

## Thermochemistry Worksheet

Heat capacity	Heat to cause temp change	Enthalpy
Heat capacity(J/°C) = $mc$	$q = m \times c \times \Delta T$	$H = E + PV$ $\Delta H_{\text{reaction}} = H_{\text{products}} - H_{\text{reactants}}$
$m$ = mass of the material $c$ = the specific heat of the material	$q$ = amount of heat added to the system $m$ = mass of the substance $c$ = specific heat of the substance $\Delta T$ = change in temperature.	$H$ = enthalpy $E$ = internal energy $P$ = pressure $V$ = volume

- Calculate the amount of heat needed to increase the temperature of 125 g of water from 22°C to 59°C (Specific heat of water is 4.184 J/g-°C).
- Calculate the specific heat of copper, given that 204.75 J of energy raises the temperature of 15 g of copper from 35°C to 70°C.
- 432 J of energy is required to raise the temperature of a block of aluminum from 20°C to 60°C. Calculate the mass of aluminum present.
- Calculate  $\Delta H_{\text{rxn}}$  for the reaction:  $2\text{CO}(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g})$  [ $\Delta H_f$  of CO = -110.5 kJ/mol,  $\Delta H_f$  of  $\text{O}_2$  = 0 kJ/mol,  $\Delta H_f$  of  $\text{CO}_2$  = -393.5 kJ/mol]. Is this reaction Exothermic or Endothermic?
- A pure gold ring and pure silver ring have a total mass of 17.0 g. The two rings are heated to 65.4 °C and dropped into 12.4 mL of water at 22.3 °C. When equilibrium is reached, the temperature of the water is 24.7 °C. What is the mass of the gold ring? [ $C_p$  gold = 0.129 J g<sup>-1</sup> °C<sup>-1</sup>,  $C_p$  silver = 0.237 J g<sup>-1</sup> °C<sup>-1</sup>]