

Lesson:

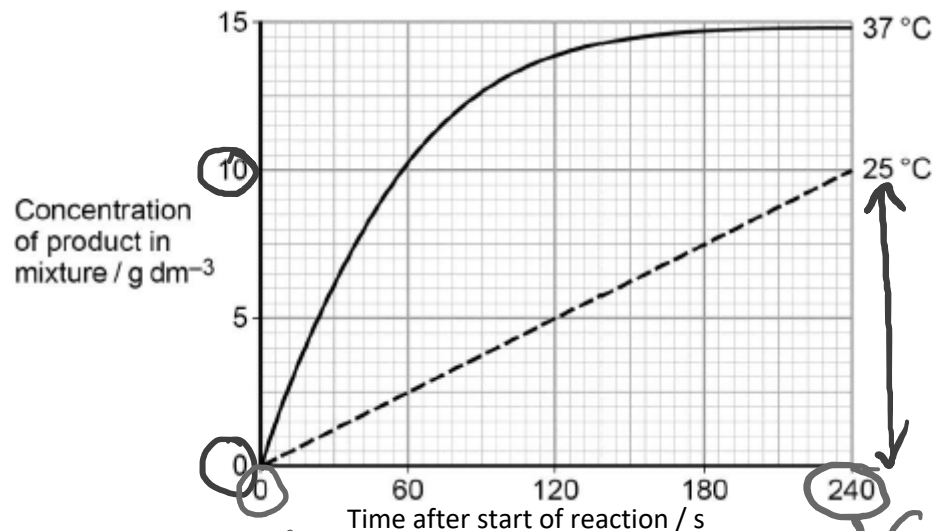
Topic: **Exam skills**

Teacher goes through mark scheme
for AS paper 1 2014.



Q2. A technician investigated the effect of temperature on the rate of an enzyme-controlled reaction. At each temperature, he started the reaction using the same volume of substrate solution and the same volume of enzyme solution.

The figure below shows his results.



- (a) Give **one** other factor the technician would have controlled.

(a) Concentration of substrate solution / of enzyme solution / pH.

(1)

- (b) Calculate the rate of reaction at 25 °C.

(b) 1. 2.5 / 0.04;

1 mark for correct value

2. g dm⁻³ minute⁻¹ / g dm⁻³ s⁻¹;

1 mark for related unit- read unit from graph axis

Answer _____ (2)

Option 1

$$\text{Rate of Reaction} = \frac{\text{Change in } y}{\text{Change in } x} = \frac{10}{240} = 0.04 \text{ g dm}^{-3} \text{ s}^{-1}$$

$$\text{Change in } y = 10 - 0 = 10 \text{ g dm}^{-3}$$

$$\text{Change in } x = 240 - 0 = 240 \text{ seconds (4 minutes)}$$

Option 2

$$\text{Rate of reaction} = \frac{10 \text{ g dm}^{-3}}{4 \text{ minutes}} = 2.5 \text{ g dm}^{-3} \text{ minute}^{-1}$$

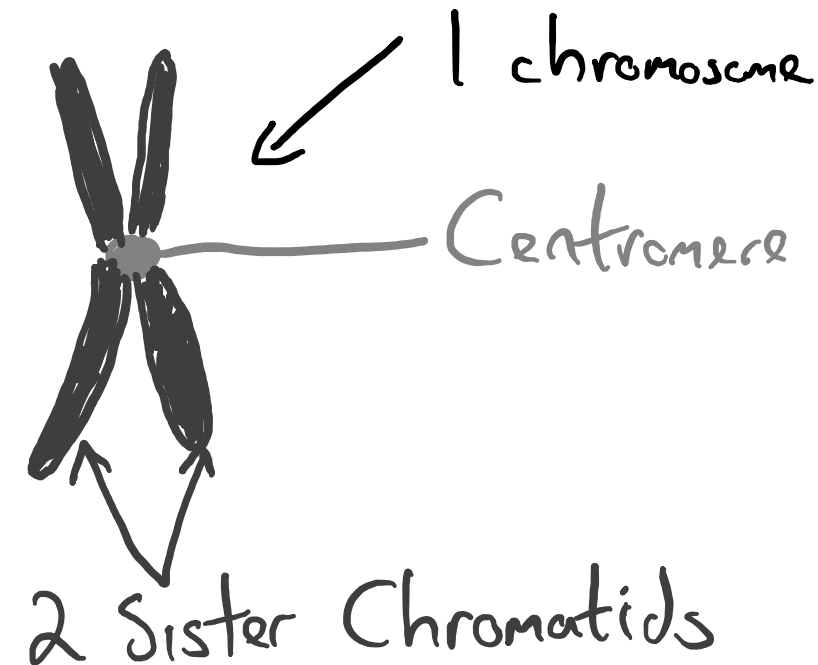
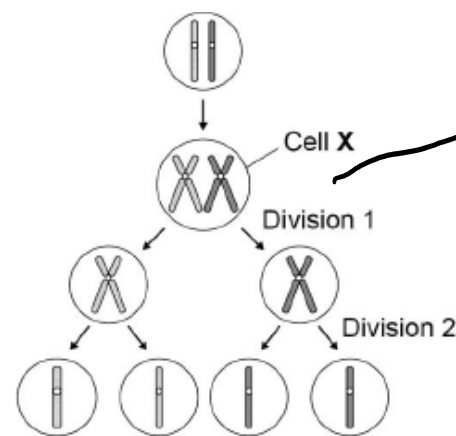
(c) Describe and explain the differences between the two curves.

