

USEFUL CONSTANTS

sp. ht. of water = $4186 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$

sp. ht. of ice = $2060 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$

sp. ht. of steam = $2020 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$

$L_f = 334000 \text{ J kg}^{-1}$

$L_v = 2226000 \text{ J kg}^{-1}$

1. If 1.5kg water at 20°C is thoroughly mixed with 2.0kg alcohol at 50°C , what will be the final temperature of the mixture? (c for alcohol = $2400 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$)
2. A 4.0g lead bullet moving at 500 m/s becomes embedded in a large block of 0°C ice. Assuming all the energy of the bullet is transferred to the ice, what amount of ice changes into water at 0°C ?
3. What mass of 50°C aluminum needs to be added to 250g of water initially at 20°C to increase the temperature of the water by 5.0°C ?
4. How long will it take a 1500W kettle to heat 2.0kg water from 22°C to the boiling point if the kettle is known to be only 80% efficient?
5. What amount of heat does a fridge have to remove from 400g water initially at 22°C to make 400g ice at -12°C ?
6. What amount of heat is required to change 8.0 cm^3 of ice, density = 1.0 g/cm^3 , initially at -10°C into steam at 100°C ?