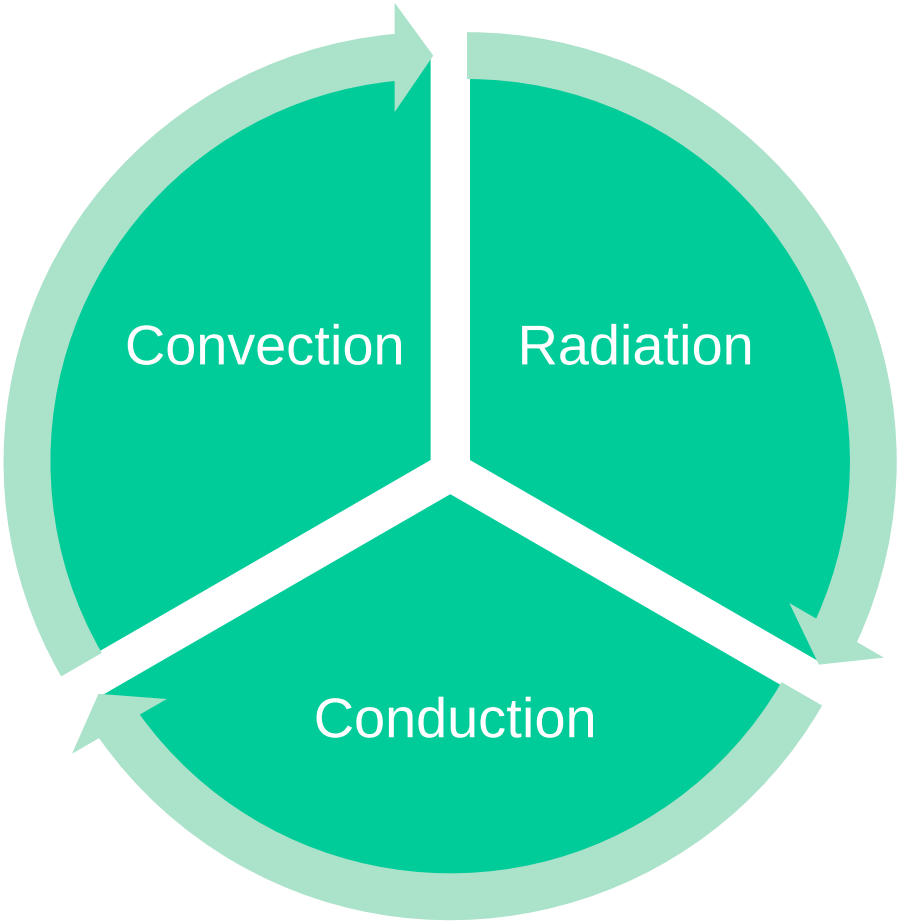
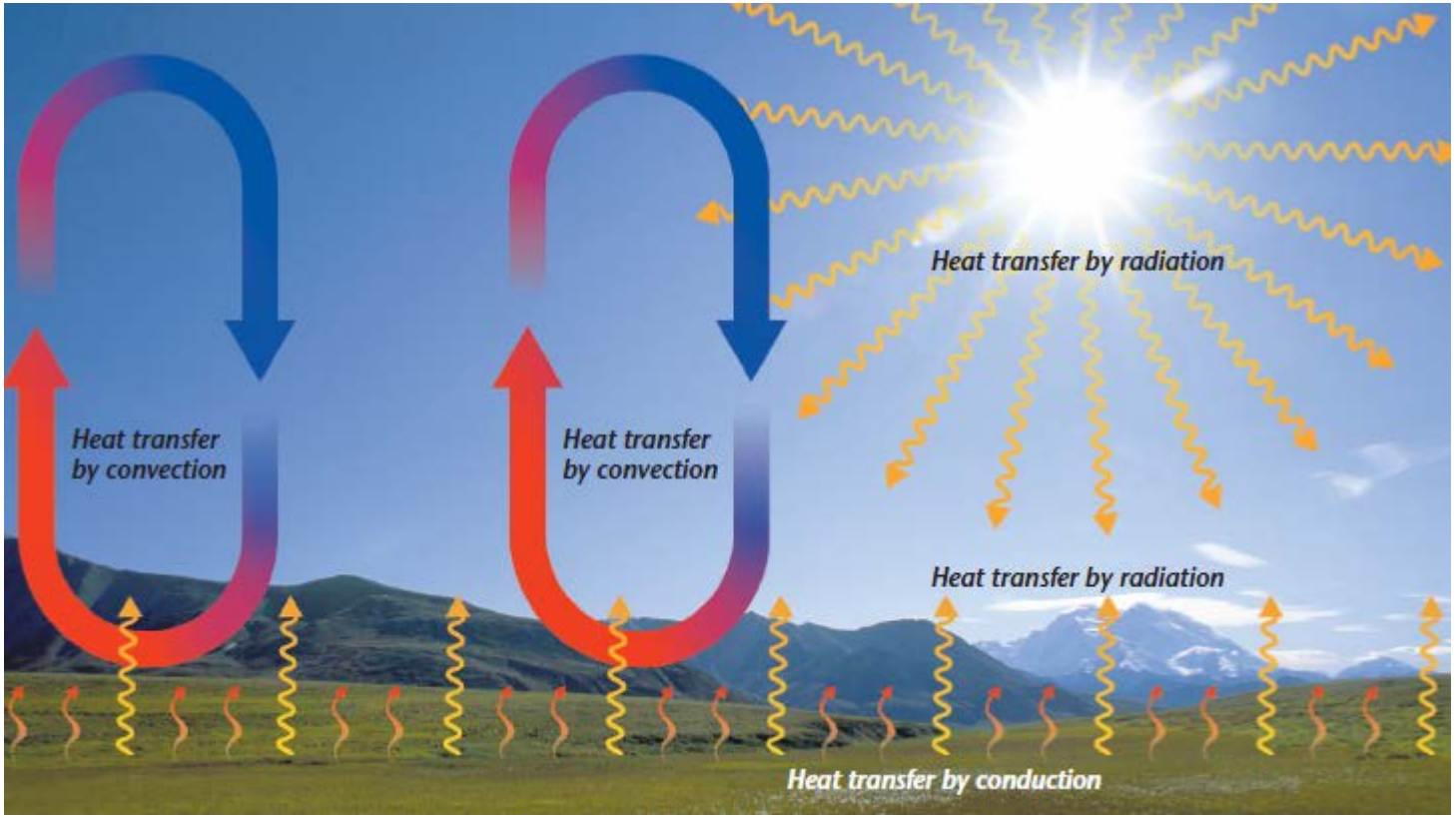
