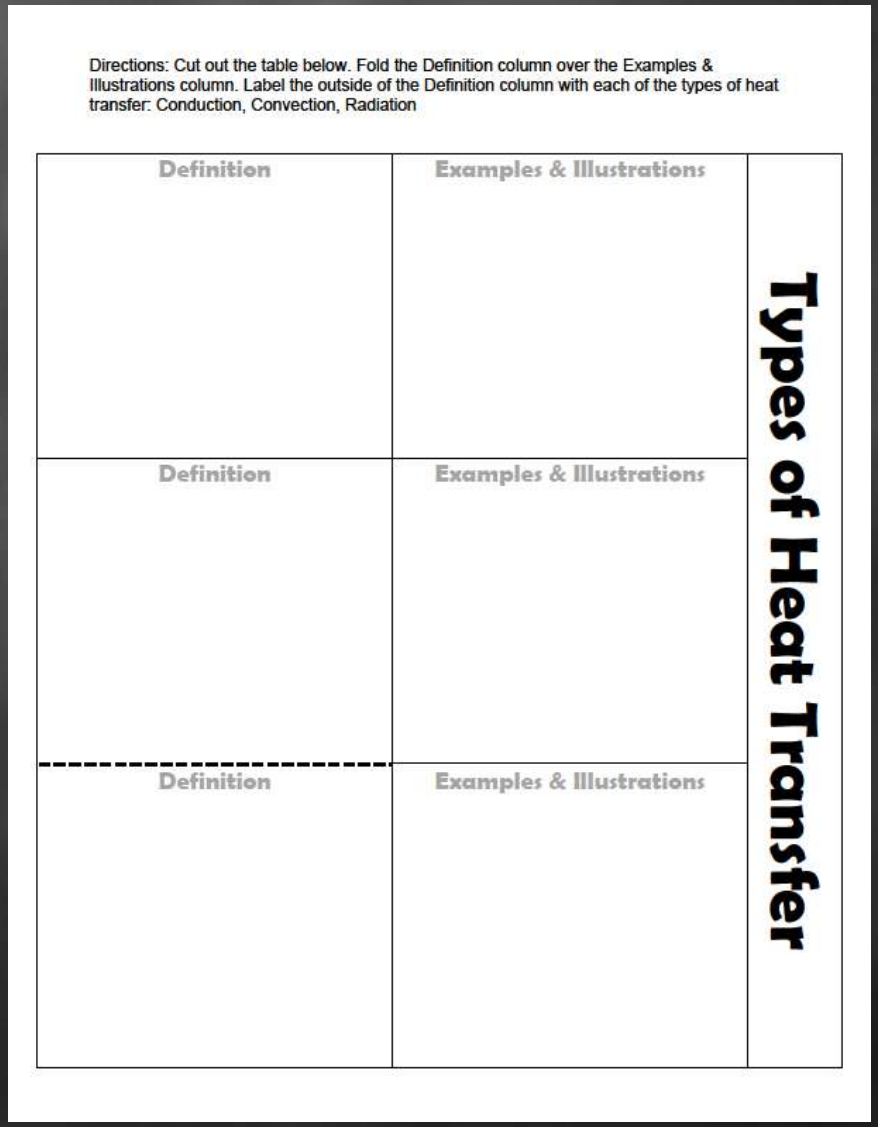
Use the Types of Heat Transfer Foldable to take notes



Directions: Cut out the table below. Fold the Definition column over the Examples & Illustrations column. Label the outside of the Definition column with each of the types of heat transfer: Conduction, Convection, Radiation

Definition	Examples & Illustrations	Types of Heat Transfer
Definition	Examples & Illustrations	
Definition	Examples & Illustrations	

Heat Transfer Activating Strategy

Watch the videos below or do the activities in class. Ask students to guess what cooks the popcorn in each example.

Popcorn Method 1:
http://www.youtube.com/watch?v=9UL1Mbo_tSw

Popcorn Method 2:
http://www.youtube.com/watch?v=cSoR8v4GT5I

Popcorn Method 3:
http://www.youtube.com/watch?v=_HGIkNLBcWY

Essential Question:

How does energy move from one object to another?

Standard:

S8P2d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).

Reviewing Heat (Thermal) Energy

- Heat (thermal) energy is created by the movement of particles (atoms) that produces heat.
- Heat (thermal) energy increases as temperature increases because as temperature increases, atoms move faster (have more kinetic energy)

http://www.middleschoolchemistry.com/multimedia/chapter1/lesson2#heating_and_cooling

Transfer of Heat (Thermal) Energy

- Heat (thermal energy) is transferred from one object to another when the objects are at different temperatures.
- The amount of heat (thermal energy) that is transferred when two objects are brought into contact depends on the difference in temperature between the objects.

Transfer of Heat (Thermal) Energy

- Heat is transferred only when two objects are at different temperatures
- Thermal energy always moves from warmer to cooler objects
- The warmer object loses thermal energy and becomes cooler as the cooler object gains thermal energy and becomes warmer.
- Energy will continue to move from a warmer object to a cooler object until both have the same temperature.

What will happen to the coffee as it continues to sit?

