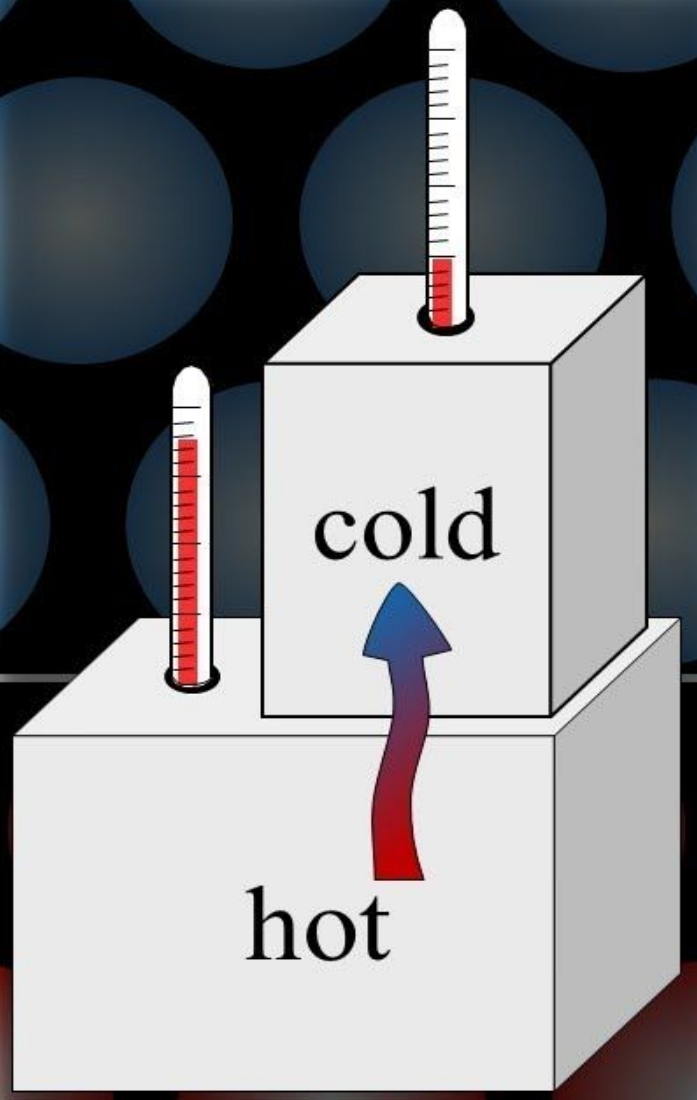
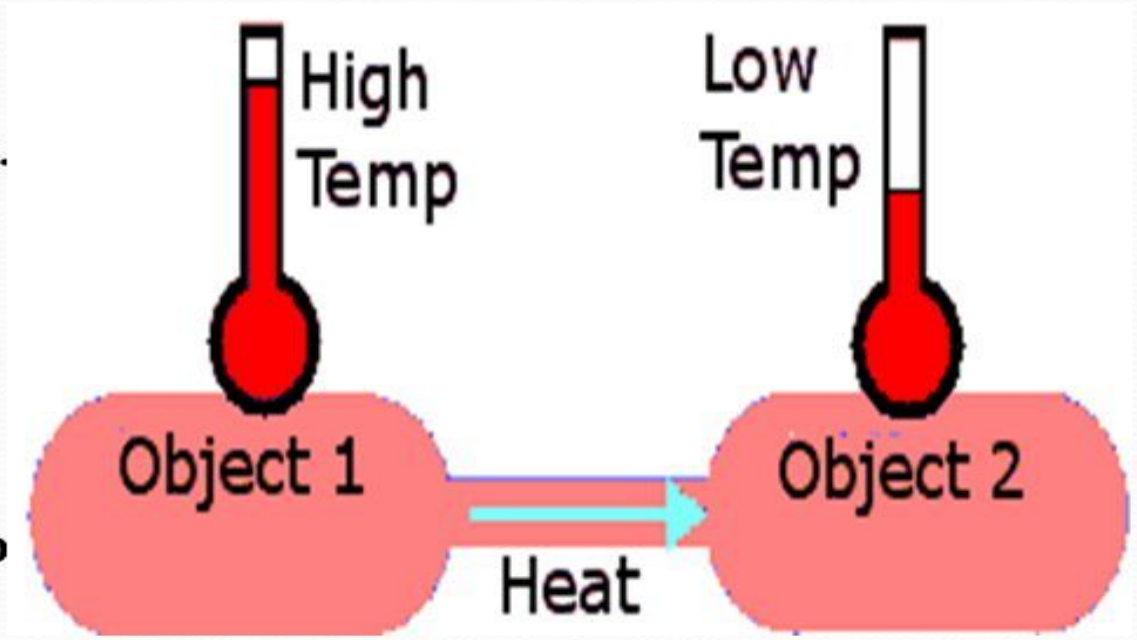
Measurement and effects of heat

What is HEAT?