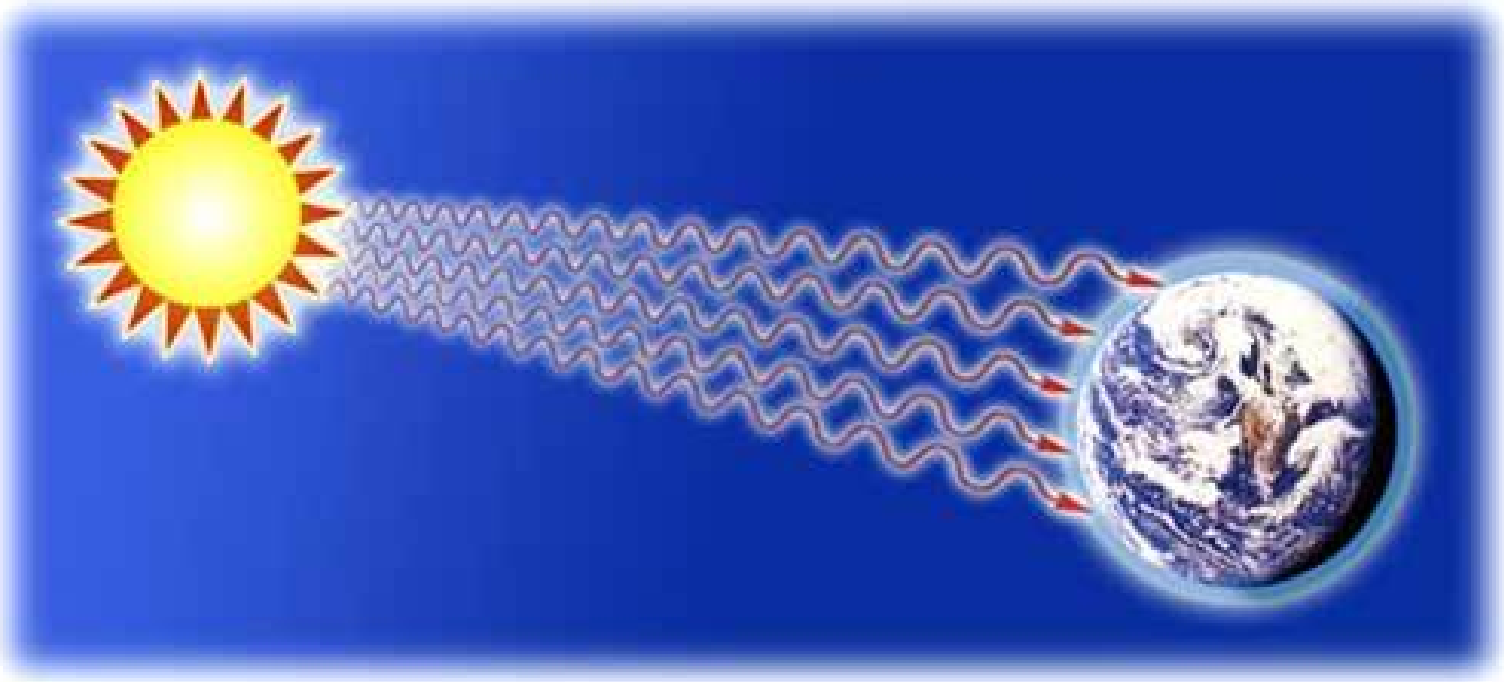
The Water Cycle and Energy Transfer



