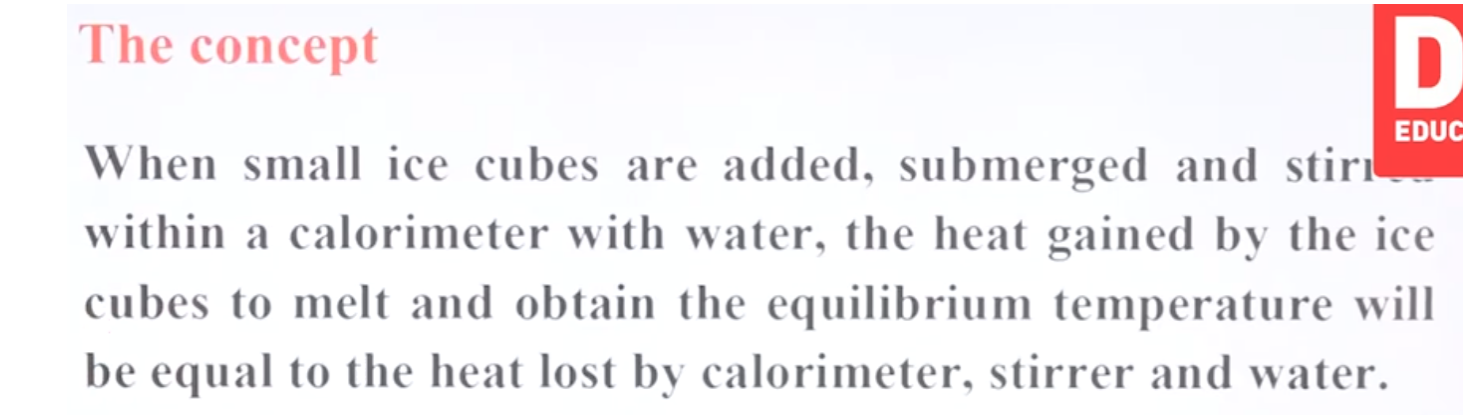
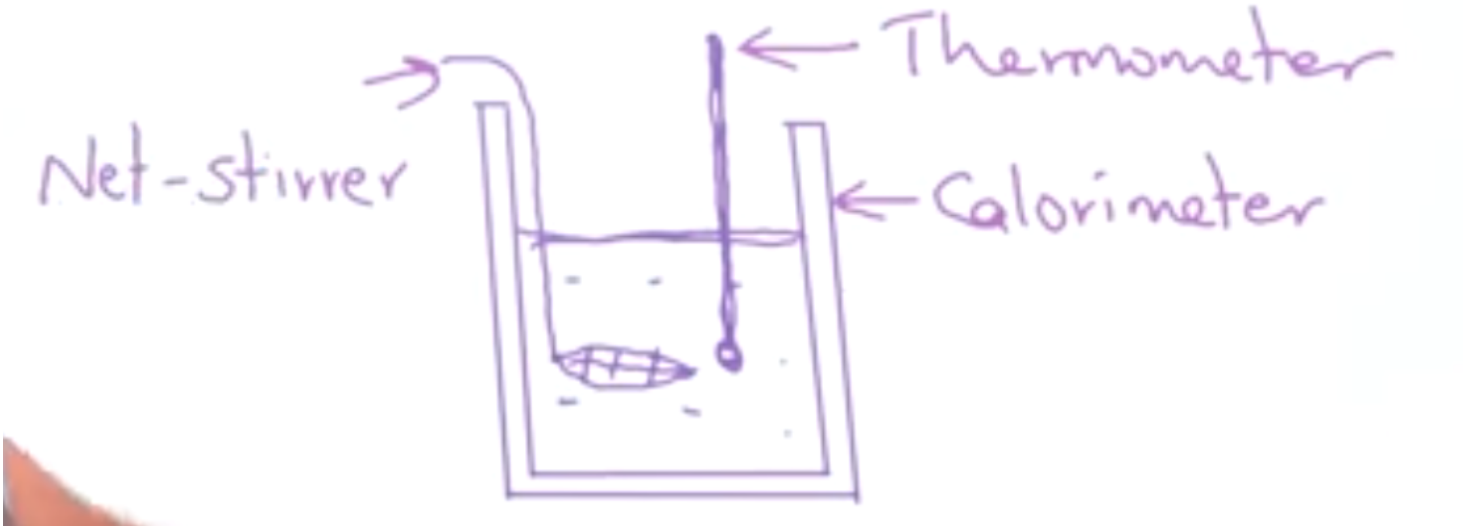
- Concept



