Name _____ per _____ date _____ mail box_____

Physical Science

Heat LAB Investigation PART 1

1 - Black Body Radiant Effect - record observations
2 - Convection Cell Investigation – follow procedures & sketch results
3 – Answer all lab questions in class today (time management)

Lab Participation pts

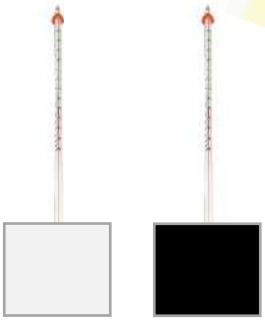
Model Student ← +5
Cleaned up lab station +1
or
Left a mess -1
Unproductive
Spoken to once
Spoken to repeatedly
Fooling around
Interrupts instruction
-1 for each offense

1- Black Body Radiant Effect - record observations

Darker and typically opaque surfaces are known to absorb incoming electromagnetic radiation (radiant heat) that happens to fall on them more readily, while pale, white and reflective surfaces tend to reflect more radiant heat rays typically resulting in lower surface temperatures in contrast to higher temperatures for blacker surfaces. *Opaque means light cannot penetrate.*

Radiation Materials – Black paper, white paper, timer, 2 thermometers and 1 lamp

1. Center the black and white pieces under the lamp
2. Put a thermometer in the pouch of each piece of paper
3. Turn on/adjust lamp
4. Record observations and answers questions below



Clearly and legibly record the temperatures for each thermometer in this box. Label each and include units:

1. How does the heat get to the thermometer? _____

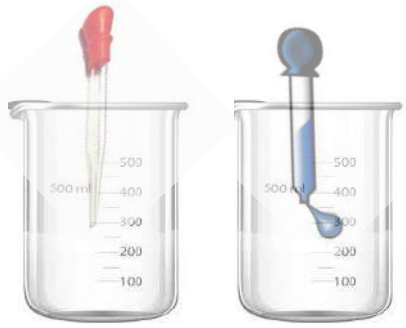
____ 2. Which paper got hotter? Why does this happen?

A. White paper, because it is opaque.
B. White paper, because it is reflective.
C. Black paper, because it is opaque.
D. Black paper, because it is reflective.

2 - Convection Cell Investigation – follow procedures & sketch results

Convection is the heat transfer due to the bulk movement of molecules within fluids such as gases and liquids, including molten rock in the earth's mantle. Convection includes sub-mechanisms of advection, and diffusion. Advection is the transfer of heat or matter by the flow of a fluid, especially horizontally in the atmosphere or the sea while. Think of it has the overall direction of flow. Meanwhile, diffusion commonly refers to the single individual particles moving about transporting momentum and heat energy about to other particles.

1. Pick up some cold water (blue food coloring) in cold bath with eye dropper
2. Slowly put the tip of the dropper in the center of the large beaker (room temp water)
3. Carefully squeeze the colored fluid into the water bath being careful not to disturb the H_2O.
4. Record/ sketch observations and answers questions below
5. Repeat for the hot eye dropper (CAUTION) HOT Plate is HOT!



Hot Cold

Blue water cold

30 sec	1min	1min – 30sec	2min	2min -30sec	3min

Red water hot

30 sec	1min	1min – 30sec	2min	2min -30sec	3min

1. What happened when you put the cold water into the clear water? Which way did it move?

_____

2. What happened when you put the hot water into the clear water? Which way did it move?

_____

3. Describe how and why this happens o the best of your ability?

_____

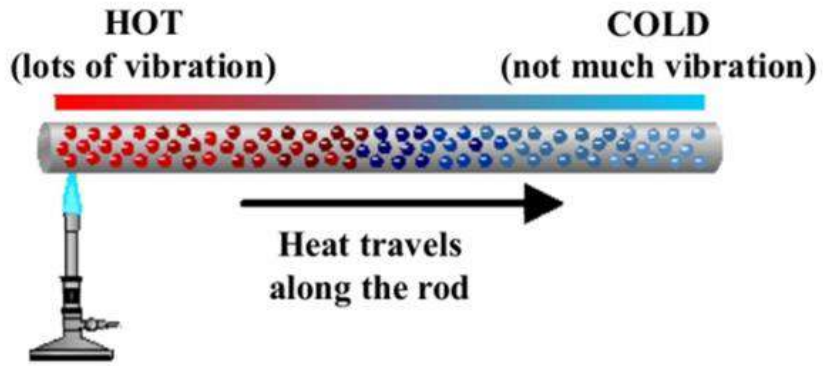
_____

_____

_____

_____

QUESTION 1 Which method of heat energy transference is illustrated here? _____



QUESTION 2 Number or draw arrows indicating the steps for the text boxes below.

The waves are absorbed by another object or substance.

The electromagnetic waves travel through matter or empty space.

An object emits radiation in the form of electromagnetic waves.

QUESTION 3

fluid cycle	convection cycle	cooler
warmer	boiling point	convection current

Convection occurs when _____ particles in a fluid sink to replace the rising _____ particles in the fluid.

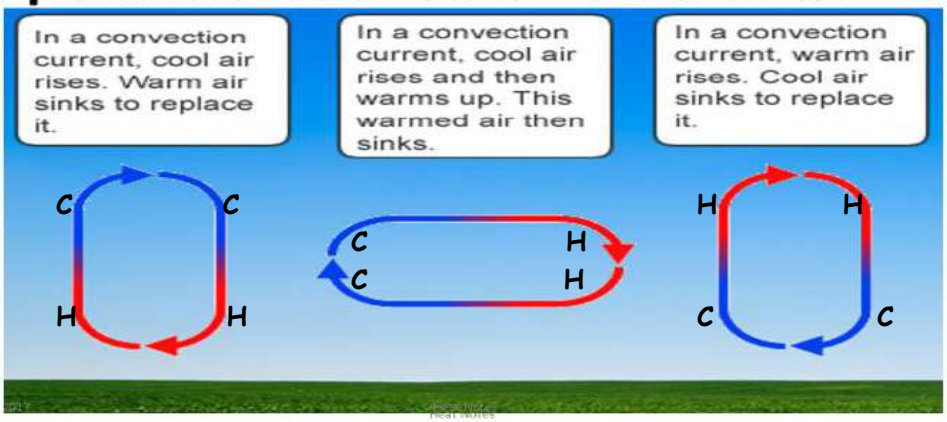
The constant cycle of warm fluid rising and cool fluid sinking is known as a _____.

QUESTION 4 A father and son are walking along the beach. The son runs toward the water and dips his hands in the cool ocean. Then, he walks back to his dad and grabs his hand.
"Matthew, your hands are so **cold** now!" his dad exclaims.

How was the heat conducted in this scenario?
CIRCLE ALL THAT APPLY

a. From Matt's body to his now cooler hand.
b. From Matt's cold hand to his fathers.
c. From the father's hand to Matt's cold hand.
d. From the cool ocean to Matt's hand.
e. From Matt's hand to the cool ocean.

Select the model that accurately depicts how particles flow in a convection current.



QUESTION 5 Can convection occur in solids?

- ☐ yes, because solids are fluids
- ☐ yes, because particles in solids move in the same way as particles in liquids and gases
- ☐ no, because solids are not fluids
- ☐ no, because solid particles cannot move freely

QUESTION 6 Give examples of radiant energy that we encounter every day.

List as many as you can below:

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____