-
- (c) 1. Initial rate of reaction faster at 37 °C;
2. Because more kinetic energy;
3. So more E–S collisions / more E–S complexes formed;
4. Graph reaches plateau at 37 °C;
5. Because all substrate used up.
-

Allow converse for correct descriptions and explanations for curve at 25 °C

(5)

Q3. The figure below summarises the process of meiosis. The circles represent cells and the structures within each cell represent chromosomes.



(a) Describe and explain the appearance of **one** of the chromosomes in cell X.

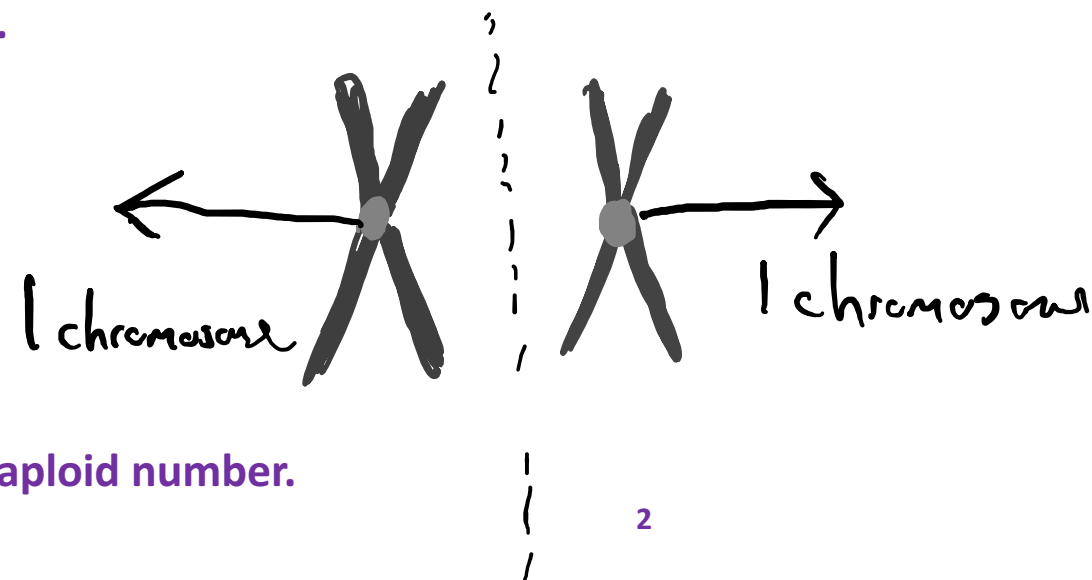
- (a) 1. Chromosome is formed of two chromatids;**
- 2. (Because) DNA replication (has occurred);**
- 3. (Sister) chromatids held together by centromere.**

