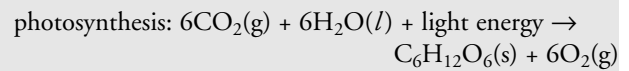


Section 1.1 Review Answers

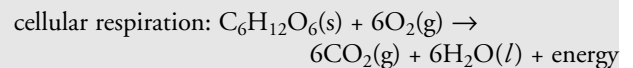
Student Textbook page 15

1. Light energy and the products of cellular respiration (carbon dioxide and water) are the inputs of photosynthesis.



carbon dioxide + water + light energy →
carbohydrates + oxygen

The inputs of cellular respiration (carbohydrates and oxygen) are the products of photosynthesis.



carbohydrates + oxygen → carbon dioxide + water + energy

2. Photosynthesis and chemosynthesis are both processes that producers (autotrophs) use to capture and store energy. Through photosynthesis, plants, algae, or some bacteria use energy from the Sun to build energy-rich organic molecules from carbon dioxide and water. Through chemosynthesis, thermal vent micro-organisms use energy from hydrogen sulfide to build energy-rich organic molecules from carbon dioxide and water. In addition to organic molecules, photosynthesis also produces oxygen, while chemosynthesis produces sulfuric acid.
3. Like herbivores, plants use cellular respiration to access the energy stored in glucose.
4. Most of the radiant energy from the Sun that reaches the biosphere never reaches producers: Clouds, dust particles in the atmosphere, and water and land at Earth's surface reflect 30% of incoming radiant energy; the atmosphere and clouds absorb 19%; and Earth's surface absorbs 51%. Even leaves reflect some sunlight.
5. Producers use photosynthesis or chemosynthesis to capture energy, and cellular respiration to release stored energy so that it can be used. Primary consumers obtain energy by eating producers; secondary consumers, by eating primary consumers; and tertiary consumers, by eating secondary consumers. Consumers also use cellular respiration to release stored energy.
6. The first law of thermodynamics states that energy cannot be created or destroyed, but it can be transformed from one form to another, or passed from one object to another. The second law of thermodynamics states that with each energy conversion, there is less energy to do useful work, because some energy is converted into a form that organisms cannot use, such as heat.
7. The albedo of fresh snow is 80-90%, while the albedo of water is 25% or less (see page 11 of student text). Forest

and grass have even lower albedo values (7–18% and 18–25%, respectively). With the loss of snow and ice cover, which has a high albedo, more of Earth's surface will have a low albedo. As the albedo of Earth's surface decreases, less incoming radiant energy from the Sun is reflected by Earth's surface, and more is absorbed, further warming the planet and reducing snow and ice cover even more.

8. As the skunk cabbage carries out cellular respiration and other reactions, it transfers energy to the environment as dissipated heat, which melts the snow.