

The Material Heat Cannot Cross

KIDS OBSERVE, ADULT HANDLES

RUN AT 12:00

15 MIN

The point

Aerogel is 99.8% air held in a glass skeleton — the best solid insulator there is. It teaches **conduction** by flatly refusing to do it.

Materials

- The silica aerogel tile (owned — handle over a tray, it sheds dust)
- Mug of very hot water • an ice cube
- A metal spoon or coin for contrast

Steps

- 1 Set the mug of hot water on the table. Lay the aerogel tile flat on top of the mug.
- 2 **PREDICT:** will heat cross the tile? Will an ice cube on top melt?
- 3 Set the ice cube on the tile. Kids touch the tile's TOP with one finger — cool! — while the mug below is too hot to hold.
- 4 Swap: metal spoon flat over the mug, finger on top — hot within seconds. The metal conducts; the aerogel refuses.
- 5 Pass the tile over the tray: it looks like solid frozen smoke and weighs nearly nothing — call back A-4: matter is mostly empty space, and here is that emptiness in your hand.

Say: "The heat is right there, pushing — and this ghost-solid just will not carry it. That carrying is called CONDUCTION, and aerogel is the world's worst at it. That is exactly what makes it precious."

PLATE 24. THERMAL INSULATION DEMONSTRATION OF AEROGEL.



TEACHER PREP

NO flames — hot water only. Tray under the tile at all times; brittle, sheds dust; adult places and removes it.

What to watch for

- The unmelting ice cube — give it real minutes while talk continues
- The metal-spoon contrast lands the concept in seconds
- Every child gets the weight moment — it is unforgettable

EXPECTED RESULT

Ice sits unmelted on a tile above steaming water; the same setup with metal is hot in seconds. Conduction has a name, a hero, and a refusal.