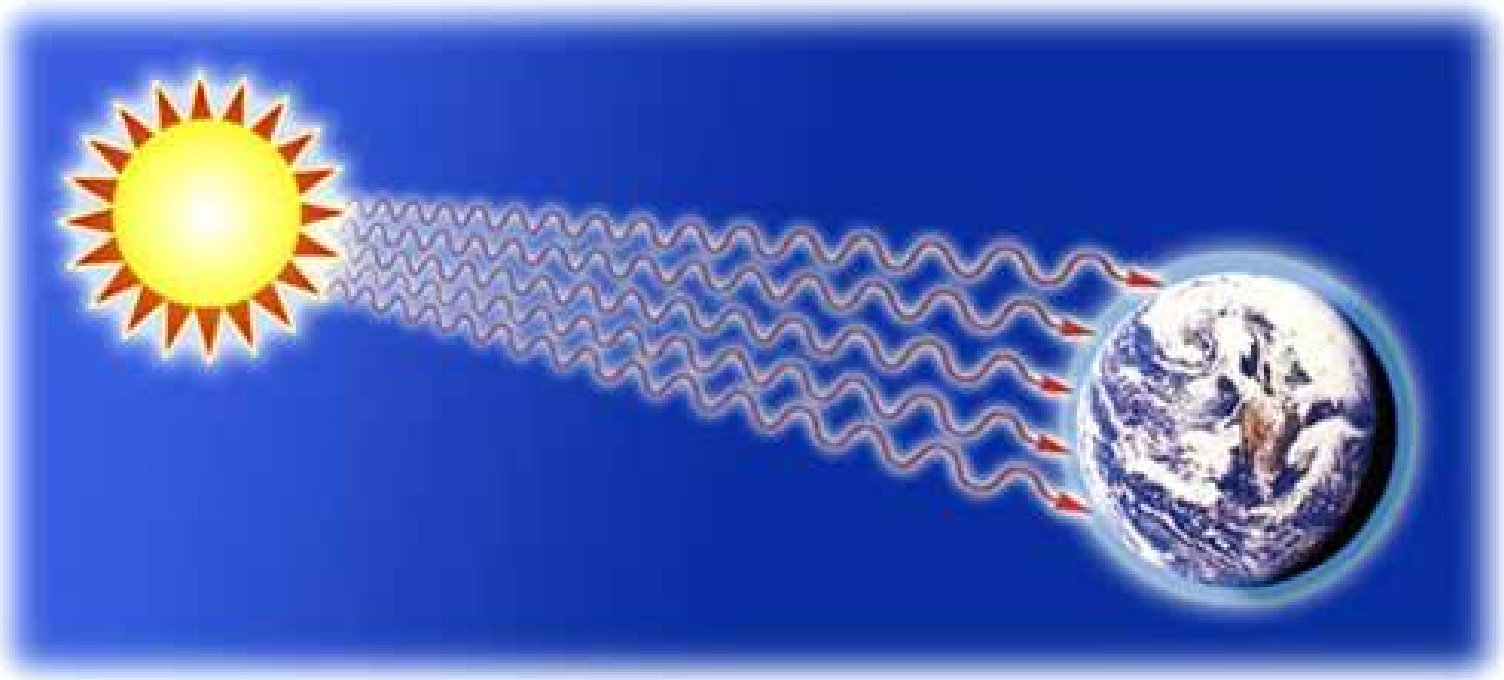
The Sun's energy (heat) is transferred through the atmosphere in three ways – Radiation, Conduction, and Convection



