Thermodynamics,

Temperature and Heat.

The difference between temperature and heat can be confusing.

Often the two are considered the same thing.

Comparing how hot or cold two things are based on our sense of touch can be helpful, but misleading.

For example:

If you remove a metal ice tray from the freezer and a bag of frozen vegetables the metal tray feels colder.

Even though the two objects are at the same temperature the metal feels colder because it is a conductor.

The metal transfers the heat from your hand to the tray much quicker than the bag of vegetables which is acting as an insulator.

Heat: is the energy exchanged between objects because of a difference in temperature.

Temperature: the property that determines whether or not two (or more) objects are at thermal equilibrium (a constant temperature. Two objects at thermal equilibrium are at the same temperature).

Thermal expansion: as matter heats up the molecules move more, run into each other more often and expand (and vise versa).

The expansion of an object that changes in temperature can be calculated by using:

L - Lo = Lo (T – To)

L = Final length Lo = initial length

= Constant (average coefficient of linear expansion)

T = final temperature To = initial temp.

Calculate the following:

1. If a steal railroad track (Constant = 11 x 10-6) is initial 30 m long heats up from 0 to 40 degrees Celsius, what is the final length?
2. If the same changed from 0 degrees Celsius to 0 degrees Fahrenheit, what would the final length be?