



GCSE to A-Level Biology Transition



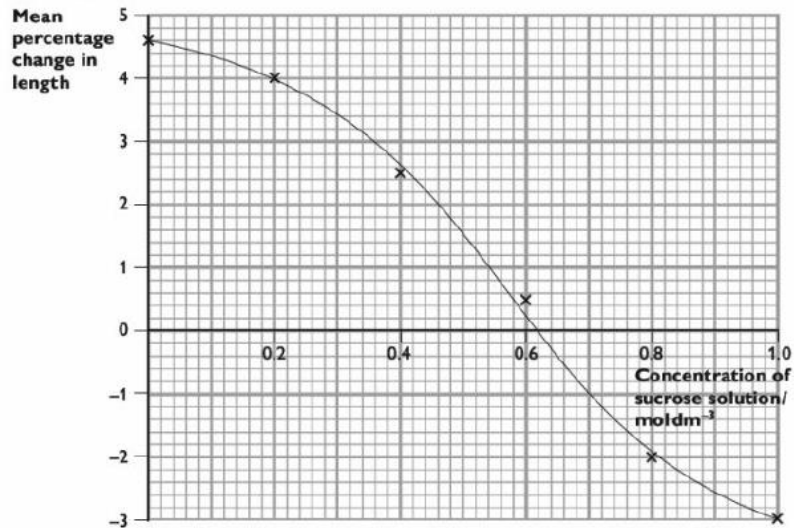
Lesson 12 Percentage Changes



Beauchamp City
Sixth Form

Learning Objectives

- ▶ To recall the method to calculate percentage increase and decrease
- ▶ To be able to use experimental data and calculate percentage change.



Graph of the results of Investigation 2

Calculating percentage change

- ▶ When you work out an increase or a decrease as a percentage change, you must identify, or calculate, the total original amount:

$$\% \text{ increase} = \frac{\text{increase}}{\text{original amount}} \times 100$$

$$\% \text{ decrease} = \frac{\text{decrease}}{\text{original amount}} \times 100$$

NB: A % decrease should be a negative number

- ▶ **Remember:** When you calculate a percentage change, use the total *before* the increase or decrease, not the final total.

Worked Examples

A common example you will see is the change in mass of potatoes when placed in different solution concentrations.

You may remember this from the osmosis topic.

In this example the information will be obtained from a table.

Sucrose concentration/ mol dm ⁻³	Initial mass/g	Final mass/g	Change in mass/g	Percentage change
0.0	6.54	6.81		
0.2	6.57	6.63		
0.4	6.46	6.17		
0.6	6.41	5.96		
0.8	6.21	5.57		
1.0	6.33	5.53		

Sucrose concentration/ mol dm ⁻³	Initial mass/g	Final mass/g	Change in mass/g	Percentage change
0.0	6.54	6.81	0.27	4.13
0.2	6.57	6.63		
0.4	6.46	6.17		
0.6	6.41	5.96		
0.8	6.21	5.57		
1.0	6.33	5.53		

1. Work out the change in mass

Final mass - initial mass = change in mass

$$6.81\text{g} - 6.54\text{g} = 0.27\text{g}$$

2. Calculate % change

$$0.27 \div 6.54 = 4.13$$

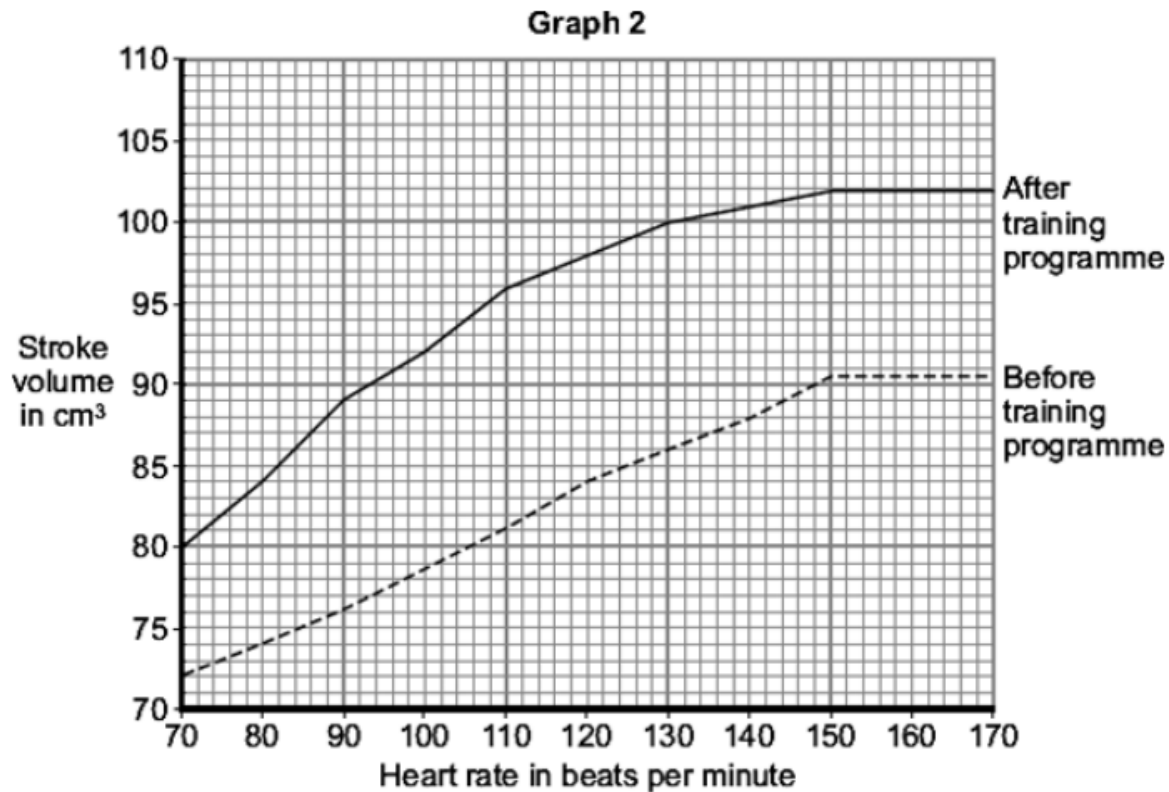
You should attempt to complete the rest of the table.

