

Thermal Energy Activity

(Adapted from the MCAS High School Physics, 2015 Spring Release)

Related Standards

- MS-PS3-4. Determine the relationships among the energy transferred, how well the type of matter retains or radiates heat, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
- Introductory Physics: Standard: 3.1 - Explain how heat energy is transferred by convection, conduction, and radiation.

Prompt

A student was investigating cooling times for two pots made of different materials. One pot was stainless steel and the other pot was iron. The pots were placed on a table in a 25°C room. The pots were roughly the same size and shape, and contained the same amount of water. The pots and water were originally at 100°C. The student recorded the temperature of the water in each pot over time. The data table shows the results.

Material	Time (hr)	Temperature (°C)
Stainless Steel	0.0	100
Stainless Steel	0.5	85
Stainless Steel	1.0	72
Stainless Steel	1.5	61
Stainless Steel	2.5	58
Iron	0.0	100
Iron	0.5	77
Iron	1.0	62
Iron	1.5	50
Iron	2.5	38

- a. Graph the data for both the stainless steel pot and the iron pot.



- b. Describe what happened to the temperature of the stainless steel pot as the time (hr.) increased?
- c. Determine the amount of time it took the water in the iron pot to cool from 100°C to 62°C .
- d. Based on the graph, which pot, the iron pot or the stainless steel pot, was a better conductor of thermal energy? Explain your answer.
- e. What pot, the iron or the stainless steel pot, should you use to keep soup warm the longest? Justify your answer using evidence from the data table or the graph that you created in Part (a).