Quiz.

1. Which of the following statements is FALSE?
   a) A solid absorbs energy when it melts.
   b) A gas absorbs energy when it liquefies.
   c) A liquid absorbs energy when it vaporizes.
   d) A liquid emits energy when it solidifies.

2. When a block of ice at zero degrees Celsius melts, the ice
   a) absorbs energy and gets warmer.
   b) releases energy and gets warmer.
   c) absorbs energy but does not change its temperature.
   d) releases energy but does not change its temperature.

3. When water vapor condenses on the inside of a window, the room becomes slightly
   a) warmer.
   b) cooler.
   c) neither warmer nor cooler.

4. If you want to cook eggs by boiling them while in the mountains, then compared to sea-level cooking, you should
   a) boil the eggs for a longer time.
   b) use a hotter flame.
   c) boil the eggs for a shorter time.
   d) None of the above choices are true.

5. A hot dog pants
   a) to help evaporation occur in its mouth and bronchial tract.
   b) to bring more oxygen into its lungs.
   c) for no particular reason – some things just happen.
   d) to impress dogs they find attractive.

6. Suppose you want to save energy and you're going to leave your cool house for a half hour on a hot day. You should turn the temperature setting on the air conditioner
   a) up a little.
   b) down a little.
   c) off altogether.
   d) to room temperature.

7. Steam burns are more damaging than burns caused by boiling water because steam
   a) gives up additional energy when it condenses.
   b) has more energy per kilogram than boiling water.
   c) Choices A and B are both correct.
   d) Choices B and C are both incorrect.

8. A factor that usually determines whether a substance is in the solid, liquid, gaseous, or plasma state is its
   a) atomic number.
   b) composition.
   c) temperature.
   d) atomic shell configuration.
   e) none of these

9. Wrapping a hot potato in aluminum foil significantly reduces the rate at which it cools by
   a) conduction,
   b) condensation.
   c) evaporation.
   d) melting.

Answer Key.
1. b)

Going from a solid to a liquid and a liquid to a gas, energy is absorbed, and energy is released going in the opposite direction.

2. c)

Ice does absorb energy while it melts, but its temperature does not change until all of the ice has melted due to amount of energy that is needed to break the molecular bonds.

3. a)

Condensation is a warming process because the molecules emit energy to their surroundings.

4. a)

At higher altitudes there is less atmosphere above, resulting in a lower atmospheric pressure. Lower pressures decrease boiling points, so water will boil at a temperature less than 100º C.

5. a)
Dogs only sweat between their "toes," which is a very small surface area compared to their total volumes. Therefore, panting allows them to increase the surface area through which they can cool off via evaporation.

6. c)
According to Newton's Law of Cooling, the greater the temperature difference between an object and its surroundings the greater the rate of cooling. If your house is much colder than the ambient temperature, then it will allow the heat in at a faster rate and require more energy to keep the house cool. Also, its condensers will also be dumping more heat outside, driving up the temperature difference!

7. c)

Condensing steam does give up additional energy when it condenses on your skin, and also it has more energetic molecules per unit volume than boiling water. Both of these can contribute to intensifying its burning potential.

8. c)

Generally, the higher the temperature of an object (at a constant pressure) the higher the energy of the molecules, one of the defining characteristics between the different phases of a substance.

9. c)

Of these options, only evaporation makes sense. Conduction may still occur if aluminum is in thermal contact with the potato, condensation is not a cooling process, and the potato is not in danger of melting.