Heat Transfer can occur in three ways:

Conduction

Convection

Radiation

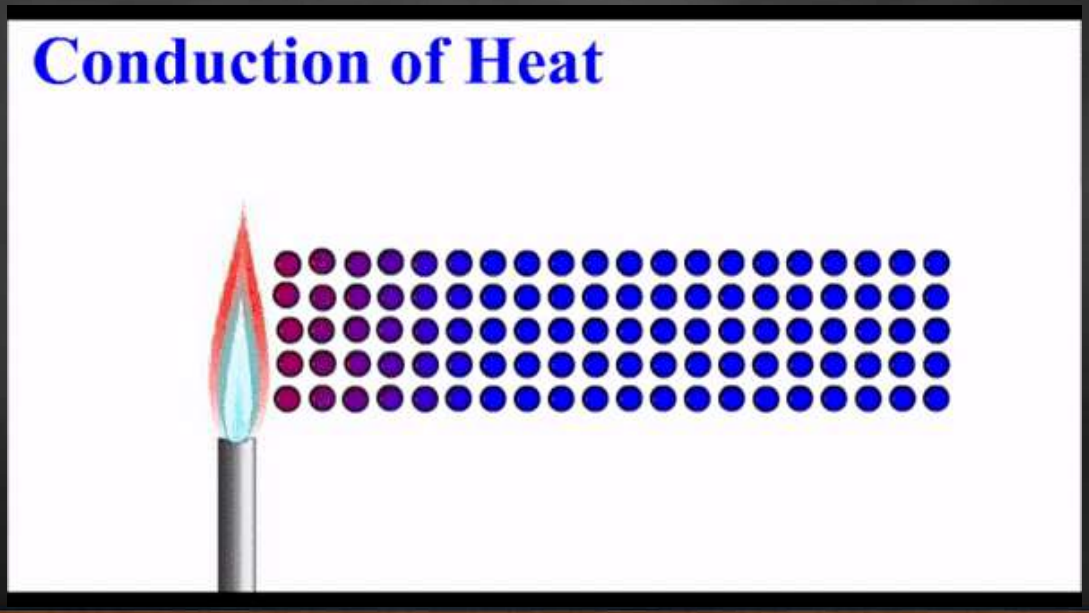
Conduction

- Conduction is the transfer of heat by direct contact (particles collide)
- Conduction occurs most easily in solids and liquids

Conduction

Why is conduction easier in solids and liquids?

Atoms and molecules are closer together in solids and liquids. So, the particles need to move only a short distance before they bump into one another and transfer energy.



Explain the movement of thermal energy in the picture below.

How is this an example of Conduction?

Conduction

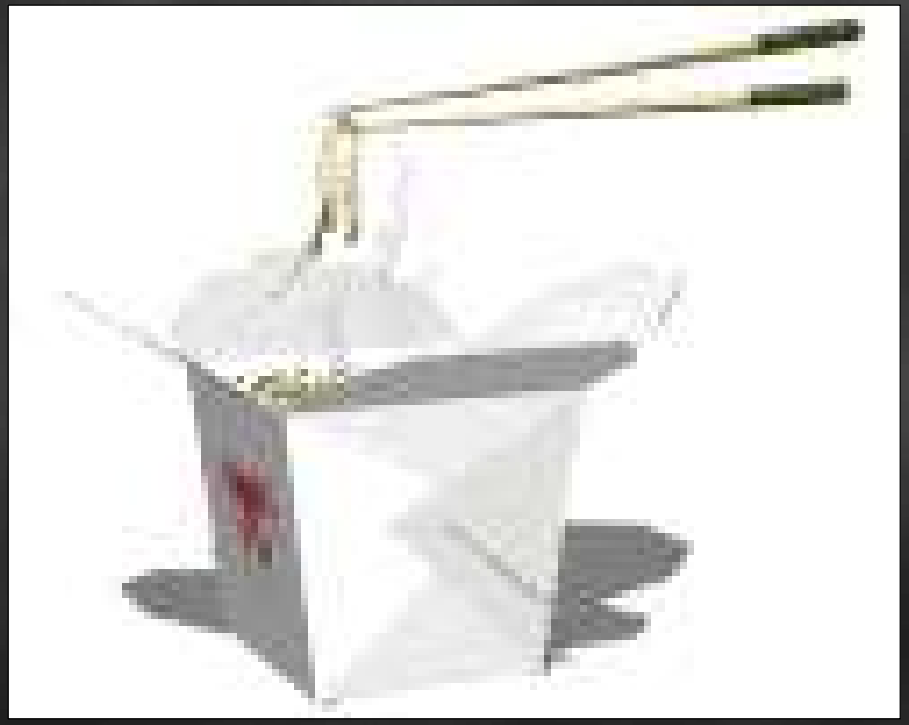
Animation:

