

### **MEDICAL SCIENCE**

### BTEC LEVEL 3 NATIONAL EXTENDED CERTIFICATE IN MEDICAL SCIENCE (AAQ)



#### WHAT YOU WILL LEARN:

The Medical Science is a post-16 qualification designed to provide learners with a comprehensive foundation in the principles and practices of medical science. Equivalent in size to one A Level, this qualification forms part of a balanced study programme and supports progression to higher education and employment in health-related fields. It builds on what you will have learned in GCSE Biology, with a focus on medicine and diagnostics. The course has a mixture of examined content and coursework, and these will be spread throughout the two years, rather than traditional A levels which have exams at the end of second year.

The qualification emphasises the development of transferable skills such as critical thinking, independent research, data interpretation, and practical laboratory competence. Assessment is through a combination of internal assignments and external examinations, ensuring a balanced and rigorous approach to learning.

The course awards you with Distinction\*, Distinction, Merit, Pass.

### **INSIGHT INTO TOPICS:**

#### Unit 1:

- Human Physiology, Anatomy and Pathology
- Human body systems, cell ultrastructure, and how substances are transported.

This is an examined unit.

#### Unit 2:

- Health Issues and Scientific Reporting
- The immune system, its dysfunction and genetic technologies. The validity and reliability of information used in health science reporting.

This is an examined unit.

### Unit 3:

- Practical Microbiology and Infectious Diseases
- Methods of pathogenicity and infectious agents, growth of microorganisms and health and safety in a laboratory environment.

This is a coursework unit.

In addition, one optional unit from a choice of three: *Diseases, Disorders, Treatments and Therapies; Biomedical Science*; or *Human Reproduction and Fertility* 

### WHERE CAN MEDICAL SCIENCE TAKE YOU?

Medical science is a course designed to support your university application. It is a good choice for those looking to study nursing, midwifery, Sports Science, Sports Therapy, Physiotherapy, Pharmaceutical Science, Biomedical Science, Paramedical Science, Psychology. It is not an option if you wish to study medicine.

### **ENTRY REQUIREMENTS:**

GCSE Grade 4 in Science and Maths



# Practical skills – key terms

Join the boxes to link the keyword to the definition.

Key term		Definition
Accurate		A statement suggesting what may happen in the future.
Data		An experiment that gives the same results when a different person carries it out, or a different set of equipment or technique is used.
Precise		A measurement that is close to the true value.
Prediction		An experiment that gives the same results when the same experimenter uses the same method and equipment.
Range		Physical, chemical or biological quantities or characteristics.
Repeatable		A variable that is kept constant during an experiment.
Reproducible		A variable that is measured as the outcome of an experiment.
Resolution		This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.
Uncertainty		The interval within the true value that can be expected to lie.
Variable	-	The spread of data, showing the maximum and minimum values of the data.
Control variable		Measurements where repeated measurements show very little spread.
Dependent variable		Information, in any form, that has been collected.

## Cells



Watch



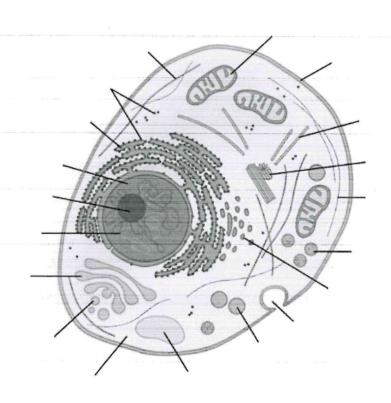
https://www.youtube.com/watch?v=mUJryLNKScg



Practice

Label the diagram of the animal cell below.

You only need to write the name of each organelle.



## Cells



Practice

Complete the table to describe the functions of each organelle in a eukaryotic cell.

Nucleus	
Nucleolus	
Mitochondria	
Chloroplasts	
Rough Endoplasmic Reticulum (RER)	
Smooth Endoplasmic Reticulum (SER)	
Golgi Apparatus	
Lysosomes	
Ribosomes	
Cell wall	
Vacuole	



Complete the Quizlet.

Review

Change 'answer with' to 'definition', then click the blue 'Start test' button at the bottom right.



https://quizlet.com/8041 05807/test

Score: / 16

# Exchange of substances



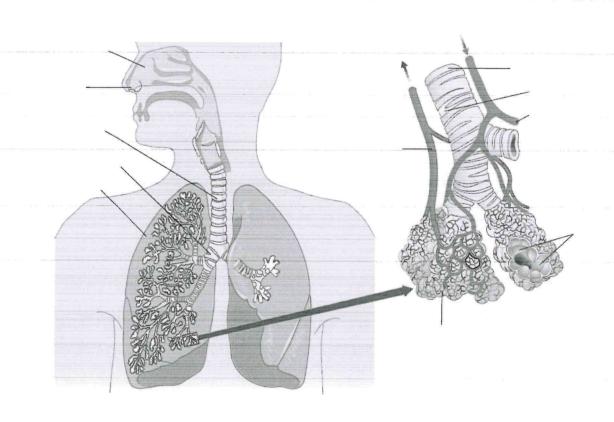
Watch



https://www.youtube.co
m/watch?v=v j-LD2YEqq



Label the diagram of the respiratory system.



