

# Zoe's Animal Rescue Energy Adventure

Grade 6

science

animal-rescue

Students will be able to identify, describe, and explain how energy is transferred between objects and systems in real-world contexts.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Zoe arrives at the rescue center. She switches on a heat lamp for an injured owl. The lamp glows and warms the nest. What two forms of energy does the lamp transfer to the owl's nest? Name them.

2. True or False: Zoe notices the owl's nest gets warmer over time. This means thermal energy moved FROM the lamp TO the nest. Write True or False, then explain in one sentence why.

3. Zoe finds a rare find — a solar-powered tracker — on an injured sea turtle. Sunlight hits the tracker's panel. The tracker then sends a signal. Complete the energy chain: Solar (light) energy → \_\_\_\_\_ energy → \_\_\_\_\_ energy (signal).

4. Zoe uses a special object — a heated blanket — to warm a cold dolphin. The blanket uses electrical energy. The dolphin's body temperature rises. Explain how energy is transferred from the blanket to the dolphin. Use the word 'conduction' in your answer.

5. Zoe observes two transfer methods: (A) the heated blanket touching the dolphin, (B) the heat lamp warming the owl from across the cage. Which uses radiation and which uses conduction? Explain the difference in two sentences.

6. Zoe discovers a unique item — an old wind-up feeding machine — in the rescue center's storage. Someone winds a spring (storing elastic potential energy). The spring releases and spins a paddle that splashes water. Trace the full energy transfer chain from winding to water splash. Include at least three energy forms.

7. Zoe compares two rescue tools. Tool 1: a hand pump that moves air to inflate a raft (mechanical → kinetic → pressure). Tool 2: an electric pump powered by a battery. The electric pump feels warm after use. Zoe says, 'The electric pump wastes energy.' Is she correct? Explain using the idea of energy conservation and energy dissipation.

8. Mission complete! Zoe used every tool in the rescue center to save three animals. Now she writes her report. She found a hidden treasure — a field notebook — with this note: 'In every rescue tool, energy changes form but the total amount never changes.' Using evidence from at least two tools Zoe used today (heat lamp, solar tracker, heated blanket, or wind-up feeder), write a two-sentence scientific explanation that supports this note. Use the terms 'energy transfer,' 'energy transformation,' and 'conservation of energy' in your answer.



## Answer Key: Zoe's Animal Rescue Energy Adventure

GRADE 6 | TEACHER & PARENT USE ONLY

Before Q3, pause and ask students to predict which energy transfer Zoe will use next — this activates the thermal-to-mechanical chain students explore in questions 3 through 5 and builds anticipation for Q8's resolution.

1. Zoe arrives at the rescue center. She switches on a heat lamp for an injured owl. The lamp glows and warms the nest. What two forms of energy does the lamp transfer to the owl's nest? Name them.

**Answer: Q1: The lamp converts electrical energy → light energy (glowing) and electrical energy → thermal energy (heat warming the nest). Answer: The lamp transfers light energy and thermal energy to the owl's nest.**

2. True or False: Zoe notices the owl's nest gets warmer over time. This means thermal energy moved FROM the lamp TO the nest. Write True or False, then explain in one sentence why.

**Answer: Q2: Heat always flows from a warmer object (lamp) to a cooler object (nest) — this is thermal energy transfer by radiation and conduction. Answer: TRUE — thermal energy transferred from the warmer lamp to the cooler nest, raising the nest's temperature.**

3. Zoe finds a rare find — a solar-powered tracker — on an injured sea turtle. Sunlight hits the tracker's panel. The tracker then sends a signal. Complete the energy chain: Solar (light) energy → \_\_\_\_\_ energy → \_\_\_\_\_ energy (signal).

**Answer: Q3: Sunlight (light/radiant energy) is absorbed by the solar panel and converted to electrical energy. The electrical energy then powers the transmitter, converting to electromagnetic (signal/wave) energy. Answer: Solar (light) energy → ELECTRICAL energy → ELECTROMAGNETIC (signal) energy.**

4. Zoe uses a special object — a heated blanket — to warm a cold dolphin. The blanket uses electrical energy. The dolphin's body temperature rises. Explain how energy is transferred from the blanket to the dolphin. Use the word 'conduction' in your answer.

