Temperature and Heat - 1

Fahrenheit and Celcius (1): Solve $C = 5\,(F - 32)/9$ for C=F.
Convert the result in into Kelvin (K) by adding 273.15.

Energy Dissipation (2): Solve $Q = 4m\,c\,\triangle T = M\,v_0^2/2$ for $\triangle T$.

Melting Iceberg (3): With p for percent,

$$Q = Q_1 + Q_2\,, \quad Q_1 = p\,M\,c\,\triangle T\,, \quad Q_2 = p\,M\,L_f\,,$$

where $L_f = 333.5 \times 10^3\ J/kg$ is the latent heat of fusion.

Specific Heat of a Metal (4): Solve

$$c_m\,M\,(T - T_f) = c_m\,M_c\,(T_f - T_i) + c_w\,M_w\,(T_f - T_i)$$

for c_m. The specific heat of water is $c_w = 4184\,J/kg/K$.

Temperature and Heat - 2

Steam to Ice (5). With s for steam, w for water:

$$Q = M \left[(T - T_s) c_s + L_s + (T_s - 0) c_w + L_f \right],$$

where T is the initial temperature of the steam, $T_s = 100\ C$ the phase transition temperature of steam to water, the latent heat of vaporization is $L_s = 2257 \times 10^3\ J/kg$. The specific heat of water c_w and the latent heat L_f were already given above.

Potential Energy to Heat (6): Solve

$$M g H = M c_{\text{lead}} (T_f - T_i)$$

for T_f (note that M drops out).