_____ (3)

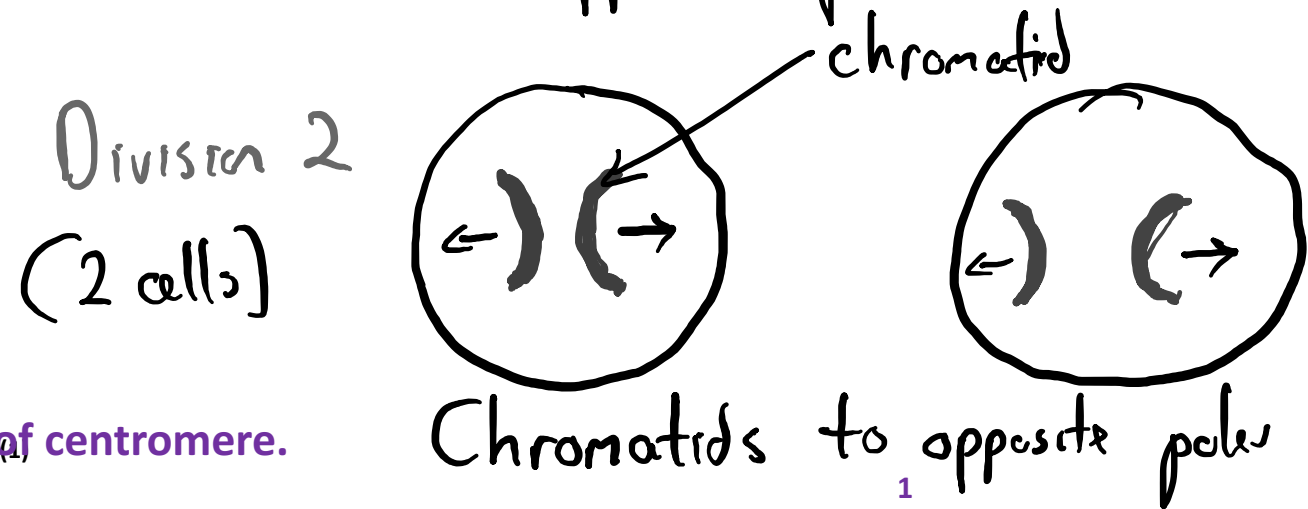
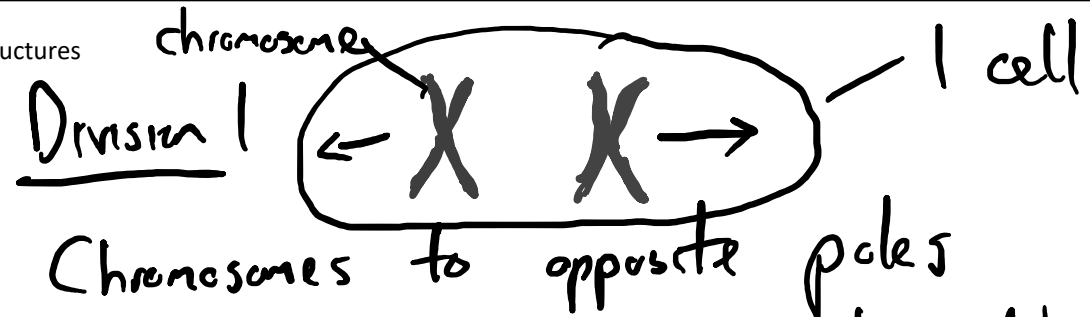
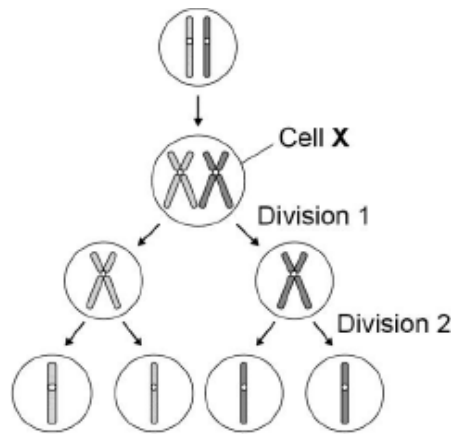
(b) Describe what has happened during division 1 in the figure above.

- (b) 1. Chromosomes in homologous pair;**
- 2. One of each chromosome into daughter cells / haploid number.**

_____ (2)



Q3. The figure below summarises the process of meiosis. The circles represent cells and the structures within each cell represent chromosomes.