Solar radiation (Energy) from the Sun heats the Earth's surface.

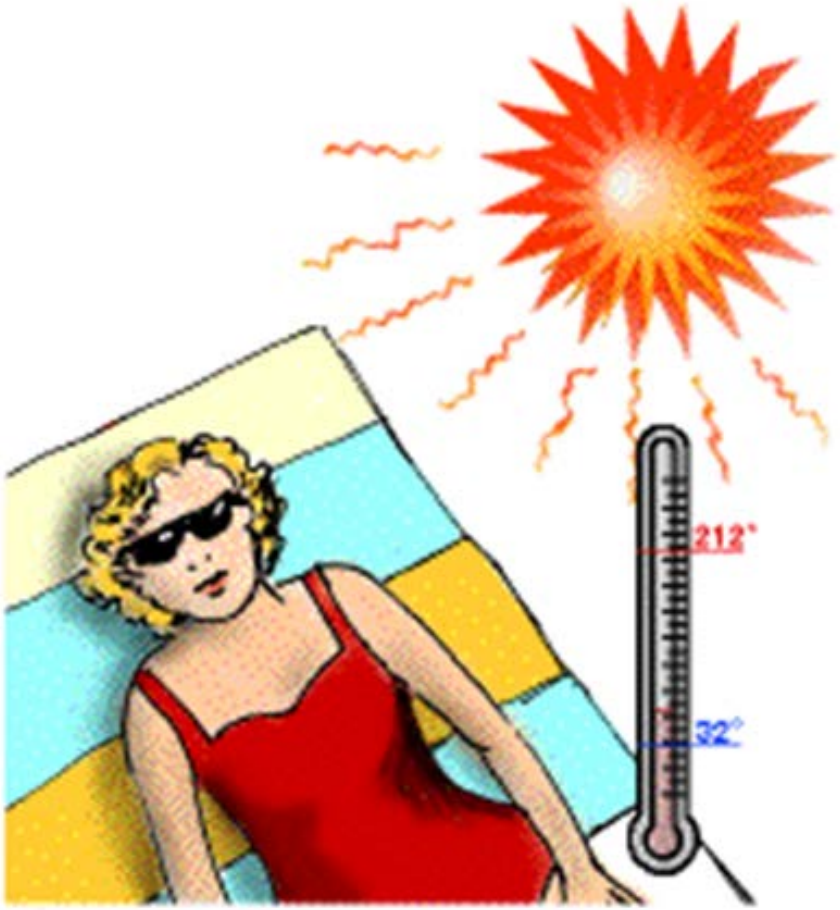


Energy from the Sun is known as heat transfer by Radiation.

