



Spoon Conduction Test

Mission: The café needs new stirring spoons that won't burn hands. Put metal, wooden, and plastic spoons in hot cocoa, track the handle temperatures, and watch the butter pats.

Big question: Why do some materials conduct thermal energy better than others?

★ Warm-up: Notice & wonder

Think about your kitchen.

Why do pots have plastic or wooden handles? ✓ **Those materials are insulators; they don't get hot quickly.**

A metal bench feels colder than a wood bench on the same day. Why? ✓ **Metal conducts heat away from your hand faster.**

Key vocabulary

Conduction	Heat transfer by direct contact between particles.
Conductor	A material that transfers heat well (metals).
Insulator	A material that transfers heat poorly (wood, plastic, foam).
Thermal equilibrium	When touching objects reach the same temperature.

1 Box 1

Predict

PREDICTION Which spoon's butter will melt first?

☐ Metal ☐ Wooden ☐ Plastic

Run the test

In the simulator: Put the spoons in the cocoa and run for 10 minutes.

Record the handle temperatures at 5 minutes (read the graph).

Spoon	At 5 min (°C)
Metal	from simulator
Wooden	from simulator
Plastic	from simulator

2 Box 2

Conductor or insulator?

Sort the materials.

Sort: Metal spoon · Wooden spoon · Plastic spoon · Copper pot bottom · Foam cup · Oven mitt

Conductor	Insulator
Metal spoon Copper pot bottom	Wooden spoon Plastic spoon Foam cup Oven mitt

3 Box 3

Particle explanation

How did thermal energy travel up the metal spoon?

- ☐ Fast particles in the cocoa bumped spoon particles, which bumped their neighbors up the handle
- ☐ Hot air blew up the spoon ☐ The cocoa climbed the spoon

✓ **Fast particles in the cocoa bumped spoon particles, which bumped their neighbors up the handle**

Equilibrium

If you waited a very long time, what would happen to the cocoa and the metal spoon?

- ☐ They would reach the same temperature, then cool to room temperature
- ☐ The spoon would get hotter than the cocoa ☐ Nothing would change

✓ **They would reach the same temperature, then cool to room temperature**

4 Box 4

Legend: best spoon Legend only

The café wants a spoon that stirs well AND is safe to hold. What design is best?

- ☐ Metal bowl with a wooden or plastic handle ☐ All metal ☐ All foam

✓ **Metal bowl with a wooden or plastic handle**

5 Box 5

Recommendation (CER)

Which spoon should the café buy, and why?

Claim

Look for: Recommends an insulator; at least 6 words

Evidence

Look for: Uses temperature data; a number from the simulator; at least 12 words

Reasoning

Look for: Uses conductor/insulator; at least 10 words



Exit ticket: answer the big question in your own words

Why do some materials conduct thermal energy better than others?

Look for: Conduction is heat transfer by direct contact: fast-moving particles bump neighbors and pass energy along. Metals are good conductors, so a metal handle heats up quickly. Wood and plastic are insulators; energy moves through them slowly.



Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	5NR-E
 Investigator	MB6-I
 Legend	HHU-L

 Watch for these misconceptions

- "Cold moves into things." Heat moves; objects feel cold because heat leaves your hand.
- "Only moving things have energy." Stored (potential) energy counts too.
- "Radiation needs air to travel." Radiation crosses empty space, which is how sunlight reaches Earth.