BC Science Chemistry 11 Answer Key

Section 2.1

Warm Up

- 1. for e.g. cold, white, crystalline, slippery, compressible, cohesive
- 2. for e.g. light, heavy, fluffy, wet
- 3. for e.g. the air temperature and pressure

Quick Check

- 1. the stuff that materials are composed of
- 2. a quality of a thing, especially a quality common to a group, type, class, etc.
- 3. a quality that is or depends upon the amount of the material
- 4. a property that describes a chemical change, i.e. one in which a new substance(s) or species is formed, or otherwise describes the tendency of a chemical to react

Quick Check

- 1. the average mechanical energy of the particles that compose a material
- 2. the total mechanical energy of an object's or a material's particles
- 3. the energy transferred from one body to another because of a difference in temperature

Quick Check

- 1. the process of changing from a solid to a liquid
- 2. the vigorous bubbling that occurs within the body of a liquid as it vaporizes internally
- 3. the amount of heat energy required to melt a specified amount of a substance at its melting point

Quick Check

- 1. a property of a solution that only depends on the concentration of the dissolved particles, not on their identity
- 2. for e.g. boiling point elevation
- 3. a solution of a metal and another solid or solids

Activity: The Thickness of Aluminum Foil

For example:

Length	Width	S. Area	Mass	Density	Volume	Thickness
(cm)	(cm)	(cm ²)	(g)	(g/cm ³)	(cm ³)	(cm)
30.0	30.5	915.0	3.872	2.702	1.433	0.001566

9. for e.g. $\frac{1.566 \times 10^{-5} \text{ m thick}}{2.86 \times 10^{-10} \text{ m/atom}} = 54,800 \text{ atoms thick}$

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Review Questions

- a. vapour is a form of matter, vapour pressure is a property, and vaporizing is a phenomenon.
 b. solid is a form of matter, freezing point is a property, and freezing is a phenomenon.
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- 2. All matter exerts a force of gravity on other matter and occupies space.
- 3. Alchemists had it backwards, believing that a material depends on its properties rather that the properties depending on the material.
- 4. for e.g. elastic, durable, non-marking, gets good traction without sticking, easily produced
- 5. for e.g. how much liquid it can absorb, how quickly it absorbs liquids, how strong it is when wet
- 6. a. intensive d. intensive b. extensive e. intensive c. extensive f. extensive
- 7. a. physical d. physical b. physical e. physical c. chemical f. chemical
- 8. a. physical d. physical b. chemical e. chemical c. chemical f. physical
- 9. to get a combination of properties not possible in a single material
- 10. mass, speed
- 11. The particles move faster and thereby strike each other harder causing them to bounce further apart.
- 12. Solids: fixed shape and volume Liquids: fixed volume, adopt the shape of their container Gases: adopt the shape and volume of their container
- 13. No. An individual atom or molecule cannot melt. Melting describes a change in the relationship between atoms or molecules.
- 14. The particles have spread apart to an extent where they can slip by one another.
- 15. As a solid melts slowly in its own liquid, the temperature of the liquid does not rise

because any added kinetic energy is absorbed by the solid and converted into potential energy through melting.

- 16. at the liquid's boiling point
- 17. Operational: the temperature at which vigorous bubbling occursConceptual: the temperature at which the substance's vapour pressure equals the pressure of the gas above the liquid
- 18. lower the atmospheric pressure above the liquid, for example by putting it in a vacuum chamber or by going to a higher altitude
- 19. a. heat of vaporization
 - b. particles in the liquid state are not that much farther apart than they are in the solid state whereas particles in the gas state are much farther apart (on average) than they are in the liquid state, i.e. there is a much greater increase in P.E. going from a liquid to a gas than going from a solid to a liquid.
- 20. a. heat of combustion
 - b. Changing the positions of molecules relative to one another involves less energy than changing the positions of atoms within molecules, i.e. chemical changes generally involve much more energy than physical changes
- 21. Chemical properties



- 23. each student forms new associations with different students
- 24. a person might mistakenly believe inflammable means not flammable
- 25. A liquid's freezing point decreases when a nonvolatile substance is dissolved in it. The amount that the freezing point decreases depends only on the concentration of the dissolved particles, not on their identity.
- 26. high carbon steel because it's harder