Applied Science: Biology Summer Work

Name _____

Aims of this booklet:

1. To introduce some of the key skills that you will need to succeed in Applied Science.
2. To recall some key information from GCSE Biology.
3. To help you to start to think about the **command words** used in different questions.

This booklet **must** be handed in during your first year 12 Applied Science lesson. No excuses. Don't come to the lesson without it.

Section 1: Converting between units

Work to be completed by 17th July 2026

In AS Biology you will need to be able to convert measurements into different units. Biologists don't measure in millimetres and not centimetres.

1mm = 1000μm = 1000,000nm
nm = nanometres
μm = micrometres

1. Convert the following measurements into μm
a) 5mm
b) 71mm
c) 150nm
d) 1250nm
e) 0.3mm

2. Convert the following measurements into mm
a) 12μm
b) 150μm
c) 0.3μm
d) 112nm
e) 5nm

3. Convert the following measurements into nm
a) 15mm
b) 0.1mm
c) 0.02mm
d) 130μm
e) 2500μm
f) 0.6μm

4. Put the following into size order, from smallest to largest.

0.1mm 15mm 1200μm 30μm 150nm 7nm 1200nm

Section 2: rearranging equations

Work to be completed by 17th July 2026

image size = actual size x magnification

1. Rearrange the equation to show how you would calculate:

a) magnification =

b) actual size =

2. Complete the following calculations:

a) An image of a water flea was 15mm long. The image had been magnified 3.8 X from the actual size of the flea. How big is the real flea?

b) The actual size of a bacterium is 40μm. A picture of a the bacterium includes an image that has been magnified 2500X. How big is the picture of the bacterium?

c) An image of a buttercup is 55mm wide. The actual flower is 23mm wide. By how much has the flower been magnified to make the image?

Wallingford School Biology

Section 3: Practising the use of command words

Work to be completed by 17th July 2026

1. **Describe** the structure of a red blood cell.

2. **Explain** why a plant grows towards the light.

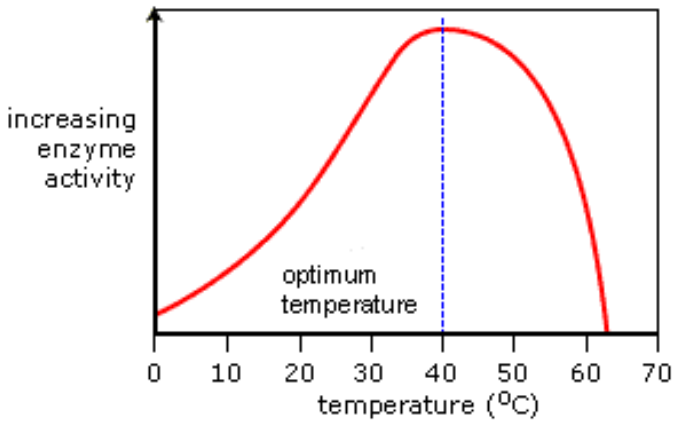
3. **State** the job of the heart.

4. **Justify** the use of animals in the testing of new medicines.

5. **Evaluate** both sides of the argument for the use of stem cells in medicine.

Section 3: Practising the use of command words

Work to be completed by 17th July 2026



1. **Describe** the shape of the graph.

2. **Explain** the shape of the graph.

3. **State** what enzymes are made of.

4. **Explain** why the body needs a different enzyme to digest a meal of chicken and potatoes.

Section 4: looking at practical Biology

Work to be completed by 17th July 202

Ms White spent her summer investigating the effect of temperature on enzyme activity. She collected the volume of oxygen made during an enzyme-controlled reaction. The greater the volume of oxygen, the more the enzyme was functioning.

She collected the following data:

Temperature (°C)	Volume of oxygen (cm^3)	Volume of oxygen (cm^3)	Volume of oxygen (cm^3)	Mean vol. of oxygen (cm^3)
5	12	9	10	
15	16	21	17	
25	25	26	23	
35	38	36	36	
45	18	9	15	

1. Identify any outliers in Ms White's data.

2. Calculate the mean volume of oxygen (cm^3) for each temperature.

3. Use the graph paper to plot a full page graph with range bars.

Section 5: Important facts from GCSE

Work to be completed by 17th July 2026

1. Write down the equations for respiration and photosynthesis.

2. Draw and label an animal and a plant cell.

3. Explain the link between chromosomes, DNA, genes and proteins.

4. Describe how a cell divides by mitosis.

5. Describe how particles move by diffusion.

6. Describe how water moves by osmosis.

7. Describe how particles move by active transport.

Organelles

Work to be completed by 1st September 2026

1. Use the PDF online to complete the A3 table on organelles.
2. Which of the following best describes the function of the rough endoplasmic reticulum? (1 mark)
   A. It has ribosomes bound to the surface and is responsible for the synthesis and transport of proteins.
   B. It is responsible for lipid and carbohydrate synthesis and storage.
   C. It has ribosomes bound to the surface and is responsible for lipid synthesis and storage.
   D. It is responsible for protein storage.

Your Answer _____

2. What is the function of the nucleolus? (2 marks)

_____

_____

_____

3. What is the function of the centrioles? (2 marks)

_____

_____

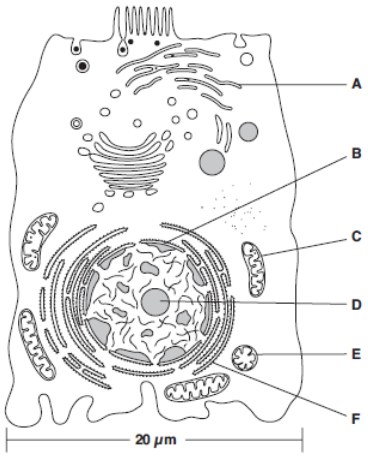
_____

Fig. 1.1 is a diagram of an animal cell as seen using a transmission electron microscope.

4. Select the correct term for the organelle labelled C?

   A. Smooth endoplasmic reticulum
   A. Vesicle
   B. Golgi Apparatus
   C. Mitochondria

Your Answer _____



5. Which of the following best describes the function of the mitochondria?
   A. The site of anaerobic respiration where ATP is produced.
   B. The site of aerobic respiration where ATP is used.
   C. The site of aerobic respiration where ATP is produced.
   D. The site of anaerobic respiration where ATP is used.

Your Answer _____

Work to be completed by 1st September 2026

1 Using your knowledge of cell ultrastructure, identify the structures visible in the micrograph below. State, with reasons, whether the cell is a plant or animal cell *(4 marks)*

2 a Many different organisms have cell walls including fungi and bacteria. What is unique about plant cell walls? *(1 mark)*

b Give three functions of plant cell walls *(3 marks)*

3 Describe the similarities and differences between a human cell and a plant root cell *(3 marks)*

Work to be completed by 1st September 2026

1 What is a lysosome and why is the membrane that surrounds it so important? *(3 marks)*

2 Explain why cells need to be compartmentalised, and describe three examples of compartmentalisation within an animal cell. *(4 marks)*

3 Compare the structure and function of the rough and smooth endoplasmic reticulum. *(3 marks)*