Answers

latent heat ice melting experiment

1. Play from 0:26 Why do I say "It's not important?" **it's just there to speed up the process. The ice would melt anyway.**

2. What temperature does the ice water start at (0:33)? **We would expect 0°C but the thermometer reads ~2°C perhaps because of the water I added.**

3. At what time does the temperature begin to rise? **0:41mins wall time or 0:52sec video time**

4. At around 44 mins the reading on the thermometer drops a bit, why do you think that is? **Perhaps because as the ice repositions itself it gathers around the thermometer more closely. Remember the thermometer takes a reading along its length, not at a single point.**

5. What mass of ice did I use? **118g**

6. The latent heat of fusion for water is 333KJ per Kg. How much energy would it take to melt the ice in this video if the ice's temperature is 0°C? **E = m L = 0.118 * 333 = 39KJ**

the frozen thermometer experiment

1. How long does it take the ice to heat up to 0°C? **Hard to judge! Anywhere from 8:00-10:30 wall time. N.B you can skip forward and back in videos using the ,. keys.**

2. At around 0:29 we can see condensation disappearing from the side of the test tube, why? **The test tube is no longer cold enough to cause condensation to form and then freeze, instead it probably forms as a liquid and runs down the sides.**

3. The temperature reading drops at one point in this video, too. What time (stopwatch or video) does this happen and why do you think it happens? **(2:18:48 wall time or 1:22 video)**

4. The specific heat capacity of ice is 2.04KJ per Kg. Suppose we have 60g of water in this video. How much energy did it take to heat the ice up to 0°C? **It's hard to measure the start temp in °C because it's off the scale but it is clearly about 10°F which is -12.2°C so dT = 12.2°C. E = m C dT = 0.06 * 2.04 * 12.2 = 1.49KJ**

5. How long did warming up take? And so how rapidly was heat flowing through the walls of the test tube during this time? Your answer should be in Watts. **From Q1 let's say 8 minutes. Power = Energy transferred / time taken = 1.49Kj / 490 sec = 3W**