

## CONCEPT: INTRODUCTION TO ENERGY

● **Energy:** the ability to perform \_\_\_\_\_.





□ In Biology, **work** is a *transfer of energy* that causes an overall \_\_\_\_\_.

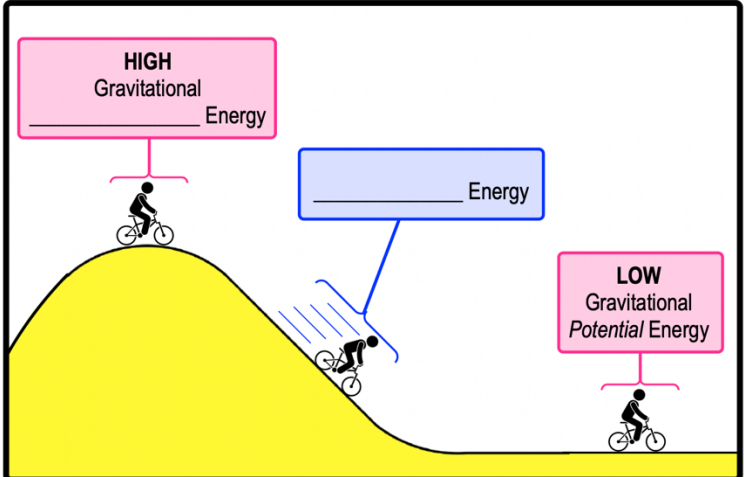
### Potential vs. Kinetic Energy

1) \_\_\_\_\_ **Energy:** \_\_\_\_\_ energy that is available to do *work*.

2) \_\_\_\_\_ **Energy:** energy of \_\_\_\_\_.

**EXAMPLE:** Potential vs. Kinetic Energy.

Energy Types	Examples
<b>Potential Energy</b> (Storage)	 Gravitational Energy  _____ Energy (stored in chemical bonds)
<b>Kinetic Energy</b> (Motion)	 _____ Objects  Muscle Contractions



**PRACTICE:** Which of the following is an example of potential energy?

- a) Water rushing over a water fall.
- b) A glucose molecule.
- c) A spring being released and expanding rapidly.
- d) An ant foraging (moving around) for food.

**PRACTICE:** Which of the following is NOT a form of kinetic energy?

- a) When the temperature of a substance rises causing the molecules of that substance to move faster.
- b) When a hockey puck slides across the ice after being hit by a player.
- c) When glucose molecules are broken down to create energy for cellular work.
- d) When the molecules of the air vibrate transmitting soundwaves.

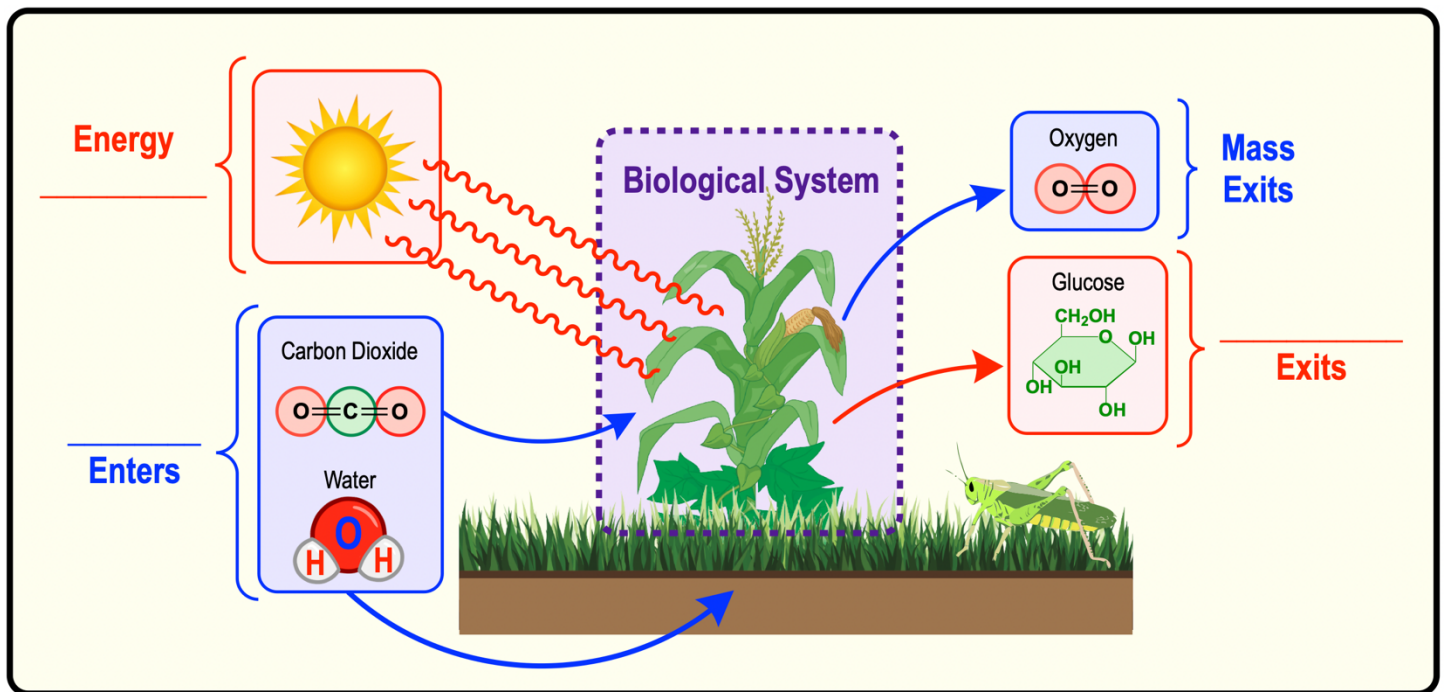
## CONCEPT: INTRODUCTION TO ENERGY

### Thermodynamics: System vs. Surroundings

● **Thermodynamics:** the study of \_\_\_\_\_ transfers between bodies of matter.

- \_\_\_\_\_: the specific portion of matter being studied.
- \_\_\_\_\_: everything else outside of the system.
- **Biological Systems** transfer both \_\_\_\_\_ & \_\_\_\_\_ with the surroundings.

**EXAMPLE:** Biological Systems.



**PRACTICE:** Why are the principles of thermodynamics important for the study of biology?

- a) The principles of thermodynamics govern the chemical processes in all biological organisms.
- b) The principles of thermodynamics govern how an organism exchanges energy with their environment.
- c) The principles of thermodynamics govern how all life on Earth exchanges energy.
- d) All of the above.

**PRACTICE:** Which of the following is NOT an example of a biological system?

- a) A human eating a cheeseburger.
- b) A coral reef where energy and mass both enter and exit.
- c) The digestive system of an organism absorbing food energy and discarding food waste.
- d) The universe where the amount of energy and mass is constant.