http://www.passmyexams.co.uk/GCSE/physics/conduction-heat-transfer.html

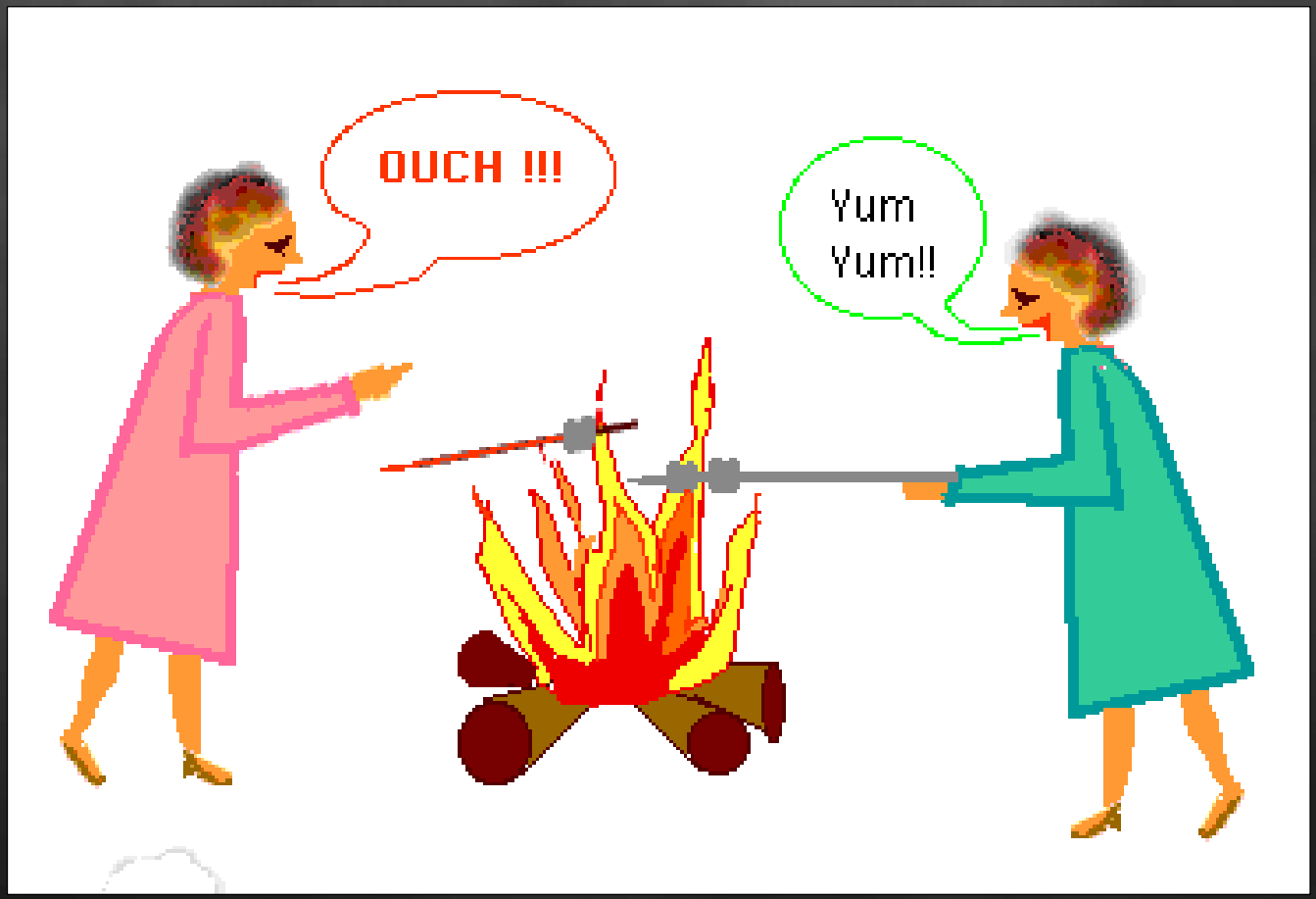
Eureka Video clip:

http://www.youtube.com/watch?v=Yitiw6Y7xZg

Your turn…Explain the movement of thermal energy if you were to eat the Chinese food below. How is this an example of Conduction?



Why does the lady in the pink dress drop her roasting stick before the lady in the green dress?



Conductors and Insulators

- Substances that transfer thermal energy very well are called Conductors.
- Substances that do not transfer thermal energy very well are called Insulators.

Conductors and Insulators

Table 1 Common Conductors

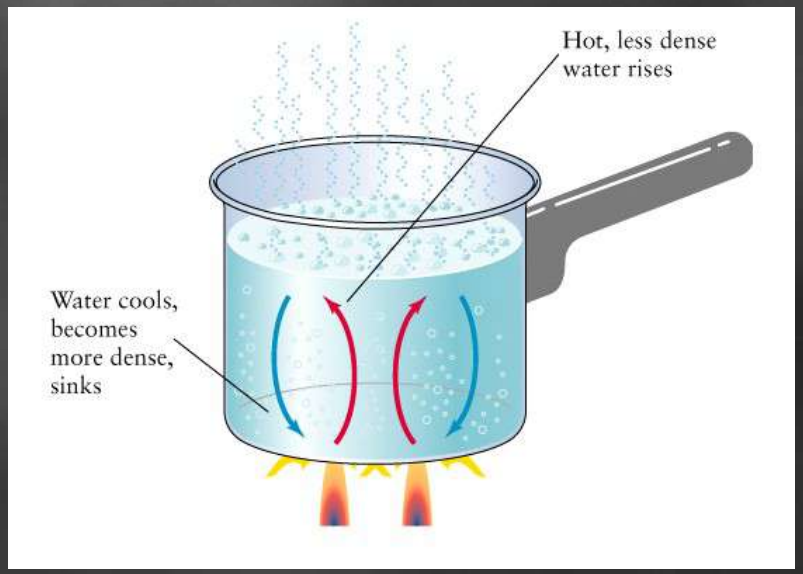
Good conductors	Fair conductors
silver	graphite (carbon)
copper	nichrome
gold	the human body
aluminum	damp skin
magnesium	acid solutions
tungsten	salt water
nickel	Earth
mercury	water vapour in air
platinum	silicon
iron	germanium

