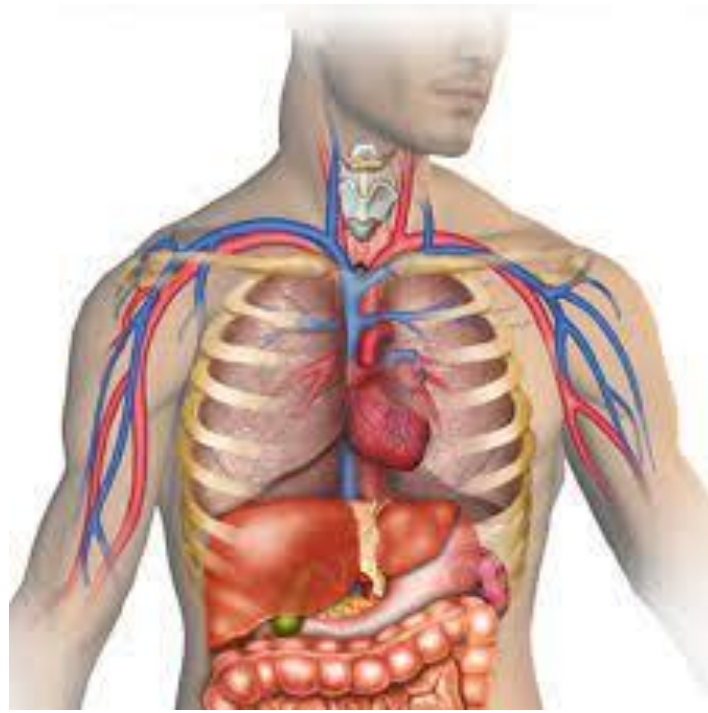


BTEC Human Biology

Summer Independent Learning

Year 11 - 12



BTEC Human Biology Summer Independent Learning Activity.

Welcome to BTEC Human Biology, please complete **ALL** of the following tasks ready for your first day at New College.

There are 2 things we are expecting of you from your SIL. Teachers will be checking that this has been completed in the first week back in September.

1. Complete the questions, and self-mark (mark scheme at the back of the paper)
2. Test yourself on the content, in preparation for an **assessment** on your return to college

You can print the booklet, write on the PDF file or answer the questions on paper. The Mark Scheme follows the sections at the end of the document.

Overview of the tasks

Part 1: Structure of Carbohydrates, Lipids and Proteins

Task 1: Carbohydrate Structure

Task 2: Lipid Structure

Task 3: Protein Structure

Part 2: Cell Structure

Task 4: Cell Structure

Task 5: Function of organelles

Part 3: Revision techniques for the assessment

Task 6: how to revise for your initial assessment.

Part 1**Task 1: Structure of carbohydrates**

Use the following video links to support with your answers:



https://www.youtube.com/watch?v=dSJGCGQ_9vA&list=PL0Mjub5NT755dp8xUfC-yoXlbPTcjVM1i&index=7&t=0s



<https://www.youtube.com/watch?v=wuDxoneoPnY&list=PL0Mjub5NT755dp8xUfC-yoXlbPTcjVM1i&index=5>

What is a monomer?

What is a polymer?

Can you describe what a condensation reaction is?

Can you describe what a hydrolysis reaction is?

Can you describe how larger carbohydrates are made from monosaccharide monomers?

Can you list some common monosaccharides?

Can you describe how disaccharides are formed?

What are maltose, sucrose and lactose formed from?

Draw a diagram to show how a condensation reaction occurs between two monosaccharides to form maltose. Label the bond that forms.

Can you explain how glycogen and starch are formed?

Task 2: Lipid Structure

<https://www.youtube.com/watch?v=TOFjqpbMZU&list=PL0Mjub5NT755dp8xUfC-yoXlbPTcjVM1i&index=3>



Video 2 from **10:50 to 12:50**

<https://www.youtube.com/watch?v=QFq9o72Qal8&list=PL0Mjub5NT755dp8xUfC-yoXlbPTcjVM1i&index=7>



Can you explain how triglycerides are formed? Draw a diagram to show this happening. Label the molecules involved, the type of reaction and the types of bonds formed.

