

Melting Blocks - Heat Conduction

Georgia Standards of Excellence:

S3P1. Obtain, evaluate, and communicate information about the ways heat energy is transferred and measured.

Ask questions to identify sources of heat energy. (Clarification statement: Examples could include sunlight, friction, and burning.)

S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.

b. Construct an argument based on observations to support a claim that the physical changes in the state of water are due to temperature changes, which cause small particles that cannot be seen to move differently.

SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular motion.

a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gases, and plasmas.

b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gases in closed systems.

(Clarification statement: Using specific Gas laws to perform calculations is beyond the scope of this standard; emphasis should focus on the conceptual understanding of the behavior of gases rather than calculations.)

Objective:

Observe and discuss heat conduction and hypothesize how the two apparently identical black square blocks behave differently with ice..

Materials:

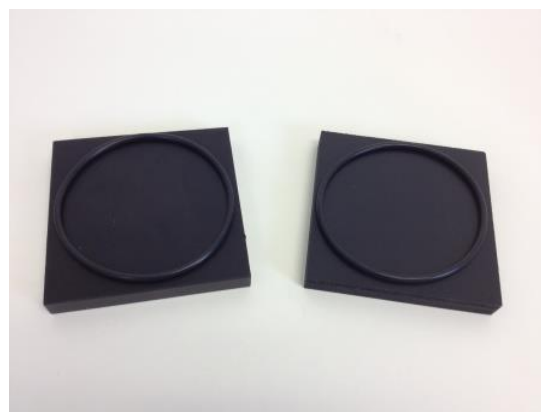
A pair of melting blocks

Ice cubes

Stop watch

Discussion:

There are two ways to understand heat moving by conduction. The first way to think about how conduction works is that heat moves from one thing to another by touching. If you touch a hot surface, your hand feels hotter because the heat moves from the surface into your hand. If you put a pot on an electric stove, like the coil stove in the image, the coils touch the pot and they heat the pot at that touching point. Remember, heat always moves from hotter



objects to colder objects, so the heat moves from the hot coils on the stove straight into the bottom of the cooler pot.

The second way to understand how conduction works is to understand that heat moves through an object itself. After the coils heat the bottom of the pot, the heat spreads through the whole pot, warming the sides of the pot, too. Many pot handles are plastic because, otherwise, heat would conduct up into the handle too and burn your hand!

Procedure:

1. Set up the two melting blocks on a flat surface.
2. Place an ice cube on each melting block and begin the stop watch.
3. Record your results.
4. How do you explain what happened?



Analysis:

How are the two melting blocks different that account for the different results?

Are there other materials that you could use to produce similar results?