**Answer: Q4: The electric blanket converts electrical energy to thermal energy. The warm blanket touches the dolphin's skin directly. Heat moves from the warmer blanket into the cooler dolphin body through direct contact — this is conduction. Answer: The blanket transfers thermal energy to the dolphin by conduction — direct contact moves heat from the warmer blanket into the cooler dolphin skin.**

5. Zoe observes two transfer methods: (A) the heated blanket touching the dolphin, (B) the heat lamp warming the owl from across the cage. Which uses radiation and which uses conduction? Explain the difference in two sentences.

**Answer: Q5: Conduction requires direct physical contact between objects. Radiation transfers energy through waves without any contact needed. Answer: Method A (blanket touching dolphin) uses CONDUCTION because the objects are in direct contact. Method B (lamp across the cage) uses RADIATION because the energy travels as waves through the air without touching the owl.**

6. Zoe discovers a unique item — an old wind-up feeding machine — in the rescue center's storage. Someone winds a spring (storing elastic potential energy). The spring releases and spins a paddle that splashes water. Trace the full energy transfer chain from winding to water splash. Include at least three energy forms.

**Answer: Q6: Step 1 — A person uses muscular (chemical) energy to wind the spring. Step 2 — Winding stores elastic potential energy in the spring. Step 3 — The spring releases, converting elastic potential energy to kinetic energy (moving paddle). Step 4 — The moving paddle transfers**

kinetic energy to the water, causing a splash (kinetic energy in water). Answer: Chemical (muscular) energy → Elastic potential energy (spring) → Kinetic energy (spinning paddle) → Kinetic energy (water splash). Three or more energy forms are present: chemical, elastic potential, and kinetic.

7. Zoe compares two rescue tools. Tool 1: a hand pump that moves air to inflate a raft (mechanical → kinetic → pressure). Tool 2: an electric pump powered by a battery. The electric pump feels warm after use. Zoe says, 'The electric pump wastes energy.' Is she correct? Explain using the idea of energy conservation and energy dissipation.

**Answer: Q7: The law of conservation of energy states that energy cannot be created or destroyed — it only changes form. The electric pump converts chemical energy (battery) → electrical energy → mechanical/kinetic energy (moving air). However, some energy converts to thermal energy (heat felt in the motor) — this is dissipation. The energy is not destroyed; it is transferred as heat to the surroundings and is no longer useful for the task. Answer: Zoe is partially correct. The electric pump does not destroy energy — no pump can. However, some electrical energy is dissipated as thermal energy (heat in the motor) rather than doing useful work. This is energy dissipation, not energy loss, and it follows the law of conservation of energy.**

8. Mission complete! Zoe used every tool in the rescue center to save three animals. Now she writes her report. She found a hidden treasure — a field notebook — with this note: 'In every rescue tool, energy changes form but the total amount never changes.' Using evidence from at least two tools Zoe used today (heat lamp, solar tracker, heated blanket, or wind-up feeder), write a two-sentence scientific explanation that supports this note. Use the terms 'energy transfer,' 'energy transformation,' and 'conservation of energy' in your answer.

**Answer: Q8: Sample strong answer — The heat lamp transformed electrical energy into light energy and thermal energy, warming the owl; no energy disappeared, it only changed form — this supports conservation of energy. The wind-up feeding machine transformed elastic potential energy into kinetic energy to splash water for the dolphin, again showing that energy transfer and energy transformation occur without any energy being created or destroyed. Scoring guide: Award full credit if the student (1) correctly names at least two tools, (2) correctly identifies the energy forms involved in each, (3) uses all three required terms accurately, and (4) states that total energy is conserved. Narrative closure: Zoe's hidden treasure notebook confirmed what she observed all day — energy always transfers or transforms, but the total amount in a closed system stays the same. Mission accomplished.**