

## Key Concept Review Pg. 147 #1-12

- (a)** Heat is added to boil water.  
**(b)** Heat is removed to condense water vapour.  
**(c)** Heat is removed to freeze water.  
**(d)** Heat is added to melt ice.
2. Particles in a solid do have spaces between them, and the particles are always moving. However, because the particles are packed together in a solid, the spaces between them are much smaller than the spaces between particles in a gas of the same substance. Also, the particles in a solid vibrate but from a fairly stable position.
3. To speed up the motion of particles, you could add heat. To slow down the motion of particles, you would remove heat from the fork (i.e., you would cool it).
4. A mechanical mixture is a combination of pure substances, as is a solution. However, in a solution, one substance is completely dissolved in another, giving the solution a homogeneous appearance. In a mechanical mixture, the different pure substances are clearly visible.
5. The freezing point of aluminum is equal to the melting point of aluminum.
- (a)** Tin is a solid at 0°C.  
**(b)** Tin is a liquid at 1000°C.  
**(c)** Tin is a liquid at 2000°C.  
**(d)** Tin is a gas at 4000°C.
7.  
Particle - The particle is the base unit for all matter.  
Spaces- Every particle has space around it, and the size of the spaces determine the state of matter.  
Motion - The motion of particles explains the changes of state.  
Attraction - The attraction between particles explains why they stay close together in solid objects.
8. A compound, such as water, is a pure substance. Unlike a mixture, the elements in a compound are chemically combined. A mixture contains two or more pure substances that do not combine chemically.
- (a)** The bowl of salsa is a heterogeneous mixture.  
**(b)** Vinegar is a homogeneous mixture. Note: Vinegar is also described as a solution in which acetic acid has been diluted with water. Students may overlook this and respond that vinegar is a pure substance, which, in its undiluted form, it is.
10. When the olive oil is put into the fridge, heat is removed from the oil. The particles in the olive oil slow down and move closer together, resulting in a hardening of the oil.
11. Yes, one type of matter can exist in two states at one time—for example, when it is undergoing a change of state, as when ice melts. Another example is foam, which is composed of gas surrounded by a liquid or solid.
12. No, not all substances have the same melting point and boiling point as water. For example, if air boiled at the same temperature as water, air would be liquid at room temperature; or if concrete had the same melting temperature as water, the sidewalks would be liquid.