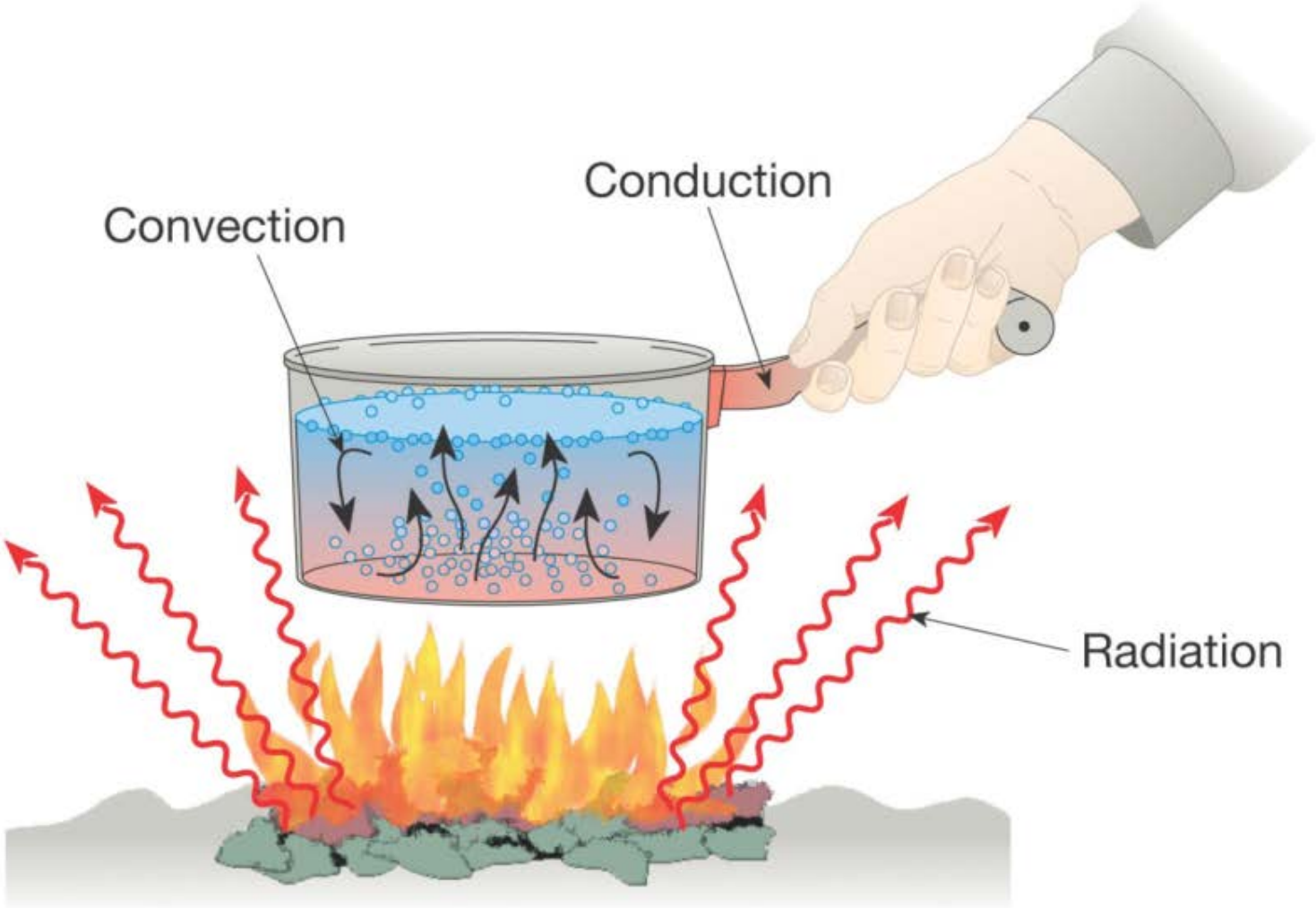


Radiation is energy that is transferred in the form of rays or waves.

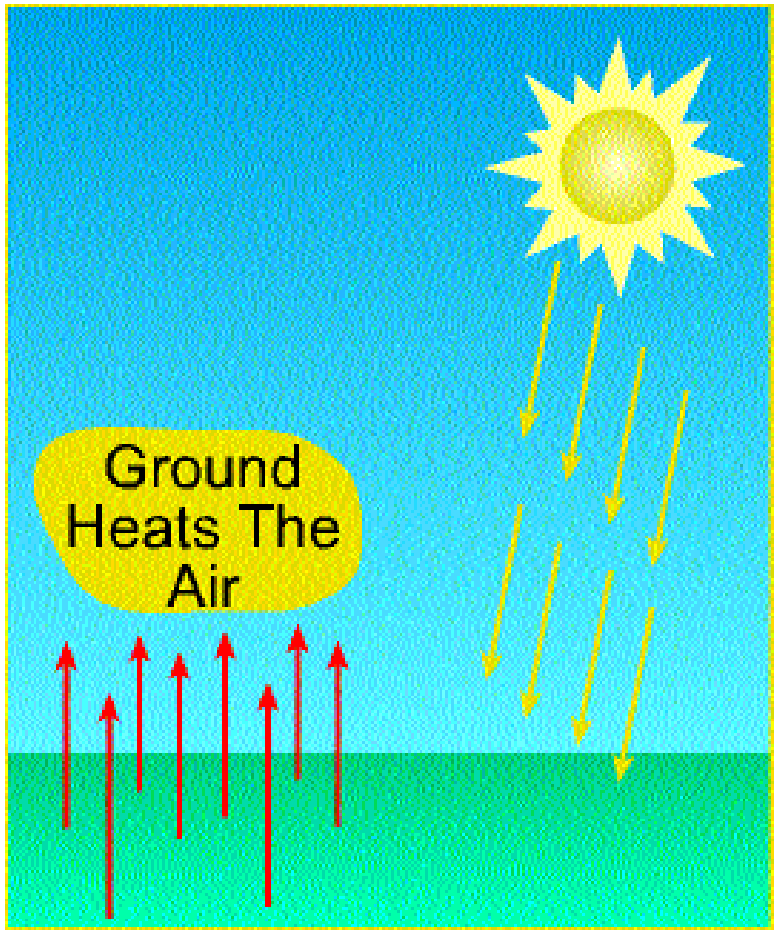
Radiation allows you to feel heat (energy) even though you are not in direct contact with it.



Heat Transfer



Radiation heats the Earth's surface. As air moves over warm land or water, molecules in air are heated by Conduction (direct contact).