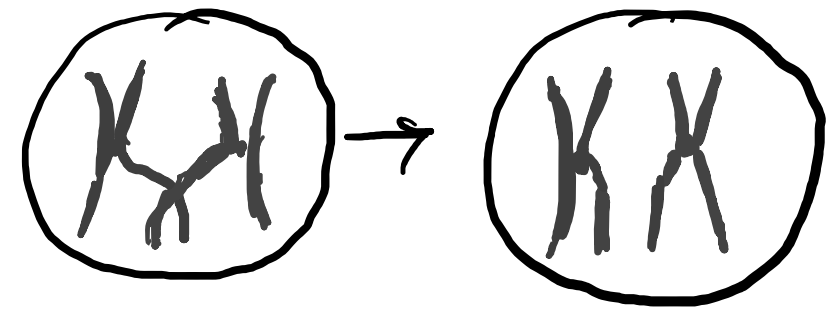
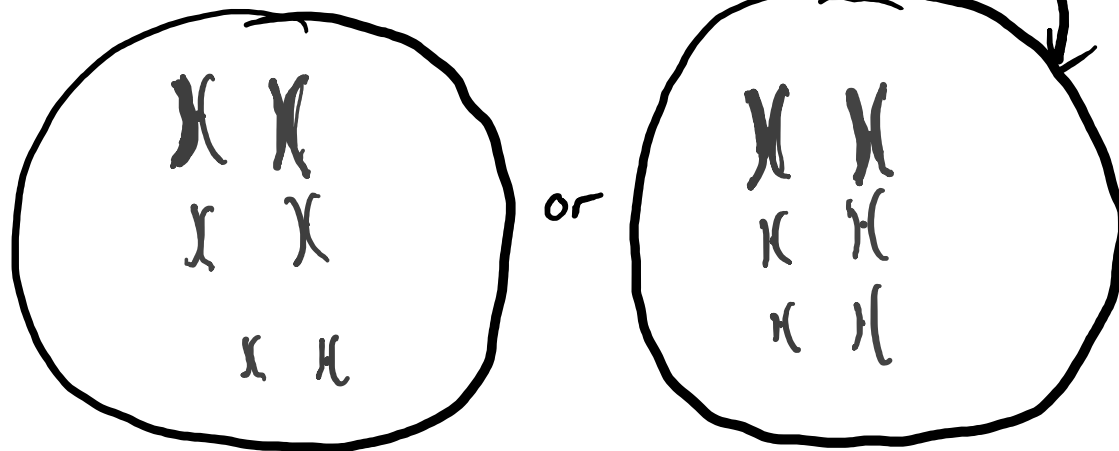
(c) Identify **one** event that occurred during division 2 but **not** during division 1.

(c) Separation of (sister) chromatids / division of centromere.

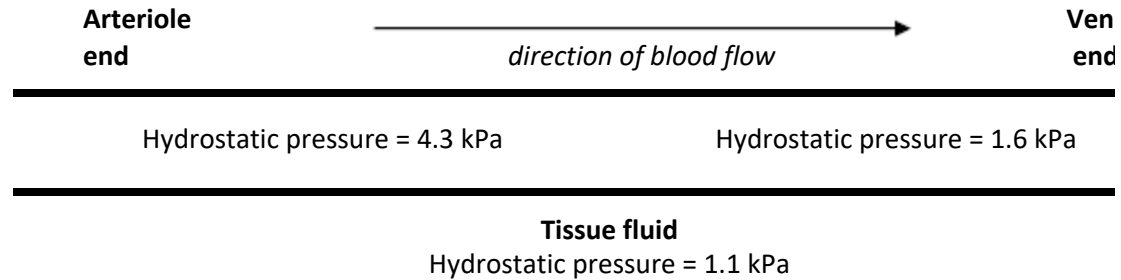
(d) Name **two** ways in which meiosis produces genetic variation.

1. (d) 1. Independent segregation (of homologous chromosomes);
2. 2. Crossing over / formation of chiasmata.

Accept random assortment



Q6. The figure below represents a capillary surrounded by tissue fluid.
The values of the hydrostatic pressure are shown.



- (a) Use the information in the figure above to explain how tissue fluid is formed.

(a) 1. (Overall) outward pressure of 3.2 kPa;
2. Forces small molecules out of capillary.

(2)

- (b) The hydrostatic pressure falls from the arteriole end of the capillary to the venule end of the capillary. Explain why.

(b) Loss of water / loss of fluid / friction (against capillary lining).

(1)

(c) High blood pressure leads to an accumulation of tissue fluid. Explain how.

- (c) 1. High blood pressure = high hydrostatic pressure;
 - 2. Increases outward pressure from (arterial) end of capillary / reduces inward pressure at (venule) end of capillary;
 - 3. (So) more tissue fluid formed / less tissue fluid is reabsorbed.
- Allow lymph system not able to drain tissues fast enough*

_____ (3)

(d) The water potential of the blood plasma is more negative at the venule end of the capillary than at the arteriole end of the capillary. Explain why.

- (d) 1. Water has left the capillary;
- 2. Proteins (in blood) too large to leave capillary;
- 3. Increasing / giving higher concentration of blood proteins (and thus wp).

