8th Grade Science – Week 13

$$Q = mC\Delta T \qquad Heat = mass\ x\ Specific\ Heat\ x\ (T_{final} - T_{initial})$$

$$Specific\ Heat\ of\ Water = C = 4.18\ J/g℃$$

1. 1. How much heat does it take to warm up 50 grams of water from 20˚C to 35˚C?
   (A) 209 J
   (B) 500 J
   (C) 1000 J
   (D) 3135 J

2. The specific heat of iron is 0.450 J/g˚C. How much heat must be transferred to 15 grams of iron to raise its temperature only 4˚C?
   (A) 27 J
   (B) 45 J
   (C) 60 J
   (D) 87 J

3. A hand warmer will transfer heat differently from the sun or from an oven. What would a hand warmer be described as in terms of transferring heat?
   (A) Convection
   (B) Radiation
   (C) Conduction
   (D) Vaporization

4. An 8 kg piece of copper is heated to 300˚C and is placed in a sealed Styrofoam container that contains 5 kg of water at 20˚C. What can be said about the temperature changes of the copper and water as well as the energy changes?
   (A) The water increases its temperature drastically, but the energy change is the same as the copper.
   (B) The water increases its temperature slightly, but the energy change is the same as the copper.
   (C) The water increases its temperature and energy the same amount as the copper.
   (D) The water increases its temperature slightly and the energy increases slightly as compared to the copper.

5. During a basketball practice one of the players sprains their ankle. Because it is starting to swell, the coach gets an instant cold pack from the first aid box and has the player put it on their ankle. Although the instant cold pack was not at all cold when the coach picked it up, the instructions said to punch the pack so that you break open a sack of chemicals inside of it. Once it is punched, the cold pack rapidly becomes very cold. What is happening here?
   (A) Some of the energy from the cold pack is used up and no longer exists when the chemicals react.
   (B) The chemical reaction inside of the pack is exothermic and so it releases heat from the water inside the pack.
   (C) The chemical reaction inside of the pack is endothermic and so it absorbs heat from the water inside the pack.
   (D) The cold pack absorbs the coldness from the air around it.

6. A small ice cube is placed in a refrigerator that has a constant temperature of 5˚C. At the moment the ice cube is placed inside the refrigerator it has a temperature of 0˚C. What will happen to the temperature of the ice cube?
   (A) It will increase gradually to 5˚C as it melts.
   (B) It will remain 0˚C until the ice is completely melted.
   (C) It will increase to 5˚C and then begin to melt.
   (D) It will remain 0˚C forever.

7. Consider a smooth piece of wood and a smooth piece of steel, both of the same shape and mass, both cooled to a temperature of 0˚C. Why does the steel feel colder to you even though they both have the same temperature?
   (A) Steel absorbs cold better than wood does.
   (B) Wood stores cold better than steel does.
   (C) Heat is released more quickly from your hand to steel than it does to wood.
   (D) Metals are cold by nature.

8. As a small sample of water freezes,
   (A) Its surroundings absorb energy from it.
   (B) It absorbs energy from its surroundings.
   (C) It absorbs coldness from its surroundings.
   (D) It neither absorbs nor releases energy because of the Law of Conservation of Energy.

9. Liquid water is boiling in a pan on a stove. The burner is set to “LOW.” While the water is boiling on the burner the burner is turned to “HIGH.” What happens to the temperature of the liquid water?
   (A) It increases, and it does so at a faster rate than when the burner was on “LOW.”
   (B) It increases, and it does so at the same rate as when the burner was on “LOW.”
   (C) It decreases slightly due to the extra boiling in the pan.
   (D) It remains the same.

10. The boiling point of water is 100˚C. Where is the energy going during this physical change from liquid to gaseous water?
    (A) To increase the temperature of the water.
    (B) To break the attractions of the water molecules.
    (C) To break the bonds of the water molecules.
    (D) To the melting of the water.