**Activity 48: Catabolism and Anabolism**

***Learning Objective***

*Distinguish catabolism and anabolism and the energy exchange in each*

**Estimated Completion Time** 25 Minutes

**Instructor Information**

This is a basic activity that assumes no prior knowledge of metabolism. If students have a lot of prior knowledge, they may overthink some of the questions.

**ANSWERS TO QUESTIONS**

1.

|  |  |  |
| --- | --- | --- |
| Type of Reaction | Reactants | Products |
| Catabolic | **Large biological molecules** | **Small building blocks** |
| Anabolic | **Small building blocks** | **Large biological molecules** |

2. Catabolism exergonic (produce ATP); anabolism endergonic (require ATP)

3. The breakdown of large biological molecules into smaller building blocks. Energy is also produced.

4. The synthesis of large biological molecules by smaller building blocks. The reactions require energy.

5. The combination of reactions of catabolism and anabolism

6. Catabolism—oxidation or hydrolysis; anabolism; reduction or condensation

7. a. Glycolysis—catabolism; gluconeogenesis—anabolism

b. The two pathways cannot use all the same enzymes because the reactions would then be completely reversible and would not produce any energy. (They could rest at equilibrium. Many answers would be acceptable here.)

8. No. Large amounts of heat cannot be dissipated by the body, which is why several chemical reactions occur during a metabolic pathway so that the energy changes of a single reaction are kept small.

**Activity 48: Skill Development**

1. It would require energy, and the reactants would be combining to form a larger product.

2. It would likely give off energy, and the reactant would be breaking up into smaller pieces.

3. ATP

4. Neither. A reversible reaction would be able to come to equilibrium and would have a G of 0 (neither exergonic nor endergonic).