

# GCSE *Combined* Biology

Weeks 9-12

Online Tuition

Exam Question Workbook



1. Compare the cells produced by mitosis and meiosis.

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2. Compare mitosis and meiosis.

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1. Complete the Punnett square to show how sex is inherited.



2. Describe how sex is inherited and state the probability that a child will be female.

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A heterozygous male and a heterozygous female for brown eyes have a baby.

1. Complete the Punnett square to show the inheritance of eye colour from the parents above.


2. Explain how two parents with brown eyes can have a child with blue eyes?  
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A heterozygous male and a heterozygous female for the cystic fibrosis allele have a baby.

1. Complete the Punnett square to show the inheritance of cystic fibrosis from the parents above.


2. Explain how two parents without cystic fibrosis can have a child **with** cystic fibrosis

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A heterozygous male for Polydactyly (P) and a homozygous recessive (p) female have a baby

1. Complete the Punnett square to show the inheritance of polydactyly from the parents above.


2. Explain the inheritance of Polydactyly below.

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1. Compare haploid & diploid cells in humans.

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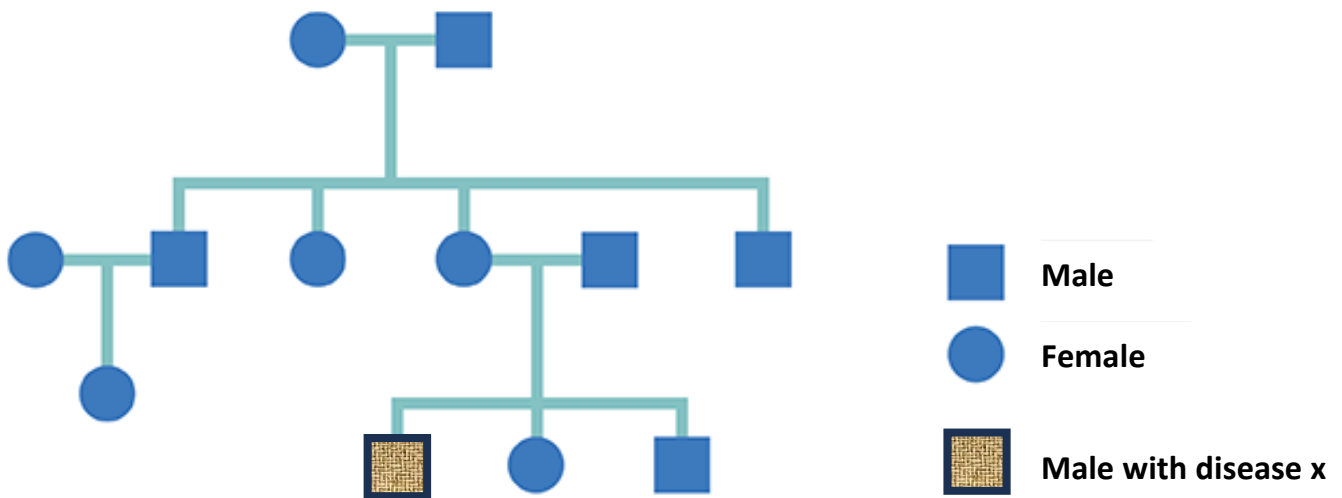
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2. Explain how disease x is inherited.

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- 1. Heavy snowfall in the Arctic Circle covered the ground leading to a selection pressure on the snow hares. Some hares are white, and some hares are brown.

Explain which hare would most likely survive.

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- 2. Antibiotics can be used to treat infections & some are resistant to antibiotics.

With reference to Darwin's Theory of Natural Selection, explain which bacteria would most likely survive if the course of antibiotics is not completed.

