



DIXONS
SIXTH FORM
BRADFORD

SUMMER WORK

**BTEC MEDICAL
SCIENCE**

STUDENT NAME:

20
26

Welcome to Medical Science

Subject outline

Congratulations on choosing a course through which you will develop a set of knowledge and skills which will allow you to successfully move on to your next step in your journey, whether that is to university, an apprenticeship, or into employment.

Medical Science is, at its heart, all about giving you as a learner the best opportunity to show off your skills through a combination of examination and coursework units, across a range of scientific topics which are applicable to science as it is used and applied in industry. Through your hard work and determination not only will you come out of the next two years with a fantastic qualification which will allow you to access a range of opportunities, you will also have developed skills which will allow you to quickly adapt to the demands of further education/apprenticeship/employment. These skills include: organisation, research, communication – both verbal and written, time management, practical investigation, and taking initiative and independent working.

By the end of this course you will have built up a portfolio of work which you can feel proud of, knowing that it shows your journey and development as a learner and a scientist.

Good luck, and we hope you enjoy your course.

Careers & Higher Education

One of the main career paths for Medical science students is the healthcare sector. The study of Medical science helps develop skills which are valuable for this sector – written communication skills, practical lab-based skills, teamwork as part of lab-based work, organisation and time management through the coursework report writing, and problem solving. There is a shortage of skilled workers for the healthcare sector in Bradford and Yorkshire, so a background in science is a real advantage to help you get into this field.

If there is a particular career that you are interested in pursuing the best thing you can do to support your application is to look for work experience; that in conjunction with an applied science qualification helps boost applications to science-based university courses.

Links to key information:

<https://qualifications.pearson.com/content/dam/pdf/btec-aags/medical-science/2025/specification-and-sample-assessments/btec-l3-medical-science-aag-spec.pdf>

Summer work tasks

Useful information

The Pearson Level 3 Alternative Academic Qualification BTEC National in Medical Science (Extended Certificate) enables students to study the principles and applications of medical science through three mandatory units, and further explore other areas in more detail via an optional unit. Students will also learn practical and investigation skills that build on this fundamental knowledge.

The mandatory units cover the following areas:

- Human anatomy, physiology and pathology
- Health issues and scientific reporting
- Practical microbiology and infectious diseases.

The optional units provide opportunity for students to choose one of the following specific specialist area in which they wish to develop their knowledge and skills:

- Diseases, disorders, treatments and therapies
- Biomedical science
- Human reproduction and fertility.

The qualification is designed to be taken alongside A Levels as part of a study programme and can link to learning in A Level subjects such as physical education and sport, sociology, chemistry and psychology. It is intended for students that wish to progress into higher education as a pathway to employment.

Task 1: Why have you chosen medical Science?

Why this booklet matters?

This booklet has been designed to help you successfully transition from **GCSE Science** to **BTEC Medical Science**, and to prepare you for the demands of **Examined units**.

At GCSE, many students are able to **recognise topics and recall facts**, but examiners consistently report that students often struggle to:

- apply their knowledge in **new or unfamiliar situations**
- **explain their answers clearly**
- interpret **data, graphs and experiments**
- evaluate methods and draw **reasoned conclusions**

These are exactly the skills that are essential for success in BTEC Applied Science.

The aim of this booklet

The aim of this booklet is to help you:

- **revisit key GCSE topics** that are essential for Medical Science
- strengthen your understanding so you can **apply knowledge, not just recall it**
- practise using **scientific reasoning and explanation skills**
- develop confidence in working with **data, graphs and calculations**
- avoid the **common mistakes identified by examiners**

A key message

You may feel like you “already know this content” from GCSE.
However, in BTEC you will need to go further:

- ✓ Not just *what* happens
- ✓ But *why it happens*
- ✓ And how to apply it in new situations

How to use this booklet

To get the most out of it:

- Take your time to **think about your answers**
- Always try to **explain your reasoning** fully
- Use **key scientific vocabulary accurately**
- Check your **working and units in calculations**
- Learn from mistakes — this is where real progress happens

Final focus

This booklet is not about learning *more* science.

It is about becoming better at **thinking like a scientist**.

Key things students often struggle with

Before you move on, read this carefully — these are the areas that *regularly stop students from achieving their target grades*.

Applying your knowledge (not just recalling it)

- You may *recognise* a topic, but you often struggle to:
 - apply it to a **new situation**
 - adapt your answer to match the question
- You must avoid giving:
 - **generic “textbook” answers**
- Instead, always:
 - **link your answer to the context in the question**

Using data, graphs and information properly

- Many students:
 - describe trends (e.g. “it increases”)
 - but do NOT explain them
- You must:
 - use numbers from the graph or table
 - explain *why* the trend happens

Explaining, not describing

- A very common mistake is:
 - describing what happens instead of explaining why
- For example:
 -  “The rate increases”
 -  “The rate increases **because** particles have more energy and collide more frequently”

Linking ideas together

- Strong answers link ideas into a chain:
 - cause → effect → outcome
- Weak answers:
 - list facts with no connection

