Three Ways to Warm

Read, mark, and compare sources of heat energy.

P.4.6A.1 "Obtain and communicate information to compare how different processes (including burning, friction, and electricity) serve as sources of heat energy."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each heat-making process, circle what it needs to work, and draw a box around what it heats so you can compare the three.

Maya's Chilly Day

1. On a chilly morning, Maya sees three ways to get warm. Her family cooks oatmeal over a small camp stove. The stove burns fuel, which reacts with oxygen in the air. This process releases heat that warms the pot. Burning can keep making heat while fuel and oxygen are available, but the flame can burn skin or start a fire.

2. Maya rubs her palms together while she waits. Her moving hands press against each other. Friction between their surfaces changes some of that motion into heat. Her hands feel warmer after a few seconds, but they cool when she stops rubbing. Friction needs motion, not fuel or a power cord. It warms a small area, unlike the stove, which heats a whole pot.

3. Back home, Maya uses an electric kettle to heat water for cocoa. Electric current passes through a part inside the kettle called a heating element. The element becomes hot and warms the water. Unlike friction, this source can keep heating without someone rubbing surfaces. Unlike the stove, the kettle makes heat without a flame, but it needs a supply of electricity to work.

2 ANSWER WITH EVIDENCE

Use the passage

1. Maya has no electrical outlet and wants to heat a pot of oatmeal. Why would the stove work better than rubbing her hands?

2. How do the stove and kettle each heat something Maya can eat or drink? How are their heat-making processes different?

3. Why do Maya's hands stop getting warmer when she stops rubbing, while the kettle can keep heating water?

4. The stove and kettle can both keep heating. What does each need to keep working?

3 YOUR TURN

Your own words

Think of a cold-day task not mentioned in the passage. In 3 or 4 sentences, choose two heat-making processes, explain how each could help with your task, and compare what each needs to work.

ANSWER KEY

Three Ways to Warm

GRADE 4 · P.4.6A.1

PART 1 · READ AND MARK

Underline each heat-making process, circle what it needs to work, and draw a box around what it heats so you can compare the three. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Maya has no electrical outlet and wants to heat a pot of oatmeal. Why would the stove work better than rubbing her hands?	**Burning fuel heats the whole pot, while friction from rubbing warms only a small area of her hands.**
2	How do the stove and kettle each heat something Maya can eat or drink? How are their heat-making processes different?	**The stove burns fuel to warm the oatmeal pot. Electric current heats a part inside the kettle, which warms the water.**
3	Why do Maya's hands stop getting warmer when she stops rubbing, while the kettle can keep heating water?	**Friction needs her hands to move. The kettle can keep heating while it has electricity.**
4	The stove and kettle can both keep heating. What does each need to keep working?	**The stove needs fuel and oxygen. The kettle needs electricity.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I want to warm a cold room. A fire in a fireplace burns wood with oxygen and gives off heat. An electric heater uses electric current to make a heating element hot. Both can warm the room, but the fire needs fuel and oxygen, while the heater needs electricity.

Accept different cold-day tasks if the student accurately explains two processes and compares what they need. The task should not be cooking oatmeal, warming hands, or heating cocoa water.