_____ (3)

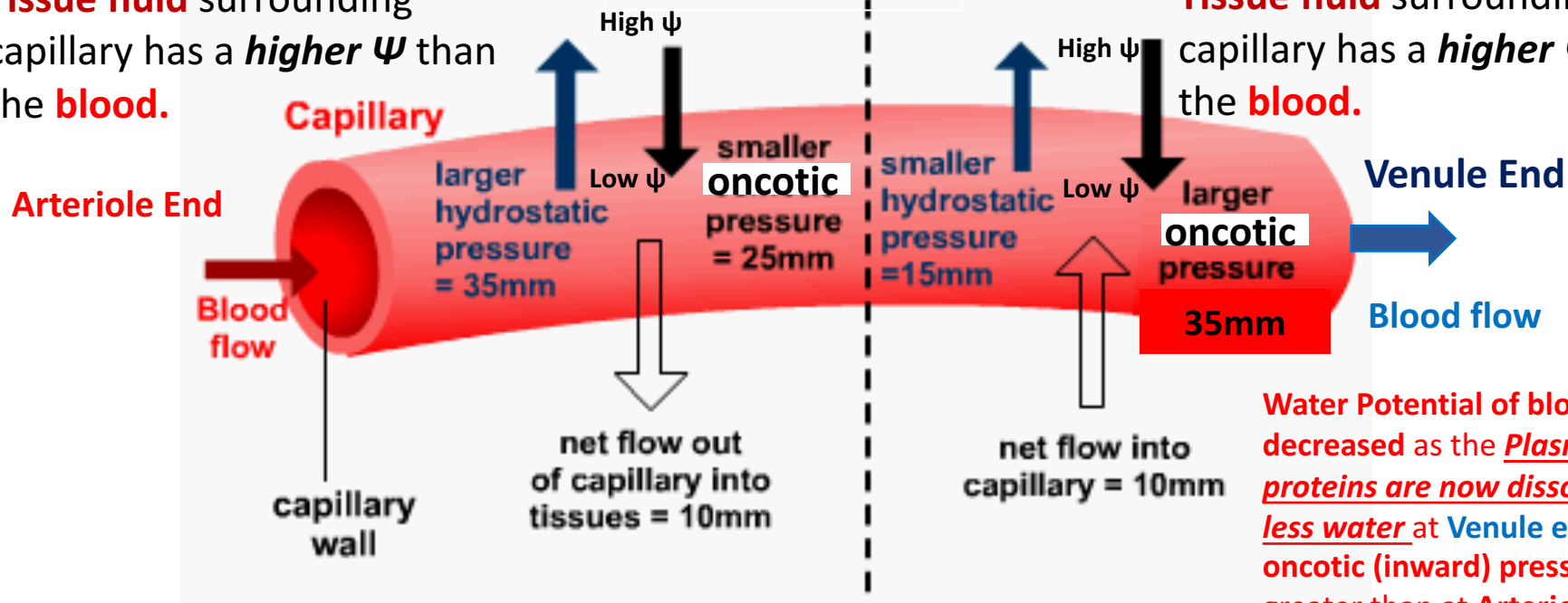
High Hydrostatic Pressure (Outwards)

Result of *Ventricular systole* and *recoiling* action of artery walls.

Oncotic Pressure (Inwards)

Tissue fluid surrounding capillary has a *higher ψ* than the **blood**.

Tissue Fluid Formation and Reabsorption



Lower Hydrostatic Pressure (Outwards)

1. Due to *loss of fluid* from blood
2. Due to *friction* between Red blood cells and Capillary Endothelial Walls

Oncotic Pressure (Inwards)

Tissue fluid surrounding capillary has a *higher ψ* than the **blood**.

Water Potential of blood has decreased as the Plasma proteins are now dissolved in less water at Venule end, so oncotic (inward) pressure is greater than at Arteriole End

RESULT: Hydrostatic Pressure is **greater** than Oncotic pressure, so there is a **NET** flow of substances **out of the blood**. This **Tissue fluid** will consist of **Water, Glucose, Amino Acids, Oxygen, Na/Cl- ions and Neutrophils (White Blood Cells)**.

What can't move out? **Red Blood Cells, Platelets and Plasma Proteins** are too large to pass out.

RESULT: Hydrostatic Pressure is now **lower** than Oncotic pressure, so there will be a **NET** flow of substances **back into the blood**.

What moves back into the Blood?

Water returns to the blood by *Osmosis*, along with waste products such as **Carbon Dioxide** and **Urea**.

Q8.A group of students carried out an investigation to find the water potential of potato tissue.

The students were each given a potato and 50 cm³ of a 1.0 mol dm⁻³ solution of sucrose.

- They used the 1.0 mol dm⁻³ solution of sucrose to make a series of different concentrations.
- They cut and weighed discs of potato tissue and left them in the sucrose solutions for a set time.
- They then removed the discs of potato tissue and reweighed them.

The table below shows how one student presented his processed results.

Concentration of sucrose solution / mol dm ⁻³	Percentage change in mass of potato tissue
0.15	+4.7
0.20	+4.1
0.25	+3.0
0.30	+1.9
0.35	-0.9
0.40	-3.8

(a) Explain why the data in the table above are described as **processed** results.

