BTEC LEVEL 3 NATIONAL EXTENDED CERTIFICATE IN APPLIED HUMAN BIOLOGY

TRANSITION BOOKLET 3

UNIT 1

LEARNING AIM B: IMMUNE RESPONSE, DYSFUNCTION AND TREATMENT OF IMMUNE DISORDER

LEARNING AIM C: GENETICS AND HEALTH

QUEEN ELIZABETH HIGH SCHOOL

About this resource

This resource was produced in May 2020 by Mrs Fraser for Queen Elizabeth High School.

Resources used in the production of this booklet include:

BTEC Level 3 National Extended Certificate in Applied Human Biology specification issue 5 (2019) https://qualifications.pearson.com/content/dam/pdf/BTEC-Nationals/applied-human-biology/2018/specification-and-sample-assessments/9781446958599_BTECNAT_L3_EXTCERT_APPHUMBIO_SPEC_PPV2_070618upd.pdf (accessed 13/05/2020)

AQA Transition Guide: Biology. https://filestore.aqa.org.uk/resources/biology/AQA-7401-7402-TG.PDF (accessed 13/05/2020)

Student Support: GCSE to A Level Biology Transition. Oxford University Press (2019) https://www.kerboodle.com/app/courses/16091/modules/Resources (accessed 13/05/2020)

Biology Bridging work, Mrs Fletcher Woods, May 2020

Welcome

BTEC Nationals are widely recognised by industry and higher education as the signature vocational qualification at Level 3. YouGov research shows that 62 per cent of large companies have recruited employees with BTEC qualifications. What's more, well over 100,000 BTEC students apply to UK universities every year and their BTEC Nationals are accepted by over 150 UK universities and higher education institutes for relevant degree programmes either on their own or in combination with A Levels.

The Applied Human Biology course you have chosen is designed to allow you to continue your education in science in order to continue on to education or employment, possibly in the health and health science sectors. With 50,000 people currently employed in the applied health science sector, and over 3 million nurses in the UK, Applied Human Biology gives students a good progression pathway into many future careers.

A word to students

Today's BTEC Nationals are demanding, as you would expect of the most respected applied learning qualification in the UK. You will have to choose and complete a range of units, be organised, take some assessments that we will set and mark and keep a portfolio of your assignments. But you can feel proud to achieve a BTEC because, whatever your plans in life – whether you decide to study further, go on to work or an Apprenticeship, or set up your own business – your BTEC National will be your passport to success in the next stage of your life.

How this course works

Unlike with A-levels, you will have an exam at the end of year 12, and both years you will complete coursework assignments.

Year	Unit	Assessment method	Contribution to overall grade
12	1- Principles of Applied Human Biology	Exam	25%
12	2- Microoganisms and infectious disease	Assignments	25%
13	3- Human Biology and health issues	Exam	33%
13	TBC	Assignments	17%

At the end of year 12 we will review each students progress. There will be opportunities to resit the unit 1 exam however we will not allow students to progress into year 13 if they have not achieved a minimum of a "near pass" in unit 1 alongside a pass in unit 2.

Unit 1 – Principles of Applied Human Biology (Year 12)
This unit covers some of the biological principles that underpin human biology. You will study human body functions at a genetic, cellular, and tissue level. You will examine the link between lifestyle factors and health, and explore the ways this knowledge can be applied to improve diagnostic and health outcomes.

Unit 2 – Microorganisms and Infectious Diseases (Year 12)
You will investigate the effect of antimicrobials agents on the growth of microorganisms, carrying out a wide range of practical techniques. You will develop their knowledge and understanding of microorganisms and infectious disease.

Unit 3 – Human Biology and Health issues (Year 13)
You will develop their skills in researching, evaluating and reporting whilst exploring the impact of health issues on our society.

Internally assessed unit (Year 13)
You will carry out three internally assessed assignments widening your knowledge of a particular area of the body. The unit content is to be confirmed but will focus on one of the following: functional physiology, disease and disorder, biomedical science, or human reproduction.