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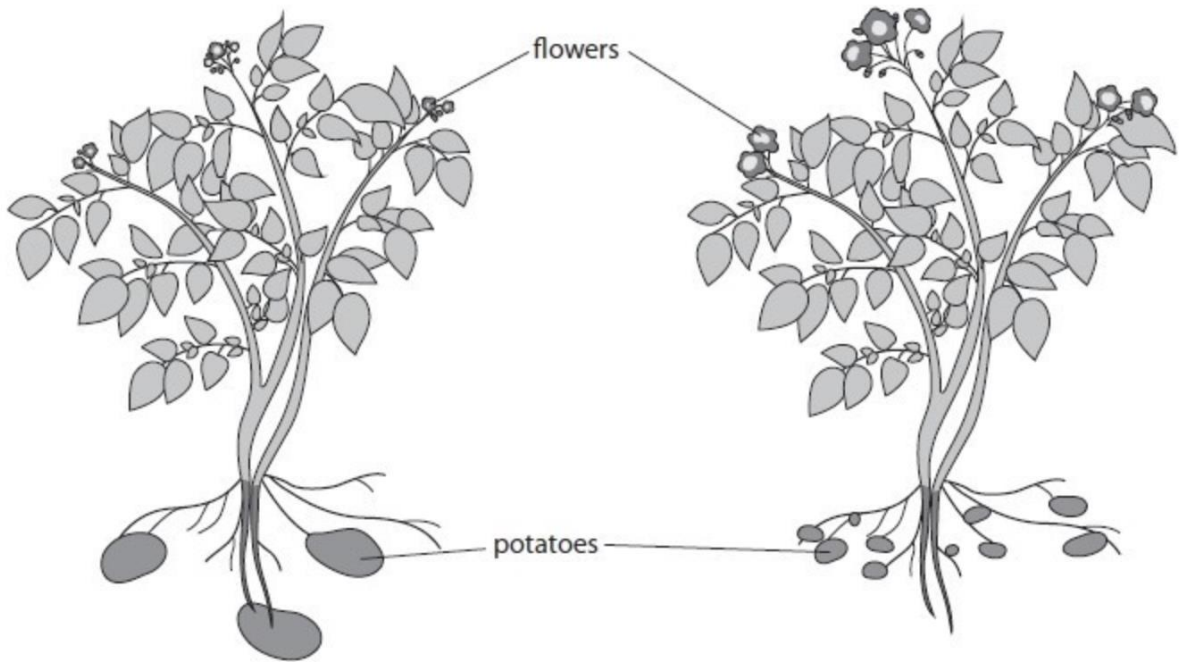
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The picture shows two varieties of potato plant.

New varieties of potato plant can be produced by selective breeding. (6)



- Variety A
- large potatoes
  - few potatoes
  - slow growing plant

- Variety B
- small potatoes
  - many potatoes
  - fast growing plant

Explain how selective breeding of the two varieties of potato plants can produce new potato plants that are all faster growing and produce many, large potatoes.

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1. Describe the advantages of selective breeding.

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2. Describe the disadvantages of selective breeding.

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1. What is the function of restriction enzymes during genetic engineering?

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2. What is the function of the enzyme ligase during genetic engineering?

(2)

3. Describe how you would genetically engineer bacteria to produce insulin.

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1. Describe the advantages of genetic engineering

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2. Describe the disadvantages of genetic engineering

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3. Compare the advantages and disadvantages of genetic engineering

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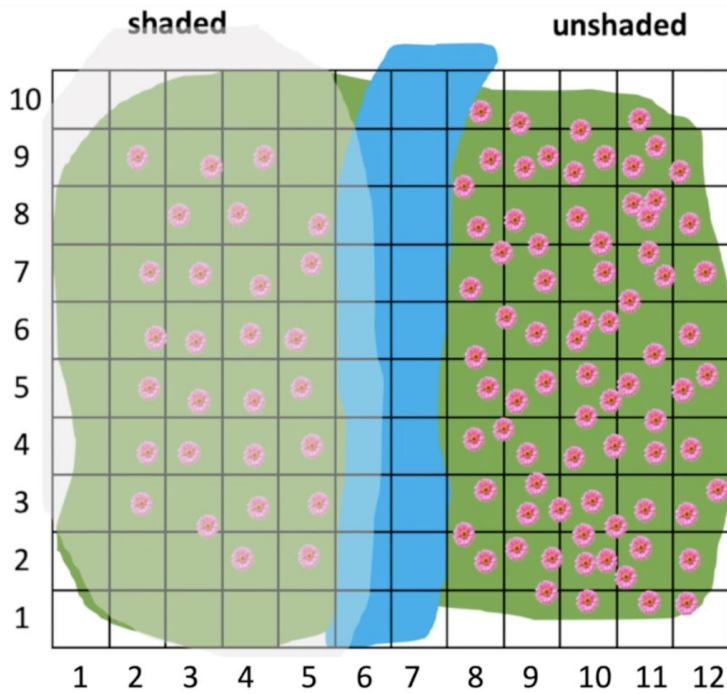
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Write a method for estimating the population size of flowers in both the shaded and unshaded part of the field.