Table 2 Common Insulators

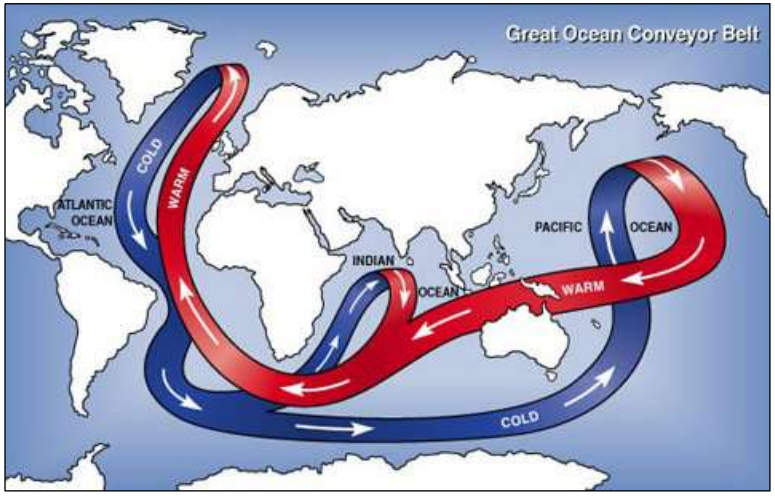
Good insulators	
oil	plastic
fur	wood
silk	paper
wool	wax
rubber	ebonite
porcelain, glass	pure water

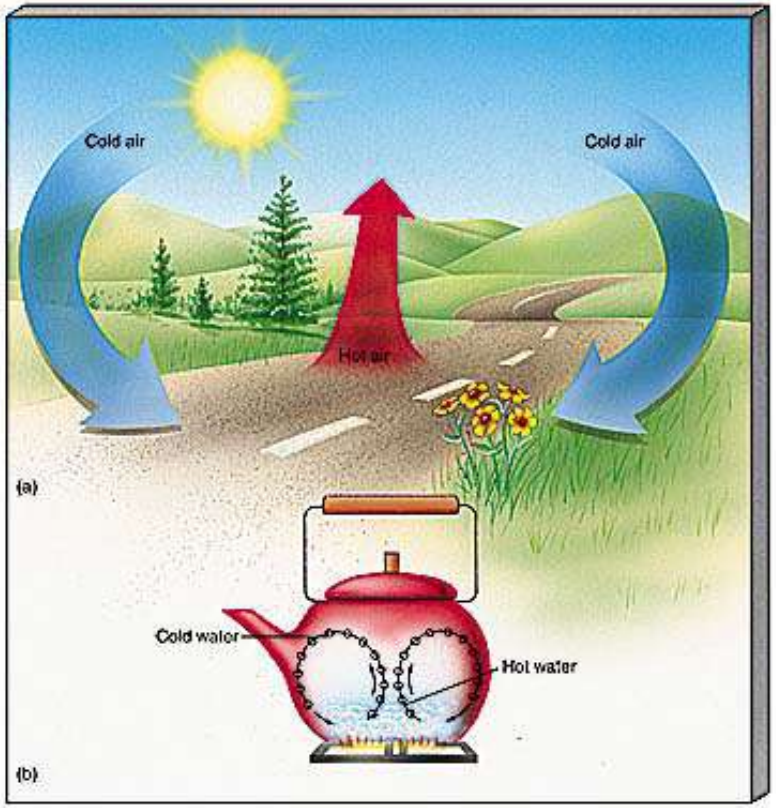
Convection

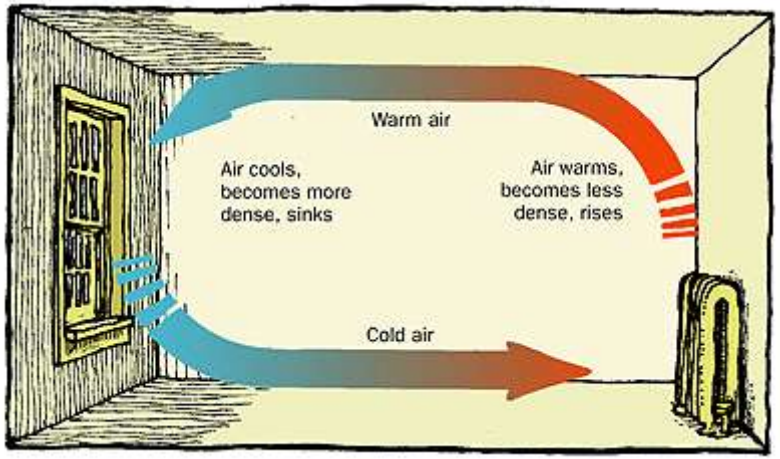
- Convection is the flow of currents in a liquid or gas
- A current is created when the warmer (less dense) material rises forcing the cooler (more dense) material to sink.

