Heat and Temperature Concepts

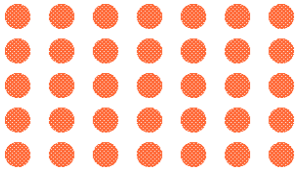
What is Heat?

If you have a cup of hot cocoa, the cup feels warm to the touch. Why is this?

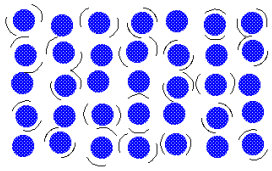
The '_____' has travelled from the cocoa to the cup due to the particle's _____ and _____ with the cup's _____. This transfer of '_____' is what is known as _____.

_____ is the amount of _____ _____ in a sample of matter.

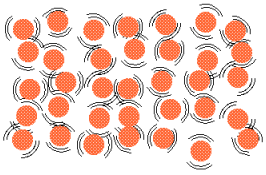
Since Heat is the _____ of _____, it can be _____ from one mass to another and moves from particles that are at a higher _____ to ones that are at a lower _____.



Particles that are 'cold'



Particles that area 'warm'



Particles that are 'hot'

These terms are relative terms that describe an _____ of _____ that can be used for comparison with each other. But, they don't give us an idea as to_____ _____heat they have relative to all other particles.

What is Temperature?

There are many ways to '_____' the amount of heat in particles.

Many countries of the world use the _____ scale which sets the boiling point of water at _____ and the freezing point at _____.

The U.S. uses the _____scale which is based mostly on_____ _____ solution properties and a previously used scale that had _____ at 0 degrees and _____and _____at 7.5, with _____ temp at 22.

Both scales have different increments:

1 Degree _____ is 5/9ths of a_____ degree! Here is the conversion between units:

°F to °C - Deduct 32, then multiply by 5, then divide by 9

°C to °F - Multiply by 9, then divide by 5, then add 32

Practice problems

95F to C

-14C to F

Another Scale

The _____ scale (named after William 'Lord' Kelvin) is an _____ scale in which 0 Kelvin is known as '_____ _____'.

This is the point at which all particle_____ _____ and there is zero _____ taken up by the particles in a substance.

This is also the SI unit of choice for Physical Sciences. Mainly because there are no _____ numbers.

°C	°F	Description
180	**356**	Moderate Oven
100	**212**	_____ _____
40	**104**	Hot Bath
37	**98.6**	_____ _____
30	**86**	Beach weather
21	70	_____ _____
10	**50**	Cool Day
0	**32**	_____ point of water
−18	0	Very Cold Day
−40	**−40**	Extremely Cold Day (and the same number!)

(**bold** are exact)

Heat and Temperature related

So, ***Temperature*** is a measurement of the _____ amount of _____ _____ in the particles of a substance.

Heat and Temperature Concepts Part 2: Heat Transfer

Methods of Heat Transfer

Heat flows from particles at a _____ _____ to a _____ _____. But do they flow the same through all materials?

Does heat flow the same through _____ as it does through _____ materials?

There are three basic methods in which heat can be transferred through particles of different phases.

Conduction

Conduction occurs when two objects at _____ _____ are in contact with each other.

Heat flows from the _____ to the_____ object until they are both at the same temperature.

Conduction is the movement of heat through a substance by the _____ of molecules.

Heat flows by conduction best through _____, because the particles are close together and have better _____ with each other.

Conductors Vs. Insulators

All **metals** have **high** _____ and are good conductors, while **rubber**, **plastic**, ceramics and **glass** have low _____, making them the best _____.

Metals are good conductors because their particles allow _____ to flow from atom to atom more easily than those of _____. This is due to their higher _____

Convection

Convection occurs when warmer areas of a _____ or a _____ rise to cooler areas in the _____ or _____.

As this happens, cooler liquid or gas takes the place of the warmer areas which have risen higher. This cycle results in a continuous _____ pattern and heat is _____ to cooler areas. You see convection when you _____

Convection is the flow of heat energy through _____.

Radiation

Radiation is a method of heat transfer that does not rely upon any _____ between the _____ _____ and the heated object.

For example, we feel heat from the_____ even though we are not touching it. Heat can be transmitted through _____ _____ by _____ radiation.

Radiation is a form of energy transport consisting of _____ waves traveling at the _____ of light. No _____ is exchanged and no _____ is required.