What is heat?

- Heat is the transfer of energy between two objects that are at **different** temperatures.
- When two objects of different temperature come in contact, **energy** is always **transferred** from the **higher temperature** to the **lower temperature**.



Effects on Matter:

In general, solids, liquids and gaseous:

(1) **Expand** when they gain heat and;

(2) **Contract** when they lose heat

Effects of Heat

Some daily life examples on effect of Heat on Matter.

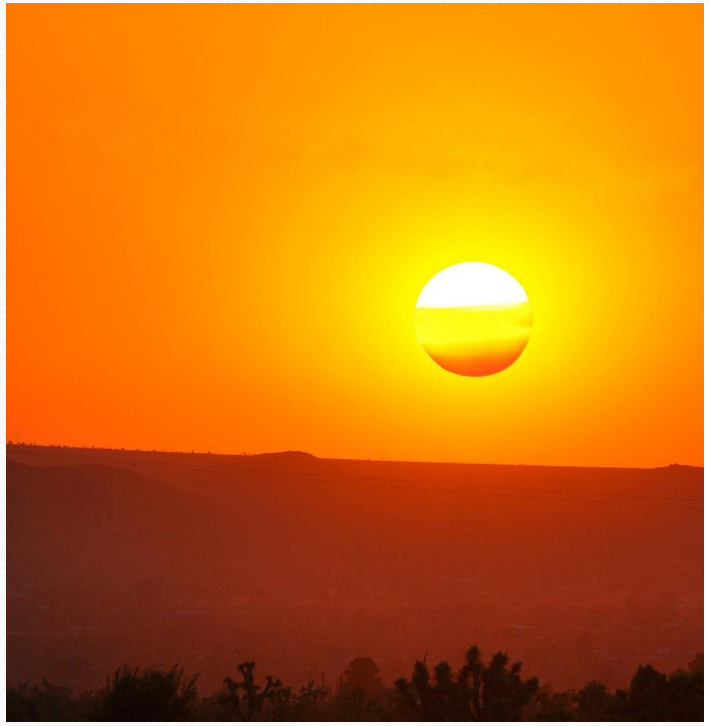
1. Snow Melts, Water boils and gradually disappears.
2. Rise in temperature of the body.
3. Expanding of objects.
4. Change of states.
5. Speeding up of chemical reactions.
6. Killing of organisms eg. Bacteria present in milk and water

How is heat measured?

Heat is measured in two ways:

1. Heat is measured in **calories** (c).
   - One **calorie** is equal to the amount of energy needed to raise the temperature of 1 g of water by 1 °C.

2. Heat is also measured in **joules** (J) because heat is a measurement of energy.
   - One **calorie** is equal to 4.18 **joules**.



- ***Nuclear Fusion*** is the energy-producing process taking place in the core of the Sun and stars

Heat Sources

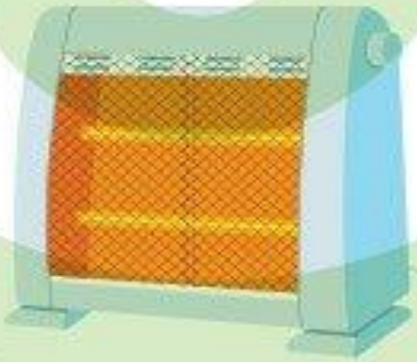
A heat source is a producer of heat. There are three main types of heat sources.

Kinetic Energy

The friction created when two surfaces rub against each other produces heat energy. Some examples include rubbing your hands together, sliding down a slippery-dip or jumping on the spot.

Electrical Energy

Electrical appliances have the ability to convert electrical energy into heat energy. Some examples include hair dryers, light bulbs and stove top elements.



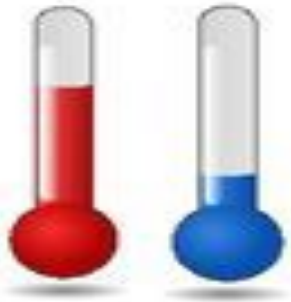
Chemical Energy

Heat energy can be produced as a result of a chemical reaction. Some examples include burning wood, digesting food and mixing chemical substances.

What is Temperature?

Temperature is the measure of how hot or cold something is.

A thermometer is a tool used for measuring temperature.



Heat

The heat energy from the stove burner warms up the water.

