

Specific Heat/Heat Capacity Practice

Use the Heat Capacity Table to the right to answer items 1 – 3

1. If you had a sample of each of the materials found in the Heat Capacity table and were to add 1000 Joules of ENERGY to each sample, which would have the highest increase in temperature?

a. Which would have the lowest increase in temperature?

Material	Heat Capacity (J/°C)
aluminum	0.90
beryllium	1.82
gold	0.13
graphite	0.83

2. If you had a sample of each of the materials found in the Heat Capacity table and were to remove 2,500 Joules of ENERGY from each sample, which would have the highest decrease in temperature?

a. Which would have the lowest decrease in temperature?

3. Electronics get hot as they use electricity because any time there is an energy transformation some energy is always lost from the system as heat. You just got the job as the lead engineer for developing a heat sink for a new computer design. A heat sink's purpose is to protect the electronics by absorbing/removing heat from the electronics and releasing it to the surroundings, you need to make this out of a material that will absorb heat and release heat quickly, which material from the heat capacity table would be best suited for this?

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4. **What is the total heat required** to raise the temperature of 500 grams of water from 25°C to 100°C if the specific heat of water is 4 J/g°C?
5. Naomi is investigating the properties of a solid material. She found that it takes 120 joules to raise the temperature of a 10-gram material by 5 degrees. **What is the specific heat of the material?**
6. An Iron(Fe) ball with a mass of 100 grams was heated from 0°C to 20°C. **How much energy did the Iron ball gain?** (The specific heat of Fe is 0.5 J/g°C.)
7. 4000 Joules of Energy was removed from a steel alloy sample and cause the temperature to decrease by 20°C. If the specific heat of this steel alloy is 1.0 J/g°C, **what was the mass of the sample.**
8. Water (H₂O) has a specific heat capacity of 4 J/g°C. If 2,250 joules (2.25 kJ) was added to a 50 gram sample of water, **how much did the temperature Δ?**
- a. Use your answer from 8 to solve this item. If the original temperature of the H₂O was room temperature 22°C, **what is the temperature now** that 2,250 Joules has been added to the water?
9. An Iron ball with a temperature of 50°C is dropped into a bowl containing 100 grams of water that was 20°C. The system came to equilibrium at 30°C. **What is the heat capacity of the ball?** (The specific heat of the water is 4 J/g°C). In order to solve this, you need to first find out how much energy was lost from the ball and gained by the water. Use
- $Q=mc\Delta T$ with the water data first to find Q.
 - Then use that Q to find the heat capacity of the ball with the ball data
 - So basically you gotta work $Q=mc\Delta T$ twice. 1st with water data 2nd with iron data and the Q from H₂O