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unshaded area co-ordinates	number of flowers	shaded area co-ordinates	number of flowers
11,3		2,2	
9,4		3,3	
8,2		4,8	
10,6		1,5	
9,2		3,7	
total number of flowers		total number of flowers	
Mean / quadrat		Mean / quadrat	

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Use the following co-ordinates to calculate the mean number of flowers in both the shaded and unshaded regions.

Calculate the estimated flower population size of the shaded and unshaded regions of the field.

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1. Describe how water is cycled in the environment.

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2. Describe how carbon is cycled in the environment.

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Reforestation has a beneficial effect on air composition and biodiversity.

Animal conservation projects can also have a beneficial effect on biodiversity.

1. Explain the beneficial effects of reforestation and animal conservation projects.

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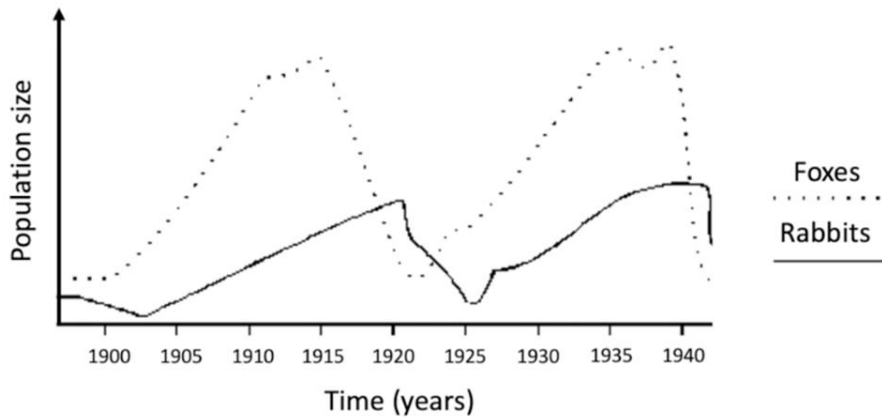
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The graph shows how the number of these rabbits and foxes changes over a period of time.



1. What do we call animals, like a fox, which eat other animals, like rabbits.

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2. What happens to the number of foxes five years after the number of rabbits decreases.

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3. Explain why the number of foxes decreases five years after the rabbit numbers decrease.

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4. What happens to the number of rabbits as the number of foxes decrease?

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5. Explain why the number of rabbits decreases five years after the fox numbers increase.

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1. State the function of the coverslip. (1)

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2. What do you place the specimen on? (1)

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3. Why is a stained used? (1)

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4. How could you use a light microscope to get a x400 magnification? (2)

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5. What is the difference between the eyepiece and objective lens? (2)

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6. State two advantages of an electron microscope over a light microscope. (2)