(a) Calculations made (from raw data) / raw data would have recorded initial and final masses.

_____ (1)

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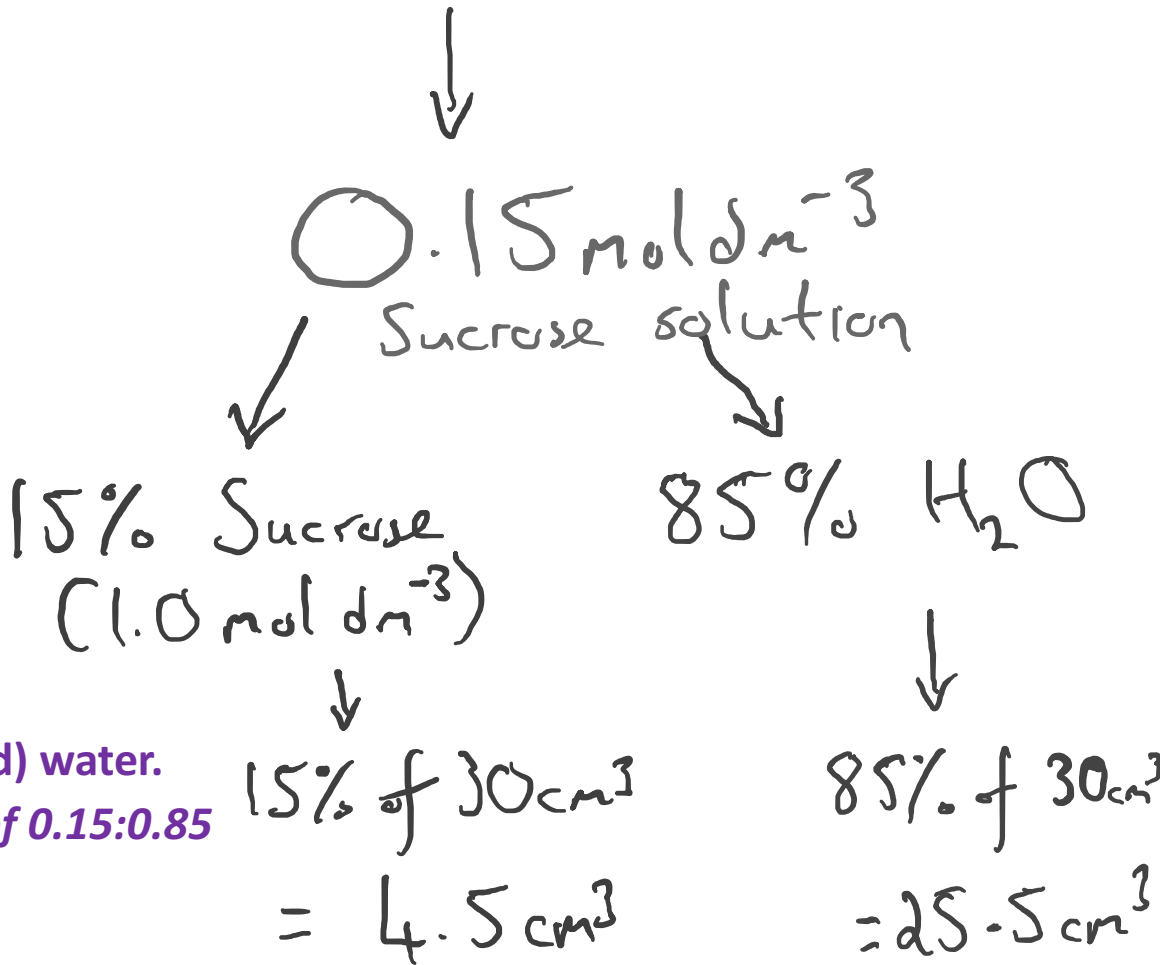
(b) Describe how you would use a 1.0 mol dm^{-3} solution of sucrose to produce 30 cm^3 of a 0.15 mol dm^{-3} solution of sucrose.

(b) Add 4.5 cm³ of (1.0 mol dm⁻³) solution to 25.5 cm³ (distilled) water.

