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| **Heat Transfer** | Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

Write the form of heat flow described below: Conduction, Radiation, Convection

1. Energy transfer through collisions. Conduction
2. Hot fluid moves to cooler location. Convection
3. Photons are emitted from hot objects. Radiation

Write the form of heat transfer that is reduced by the following: Conduction, Radiation, Convection

1. Overhangs (blinds) along the south side of a classroom. Radiation
2. Weather striping around windows and doors. Conduction
3. Double-paned windows. Conduction
4. If you have a cup of coffee that is too hot to drink, should you add cold milk to it immediately to cool it or let it stay black and sit for a while before adding cream? The object is to get it cool enough to drink in the shortest possible time.

Ans: Leave it black. Conduction, convection, and radiation is dependent on Δt, Cooling is greatest BEFORE adding milk.

1. If you heat a uniform metal place with a hole in it, will the heat get larger or smaller?

Ans: Larger. The material expands in every direction.

1. Heat flow is normally from a high temperature towards a low temperature region. How do you manage to cool your body on a July day when the temperature is 102 F (compared to 98.6 F normal for body temperature)?

Ans: Perspiration. Evaporation causes cooling.

1. A metal rod of length *L* and cross sectional area of *A* connects two thermal reservoirs of different temperatures. The amount of energy that is transferred through the rod in a second is E. How much energy would be transferred in a second if the rod were replaced with one of 2*L*?

Ans: E/2

1. A metal rod of length *L* and cross sectional area of *A* connects two thermal reservoirs of different temperatures. The amount of energy that is transferred through the rod in a second is E. How much energy would be transferred in a second if the rod were replaced with one of cross sectional area 2*A*?

Ans: 2E

1. A 20.0 cm long bimetal strip of brass (α = 19 x 10-8 oC-1) and aluminum (α = 19 x 10-8 oC-1) is heated from 22 oC to 150 oC. how much longer is the aluminum side?

Ans: 0.18 mm longer

1. During the summer, railroad track couplers appear to be touching. During the winter the couplers have a space of 0.375 m between them. Each railroads track is 3.0 m long and the liner expansion constant is 0.0050 K-1. What is the change in temperature the track encounters?

Ans: 25 oC

1. A certain resistor, attached to a battery, is known to give off 500. calories per minute. If this resistor is immersed in 1000. mL of water at an initial temperature of 10.0 oC, what will the final temperature be after 20.0 mins. ( cw = 1.00 cal/(g cC))

Ans: 20. oC

1. How much water will spill from a 5.00 L copper vat if the temperature is increased by 35.0°C?

Ans: 0.0280 L

1. If two steel rods are placed 2.50 mm apart when the temperature is -30.0 °C, will they touch if the temperature is increased to 30.0°C if both rods are originally 3.00 m?

Ans: No they will not!

1. A beaker is filled to the brim with 250 mL of ethyl alcohol at 15°C. How much will overflow at 30.0°C? (Assume that the beaker does not expand significantly.)

Ans: 4.2 mL