Remember that there will be % decrease and these need to be negative numbers.

Answers

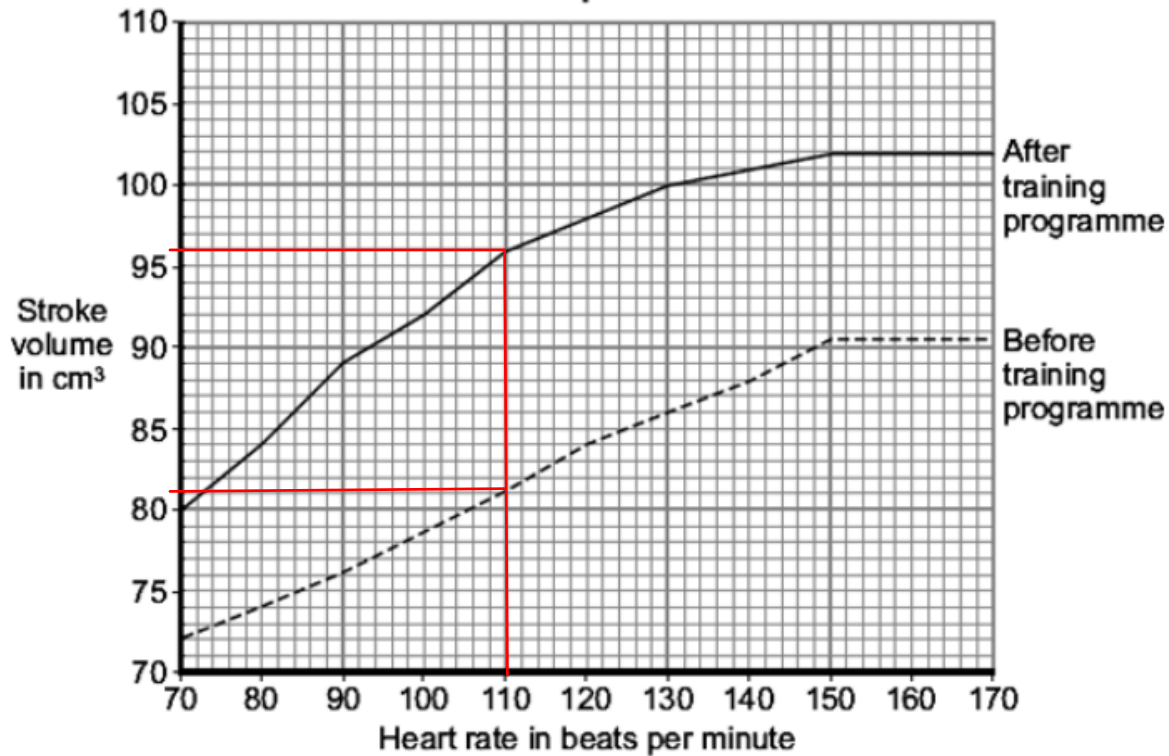
Sucrose concentration/ mol dm ⁻³	Initial mass/g	Final mass/g	Change in mass/g	Percentage change
0.0	6.54	6.81	0.27	4.13
0.2	6.57	6.63	0.06	0.91
0.4	6.46	6.17	-0.35	-5.42
0.6	6.41	5.96	-0.45	-7.02
0.8	6.21	5.57	-0.64	-10.30
1.0	6.33	5.53	-0.80	-12.60

Sometimes you will need to work out the change from a graph.



Calculate the % change of the stroke volume at a 110 beats per minute.

Graph 2



Read off the graph and find the stroke volumes at 110 beats per minute.

Before training = 81 cm³

After training = 96 cm³

Calculate the change

$$96 - 81 = 15$$

Use the equation for % change

$$\text{change} \div \text{initial} \quad (15 \div 81) \times 100 = 18.5\%$$

There is an increase of 18.5%.