Hidden Heat Paths

Trace evidence of energy moving from Earth's interior to its surface.

6.6.a "Construct an evidence-based explanation of how Earth's internal energy flows between its surface and its interior."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two observations that show heat reaching the surface, circle two ways water or melted rock moves, and number three steps in one path energy takes from inside Earth to the air.

Where Does a Hot Spring Get Its Heat?

1. On a cold morning in Iceland, steam rises from a pool fed by a hot spring. Nearby, workers drill wells to bring up hot water for heating buildings. The water is not heated by sunlight. Far below the ground, Earth's interior stores heat left from its formation and heat made as certain elements break down. In many places, temperature rises with depth. Workers can measure warmer rock and water in deeper wells. These measurements are evidence that thermal energy moves from warmer rock below toward the cooler surface.

2. Earth's outer layer is broken into moving plates. In Iceland, two plates pull apart, making cracks where melted rock, called magma, can rise. Magma carries thermal energy upward from inside Earth. When lava reaches the surface, it loses energy to the cooler air and ground and hardens into rock. A fresh lava flow gives off heat long after it stops moving. This heat is evidence of energy leaving the interior. Deeper down, hot solid rock in the mantle also moves slowly as heat flows through it.

3. Water provides another path for the energy. Rain sinks through cracks in the ground and reaches hot rocks near magma. Thermal energy passes from the rocks to the water, which becomes warmer. Some heated water moves upward through cracks and emerges as a hot spring. At the surface, it transfers energy to cooler air and water. The cooled water can soak back into the ground, but the energy it gave off has spread into the surroundings. A hot spring therefore offers a visible clue to a mostly hidden flow of energy.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do measurements in deeper wells support the idea that energy moves from Earth's interior toward its surface?

2. A fresh lava flow gives off heat after it stops moving. Explain how that energy reached the surface and where it goes next.

3. Explain how rainwater can carry energy from hot rock to the surface. What happens to the energy when the water emerges?

4. Someone says sunlight is the main source of a hot spring's heat. Use two details from the passage to explain why heat from inside Earth is a better explanation.

3 YOUR TURN

Your own words

After rain, a new crack near a volcano releases warm water. It keeps releasing warm water on cold days. Write one paragraph explaining a likely path for the water and Earth's internal energy. Use both observations as evidence, and predict where some of the energy goes when the water reaches the surface.

ANSWER KEY

Hidden Heat Paths

GRADE 6 · 6.6.a

PART 1 · READ AND MARK

Underline two observations that show heat reaching the surface, circle two ways water or melted rock moves, and number three steps in one path energy takes from inside Earth to the air. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do measurements in deeper wells support the idea that energy moves from Earth's interior toward its surface?	**Deeper wells contain warmer rock and water. Thermal energy moves from those warmer materials toward the cooler surface.**
2	A fresh lava flow gives off heat after it stops moving. Explain how that energy reached the surface and where it goes next.	**Magma carried energy upward through cracks and became lava at the surface. The lava transfers energy to the cooler air and ground.**
3	Explain how rainwater can carry energy from hot rock to the surface. What happens to the energy when the water emerges?	**Rainwater sinks through cracks and gains energy from hot rock. The warmed water rises and emerges as a hot spring, where it transfers energy to cooler air and water.**
4	Someone says sunlight is the main source of a hot spring's heat. Use two details from the passage to explain why heat from inside Earth is a better explanation.	**Deeper wells contain warmer rock and water, and rainwater can reach hot rocks near magma before rising as a hot spring. Both details point to a source below ground rather than sunlight.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Rainwater may sink through the new crack and reach hot rocks below the surface. Energy from the rocks warms the water, which then rises through the crack. Warm water coming out after rain supports this possible path for the water. Because the water stays warm even on cold days, heat from inside Earth is a better explanation than warmth from the air. At the surface, some energy moves from the warm water to the cooler air.

Accept explanations that connect an observation to a path for energy from warmer material underground toward cooler surroundings. For Part 3, students should treat the underground path as a likely explanation, not as something directly observed.