

Skill and Practice Answer Key

8A Power in Flowing Energy

1. Answers are given in table below:

Force (N)	Distance (m)	Time (sec)	Work (J)	Power (W)
100	2	5	200	40
100	2	10	200	20
100	4	10	400	40
100	5	25	500	20
50	20	20	1000	50
20	30	10	600	60
9	20	3	180	60
3	25	15	75	5

2. Answers are:

- a. 1,800 J
- b. 450 watts

3. Answers are:

- a. 60,000 J
- b. 2,000 W; 2.68 hp

4. Answers are:

- a. 36,750 J (37,000 J with correct significant figures)
- b. 20.4 W (20 W with correct significant figures)

5. 200 W

6. Answers are:

- a. 5,000 seconds or 1.4 hours
- b. 8,640,000 J
- c. 17.3 apples

7. Answers are:

- a. 98,000 J
- b. 98,000 W; 131 hp

8. 3.3 W

8B Efficiency and Energy

1. 55%
2. 12%
3. Answers are:
 - a. 91%
 - b. Energy is lost due to friction with the track (which creates heat), air resistance, and the sound made by the track and wheels.
 - c. The first hill is the tallest because a roller coaster loses energy as it moves along the track. No roller coaster is 100% efficient. Unless there is a motor to give it additional energy, it will never be able to make it back up to a height as high as the first hill.
4. 80%
5. 278 m

8C Identifying Energy Conversions

1. (1) Chemical energy from food to kinetic energy to elastic energy; (2) chemical energy from food to kinetic energy; (3) elastic energy to kinetic energy.
2. Electrical energy to radiant (microwave) energy to kinetic energy (increased movement of molecules in the soup, which increases the soup's temperature).
3. Chemical energy from food to kinetic energy (as Dmitri operates the pump) to pressure energy.
4. Chemical energy from the battery in controller to radiant energy (radio waves). Radio waves to electrical signal in car; chemical energy from car battery to kinetic energy as car moves.
5. Chemical energy from food is converted to kinetic energy which is converted to potential energy as Adeline moves toward the top of the hill. As she coasts down the other side, potential energy is converted to kinetic energy.

8D Energy Conversions—Extra Practice

Part 1 answers:

1. The potential energy of the stretched bungee cord is changed into the kinetic energy of the person bouncing back up.
2. The potential energy of the football from its high point is changed into kinetic energy as it spirals down.
3. In this case, radiant energy is converted to chemical energy in the battery, which is then converted to the electrical energy needed to run the calculator. Mechanical energy (kinetic or potential, is not being used in this case.

Part 2 answers:

1. The chemical potential energy of the wood is changed to radiant energy in the form of heat. Radiant energy is changed into mechanical energy as the water boils, changes to steam, and makes the whistle vibrate, which causes vibrations in air molecules that we experience as sound.
2. Nuclear energy is changed into electrical energy, which is changed into radiant energy (light to make the television picture) and mechanical energy (vibration of speakers) that causes vibration of air molecules that we experience as sound.
3. The chemical potential energy of food is changed into mechanical energy of the bicyclist, which is changed into electrical energy of the generator, which is changed into radiant energy from the light.