

Using Heat

1. Explain why placing a damp towel over a fan will increase its ability to cool a room.
2. Explain the flow of thermal energy when you open the door of the refrigerator.
3. Why do Desert Jackrabbits have large ears to keep them cool.
4. Why do houses in cold climates usually not have large picture windows.
5. Suppose you apply a flame to 1 liter of water for a certain time and its temperature rises by 2°C . If you apply the same flame for the same time to 2 liters of water, by how much will its temperature rise?
6. In a glass of water at room temperature, do all the molecules have the same speed?
7. Which has more kinetic energy – the molecules of a gram of ice or the molecules of a gram of steam? Defend your answer.
8. Why can't you establish whether you are running a high temperature by touching your own forehead?
9. If a fast moving marble hits a random scatter of slow marbles, does the fast marble usually speed up or slow down? Which lose(s) kinetic energy and which gain(s) kinetic energy – the initially fast moving marble or the initially slow ones? How do these questions relate to the direction of heat flow?
10. An iron thumbtack and a big iron bolt are removed from a hot oven. Both are red-hot and have the same temperature. When dropped into identical containers of water of equal temperature, which one raises the water temperature more?
11. The sand at the beach warms up much quicker during the day than the water does. Given this information, which one has a larger specific heat capacity?
12. When you touch a cold surface, does cold travel from the surface to your hand or does energy travel from your hand to the cold surface? Explain.
13. Does a substance that cools off quickly have a high or low specific heat capacity?
14. How does the specific heat of water compare with the specific heat capacities of other common materials?
15. According to the law of conservation of energy, if ocean water cools, something else should warm, what is it that warms?
16. Why is the temperature fairly constant for land masses surrounded by large bodies of water?
17. If you drop a hot rock into a pail of water, the temperature of the rock and the water will change until both are equal. The rock will cool and the water will warm. Does this hold true if the hot rock is dropped into the Atlantic Ocean? Explain.
18. Consider two glasses, one filled with water and the other half full, with the water in the two glasses being at the same temperature. In which glass are the water molecules moving faster? In which is there greater internal energy? In which will more heat be required to increase the temperature by 1°C ?
19. Adding the same amount of heat to two different objects does not necessarily produce the same increase in temperature. Why not?
20. When you put ice into a glass of room temperature Coke, does the ice cool the Coke or does the Coke warm the ice?