Science Virtual Learning

# MPI Physics 210

## Thermodynamics 5: Specific Heat

May 13, 2020

Lesson: MPI Thermodynamics 5 – Specific Heat
May 13, 2020

**Objective: To understand heat, and how it changes the temperature of objects**

This video discusses the nature of heat, and how it changes the temperature of objects

https://youtu.be/dEI7jUOfG5g

# Video:  Specific Heat

**TABLE 19.1** Specific Heats of Some Substances at 25°C and Atmospheric Pressure

| Substance | Specific Heat (J/kg · °C) | Substance | Specific Heat (J/kg · °C) |
|---|---|---|---|
| *Elemental solids* | | *Other solids* | |
| Aluminum | 900 | Brass | 380 |
| Beryllium | 1 830 | Glass | 837 |
| Cadmium | 230 | Ice (−5°C) | 2 090 |
| Copper | 387 | Marble | 860 |
| Germanium | 322 | Wood | 1 700 |
| Gold | 129 | *Liquids* | |
| Iron | 448 | Alcohol (ethyl) | 2 400 |
| Lead | 128 | Mercury | 140 |
| Silicon | 703 | Water (15°C) | 4 186 |
| Silver | 234 | *Gas* | |
| | | Steam (100°C) | 2 010 |

*Note:* To convert values to units of cal/g · °C, divide by 4 186.

# Specific Heat Table

# Specific Heat - Examples

1. An 8-oz (0.226 kg) cup of water is heated up in a microwave from 20.0°C to 92.0°C. How much heat did the water absorb?
2. A lab experiment shows that when 10000 J of heat are removed from a 2.00 kg block of metal, its temperature lowers by 12.9°C. What is the specific heat of the metal?

Video: https://youtu.be/4Fd66h2p6mA

# Homework

- Try to solve the problems yourself, then watch the solution video:
- https://youtu.be/ov1Uy2fKMsw

1. When 4280 J of heat are added to a chunk of ice, its temperature increases by 8.40°C. What is the mass of the ice?

2. A 0.750-kg chunk of hot brass is placed in a 0.222-kg container of water to cool. The temperature of the brass drops by 244°C.

a) How much heat flows out of the brass?

b) If all of that heat flows into the water, how much does its temperature increase?

# That’s it!