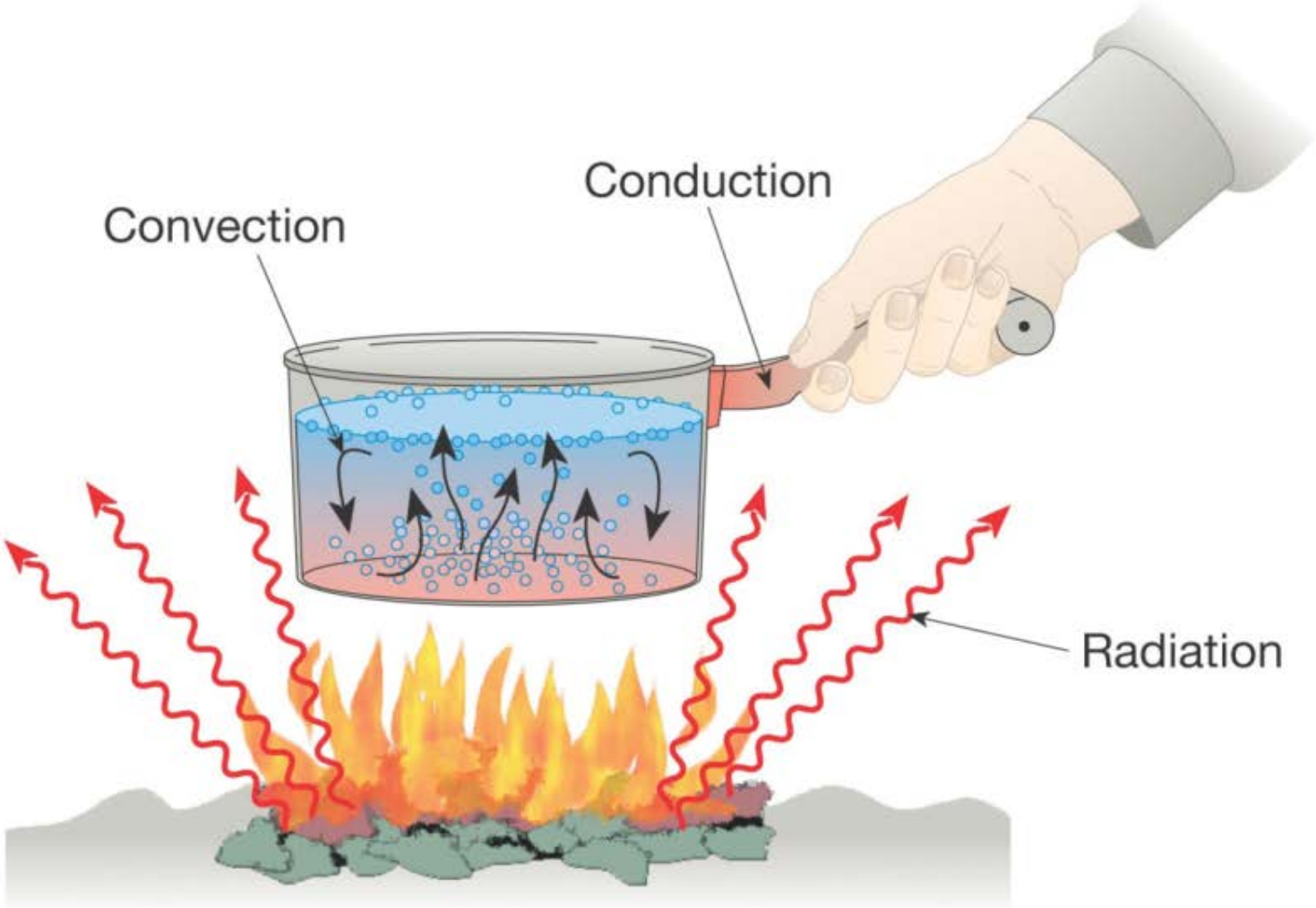


If you walk barefoot
on a hot beach or pavement,
your feet heat up because
of conduction.

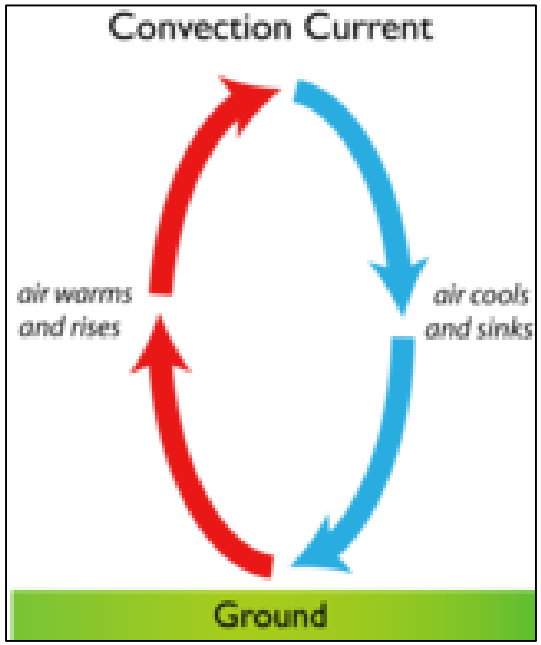
Conduction is the transfer of energy (heat) that occurs when objects are in contact. Energy is transferred from warmer objects to cooler objects.

