

## Problems of Specific and latent heat

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- 1) A 250–g piece of gold is at 19 °C. 5.192 kJ of energy is added to it by heat. The specific heat of gold is 129 J/(kg·°C). Calculate its final temperature.  
*Answer:* 180 °C.
- 2) We heat a 25–g sample of metal from 10 °C to 100 °C. 1.082 kJ of energy is added to it by heat. Calculate the specific heat of the metal.  
*Answer:* 481 J/(kg·°C).
- 3) A 365–g piece of copper is initially at 220 °C. The piece is dropped into a bucket containing 535 g of water at 51 °C. The specific heat of this metal is 385 J/(kg·°C) and the specific heat of water is 4180 J/(kg·°C). Calculate the final temperature of the system and the energy transfer to the water from the metal.  
*Answer:* 60.99 °C, 22.34 kJ.
- 4) An 845–g bar of ice is initially at –25 °C. The latent heat of fusion of ice is 334 kJ/kg, the specific heat of ice is 2050 J/(kg·°C), and the specific heat of water is 4180 J/(kg·°C). Determine how much energy is required if the final temperature of the system is to reach 39 °C.  
*Answer:* 463.3 kJ.
- 5) A 600–g bar of ice is initially at –33 °C. The latent heat of fusion of ice is 334 kJ/kg, the specific heat of ice is 2050 J/(kg·°C), and the specific heat of water is 4180 J/(kg·°C). Calculate the final temperature of the system if 383.9 kJ of energy is added by heat.  
*Answer:* 57 °C.
- 6) A system of 480 g of water is initially at 19 °C. The latent heat vaporization of water is 2260 kJ/kg, the specific heat of water is 4180 J/(kg·°C), and the specific heat of steam is 2080 J/(kg·°C). Determine how much energy is required if the final temperature of the system is to reach 195 °C.  
*Answer:* 1342 kJ.
- 7) A system of 795 g of water is initially at 49 °C. The latent heat vaporization of water is 2260 kJ/kg, the specific heat of water is 4180 J/(kg·°C), and the specific heat of steam is 2080 J/(kg·°C). Calculate the final temperature of the system if 2209 kJ of energy is added by heat.  
*Answer:* 247 °C.
- 8) We want heat an 165–g block of gold from 18 °C to 190 °C. The specific heat of gold is 129 J/(kg·°C). Calculate the heat we have to add.  
*Answer:* 3.661 kJ.