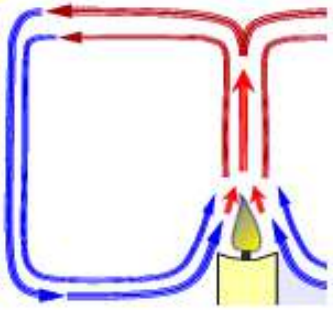


Everyday Examples of Convection Currents









http://www.healthyheating.com/Definitions/heat-transfer-convection.htm#.VD7SIfmjOSo

Convection

Animations and Video Clips

http://www.passmyexams.co.uk/GCSE/physics/convection-heat-transfer.html

Eureka Video clip:

http://www.youtube.com/watch?v=ON2Y3FEk_UI

Convection

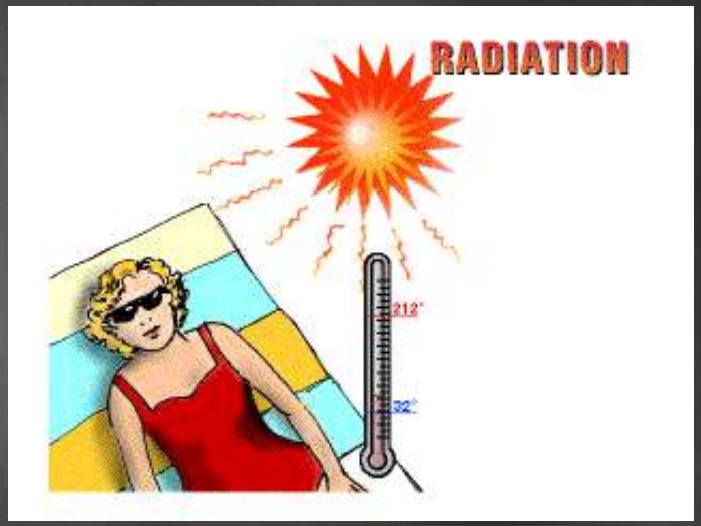
Describe an example of convection that you have experienced recently at home, at school, or outside.

How Hot was it?

Dashboard Oven Hot

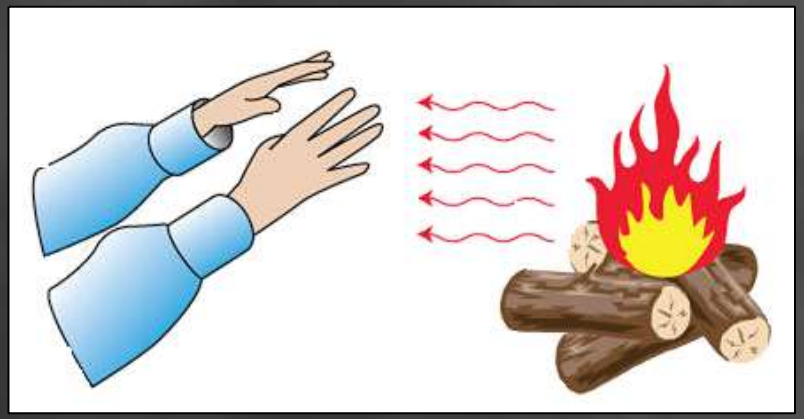
What cooked the cookies?