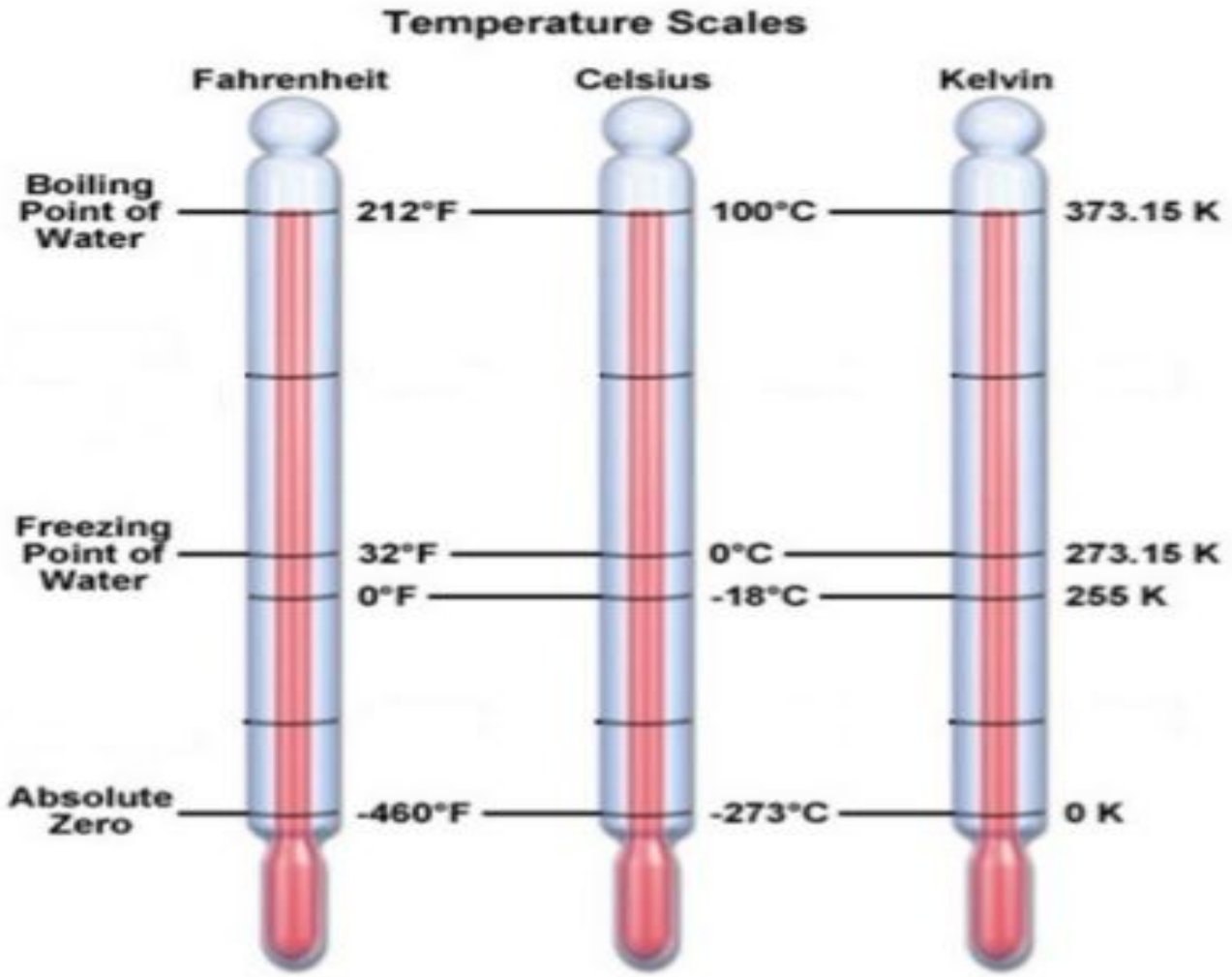
Temperature

The thermometer measures the temperature of the water.

Boiling water = 212°F (100°C)

Differences between heat and temperature

Heat	Temperature
It is a form of energy	It is the degree of hotness or coldness of a body
It is measured in joules	It is measured in Kelvin
it is not determined directly by an instrument	it is directly determined by a thermometer


Temperature Scales
Fahrenheit
Celsius
Kelvin
Boiling Point of Water
212°F
100°C
373.15 K
Freezing Point of Water
32°F
0°C
273.15 K
0°F
-18°C
255 K
Absolute Zero
-460°F
-273°C
0 K

Convert Fahrenheit to Celsius

ThoughtCo.

Formula

$$\frac{(F-32)*5}{9} = C$$

Example

98.6 = F

Temperature conversion formulas

- Celsius to Fahrenheit: $^{o}F = (9/5 * {}^{o}C) + 32$

  $^{o}C \rightarrow {}^{o}F$

- Fahrenheit to Celsius: $^{o}C = (5/9) * ({}^{o}F - 32)$

  $^{o}F \rightarrow {}^{o}C$

- Celsius to Kelvin: $K = {}^{o}C + 273$

  $^{o}C \rightarrow K$

- Kelvin to Celsius: $^{o}C = K - 273$

  $K \rightarrow {}^{o}C$