Conduction

Heat Transfer

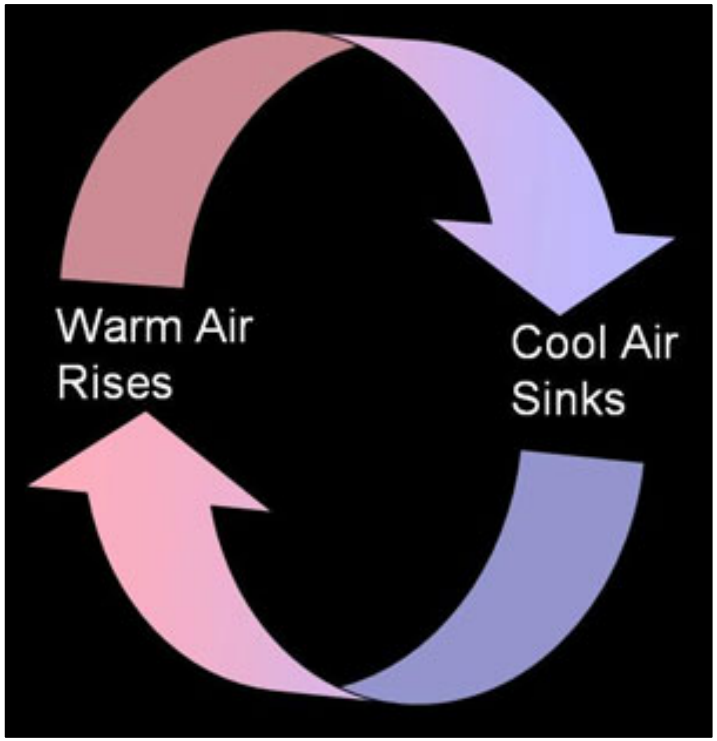


After the atmosphere is warmed by radiation or conduction, the energy (heat) is transferred by Convection.



Convection is the transfer of heat by the flow of material. Convection circulates heat throughout the atmosphere.

Warmer air rises and cool air sinks forming a convection current.

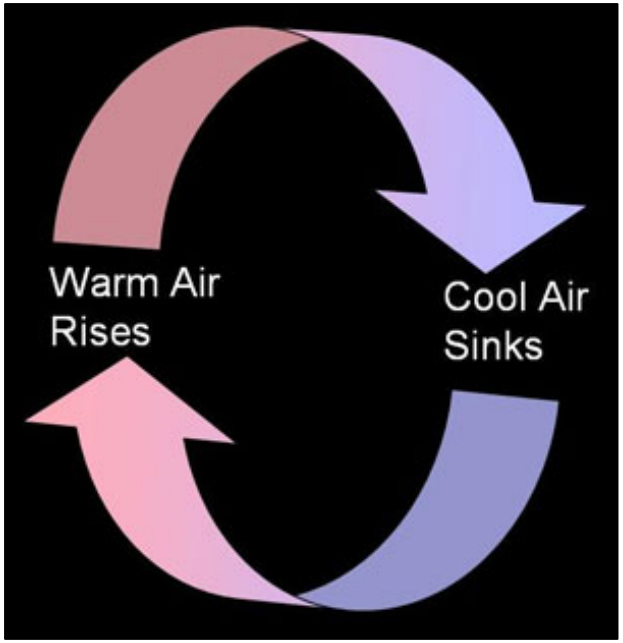


Think, Pair, Share

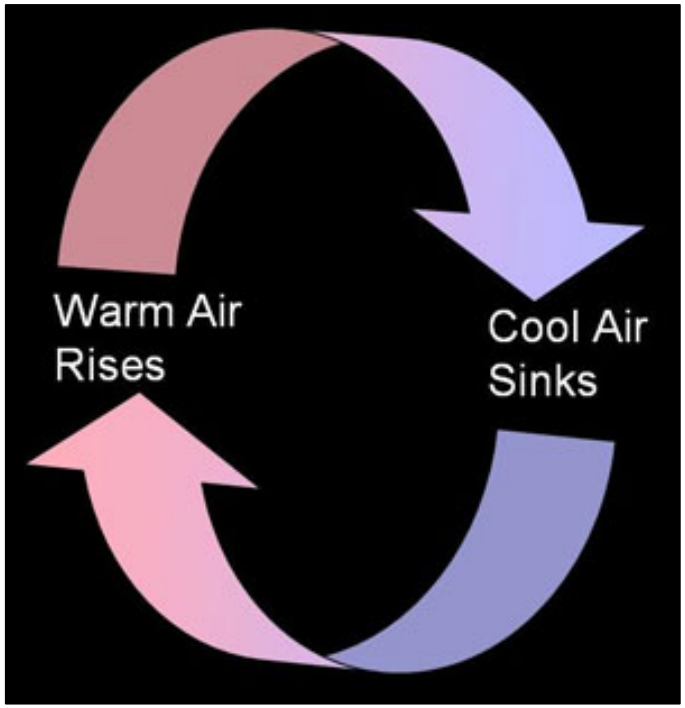
Why does warm air rise and cool air sink?

