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**In each of the following situations, identify the method of heat transfer taking place (conduction, convection, radiation). More than one process may be occurring.**

1. Hot coffee is stirred with a spoon, the spoon gets hot due to conduction.

Explanation: The spoon is in direct contact with the coffee.

2. A chair is placed several feet from a fire in a fireplace. The fireplace has a glass screen. The

side of the chair facing the fireplace gets warm because of radiation.

Explanation: The chair is not making direct contact with the fire or the glass screen, nor is the warm air rising, so radiation is the only solution left.

3. A certain type of decorative lamp contains colored liquids. These liquids form globs that break

off and rise to the top of the liquid. The globs rise due to convection.

Explanation: Fluids (like the globs) rise when they are warmer, and sink when they are cooler, in a convection current.

4. Near the ceiling of a room the air is warmer. The warm air rises because of convection.

Explanation: Convection currents cause fluids with warmer temperatures to rise (less dense). When the cooler air heats up, it rises and takes the place of the warmer air.

5. A college student holds the back of his hand near an iron to see if it is hot. Heat is transferred

to his hand by radiation.

Explanation: The student’s hand is not making direct contact with the iron, nor is there a convection current. Radiation is the only solution.

6. A heater is placed under one corner of a water bed mattress. Warm water moves throughout

the mattress because of convection.

Explanation: The warm water in the mattress flows away from the heater. Cooler water takes its place, and is heated. Soon enough, there is a current flowing throughout the mattress, warming the entire bed.

7. A certain type of stainless steel cookware has a layer of copper applied to the bottom to help it

heat evenly. The copper transfers heat to the pan by conduction.

Explanation: The copper is in direct contact with the pan.

8. In a swimming pool, the water near the surface is slightly warmer. The warm water rises

because of convection.

Explanation: Convection currents cause fluids with warmer temperatures to rise due to lower density. Once at the top, the warmer fluid will cool and sink to the bottom, recently warmed fluids taking its place.

9. One end of a copper rod is placed in a flame of a Bunsen burner. Small pieces of wax placed

along the rod melt at progressively larger distance from the flame. Heat is transferred through

the rod by conduction.

Explanation: The rod is in direct contact with the fire, and the wax is in the direct contact with the rod.

10. A house burns down. On the house across the street, all of the vinyl siding is twisted and

warped by the heat. The heat was transferred across the street by radiation.

Explanation: There was no direct contact between the two houses during the fire, nor was there a convection current to spread the heat across the street. This means that the heat had to radiate outwards to heat the other house.

11. Warm air over the beach rises while cooler dense air from the ocean rushes in due to convection.

Explanation: Convection currents cause warmer air to trade places with the cooler air. The warmth of the beach will heat the cooler air while the cool air of the ocean will lower the temperature of the warm air.

12. The metal skewer gets so hot that you drop your marshmallow in the campfire because of conduction.

Explanation: The metal skewer is heating due to the direct contact with the fire, and your hand is heating due to direct contact with the metal skewer.

13. A huge rock at the state park gets so hot during the day that you can’t sit on it from radiation.

Explanation: Heat from the sun that transferred through electromagnetic waves heats the rock. Radiation is the only way of heat transfer that works through electromagnetic waves.

14. You lay on that same rock at night so that you can keep warm by conduction.

Explanation: Heat absorbed by the rock during the day transfers into you during the night because you are in direct contact with the rock.

15. A fireman feels a door and it is hot from the fire on the other side due to conduction.

Explanation: The door is in direct contact with the fire, and the fireman is in direct contact with the door.

16. The cause of weather systems on Earth is convection.

Explanation: Convection currents transfer warm air with cool air, causing changes in wind, pressure, and temperature.

17. You are in the top bunk of a bunk bed and you want to turn the air conditioner on while your

friend on the bottom bunk is fine is caused by convection.

Explanation: The warmer air has risen to the top of the room – where your bunk is. However, cooler air is on the bottom – where your friend’s bunk is. This means that the top and bottom of the room have different temperatures.