Name: _____ **Date:** _____

Answer Key: The Thermal Detective: 2nd Grade Heat Flow Analysis Quiz

Examine 10 high-level scenarios to predict energy movement through friction, insulation, and solar absorption in real-world environments.

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1. Mila is rubbing two smooth stones together very quickly. After one minute, the stones feel warm. Why did this happen?

Answer: B) Rubbing creates friction, which turns movement into heat.

When two objects rub against each other, friction is created, which transforms kinetic energy (movement) into thermal energy (heat).

2. If you put a thick wool sweater on a cold snowman, the sweater will generate its own heat to melt the snowman quickly.

Answer: B) False

Insulators like wool don't make heat; they only slow down the transfer of heat. A sweater would actually keep the snowman cold longer by blocking outside heat.

3. Leo places a black piece of paper and a white piece of paper in the bright sun. The black paper feels much hotter because it _____ more sunlight.

Answer: C) absorbs

Darker colors absorb more light energy from the sun, which is then converted into thermal energy, making the material feel hotter.

4. An engineer is designing a lunchbox to keep soup hot. Which material would be the BEST choice for the inner lining to stop heat from escaping?

Answer: B) A layer of thick plastic foam

Foam is an insulator, meaning it traps heat. Metals like copper and silver are conductors that would let the heat escape quickly.

5. When you put a room-temperature metal spoon into a bowl of ice cream, the spoon gets cold because the heat moves _____ the spoon.

Answer: A) out of

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Heat always moves from the warmer object to the cooler object. In this case, heat leaves the spoon and moves into the cold ice cream.

6. Heat energy can move through the empty vacuum of space even if there is no air or water to carry it.

Answer: A) True

This is called radiation. Sunlight travels through the vacuum of space to reach Earth, even though there is no matter to conduct it.

7. Imagine you have two cups of water. Cup A is 100 degrees and Cup B is 50 degrees. If you mix them together, what is the most likely final temperature?

Answer: C) 75 degrees

When hot and cold liquids mix, the heat spreads out until the whole mixture reaches a temperature somewhere in the middle.

8. In a bakery, the air near the ceiling is much warmer than the air near the floor. This is because warm air _____.

Answer: B) rises

Warm air is less dense than cool air, causing it to rise. This movement of heat through air or water is called convection.

9. Scientifically speaking, 'cold' is just the absence of heat energy; it is not a 'thing' that moves into objects.

Answer: A) True

Thermodynamics teaches us that only heat moves. When we 'feel cold,' we are actually feeling heat leaving our bodies.

10. Why does a piece of chocolate melt faster on a metal slide than on a wooden bench on a sunny day?

Answer: B) Metal is a conductor that transfers heat to the chocolate quickly.

Metal is an excellent conductor of heat, meaning it passes thermal energy from the sun into the chocolate much faster than wood does.