# Exchange of substances

	Where is the cartilage found (in the respiratory system) and what is its purpose?
Practice	
increase	hree adaptations of the alveoli and how this es the efficiency of gas exchange.
2	
3	
	the role of the intercostal muscles and diaphragm echanism of breathing.

## Maths skills

## 1 Converting units



Watch



https://www.youtube.co
m/watch?v=rJJrR8h-DtA



**Practice** 

Multiplication factor	Prefix	Symbol	
10 <sup>9</sup>	giga	G	
10 <sup>6</sup>	mega	M	
10 <sup>3</sup>	kilo	k	
10-2	centi	С	
10-3	milli		
10-6	micro	μ	
10-9	nano	n	

### Convert the following units.

1.	10mm to μm	9. 0.65cm to mm
2.	67mm to μm	10. 2.64μm to mm
3.	33 μm to mm	11. 1.2cm to mm
4.	9.2 μm to mm	12. 98.8mm to µm
	1.2 nm to µm	13. 312μm to mm
6.	0.3 μm to nm	14. 13.1cm to μm
7.	4km to mm	15. 68.9cm to μm
8.	0.8km to mm	16 0.05m to um



Review

Turn to the back of the booklet and mark your answers

Score: / 16

## Maths skills

## 3 Calculating percentages

To work out a percentage, you must identify or calculate the total number using the equation:

Percentage = number you want as a percentage of total number x 100 total number

For example, in a population, the number of people who have brown hair was counted.

The results showed that in the total population of 4600 people, 1800 had brown hair.

The percentage of people with brown hair is found by calculating:

Number of people with brown hair x 100

Total number of people

$$= 1800 \times 100 = 39.1\%$$



Practice

1. The table below shows some data about energy absorbed by a tree in a year and how some of it is transferred.

Energy absorbed by the tree in a year	3 600 000 kJ/m <sup>2</sup>
Energy transferred to primary consumers	2240 kJ/m <sup>2</sup>
Energy transferred to secondary consumers	480 kJ/m <sup>2</sup>

Calculate the percentage of energy absorbed by the tree that is transferred to

- a) Primary consumers
- b) Secondary consumers

## Maths skills

## 4 Calculating percentage change

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

% increase = 
$$\frac{Increase}{Original amount} \times 100$$
% decrease = 
$$\frac{Decrease}{Original amount} \times 100$$



### **Practice**

Sucrose conc./mol d	m <sup>-3</sup> Initial ma	ass/g Fin	al mass / g	Mass change /	Percentage change in mass
0.9	1.79	9	1.06		
0.7	1.86	5	1.30		
0.5	1.95	5	1.70		
0.3	1.63	3	1.76		
0.1	1.82	2	2.55		

Review

Turn to the back of the booklet and mark your answers

Score: / 14

### **Answers**

(1) Converting units

Convert the following units.

1. 10mm to μm 10,000 μm

2. 67mm to μm 67,000 μm

3. 33 µm to mm 0.033 mm

4. 9.2 μm to mm 0.0092 mm

5. 1.2 nm to μm 0.0012 μm

6. 0.3 μm to nm 300 nm

7. 4km to mm 4,000,000 mm

8. 0.8km to mm 800,000 mm

9. 0.65cm to mm 6.5 mm

10. 2.64 µm to mm 0.00264 mm

11. 1.2cm to mm 12 mm

12. 98.8mm to μm 98,800 μm

13. 312μm to mm 0.312 mm

14. 13.1cm to μm 131,000 μm

15. 68.9cm to μm 689,000 μm

16. 0.05m to μm 50,000 μm

(3) Calculating percentage

a) 0.06%

b) 0.013%

(4) Calculating percentage change

Sucrose conc./mol dm <sup>-3</sup>	Initial mass / g	Final mass / g	Mass change / g	Percentage change in mass
0.9	1.79	1.06	-0.73	-40.8%
0.7	1.86	1.30	-0.56	-30.1%
0.5	1.95	1.70	-0.25	-12.8%
0.3	1.63	1.76	+0.13	+8.0%
0.1	1.82	2.55	+0.73	+40.1%