Understanding practical science

- Students often struggle to:
 - identify variables correctly
 - explain how to improve an investigation
- Avoid:
 - vague answers like "human error"
- Instead:
 - be **specific about what went wrong and how to fix it**

Evaluation

Many students:

- state problems
- but do NOT explain their impact
- You must:
 - explain how errors affect results
 - make a **clear judgement**

Calculations and maths in science

- Common issues:
 - not showing working
 - incorrect or missing units
 - not rearranging equations
- Always:
 - write the formula
 - show each step
 - include units

Extended writing (longer questions)

- Many students:
 - write short or unstructured answers
- To access higher marks:
 - write in full sentences
 - use connectives:
 - **because, therefore, so**
 - develop your ideas clearly

Command words

- You must understand what the question is asking:
 - **Describe** = what happens
 - **Explain** = why it happens
 - **Evaluate** = strengths, weaknesses, and judgement
 - **Compare** = similarities **and** differences

Using the question properly

- A major reason students lose marks:
 - ignoring the information given
- You must:
 - use the data, diagrams or context provided
 - avoid copying the question

Final message

If you improve these areas, you will:

- access **higher-level marks**
- feel more confident with unfamiliar questions

Key science content you must be secure in

These are the **specific topics** that regularly cause problems for students.
If you are unsure on any of these, you are likely to struggle in Unit 1 or Unit 3.

For each of these topics create a Mind Map to show clear understanding of the content?

Below is an example for the Cell structure and function:



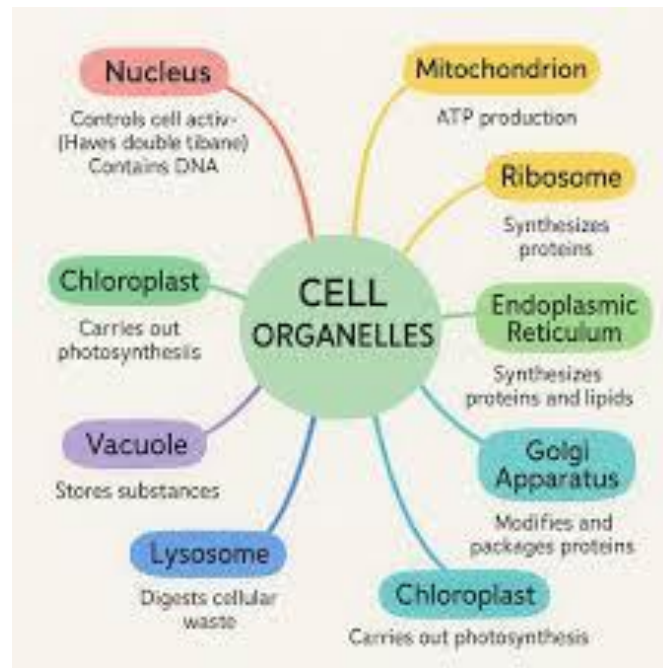
Biology



Cell structure and function

- You need to know:
 - organelles (nucleus, mitochondria, ribosomes, membrane)
- You must also be able to:
 - **explain the function** of each structure
 - apply this knowledge to unfamiliar cells or diagrams

👉 Many students can recall parts of a cell but cannot explain *how they work*



Cell transport

- Diffusion, osmosis, active transport
- Surface area to volume ratio

 You must be able to:

- **apply these ideas to real biological systems**
- explain how they affect rates (not just define them)



Enzymes

- Lock-and-key model
- Effect of temperature and pH
- Enzyme graphs

👉 Common issue:

- Students describe graphs but cannot explain **why the rate changes**



Exchange surfaces (lungs, gut, etc.)

- Structure of alveoli
- Link surface area → diffusion rate

👉 You must:

- link structure → function → outcome

Human systems

- Heart structure and blood flow
- Blood vessels and their functions

 Don't just label diagrams — you must **explain processes and movement**

How to Answer the Questions in This Booklet

This booklet is designed to help you improve the skills needed for **BTEC Unit 1 and Unit 3**. To get the most out of it, you must approach the questions in the right way.

1. Always read the command word carefully

Every question tells you what to do. You must match your answer to the command word.

- **Describe** → say what happens
- **Explain** → say *why* it happens (use **because**)
- **Compare** → give similarities **and** differences
- **Calculate** → show working AND give units

- **Evaluate** → give strengths, weaknesses, and a final judgement

👉 If you ignore the command word, you will lose marks even if your knowledge is correct.

2. Write full, clear explanations

- Do NOT just write short answers or lists
- Use full sentences
- Use connectives:
 - **because**
 - **therefore**
 - **so**

✅ Good answer:

"The rate increases **because** particles have more energy and collide more frequently"

3. Always explain cause and effect

In science, you need to show a chain of reasoning:

cause → process → result

Avoid giving isolated facts. Link your ideas together clearly.