If incorrect, allow 1 mark for solution to water in a proportion of 0.15:0.85

(2)

1.0 mol dm⁻³
Sucrose Solution



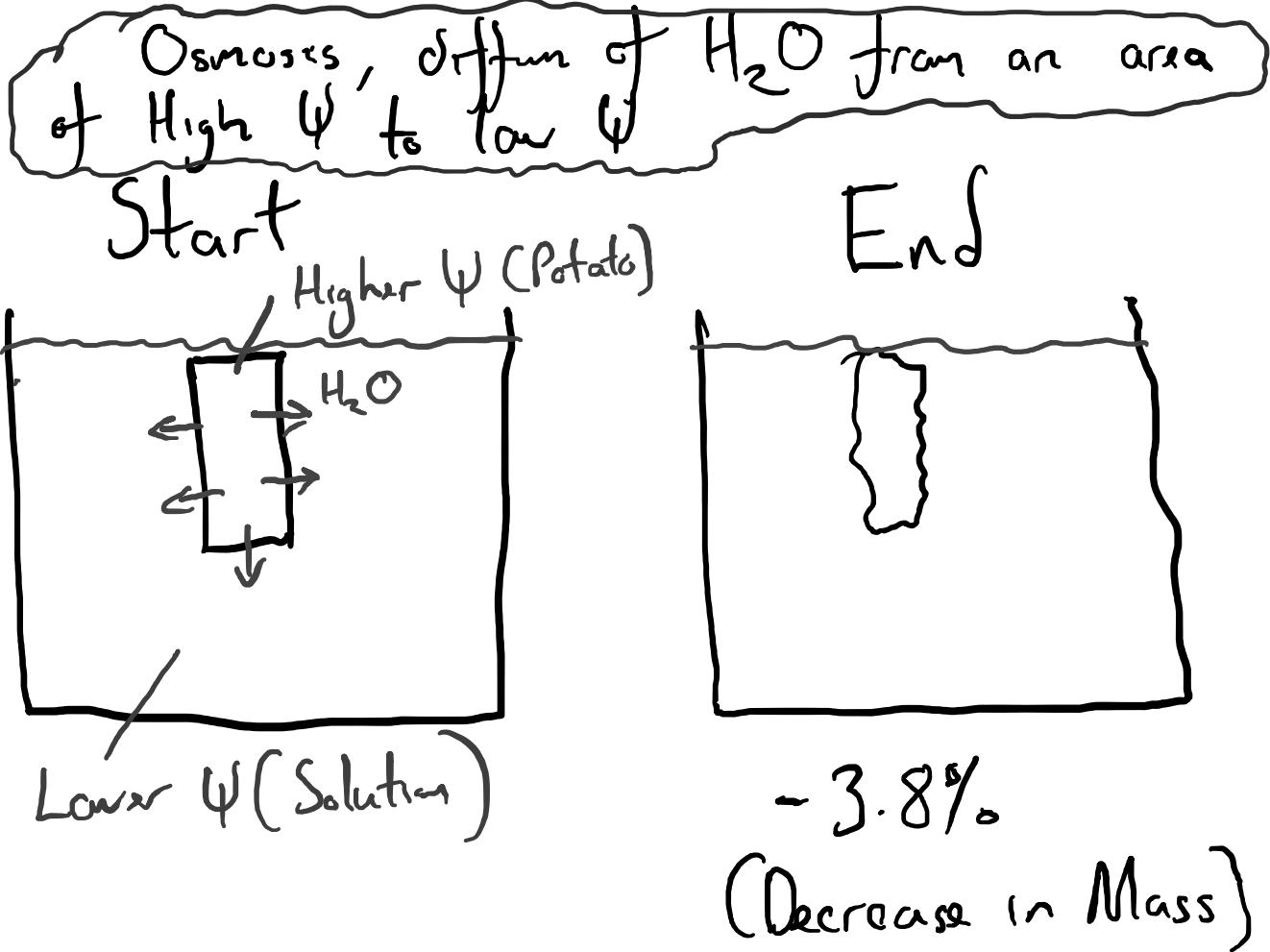
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(c) Explain the change in mass of potato tissue in the 0.40 mol dm⁻³ solution of sucrose.

(c) 1. Water potential of solution is less than / more negative than that of potato tissue;

