

Learning Target: I can read a passage to learn about energy transformations and then use the information gathered to answer multiple choice comprehension questions.

### 8<sup>th</sup> Grade Science Energy Transformations Reading for Meaning

Every morning, the Sun rises, sending waves of radiant energy toward Earth. This energy begins an incredible journey — one that eventually powers everything from growing plants to charging your phone. But how does energy change forms so many times and still never disappear?

It all starts with **nuclear energy** in the Sun. Inside the Sun's core, hydrogen atoms fuse together to form helium, releasing enormous amounts of energy through **nuclear fusion**. That energy travels through space as **electromagnetic radiation** — mainly visible light and infrared energy.

When sunlight reaches Earth, plants capture a portion of that radiant energy through **photosynthesis**, transforming it into **chemical energy** stored in glucose. This is the same energy that fuels almost every living organism on Earth, either directly or indirectly.

Now imagine you eat an apple. The chemical energy stored in that apple moves into your body, where it is transformed into **mechanical energy** as your muscles move, **thermal energy** as your body maintains temperature, and even **electrical energy** as your brain sends signals to your muscles. Energy constantly changes form, but it never disappears — a concept known as the **Law of Conservation of Energy**.

The same principle applies to technology. When you plug your phone into a charger, **electrical energy** from a power plant flows into the device. The power plant may have produced that electricity by burning coal (a **chemical-to-thermal-to-mechanical-to-electrical** energy transformation) or through a renewable source like solar panels that directly convert **radiant energy** into electricity.

Inside your phone, that electrical energy transforms into **light energy** for your screen, **sound energy** for your notifications, and **thermal energy** as the phone warms up. No energy is lost — it simply changes into less useful forms, like heat that escapes into the air.

From the Sun's nuclear fusion to your glowing smartphone screen, energy transformations make modern life possible. Understanding how energy flows and changes form helps us design more efficient systems, reduce waste, and harness energy responsibly for the future.

#### Multiple-Choice Questions (DOK 3–4)

**Standard Alignment:** *S8P2 — Obtain, evaluate, and communicate information about the law of conservation of energy to develop arguments supporting the claim that energy cannot be created or destroyed but may be transferred or transformed.*

**1. Which sequence best represents the energy transformations that occur from sunlight reaching a solar panel to a phone charging from that energy?**

- |  |   |
|--|---|
| A. Radiant → Chemical → Electrical → Thermal   | B. Radiant → Electrical → Chemical → Electrical |
| C. Radiant → Thermal → Mechanical → Electrical | D. Radiant → Mechanical → Thermal → Electrical  |

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**2. In the passage, the transformation of energy inside the human body after eating an apple demonstrates**

- A. that energy is destroyed when used by cells.
- B. that chemical energy can transform into several other forms.
- C. that mechanical energy converts into chemical energy.
- D. that energy transformations only occur in living systems.

**3. Which statement provides the strongest evidence for the Law of Conservation of Energy based on the passage?**

- A. Heat from a phone eventually escapes into the air.
- B. Energy from the Sun powers both plants and machines.
- C. Energy changes forms but the total amount remains constant.
- D. Chemical energy is the most common form of energy on Earth.

**4. When coal is burned in a power plant, which transformation sequence best describes the process before electricity reaches homes?**

- A. Chemical → Thermal → Mechanical → Electrical
- B. Thermal → Chemical → Electrical → Mechanical
- C. Mechanical → Chemical → Radiant → Electrical
- D. Electrical → Mechanical → Chemical → Thermal

**5. A student argues that “energy disappears” when a phone battery runs out. Based on the passage, which counterargument best disproves that claim?**

- A. The phone produces light energy that can’t be measured.
- B. The battery’s chemical energy transforms into other forms like heat and light.
- C. The phone stores nuclear energy that escapes into the air.
- D. The phone stops using energy because it is turned off.

**6. Why is the Sun described as the “beginning of the energy journey” in the passage?**

- A. All Earth’s energy originates from solar nuclear fusion.
- B. The Sun is the only source of chemical energy.
- C. Plants and machines use only sunlight for energy.
- D. The Sun produces energy that is destroyed over time.

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**7. Which real-world situation best mirrors the energy transformation chain described in the passage?**

- A. A car battery storing energy from a chemical reaction.
- B. A microwave converting electrical energy into radiant and thermal energy.
- C. A wind turbine converting radiant energy into sound energy.
- D. A flashlight storing radiant energy as electrical energy.

**8. According to the Law of Conservation of Energy, what happens when heat escapes from a smartphone into the air?**

- A. The total energy decreases because heat is wasted.
- B. The heat energy is transferred to surrounding air molecules.
- C. The electrical energy is destroyed in the process.
- D. The phone converts thermal energy back into electrical energy.

**9. A student suggests using waste heat from machines to power other systems. How does this idea connect to the passage's main theme?**

- A. It ignores that heat energy cannot be reused.
- B. It supports the principle that energy can be transformed into more useful forms.
- C. It shows that energy transformations always increase efficiency.
- D. It conflicts with the idea that only solar energy is renewable.

**10. If energy cannot be created or destroyed, why do some devices seem to "lose" energy efficiency over time?**

- A. Energy transforms into less useful forms like heat during each conversion.
- B. The devices use up the total energy supply on Earth.
- C. The Law of Conservation applies only to biological systems.
- D. The devices destroy extra energy through friction.