

1. Find the total energy lost by the contents of a Styrofoam picnic cooler when a 3.60 kg block of ice placed inside the cooler completely melts (at 0°C). The ice had an initial temperature of -10.0°C. **[1280 kJ]**
2. What total energy must be absorbed (from the environment) to change 1.00kg of ice at -30.0°C on a lake surface in February to water at 20.0°C in August? Sketch a heating curve and find the total energy. **[4.80 x 10² kJ]**
3. The specific heat capacity of solid lead is listed as 0.159 J/g°C. If the molar enthalpy of fusion is 5.00 kJ/mol, and the melting point of lead is 327.5 °C, calculate the initial temperature lead must have started at if 100.0g of lead had a total energy change of 7.20 kJ from this temperature to molten lead at its melting point. **[26°C]**
4. How much energy (in kJ) would be required to heat 650g of ice at 0°C to steam at 100.0°C? **[2.0 x 10³ kJ]**
5. Energy is released when 1.00 x 10²kg of steam at 150.0°C and standard pressure changes to water at 60.0°C.
 - a. Sketch a cooling curve.
 - b. Calculate the total energy change. **[-251 MJ]**
6. What mass of methane would be required to heat 1.00 L of water from 20.0°C to 200.0°C? (molar enthalpy of combustion for methane = -889 kJ/mol) **[49.9 g]**
7. What mass of propane (H_c= -2240 kJ/mol) would need to be burned to heat 250.0 g of ice at -20.0°C to water at 100.0°C? **[3.91 g]**
8. A 500.0kg steel boiler is used to convert 200.0kg of water into steam. Both the steel and its contents heat from 20.0°C to 100.0°C. Find the specific heat capacity of the steel if a total of 539.7 MJ of total energy is needed for both the boiler and the water. **[0.527 J/(g°C)]**