THE STANDARD

Thermal Energy Transfer

Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

ANCHORING PHENOMENON

The Two Spoons on the Counter

A metal spoon and a wooden spoon sit side by side on the kitchen counter overnight. Same room. Same air. Touch them both in the morning. The metal feels noticeably colder than the wood. But a thermometer pressed against each one reads exactly the same temperature. Students will keep circling back to this all week.

> **DRIVING QUESTION**
> *"If both spoons are the same temperature, why does one feel colder than the other?"*

INVESTIGATIVE 1

The Foil Ice Cube vs. the Wool Sock Ice Cube

Two identical ice cubes. One gets wrapped in a tight layer of aluminum foil. The other gets wrapped in a thick wool sock. Both sit on the counter at room temperature. The foil-wrapped cube turns into a puddle in about 20 minutes. The wool-wrapped cube is still mostly solid after an hour. Use this to sharpen the conductor-vs-insulator lens the anchor is pushing on.

> **DRIVING QUESTION**
> *"Which is better at protecting an ice cube, shiny foil or thick wool, and why does each one work the way it does?"*

INVESTIGATIVE 2

Three Cups of Coffee, Three Hours Later

Three cups, all filled with coffee at 70 degrees Celsius at the same moment. One is a paper to-go cup, lid on. One is a ceramic mug, no lid. One is a stainless-steel thermos, sealed. Three hours later the paper cup is room temperature, the ceramic mug is barely warm, and the thermos is still hot enough to drink. Same starting point, three completely different endings. Use this to push the lens further: design choices change the rate of energy flow, not the rule.

> **DRIVING QUESTION**
> *"If heat always moves from hot to cold, why are the three cups in such wildly different places after three hours?"*