Places to go for help

1. The exam board website is a good place to start
   Visit https://qualifications.pearson.com/en/qualifications/btec-nationals/applied-human-biology.html. The Biology webpages are aimed at teachers, but you may find them useful too. Information includes:
   - The specification – this explains exactly what you need to learn for your exams.
   - Specimen exam papers
2. Royal Society of Biology
   "A single unified voice for biology". They work with everyone from government policy makers to students, as well as universities and researchers studying biology. Their website includes a dedicated student section. Have a look at rsb.org.uk
3. The student room
   Join the A-level Biology forums and share thoughts and ideas with other students if you're stuck with your homework. Just be very careful not to share any details about your assessments, there are serious consequences if you're caught cheating. Visit thestudentroom.co.uk
4. Textbooks and Revision Guides
   BTEC have not year published a textbook or revision guide for Applied Human Biology. In school we will make use of a number of resources including the A-level Biology textbooks. We will make sure that you have access to these on kerboodle outside of school.
5. YouTube
   YouTube has thousands of Biology videos. Just be careful to look at who produced the video and why because some videos distort the facts. Check the author, date and comments – these help indicate whether the clip is reliable. If in doubt, ask your teacher.
6. Magazines
   Focus, New Scientist or Philip Allan updates can help you put the biology you're learning in context. Have a look in the LRC for the latest edition.

Activities to help you prepare for year 12

We have put together this transition booklet to help you prepare for the move into year 12. This booklet focuses on knowledge you have acquired at GCSE that will be required for unit 1. Learning aims B and C focus on the immune system and genetics and include:

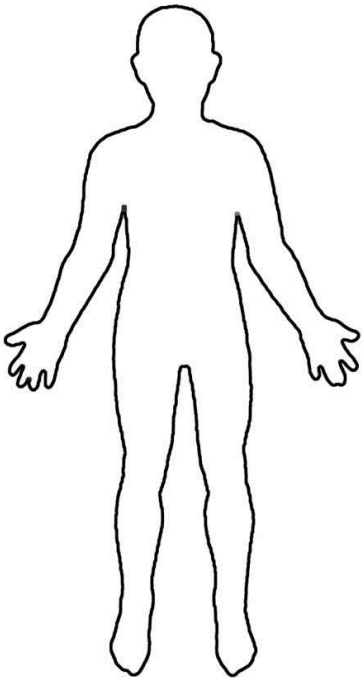
- Immune Response
- Immune Dysfunction
- Gene expression
- Genetic disorders and diagnosis

Use this page to record what you have done:

Activity Number	Title	Initial reaction from GCSE knowledge- Red/Amber/Green	Date completed	Date checked	Red/Amber/Green rating following completion and marking
1	Barriers against pathogens				
2	White blood cells				
3	HIV				
4	Protein synthesis				
5	Cancer				
6	Genetics key terms				
7	Punnet squares- Huntington's disease				

1. Barriers against pathogens

Annotate the outline of a human with the key defences you have against pathogens.



2. White blood cells

White blood cells can protect us against pathogens in three ways:
-phagocytosis
-producing antibodies
-producing antitoxins

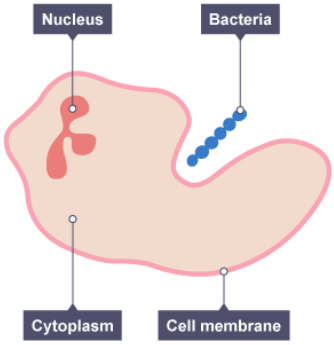
What does an antitoxin do?

_____

What does an antibody bind to?

_____

_____



Referring to the diagram, explain what phagocytosis is.

_____

_____

_____

_____

_____

Vaccines contain antigens. Explain how injection of an antigen can give long term immunity. Remember to talk about memory cells in your answer.

_____

_____

_____

3. HIV

What disease does HIV cause? What symptoms will a sufferer experience and why?