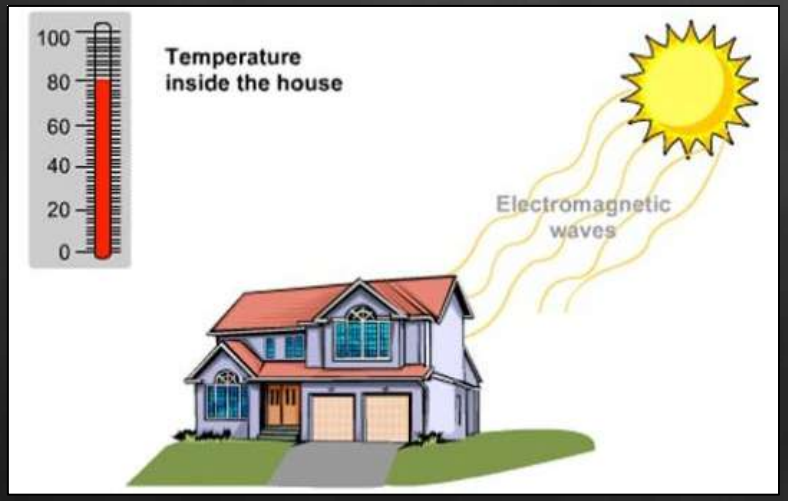
Radiation

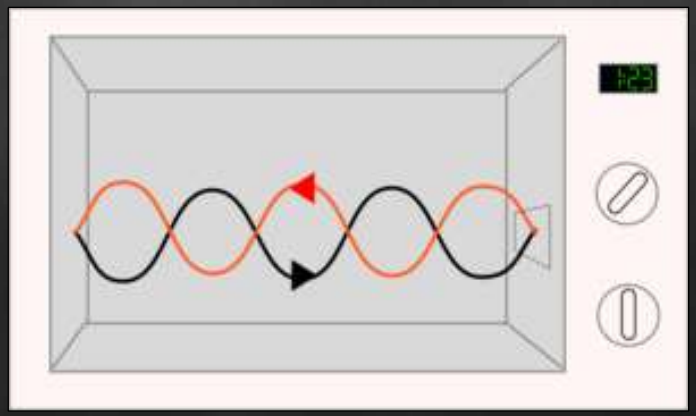


- Radiation is heat transfer through space by electromagnetic waves
- Unlike Conduction and Convection, Radiation can occur in empty space, as well as in solids, liquids, and gases.
- Waves such as visible light, infrared, and ultraviolet light are examples of radiation

Radiation







Radiation

Eureka video clip:

