

6. A puddle of water has a mass of 5.0 kg and a temperature of 15 °C. In the evening, the puddle's temperature drops to 3.0 °C. $c_{\text{water}} = 4200 \text{ J/kg}^\circ\text{C}$
- a. Calculate the change in energy, if we assume no water is lost to evaporation

A student claims that if the temperature were to drop by half the amount, the change in energy would also be half.

- b. Use calculations to back up the student's claim

It rains overnight, causing the mass of the puddle to increase. The next evening, the puddle's temperature drops from 15°C to 3.0°C but the change in energy is 30% greater than in part a.

- c. Calculate the mass of the water puddle

7. A scientist spills 0.72 kg of liquid mercury onto the floor. Whilst the scientist goes to get equipment to clean it up, the liquid warms by 3.0°C. $c_{\text{mercury}} = 126 \text{ J/kg}^\circ\text{C}$
- a. Calculate the change in energy



The scientist wants to compare an unknown liquid to mercury. They pour 0.72 kg of the new liquid on the floor. Its change in energy is the same as the mercury in part a. but its temperature rises by 6.3 °C.

- b. Calculate the unknown liquid's specific heat capacity

8. Aluminium has a specific heat capacity 900 J/kg°C and a density, $\rho = 2.7\text{g/cm}^3$.

280 g of aluminium is heated from an initial temperature of 15°C so that it absorbs 3820 J of energy.

Calculate its final temperature