Can you explain that the R-group of a fatty acid may be saturated or unsaturated? What do these terms mean?

Task 3: Protein structure

Watch the video:

From 7:20 – 10:50



<https://www.youtube.com/watch?v=QFq9o72Qal8&list=PL0Mjub5NT755dp8xUfC-yoXlbPTcjVM1i&index=7>

What is the general structure of an amino acid?

How do two amino acids form a dipeptide?

Describe the following protein structures:

Primary Structure

Secondary Structure

Tertiary Structure

Can you describe the role of hydrogen bonds, ionic bonds and disulfide bridges in the structure of proteins?

Part 2 – Cell Structure

Task 4

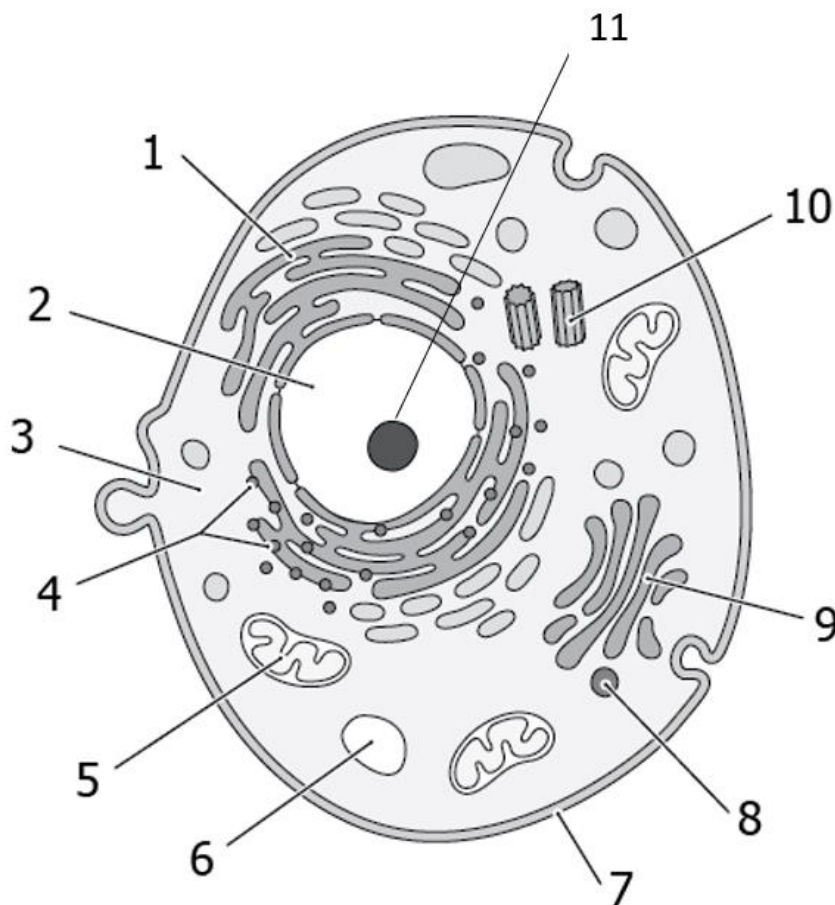
Watch the following video. Then answer the following questions.



https://www.youtube.com/watch?v=cfEFw4dcEFw&list=PL0Mjub5NT757WwL_BTIZzW09IJYk5ChQn&index=4

Use the following to label the animal cell

nucleus, nucleolus, mitochondria, rough and smooth endoplasmic reticulum (ER), Golgi apparatus, vesicles, lysosomes, 80S ribosomes, centrosomes, cytoplasm



What is the function of:

nucleus and nucleolus

mitochondria

rough endoplasmic reticulum

smooth endoplasmic reticulum

golgi apparatus

vesicles

lysosomes

80S ribosomes

Part 3 – How to revise

Task 6

Watch the following video. Use some of the techniques suggested to prepare for your initial assessment.



<https://www.youtube.com/watch?v=wrDOoBuP9A8>

Mark Scheme

Part 1

Task 1: Structure of carbohydrates

What is a monomer?

- **Single subunit. Many are joined together to form a polymer.**

What is a polymer?

- **Made from many monomers joined together**

Can you describe what a condensation reaction is?