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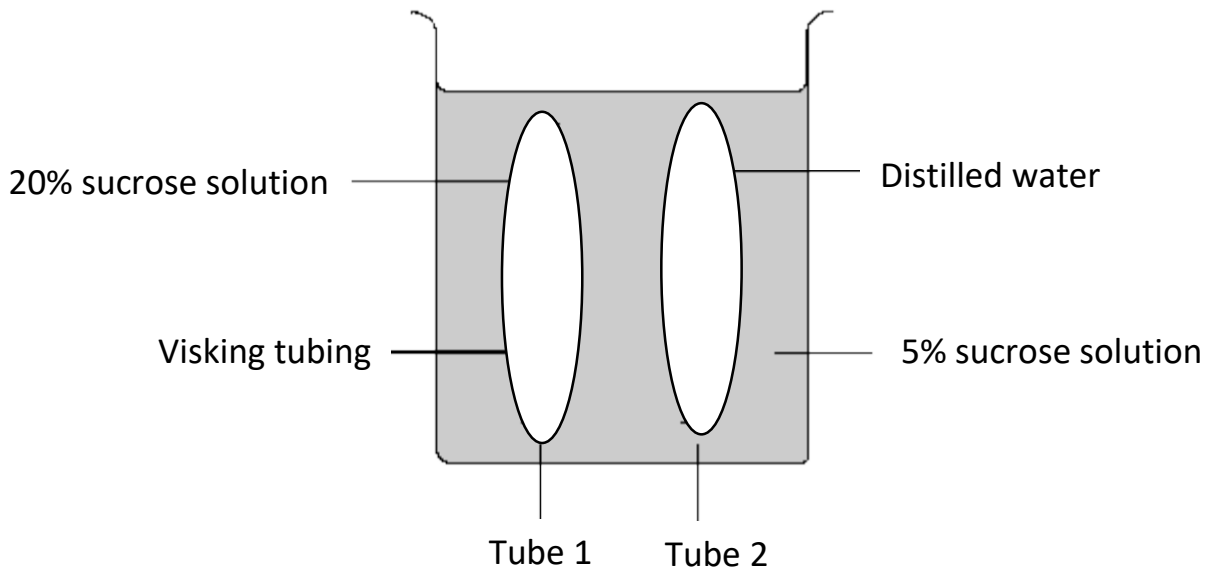
A student tested the effect of different pHs on the rate of amylase activity.

PH of amylase solution	Time taken for starch to break down (s)
4	460
6	140
8	60
10	160
12	440

1. What colour does starch turn iodine?
2. When investigating the effect of pH on amylase activity, which variables do we control?
3. Why do we control these variables?
4. What is the independent variable?
5. What is the dependent variable?
6. Write the full method for investigating effect of pH on amylase activity
7. We used measuring cylinders & added our amylase solution every 20 seconds. Describe how we can improve our method.
8. Using the data in the table explain why the rate of reaction changes between pH 4 and pH 12
9. Describe how you could change the method to measure a more accurate optimum pH?

Some students set up the experiment below to investigate osmosis.

They filled two Visking tubes with different sucrose solutions and left them both in a beaker of 5% sucrose solution for an hour.



1. Describe and explain the likely results after one hour.

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1. Write the method for calculating the sugar concentration in potatoes.

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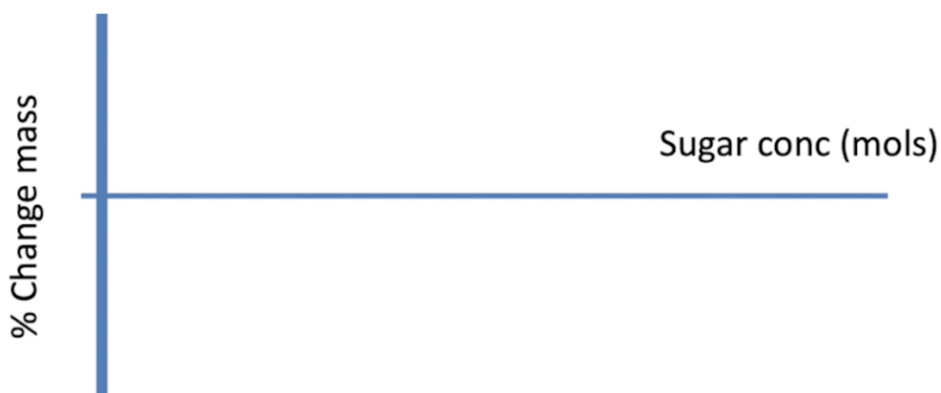
2. State two control variables for this experiment.

(2)

3. Calculate the % change in mass in the potato in the table below

Sugar conc (mols)	Initial Mass (g)	Final Mass (g)	% Change mass
0	8.2	10.3	$= \frac{FM - IM}{IM} \times 100$
0.2	8.3	9.1	
0.6	8.1	6.6	
0.8	8.2	5.7	

4. Plot the percentage change in mass against sugar concentration and Identify the sugar concentration of the potato on the graph



1. Describe how you can test food to determine if it contains **protein** or not.

(3)

2. Describe how you can test food to determine if it contains **starch** or not.

(3)

3. Describe how you can test food to determine if it contains **sugar** or not.

(3)

4. Describe how you can test food to determine if it contains **lipids** or not.

(3)