http://www.youtube.com/watch?v=2JZciWtK6vc

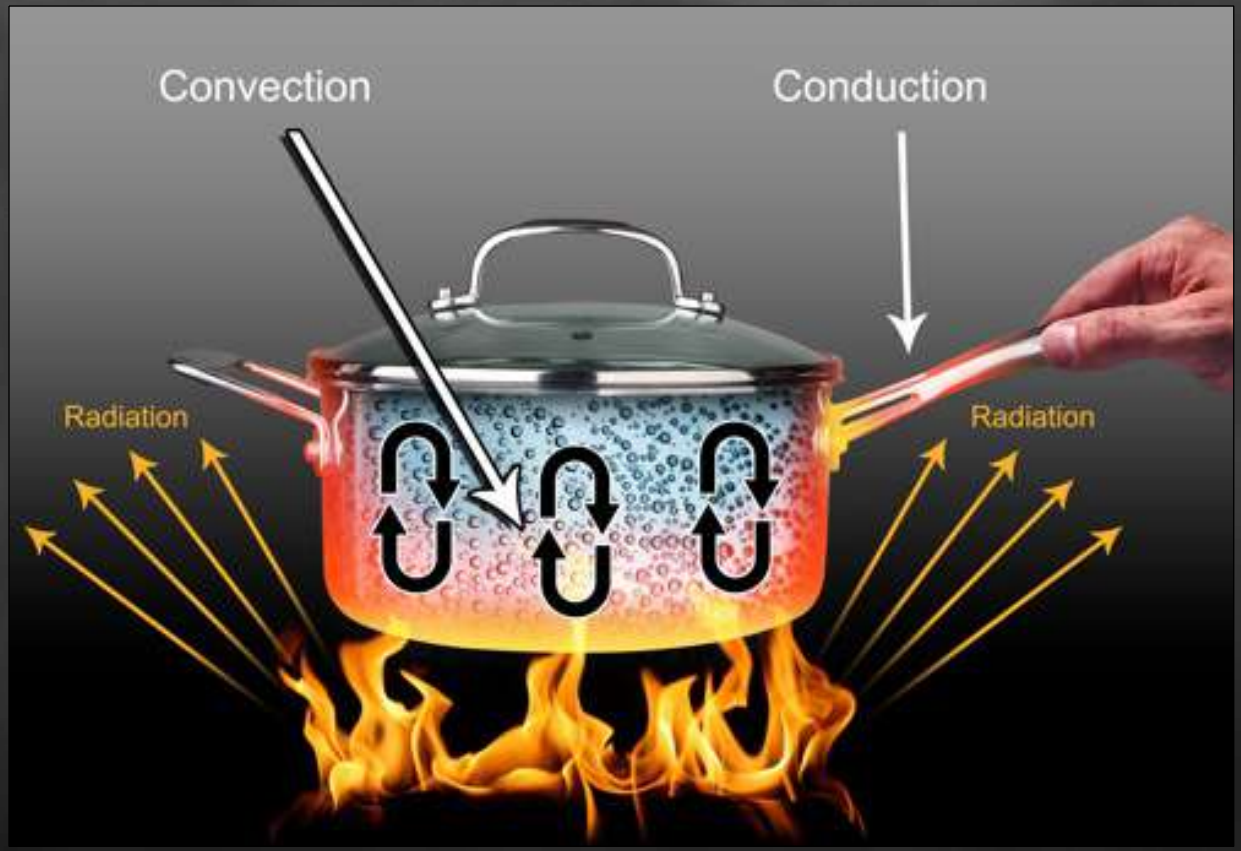
Animations of Heat Transfer

http://www.pbslearningmedia.org/asset/lsps07_int_heattransfer/

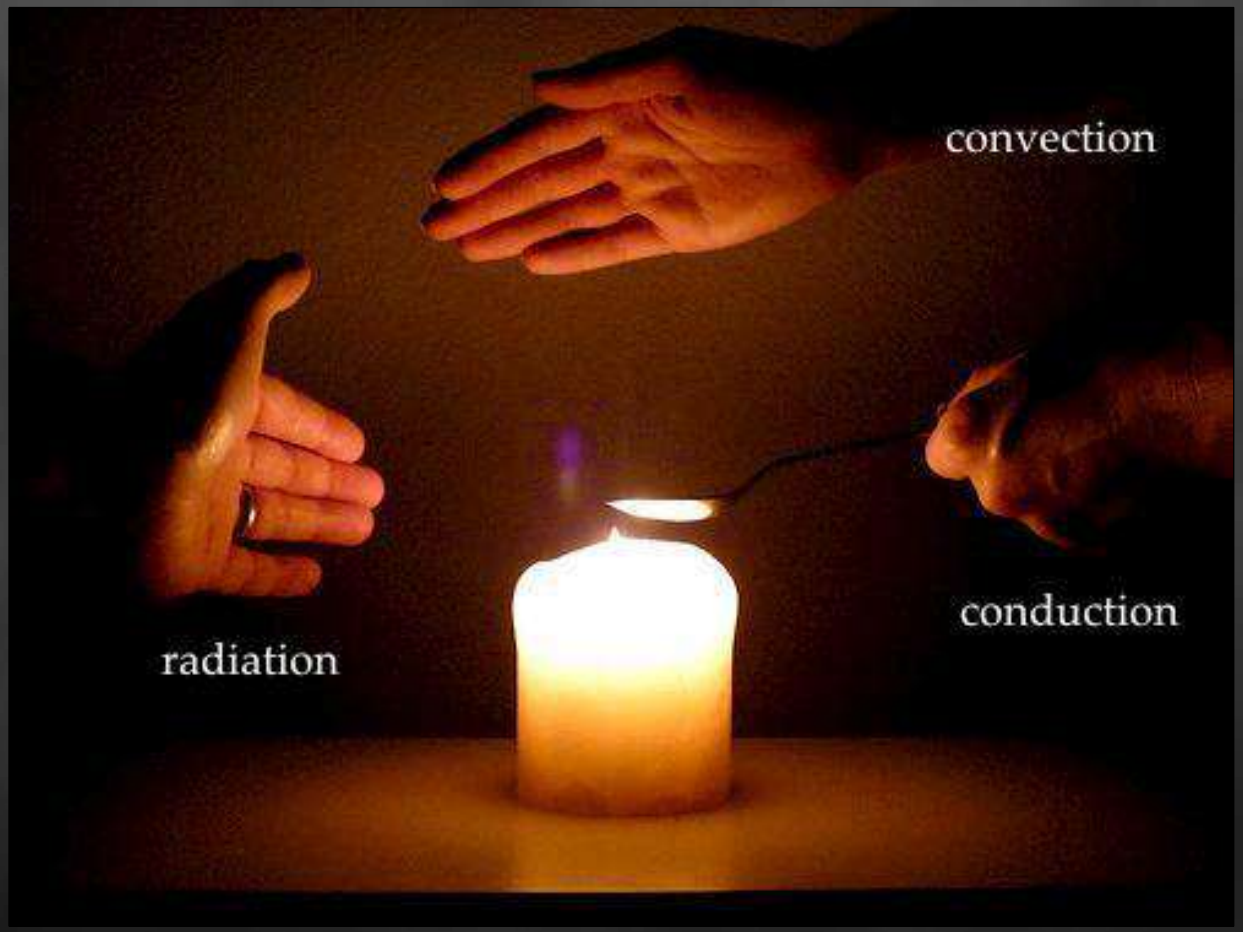
https://www.e-education.psu.edu/egee102/node/2053

Scroll down for animations

Look at the examples of Heat Transfer in the Image below



Look at the examples of Heat Transfer in the Image below



Heat Transfer Song

http://www.youtube.com/watch?v=wr8Z4SCETPs

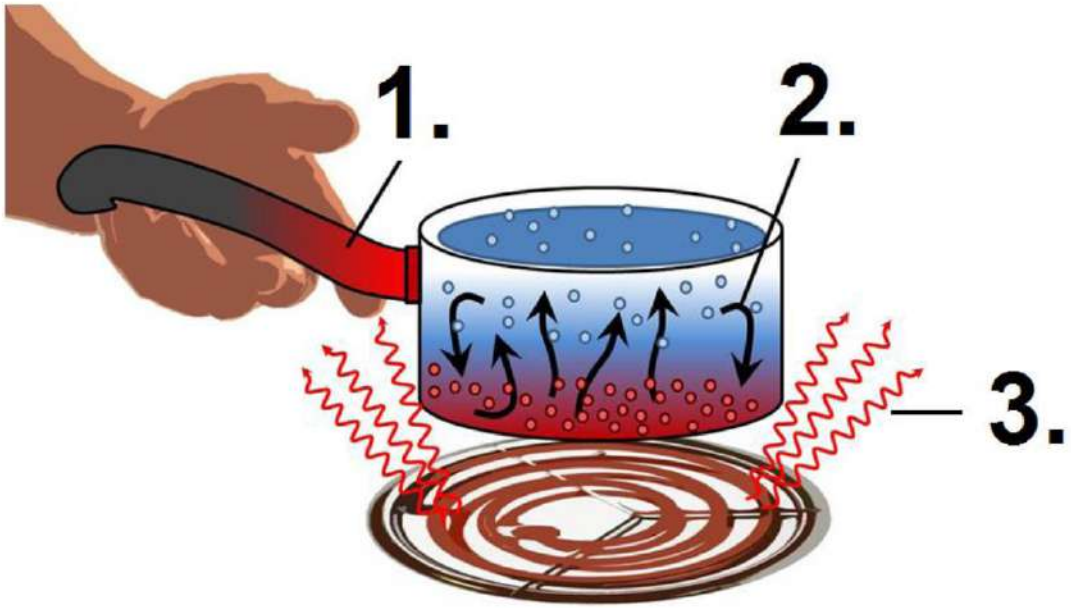
Look at the three images below. Identify which is an example of conduction, convection, and radiation.

