Example 1.1 Converting Temperatures:

On a day when the temperature reaches 50^{o}F, what is the temperature in degrees Celsius and in kelvins?

A pan of water is heated from 25°C to 80°C. What is the change in its temperature on the Kelvin scale and on the Fahrenheit scale?

Example 1.2 Expansion of a Railroad Track

A segment of steel railroad track has a length of 30.000 m when the temperature is *0.0^{o}C*. (considering linear expansion coefficient of steel is $11x10^{-6}$ $(^{O}C)^{-1}$ and its Young's modulus is $20x10^{10}$ N/m^2).

(A) What is its length when the temperature is 40.0^{o}C?

(B) Suppose that the ends of the rail are rigidly clamped at 0.0°C so that expansion is prevented. What is the thermal stress set up in the rail if its temperature is raised to 40.0°C?

Example 1.3 How Many Moles of Gas in a Container?

An ideal gas occupies a volume of 100 cm^3 at 20°C and 100 Pa. Find the number of moles of gas in the container.

Example 2.1: Losing Weight the Hard Way

A student eats a dinner rated at 2 000 Kilocalories. He wishes to do an equivalent amount of work in the gymnasium by lifting a 50.0-kg barbell. How many times must he raise the barbell to expend this much energy? Assume he raises the barbell 2.00 m each time he lifts it and he regains no energy when he lowers the barbell.

Example 2.2 Cooling a Hot Ingot:

A 0.050 0-kg ingot of metal is heated to 200.0°C and then dropped into a calorimeter containing 0.400 kg of water initially at 20.0°C. The final equilibrium temperature of the mixed system is 22.4°C. Find the specific heat of the metal.

Example 2.3 Fun Time for a Cowboy:

A cowboy fires a silver bullet with a muzzle speed of 200 m/s into the pine wall of a saloon. Assume all the internal energy generated by the impact remains with the bullet. What is the temperature change of the bullet? Using 234 J/kg.°C as the specific heat of silver.

Example 2.4 Boiling Liquid Helium

Liquid helium has a very low boiling point, 4.2 K, and a very low latent heat of vaporization, 2.09 % 104 J/kg. If energy is transferred to a container of boiling liquid helium from an immersed electric heater at a rate of 10.0 W, how long does it take to boil away 1.00 kg of the liquid?