4. Use the information given in the question

- Use:
 - values from tables
 - data from graphs
 - details from the scenario

❌ Do NOT:

- ignore the data
- give a memorised answer that doesn't fit the question



5. Show all working in calculations

For every calculation:

- Write the **formula**
- Show each step clearly
- Include the **correct units** (e.g. mol, J, m/s)

👉 Marks are often awarded for method — you can still gain marks even if the final answer is wrong.



6. When using graphs and data

- Describe the trend:
 - e.g. "as temperature increases, rate increases"
- THEN explain the trend:
 - **why does this happen?**
- Use numbers where possible



7. Be specific in practical and evaluation questions

Avoid vague answers like:

- "human error"
- "repeat the experiment"

Instead:

- explain exactly what the problem is
- suggest a clear, realistic improvement



8. Use online resources to support your learning

If you do not understand a topic:

- Research it using:
 - BBC Bitesize
 - Cognito / FreeScienceLessons

- Make notes before attempting the question again

👉 This booklet is not just a test — it is a **learning tool**.

9. Learn from your mistakes

- Check your answers carefully
- Redo questions you got wrong
- Improve your explanations

This is where real progress happens.

10. You will be assessed on this when you join the College in September

- Ensure you revise this content
- The assessment will take place within the first couple of weeks of the term
- Revising this will benefit you when you have your exams in January

BIOLOGY Questions

Section 1: Cell structure and function (

Q1. Label and explain (6 marks)

A cell diagram is shown.



a) **Name** 4 organelles? (4)

b) **Explain** the function of 2 of them? (2)

Q2. Application (3 marks)

A cell has many mitochondria.

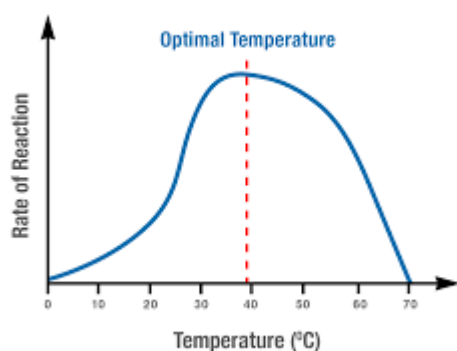
Explain why this cell is likely to require large amounts of energy?

👉 Must include **cause** → **effect**

Section 2: Enzymes and graphs

Q3. Graph interpretation (8 marks)

A graph shows enzyme activity vs temperature.



a) **Describe** the trend? (2)

b) **Explain why** the rate increases at first? (3)

c) **Explain why** the rate decreases at high temperature? (3)

Q4. Evaluation (4 marks)

A student investigates enzyme activity but does not control temperature properly.

Explain how this affects the results and suggest **two improvements**?

Section 3: Transport in cells

Q5. Application (4 marks)

Explain how surface area to volume ratio affects diffusion in cells?

Q6. Problem-solving (4 marks)

A large organism requires specialised exchange surfaces e.g. the lungs.

Explain why diffusion of oxygen through the skin alone is not enough?

Section 4: Human systems

Q7. Cardiovascular system (4 marks)

Explain how the structure of arteries is adapted to their function.

Q8. Gas exchange (4 marks)

Explain how alveoli are adapted for efficient gas exchange?

👉 Must link:

- structure → diffusion → outcome





BIOLOGY Questions

Focus: **diffusion, heart, gas exchange, kidneys** — all GCSE-based but extended in Medical Science



Section 1: Diffusion & transport

Q1 (3 marks)

Explain how a concentration gradient affects the rate of diffusion?

👉 Common issue: students describe, but don't explain

Q2 (4 marks – application)

A cell is very large.

Explain why it would struggle to exchange materials efficiently?

👉 Must link:

- surface area
- diffusion
- volume

Section 2: Cardiovascular system

Q3 (3 marks)

Explain how the structure of arteries is adapted to their function?

Q4 (4 marks – application)

A person has high blood pressure.

Explain how this can damage blood vessels and affect health?

 GCSE issue:

- weak link between structure and consequences

Section 3: Gas exchange

Q5 (3 marks)

Explain how alveoli are adapted for efficient gas exchange?

Q6 (3 marks – data style)

A patient has reduced lung surface area.

Explain how this affects oxygen uptake?



Forces real Unit 5 thinking using GCSE diffusion



Section 4: Water balance



Q7 (3 marks)

Explain the role of the kidney in removing waste from blood?

Q8 (3 marks – higher thinking)

Explain how changes in water levels in the body affect urine concentration?

Radiology Department Careers Research Task

Task Overview

Your task is to research the different **job roles within a radiology department in a hospital.**

Radiology departments use medical imaging technologies (such as X-rays, MRI and CT scans) to diagnose and treat patients. A range of Clinical, Scientific and Technical, Administrative, and Support Staff work together to ensure patients receive safe and effective care.

Clinical roles

Radiologist

Consultant Radiologist

Oncologist

Radiographer

Therapeutic Radiographer**Sonographer****Nuclear Medicine Technologist****Radiology Nurse****Specialist Nurse**

Administrative roles

Receptionist

Radiology Administrator

Booking Coordinator

Medical Secretary

Healthcare Assistant

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