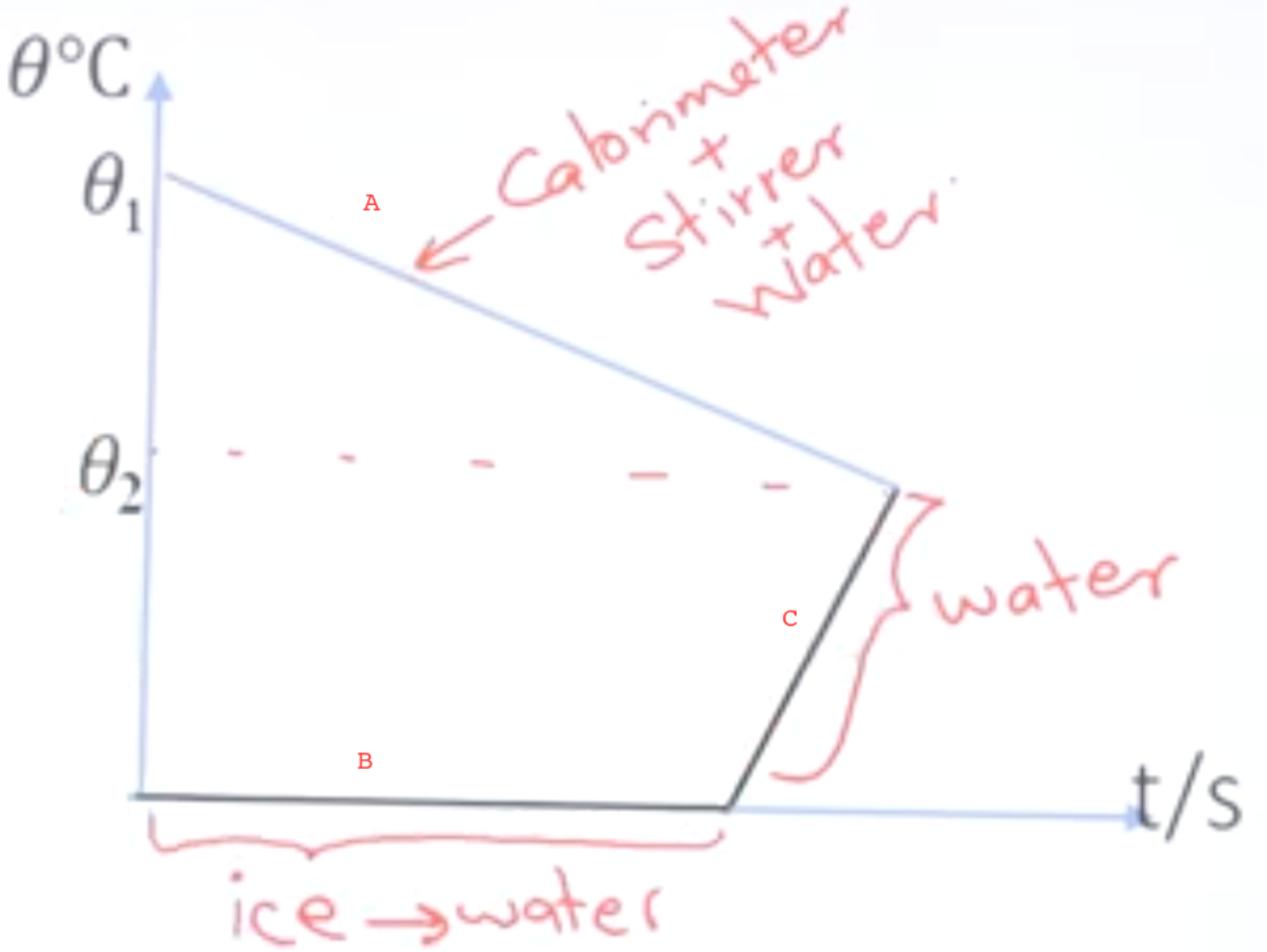
- Initial Setup



- Measurements you need to take in the correct order.

1. Measure the mass of the calorimeter with the stirrer. M_1 - (M_c)
2. Fill the calorimeter with water and then measure the mass. M_2 - $(M_c + M_w)$
3. Initial temperature of water θ_1
4. Get the lowest temperature after adding ice θ_2
5. Final mass of calorimeter + stirrer + ice M_3

> Here $\theta_1 > \theta_2$



A - Temperature of calorimeter + stirrer + water decreasing when ice cubes are added.
B - 0C ice turning into 0C water.
C - 0C water getting heated and coming into an equilibrium with water in the calorimeter.

After taking these readings, we can find the specific heat capacity of the ice using the equation $H = ML$ for the phase change of ice to water and we use $H = ms\theta$ for the other heat exchanges

So we assume that the heat gained from the ice cubes are equal to the heat released by the water and calorimeter

$$
\begin{aligned}
M_s &= Mass\ of\ ice\ added\ (M_3 - M_2) = Mass\ of\ water\ added \\
&\quad (As\ the\ same\ ice\ is\ melt\ in\ to\ water) \\
M_w &= Mass\ of\ initial\ water\ in\ calorimeter\ (M_2 - M_1) \\
M_c &= Mass\ of\ the\ calorimeter\ +\ Stirer(M_1)
\end{aligned}
$$

$$
\begin{aligned}
L &= Spefic\ latemt\ heat\ of\ fussion\ of\ water \\
S_w &= Spefic\ heat\ capacity\ of\ water(4200) \\
S_c &= Spefic\ heat\ capacity\ of\ calorimeter(4000)
\end{aligned}
$$

$$
\begin{aligned}
H &= mS\delta\theta = ML \\
M_sL + M_sS_w(\theta_2 - 0) &= M_cS_c(\theta_1 - \theta_2) + M_wS_w(\theta_1 - \theta_2)
\end{aligned}
$$

$$
\therefore L = \frac{(M_cS_c + M_wS_w)(\theta_1 - \theta_2) - M_sS_w(\theta_2 - 0)}{M_s}
$$

Important point

- Why should we use a net stirrer to stire this instead of a normal one?

As the density of ice is less than water ice floats on water. Therefore to keep them in the bottom we need a net stirrer

- Why should we wipe the ice cubes with a blotting paper before adding it to the calorimeter?

To make sure its dry and no water is added with the ice cubes

- Which shape of ice is best for this experiment?

small-medium cubes

Large onces can't be used as we can't mantain the temperature the calorimeter gains and it might have a temperature difference between the surface and the inner temperature (inner

could have a negative temperature)
Crushed or really small ice cubes can't be used as we can't blot them for water practically.