2 PLAN

a. The specific heat, c_p, of the glass is calculated using the equation given for specific heat.

$$c_p = \frac{q}{m \times \Delta T}$$

b. The rearranged specific heat equation is used to find the energy gained when the glass was heated.

$$q = c_p \times m \times \Delta T$$

3 COMPUTE

a. $$\frac{32\ \text{J}}{(4.0\ \text{g})(40.\ \text{K})} = 0.20\ \text{J/(g•K)}$$

b. $$\frac{0.20\ \text{J}}{(\text{g•K})}(4.0\ \text{g})(344\ \text{K} - 314\ \text{K})$$

$$\frac{0.20\ \text{J}}{(\text{g•K})}(4.0\ \text{g})(30\ \text{K}) = 24\ \text{J}$$

4 EVALUATE

The units combine or cancel correctly to give the specific heat in J/(g•K) and the energy in J.

PRACTICE

Answers in Appendix E

1. Determine the specific heat of a material if a 35 g sample absorbed 96 J as it was heated from 293 K to 313 K.
2. If 980 kJ of energy are added to 6.2 L of water at 291 K, what will the final temperature of the water be?

extension

Go to **go.hrw.com** for more practice problems that ask you to calculate using specific heat.

Keyword: HC6NRGX

Enthalpy of Reaction

The energy absorbed as heat during a chemical reaction at constant pressure is represented by ΔH. The H is the symbol for a quantity called *enthalpy.* It is not practical to talk just about enthalpy as a quantity, because we have no way to directly measure the enthalpy of a system. Only *changes* in enthalpy can be measured. The Greek letter Δ ("delta") stands for "change in." Therefore, ΔH is read as "change in enthalpy." *An* **enthalpy change** *is the amount of energy absorbed by a system as heat during a process at constant pressure.* The enthalpy change is always the difference between the enthalpies of the products and the reactants. The following equation expresses an enthalpy change for a reaction.

$$\Delta H = H_{products} - H_{reactants}$$

The **enthalpy of reaction** *is the quantity of energy transferred as heat during a chemical reaction.* You can think of enthalpy of reaction as the difference between the stored energy of the reactants and the products. Enthalpy of reaction is sometimes called "heat of reaction."