- **Formation of a bond with the removal of water**

Can you describe what a hydrolysis reaction is?

- **Breaking a bond using water**

Can you describe how larger carbohydrates are made from monosaccharide monomers?

- **Condensation of monosaccharides forming a glycosidic bond**

Can you list some common monosaccharides?

- **Glucose, Fructose, Galactose**

Can you describe how disaccharides are formed?

- **2 monosaccharides join by a glycosidic bond together via condensation reaction.**

What are maltose, sucrose and lactose formed from?

Maltose made from: 2 x alpha glucose monomers

Sucrose made from: 1 x glucose and 1 x fructose

Lactose made from: 1 x glucose and 1 x galactose

Draw a diagram to show how a condensation reaction occurs between two monosaccharides to form maltose. Label the bond that forms.

See video

Can you explain how glycogen and starch are formed?

- **Many alpha glucose monomers join by a glycosidic bond together via condensation reaction.**
- **Starch forms a helix held together by hydrogen bonds**
- **Glycogen is branched**

Task 2: Lipid Structure

Can you explain how triglycerides are formed? Draw a diagram to show this happening. Label the molecules involved, the type of reaction and the types of bonds formed.

See the video

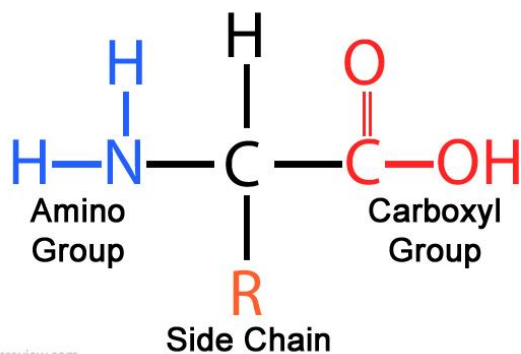
Can you explain that the R-group of a fatty acid may be saturated or unsaturated? What do these terms mean?

Saturated – when there are no C=C bonds in the hydrocarbon chain (i.e. the R group part)

Task 3: Protein structure

What is the general structure of an amino acid?

Amino Acid Structure



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How do two amino acids form a dipeptide?

- 2 amino acids join via condensation reactions. Held together by a peptide bond

Describe the following protein structures:

Primary structure: The sequence/order of amino acids that makes up the polypeptides of a protein.

Secondary structure: The way in which the chain of amino acids in a protein is folded. This forms alpha helix and Beta sheets. Structure held in place by hydrogen bonds

Tertiary structure: The further folding and coiling of the secondary structure to give the protein its 3D shape. Held in place by hydrogen, ionic and disulphide bonds. The tertiary structure is important e.g. the shape of an enzymes active site must be complementary shape to the substrate so they can fit.

Can you describe the role of hydrogen bonds, ionic bonds and disulfide bridges in the structure of proteins?

- Hydrogen bonds hold the alpha helix and Beta sheets in place in the secondary structure.
- **hydrogen bonds, ionic bonds and disulfide bridges hold the tertiary structure in place (keeps the protein in that shape)**

Part 2 – Cell Structure

Task 4

Use the following to label the animal cell

nucleus, nucleolus, mitochondria, rough and smooth endoplasmic reticulum (ER), Golgi apparatus, vesicles, lysosomes, 80S ribosomes, centrosomes, cytoplasm, cell membrane

1. Smooth ER
2. Nucleus
3. Cytoplasm
4. Ribosome and Rough ER
5. Mitochondria
6. Lysosome
7. Cell membrane
8. Vesicle
9. Golgi apparatus
10. Centrosomes
11. Nucleolus

What is the function of:

nucleus nucleolus

where RNA is synthesised

mitochondria

site of aerobic respiration and where ATP is produced

rough endoplasmic reticulum

studded with ribosomes and site of protein synthesis. Also transports proteins within the cell

smooth endoplasmic reticulum

site of production of lipids and steroid hormones

golgi apparatus

modifies proteins by adding carbohydrates. Packages proteins into vesicles

vesicles

transports molecules within the cell or to the cell surface membrane for exocytosis

lysosomes

contains hydrolytic enzymes that digest old organelles

80S ribosomes

site of protein synthesis

