

Energy in Motion

Trace energy through Earth, weather, and life.

6.4.b "Earth's energy budget relates to living systems and Earth's processes;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline one phrase that shows energy entering or leaving Earth. Then circle three sentences that show energy driving a water process, air movement, or a living system.

Sunlight Connects Earth Systems

- ① Earth continually receives energy from the Sun, mostly as visible light and other shortwave radiation. Some incoming energy bounces back to space from clouds, ice, and pale surfaces. The rest is absorbed by land, water, and the atmosphere, warming them. Warm Earth also sends energy upward as infrared radiation. Over many years, incoming and outgoing energy are usually close to balance. This balance, called Earth's energy budget, helps control temperatures that allow liquid water and life to persist.
- ② Energy transfers in the budget power Earth processes. When sunlight warms ocean water, some water evaporates. Higher in the atmosphere, cooling can condense water vapor into clouds, and precipitation can return water to the surface. Uneven heating also creates temperature and pressure differences that move air, producing wind. Greenhouse gases absorb and reemit some outgoing infrared energy, which keeps more energy in the lower atmosphere and at the surface. This natural effect influences conditions for weather, water movement, and organisms.
- ③ Living systems are part of these energy transfers. A green plant uses absorbed sunlight to make sugars through photosynthesis, storing energy in chemical bonds. An insect that eats the plant receives some of that stored energy. At each step, organisms use energy for life functions and release heat to their surroundings. Thus, sunlight can affect a food web as well as evaporation and wind. If a dark paved area replaces grass, it may absorb more sunlight, changing local heating and conditions for nearby plants and animals.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Name two things that can reflect incoming solar energy back to space.

2 How can sunlight eventually help cause precipitation? Describe the energy-related steps.

3 How does uneven heating of Earth's surface lead to wind?

4 Explain how energy from sunlight can move from a plant to an insect.

3 YOUR TURN _____ Your own words

Choose an outdoor place, such as a pond, field, sidewalk, or garden. Write exactly three sentences that explain how sunlight affects one surface, one Earth process, and one living thing there.

PART 1 • READ AND MARK

Underline one phrase that shows energy entering or leaving Earth. Then circle three sentences that show energy driving a water process, air movement, or a living system. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Name two things that can reflect incoming solar energy back to space.	Any two: clouds, ice, and pale surfaces.
2	How can sunlight eventually help cause precipitation? Describe the energy-related steps.	Sunlight warms water, causing evaporation. Higher in the atmosphere, water vapor cools and condenses into clouds. Precipitation can then return water to the surface.
3	How does uneven heating of Earth's surface lead to wind?	Uneven heating creates temperature and pressure differences. These differences move air, producing wind.
4	Explain how energy from sunlight can move from a plant to an insect.	A plant uses absorbed sunlight to make sugars and store chemical energy. An insect receives some of that stored energy when it eats the plant.

PART 3 • YOUR TURN (SAMPLE ANSWER)

At a sunny pond, dark water absorbs sunlight and warms. The added warmth increases evaporation, adding water vapor that can later form clouds. Algae use sunlight to make sugars, and small animals can obtain that stored energy by eating algae.

Accept scientifically accurate examples and wording that match the passage. For the open task, look for a clear connection among solar energy, a surface or material, an Earth process, and a living thing.