

Phases Of Matter Worksheet

- 1) What is the normal boiling point of a liquid?**
- 2) Why can different substances be in different phases at room temperature?**
- 3) Why can gases fill the containers they occupy?**
- 4) When ice is heated its temperature does not rise until all of it is melted. Explain what is happening to the heat being absorbed.**
- 5) When water boils, the temperature remains constant. What is happening to the heat?**
- 6) Under what conditions will a gas liquefy?**
- 7) What is the difference between evaporation and boiling?**
- 8) When a substance exists as a liquid or solid under ordinary conditions, its gas phase is called a _____.**
- 9) Why is evaporation of water from your skin a cooling process?**
- 10) Condensation raises the temperature of the vapor (True or False).**
- 11) How does a pressure cooker work?**
- 12) In order for a gas to condense to a liquid, the attraction between its molecules _____.**
- 13) What is the critical temperature?**

- 14) **The critical temperature of CO₂ is 31.1° C. Is it possible to liquefy CO₂ at a temperature of 40° C? Explain.**
- 15) **What is the critical pressure?**
- 16) **Why can steam burns be more dangerous than hot water burns?**
- 17) **What does it mean to say that a container is saturated with vapor?**
- 18) **Explain why substances can change shape when heated.**
- 19) **What is true about the melting point and the freezing point of a substance?**
- 20) **How can a substance have no melting or boiling point?**

Solutions

- 1) **The normal boiling point occurs at standard pressure.**
- 2) **Different substances have varying intermolecular forces due to electron distributions. The weakest attractive forces are found in gases and the strongest is found in solids.**
- 3) **The attractive forces between gas molecules are too weak to keep the gas molecules within a definite space.**
- 4) **During a change of state (phase) there is only a change in the potential energy of the molecules, not the kinetic energy. The energy is used by the molecules to rearrange themselves into positions they have in the liquid state.**
- 5) **The energy causes the molecules to break up their more rigid arrangement in the liquid state to become more freely moving particles in the gaseous phase.**
- 6) **A decrease in temperature and an increase in pressure.**
- 7) **Evaporation is the changing of a liquid state to a gaseous state that takes place at the surface of a liquid at all temperatures. Boiling is the changing of a liquid state to a gaseous state which takes place throughout the liquid at its normal boiling point.**
- 8) **vapor.**
- 9) **During evaporation, the molecules with the greatest kinetic energy escape which lowers the temperature of the remaining liquid.**
- 10) **True, because during condensation the molecules with the least kinetic energy liquefy which raises the temperature of the remaining vapor.**
- 11) **A pressure cooker operates on the principle of increasing the pressure on the surface of a liquid. The boiling point of the liquid is raised which increases the thermal energy of the liquid and the food cooks faster at higher temperatures.**
- 12) **must be strong enough to hold them together in the liquid phase.**
- 13) **Above the critical temperature, no amount of pressure will cause a gas to liquefy.**
- 14) **No, because the temperature must be at or below its critical temperature.**

- 15) Critical pressure is the pressure required to liquefy a gas at its critical temperature.**
- 16) One gram of steam at 100° C has 539 more calories (the heat of vaporization) than one gram of water at 100° C.**
- 17) The space above the liquid holds as much vapor as it can hold under the given conditions.**
- 18) Molecules acquire a greater kinetic energy when heated. They can vibrate enough to break out of their fixed pattern and enter the liquid phase.**
- 19) The melting point and the freezing point are at the same temperature.**
- 20) A few substances change into other substances when heated or decompose. For example when sugar is heated it can break down into carbon dioxide and water.**