

CHAPTER 5 THERMOCHEMISTRY

Reflect on Your Learning

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1. Absorbing energy: ice melting, water evaporating, photosynthesis.
Releasing energy: water vapour condensing, respiration, combustion of gasoline.
2. Nuclear power plants, fossil fuel-burning power plants, hydroelectric power (largely from Niagara), solar power.
3. Both technologies drive turbines to generate electricity, but one uses falling water to drive the turbine and the other uses nuclear energy to create pressurized steam to drive the turbine.

Try This Activity: Burning Food

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- (a) Use $q = mc\Delta T$ with student data.
- (b) The heat released equalled the difference in potential energy of the reactants and products.
- (c) Divide the heat by the mass of the nut.
- (d) The reactants would be the same but the nut might not be completely digested, so there would be products other than carbon dioxide and water. The energy might be stored rather than released to the surroundings as heat. The process would be more efficient in terms of production of energy in useful forms, rather than heat.
- (e) Much heat is lost to the surroundings, apart from the water in the can. Insulating the apparatus would improve results.

5.1 CHANGES IN MATTER AND ENERGY

PRACTICE

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Understanding Concepts

1. (a) chemical (new products: water and carbon dioxide)
(b) physical (no new products)
(c) chemical (new products: water and carbon dioxide)
(d) physical (no new products)
(e) chemical (new products: hydrogen gas and zinc chloride)
(f) physical (no new products)
- 2.

System	Surroundings
(a) gas and oxygen	air and metal parts
(b) ice	hand
(c) gas and oxygen	air and metal parts
(d) wax	stove
(e) zinc and acid	beaker and water solvent
(f) ice	body part

3. All of these systems may be regarded as open because energy and/or matter may escape from the system, often in the form of gases. However, (a) may be considered a closed system for the instant at which the air–fuel mixture ignites.
4. The thimbleful has greater average thermal energy per molecule, but the pool has greater total thermal energy.
5. (a) exothermic
(b) exothermic
(c) endothermic