



1. Which statement is untrue?

- (A) London dispersion forces develop between polar covalent molecules.
- (B) London dispersion forces turn gases into liquids.
- (C) London dispersion forces are most effective at turning gases into liquids when the gases are cool and under high pressure.
- (D) London dispersion forces last a very short period of time.

2. Which statement is true?

- (A) A carbon dioxide molecule with a negative charge on each oxygen side is polar.
- (B) A carbon dioxide molecule with a negative charge on each oxygen side is nonpolar.
- (C) Identical nonpolar molecules will not stick to each other unless you lower the temperature and pressure.
- (D) Identical nonpolar molecules will not stick to each other unless you raise the temperature and pressure.

3. Which statement about nonpolar molecules is untrue?

- (A) Nonpolar molecules are not attracted to other nonpolar molecules.
- (B) Nonpolar molecules are not attracted to polar molecules.
- (C) The molecules in a sample of nonpolar molecules are more mobile than the molecules in a sample of polar molecules.
- (D) Small nonpolar molecules form liquids at room temperature and normal atmospheric pressure.

4. Which arrangement of molecules is most polar to least polar?

- (A) water molecule, sodium chloride molecule, oxygen molecule
- (B) sodium chloride molecule, water molecule, oxygen molecule
- (C) water molecule, oxygen molecule, sodium chloride molecule
- (D) sodium chloride molecule, oxygen molecule, water molecule

5. Why do bubbles suddenly start forming when the temperature of water reaches the boiling point?

- (A) It takes 100 Celsius degrees to provide water with enough energy for bubbles of air to form.
- (B) It takes 100 Celsius degrees to provide water with enough energy to finally allow molecules to evaporate.
- (C) It takes 100 Celsius degrees to provide water with enough energy for water molecules to break their intramolecular bonds.
- (D) It takes 100 Celsius degrees to provide water with enough energy for bubbles of steam to form.

6. Why does it take 100 degrees Celsius for bubbles of steam to start forming in water?

- (A) In order for steam bubbles to form in water, the pressure inside the bubbles has to equal atmospheric pressure pressing down on the water. It takes 100 degrees Celsius to generate that high a pressure inside the bubbles.
- (B) In order for steam bubbles to form in water, water molecules have to have enough energy to break their intermolecular bonds and evaporate as steam.
- (C) In order for steam bubbles to form in water, water molecules have to have enough energy to evaporate steam from the surface of the water and neutralize air pressure pressing down on the water.
- (D) The first two answers are true.

7. If it takes 100 degrees Celsius temperature to break hydrogen bonds between water molecules and allow water molecules to evaporate into the air, how come water molecules are able to evaporate into the air at temperatures below the boiling point?

- (A) Because some water molecules don't need 100 degree Celsius heat to break their intermolecular bonds in order to evaporate.
- (B) Because wind energy is able to contribute to water's heat energy by allowing air molecules to bump into water molecules and bump them into the air.
- (C) Because not all water molecules have the same amount of energy. Some water molecules in a sample of water below the boiling already have 100 degrees of energy and can evaporate into the air.
- (D) Because some water molecules experience the force of repulsion between water molecules.

8. Why is steam invisible?

- (A) Steam is a gas and all gases are invisible because gas molecules are so far apart.
- (B) Like water molecules in a liquid state, water molecules in a gaseous state don't absorb light very well.
- (C) Both are true but the first answer is the main reason.
- (D) Both are true but the second answer is the main reason.

9. What is water vapor?

- (A) Water vapor is a visible cloud of water molecules below the boiling point of water.
- (B) Water vapor is an invisible gas of water molecules below the boiling point of water.
- (C) Water vapor is a collection of tiny water droplets in the air.
- (D) Water vapor is a mist or cloud of water molecules in the air.

10. What is air pressure?

- (A) Air pressure is the total weight of the air pressing down on the earth.
- (B) Air pressure is the mass of the air pressing on the earth.
- (C) Air pressure is the weight of the air pressing down on a square meter or square foot of the earth.
- (D) Air pressure is the mass of the air pressing down on a square meter or square foot of the earth.

11. The volume of a gas depends on _____.

- (A) The weight of each gas molecule
- (B) The size of each gas molecule
- (C) The mass of each gas molecule
- (D) The number of gas molecules

12. In the periodic chart, each element has an atomic weight. What are the units for atomic weight?

- (A) grams
- (B) milligrams
- (C) picograms
- (D) atomic mass units

13. How many atoms would it take to accumulate enough atoms for the collection to weigh the atom's atomic weight in grams?

- (A) 6.02×10^{21} atoms
- (B) 6.02×10^{22} atoms
- (C) 6.02×10^{23} atoms
- (D) 6.02×10^{24} atoms

14. What are two ways to express the energy of a gas?

- (A) pressure times volume, and number of gas molecules times the temperature of the gas
- (B) pressure times temperature of the gas, and number of gas molecules times the volume
- (C) pressure times number of gas molecules, and volume times the temperature of the gas
- (D) pressure times volume, and number of gas molecules times the gas constant