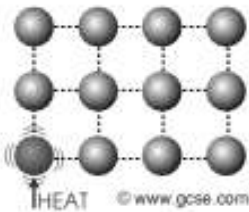


Heat Transfer

Conduction

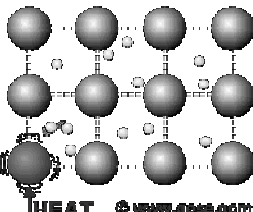
- If heat energy is supplied to one part of a solid, the atoms vibrate faster.
- As they vibrate more, the bonds between atoms are shaken more.
- passes vibrations on to the next atom, and so on



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Conduction in Metals

- Not only do the atoms vibrate more when heated, but the free electrons move around more as well.
- These transfer the energy much faster than just vibrations in bonds.



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Good Insulators



- tile floor feels colder than the wooden floor
- even though both are at same temperature
- tile is a better conductor of heat than wood
- heat is more readily conducted out of the foot touching the tile.

Convection

- heat transfer due to the actual motion of the material itself
- Liquids and gases transmit heat mainly by convection

Convection currents in air. (b) Convection currents in liquid



Radiation



- Energy from the sun passes through space and then through the Earth's atmosphere and warms the Earth's surface.
- neither convection nor conduction

Greenhouse Effect

- hot sun emits short waves
- cool Earth emits long waves, terrestrial radiation.
- water vapor, carbon dioxide, and other "greenhouse gases" in the atmosphere retain the energy