A. **B.** **C.**

Heat Transfer Summarizer

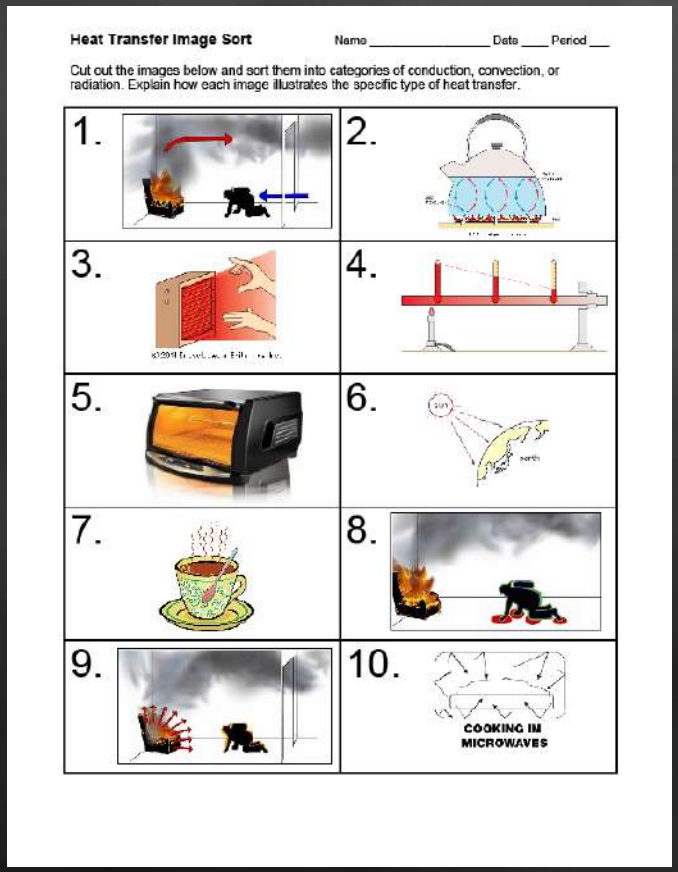
Heat Transfer Summarizer Name _____ Date ____ Period __

Label the example of conduction, convection, and radiation in the diagram below.



Heat Transfer Differentiation

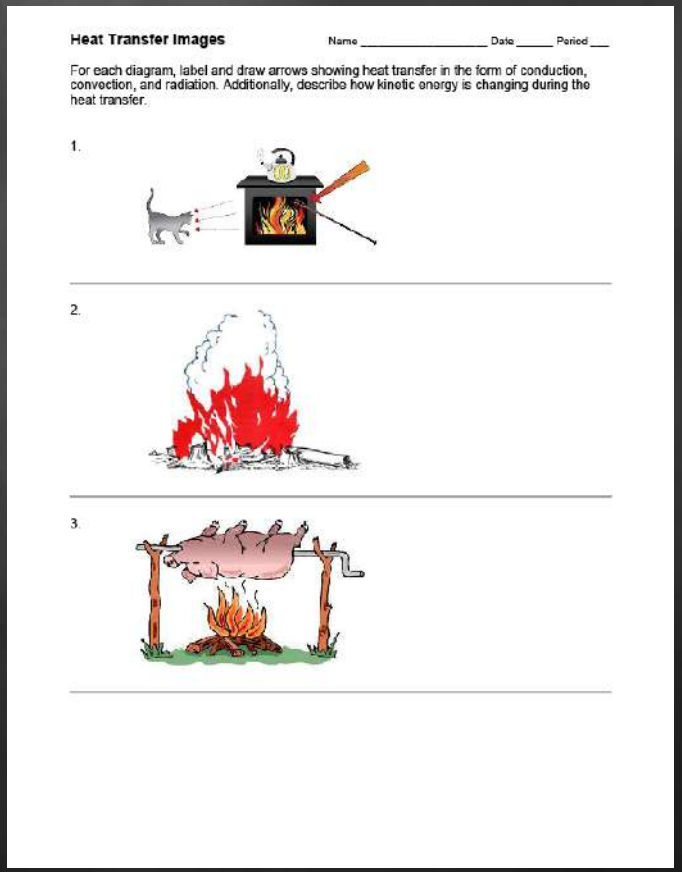
[based on summarizer]



Heat Transfer Image Sort Name _____ Date ____ Period ___

Cut out the images below and sort them into categories of conduction, convection, or radiation. Explain how each image illustrates the specific type of heat transfer.

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.



Heat Transfer Images Name _____ Date _____ Period ___

For each diagram, label and draw arrows showing heat transfer in the form of conduction, convection, and radiation. Additionally, describe how kinetic energy is changing during the heat transfer.

1.
2.
3.