Specific Heat of Glass

Purpose: to determine the specific heat of glass

**Theory:** When two objects at different temperatures are left in thermal contact, the two objects will exchange heat, eventually reaching the same temperature. The temperature of one object will go down as that object loses heat and the temperature of the other object will go up as it gains heat. Heat is energy and energy cannot be created nor destroyed. The heat gained by one object is equal to the heat lost by the other object.

From the masses of the two objects, the initial and final temperatures of the two objects, and the specific heat of one of the objects, the specific heat of the second object can be calculated.

**Procedure:**

**Measure all masses to 0.1 g and all temperatures to the nearest 0.1OC.**

Mass and record the mass of a Styrofoam cup. Put about 50 mL water into the Styrofoam cup. Mass and record the mass of the water and the cup. Measure and record the temperature of the water. Record the temperature of the pieces of glass. Put the glass pieces into the water and record the lowest temperature the water reaches. Remove the glass from the water and dry the glass pieces. Mass and record the mass of the glass.

**DATA & Calculations**

**cooler object(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ warmer object(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 mass of water & cup \_\_\_\_\_\_\_\_ grams

 mass of empty cup \_\_\_\_\_\_\_\_ grams

 mass water \_\_\_\_\_\_\_\_ grams

 specific heat of water \_\_\_\_\_\_\_\_ J/g•Co

 initial temperature of water \_\_\_\_\_\_\_\_ oC

 final temperature of water \_\_\_\_\_\_\_\_ oC

 heat lost by the water \_\_\_\_\_\_\_\_ J

 heat gained by the glass \_\_\_\_\_\_\_\_ J

 mass of glass \_\_\_\_\_\_\_\_ grams

 initial temperature of glass \_\_\_\_\_\_\_\_ oC

 final temperature of glass \_\_\_\_\_\_\_\_ oC

 **specific heat of glass** \_\_\_\_\_\_\_\_ J/g•Co

Redo the procedure but use the calorimeter.

**DATA & Calculations**

**cooler object(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ warmer object(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 mass of water & cup \_\_\_\_\_\_\_\_ grams

 mass of empty cup \_\_\_\_\_\_\_\_ grams

 mass water \_\_\_\_\_\_\_\_ grams

 specific heat of water \_\_\_\_\_\_\_\_ J/g•Co

 initial temperature of water \_\_\_\_\_\_\_\_ oC

 final temperature of water \_\_\_\_\_\_\_\_ oC

 heat lost by the water \_\_\_\_\_\_\_\_ J

 heat lost by the calorimeter \_\_\_\_\_\_\_\_ J

 heat gained by the glass \_\_\_\_\_\_\_\_ J

 mass of glass \_\_\_\_\_\_\_\_ grams

 initial temperature of glass \_\_\_\_\_\_\_\_ oC

 final temperature of glass \_\_\_\_\_\_\_\_ oC

 **specific heat of glass** \_\_\_\_\_\_\_\_ J/g•Co

\*\*Don’t forget to calculate your percent error too. The real specific heat of glass is 0.84 J/goC.

**Equipment needed per group**

LabQuest 2 with temperature probe

two Styrofoam cups with one construction-paper lid

balance 0.1 g - triple-beam will do

graduated cylinder 50 mL or 100 mL

glass marbles – 3

calorimeter

freezer