Allow ψ as equivalent to water potential

2. Tissue loses water by osmosis.

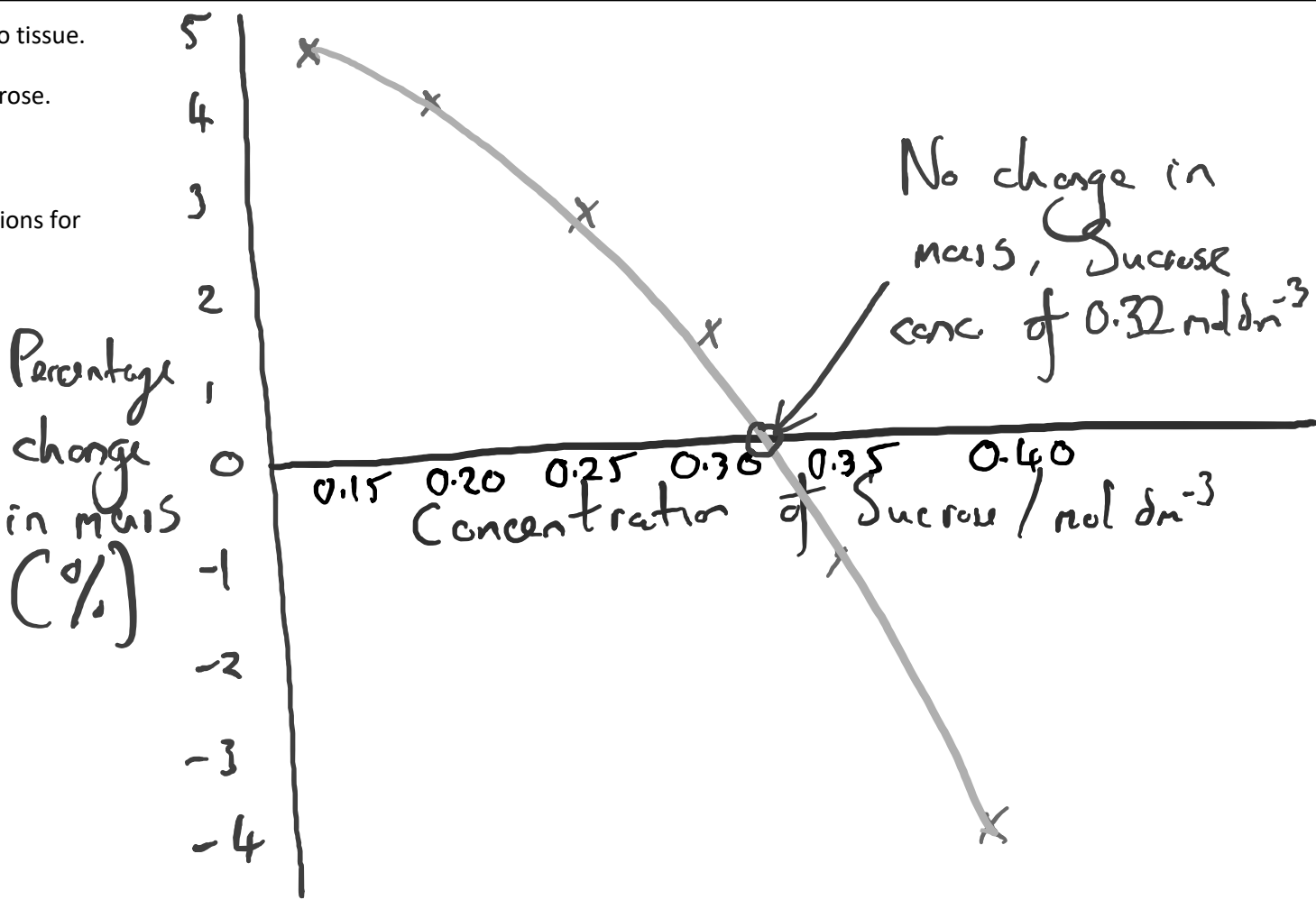
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(d) Describe how you would use the student's results in the table above to find the water potential of the potato tissue.

- (d) 1. Plot a graph with concentration on the x-axis and percentage change in mass on the y-axis;**
2. Find concentration where curve crosses the x-axis / where percentage change is zero;
3. Use (another) resource to find water potential of sucrose concentration (where curve crosses x-axis).

Group A - Do you have any questions?

Complete the reflection sheet for the exam questions we have gone through.

Self mark the remaining exam questions; remember to add any information you have missed or ask me to check your answer if you are unsure.

Complete the reflection sheet for the remaining exam questions and work out your percentage.

Group B - Do you have any questions?

Complete the reflection sheet for the exam questions on the Test

Complete the multiple-choice quiz on connect

Week commencing 1/6 Skills practice

Biology catch up student test.

 [Catch up students test 1st June 2020](#)

 [Taught session: AS paper 1 2014 markscheme](#)

 [Week Beginning June 1st](#)

Multiple choice test based on the information and skills covered in taught lesson for week beginning 1st June

 [Independent learning: Revision - Nutrient Cycles](#)

 [Independent learning- Comprehension skills explained](#)

 [Independent learning: Comprehension assessment](#)

Assessment hand in due in by Sun 7th June before Midday

 [Comprehension assessment](#)

Week commencing 8/6 Practical 2 and Kidney

Biology - On line Learning

Homework

Submit here