_____

_____

_____

_____

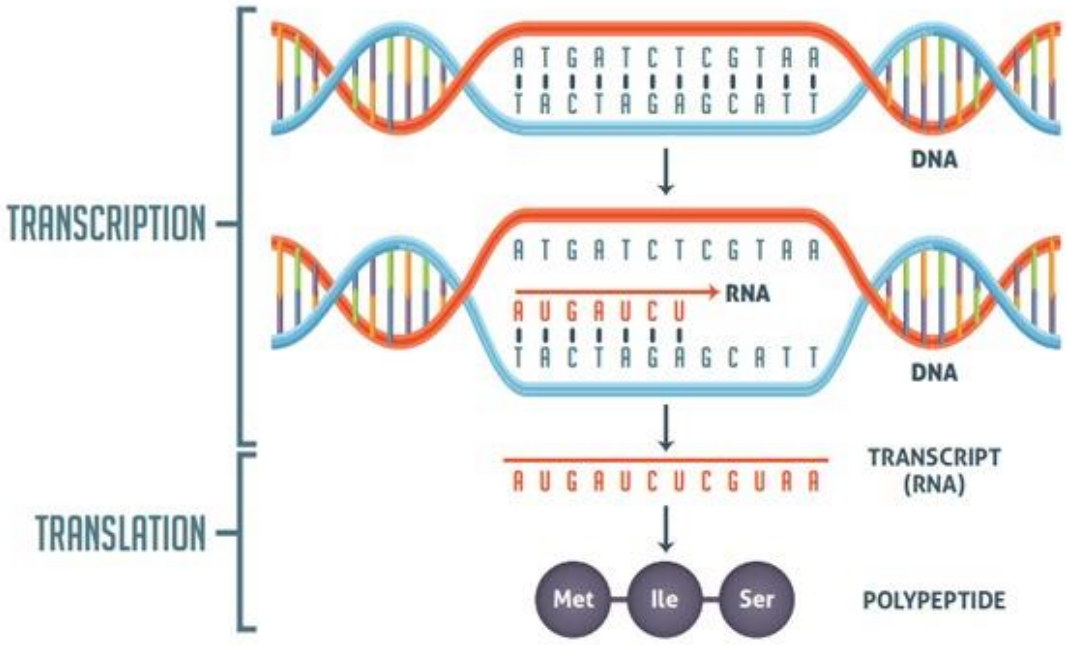
_____

_____

4. Protein Synthesis

Protein synthesis was only covered by triple students so if you did Combined science then it would be helpful for you to watch https://www.youtube.com/watch?v=1GgNNYZ47rk

Transcription occurs in the n_____ and is when the DNA message is turned into _____.
This then leaves the n_____ and goes to the c_____. A r_____ joins onto the messenger and reads it three letters at a time. A carrier brings in a_____ a_____ which are joined together to form a p_____.



5. Cancer

Decide whether these statements refer to a benign tumour or a malignant tumour or both:

Statement	Benign	Malignant	Both
Abnormal growth of cells			
Mitosis is uncontrolled			
It can't spread to other areas of the body			
It can spread to other areas of the body			
Forms secondary tumours			
Contained in one place by a membrane			
Spreads via blood			
Not cancerous			
It has undergone metastasis			
What a doctor means by "cancer"			

6. Genetics key terms

Match the key word with its definition:

Gene	An allele that is expressed even if only one copy is present.
Allele	An individual who has two alleles that are the same.
Dominant	The genes that an individual has
Recessive	A section of DNA that codes for a protein
Homozygous	The observable characteristics of an individual
Heterozygous	An individual who has two alleles that are different
Phenotype	A version of a gene
Genotype	An allele that is only expressed if two copies are present.

7. Punnet squares- Huntington's chorea

Huntington's disease is an example of a disease where the mutation causing the disease is dominant.

h: normal (recessive)

H: mutation (dominant)

		Paternal alleles	
		H	h
Maternal alleles	h		
	h		

Cystic fibrosis is an example of a disease where the mutation causing the disease is recessive.

F: normal (recessive)

f: mutation (dominant)

		Paternal alleles	
		F	f
Maternal alleles	F		
	f		

For each of the Punnett squares:

1. Complete the diagrams to show the alleles for each child.
2. State which parent and child is:
   - healthy
   - has the disease
   - a carrier.

Each of the following statements is false. Re-write each one so that it becomes true.

1. The first Punnett square shows that one in every four children from this couple will have Huntington's disease.

2. The second Punnett square shows that there is a one in three chance that a child born to this couple will have cystic fibrosis.

3. All children of the second couple will either be carriers or suffer from cystic fibrosis.

4. The percentage of children who are sufferers on the diagram is the same as the percentage of children each couple will have who are sufferers.

5. Having one child who is born with cystic fibrosis means that the next three children will not have the disease.

6. A 50:50 chance is the same as a 0.25 probability.