When air is warmed, the molecules in it move apart and the air becomes less dense (air pressure decreases).

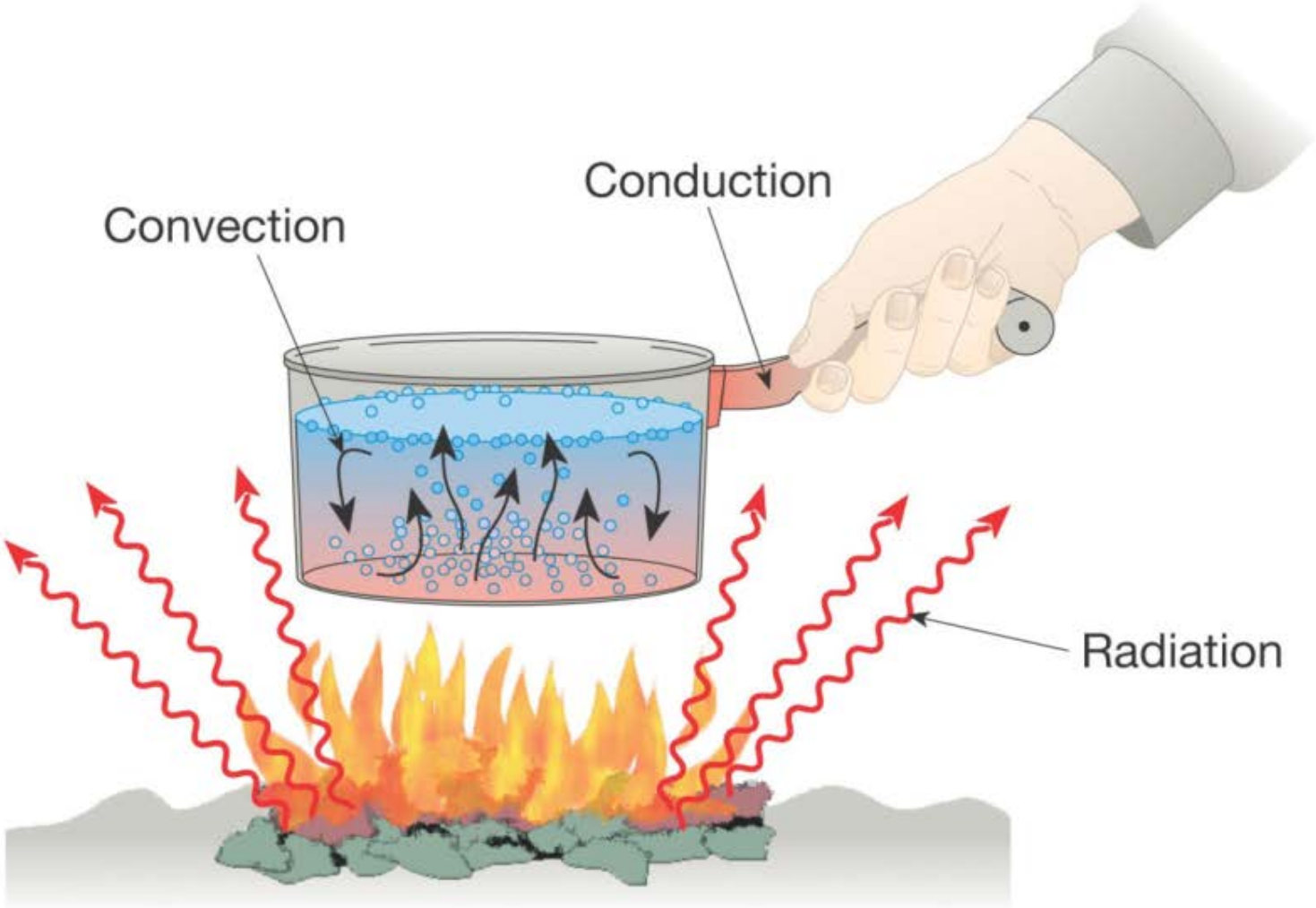
In cold air, molecules move closer together becoming more dense (air pressure increases). Cold air is “heavier” so it sinks while “lighter” warm air rises.



Convection Current



Heat Transfer



Radiation, Conduction, and Convection together distribute the Sun's energy (heat) throughout the Earth's atmosphere.