water's two hydrogen atoms are united with oxygen via *ionic* / *covalent* bonds.
3. _____ Oxygen is more *electronegative* / *electropositive* than hydrogen.
4. _____ Water molecules can form a maximum of *one* / *two* / *three* / *four* hydrogen bonds with other water molecules.
5. _____ Water molecules stick to each other as a result of *hydrogen* / *covalent* bonding.
6. _____ The most common state of water on the planet earth is *water vapor* / *liquid water* / *ice*.
7. _____ Are hydrogen bonds *permanent* or *temporary*?
8. _____ Water's attraction to other water molecules is termed *cohesion* / *adhesion*.
9. _____ Is water *pushed* or *pulled* through plants during transpiration?
10. _____ Water has a *greater* / *lesser* surface tension than most liquids.
11. _____ The faster a molecule moves, the greater its *kinetic* / *potential* energy.
12. _____ Milder climates are usually found in *coastal* / *inland* regions.
13. _____ High humidity *increases* / *decreases* evaporative cooling.
14. _____ Water reaches its greatest density at _____ (0 / 4 / 25) degrees Celcius.
15. _____ In the case of sugar water, sugar is the *solute* / *solvent*.
16. _____ A substance *does* / *does not* need to be ionic to dissolve in water.
17. _____ Non-polar substances *do* / *do not* dissolve in water.
18. _____ A substance that is "attracted" to water is labeled *hydrophilic* / *hydrophobic*.
19. _____ A hydroxide ion has a *positive* / *negative* charge.
20. _____ A substance that increases the hydrogen ion concentration in a solution is a(n) *acid* / *base*.
21. _____ pH drops as hydrogen ion concentration *decreases* / *increases*.
22. _____ A solution of pH 3 is (*3X* / *300X* / *1000X*) as acidic as a solution of pH 6.
23. _____ A buffer works by donating or accepting *hydrogen* / *hydroxide* ions.
24. _____ Acid precipitation is any form of precipitation with a pH lower than (*7.4* / *7.0* / *5.6* / *3* / *2.4*).
25. _____ Water *is* / *is not* a **true** universal solvent.

Water Vocab. Matching

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|---------------------------|--|
| 1. _____ Aqueous solution | A. A sphere of water molecules surrounding an ion. |
| 2. _____ Kinetic energy | B. Formed when a proton is lost from a water molecule. |
| 3. _____ Hydration shell | C. Bonds broken when water vaporizes. |
| 4. _____ Hydrodium ion | D. Formed when a proton bonds to a water molecule. |
| 5. _____ Hydroxide ion | E. The energy of motion. |
| 6. _____ Hydrogen bonds | F. A solution in which water is the solvent. |

How many grams of acetic acid ($C_2H_4O_2$) would you used to make 10L of a 0.1 M aqueous solution of acetic acid? _____ (Note: The atomic weights, in daltons, are approximately 12 for carbon, 1 for hydrogen, and 16 for oxygen).

Multiple Chemistry

- Which of the following is an example of a hydrophobic material?
A. paper B. table salt C. wax D. sugar E. pasta
- We can be sure that a mole of table sugar and a mole of vitamin C are equal in their:
A. weigh in daltons B. weight in grams C. number of molecules
D. number of atoms E. volume
- Air temperature often *increases* slightly as clouds begin to drop rain or snow. Which behavior of water is most directly responsible for this phenomenon?
A. water's change in density when it condenses.
B. water's reactions with other atmospheric compounds
C. release of heat by the formation of hydrogen bonds
D. release of heat by the breaking of hydrogen bonds
E. water's high surface tension
- In a single molecule of water, the two hydrogen atoms are bonded to a single oxygen atom by:
A. hydrogen bonds B. nonpolar covalent bonds C. polar covalent bonds
D. ionic bonds E. van der Waals interactions
- What do cohesion, surface tension, and adhesion have in common with reference to water?
A. All increase when temperature increases. B. All are produced by covalent bonding.
C. All are properties related to hydrogen bonding.
D. All have to do with nonpolar covalent bonds. E. Both A and C are correct.
- Desert rabbits are adapted to the warm climate because their large ears aid in the removal of heat by:
A. the high surface tension of water.
B. the high heat of vaporization of water.
C. the high specific heat of water.
D. the buffering capacity of water.
E. the dissociation of water molecules.
- Life on Earth is dependent on all the properties of water as well as the abundance of water. Which property of water is probably *most* important for the functioning of organisms at the molecular level?
A. cohesion and high surface tension
B. high specific heat
C. high heat of vaporization
D. expansion upon freezing
E. versatility as a solvent
- What is the underlying principle that causes the following emergent properties of water: cohesion, adhesion, surface tension, capillarity, high specific heat, high heat of vaporization, evaporative cooling, floating ice, and water as a versatile solvent.

