



YSGOL BRYNREFAIL

Yr hanner tymor hwn: Sgiliau, Gwybodaeth a Dealltwriaeth i'w ddatblygu;

During this half term: Skills, Information and Understanding to be developed;

Sgiliau – Erbyn diwedd yr Uned bydd y dysgwyr yn gallu: / Skills – By the end of the Unit the learners will be able to:

Draw and label animal and plant cells. Use the light microscope. Compare plant and animal cells. Calculate total magnification by multiplying the eye piece with the objective lens and calculate the magnification of an image or drawing. Use new key terms with understanding and in the correct context. Read and follow instructions carefully. Plan scientific investigations, carry out practical work safely and logically. Identify variables, record results in a table, draw an appropriate line graph and write a brief scientific conclusion. Develop exam technique.

Erbyn diwedd yr Uned bydd y dysgwyr yn gwybod ac yn deall / By the end of the Unit the learners will know and understand:

Cells as the basic unit of life. Specialised cells are adapted to their function. Transport across cell membranes can be achieved by diffusion, osmosis and active transport (higher tier only). Enzymes as biological catalysts and are affected by changes in temperature, pH, enzyme concentration and substrate concentration.

Geiriau/Termau Allweddol / Key Terms/Words;

Cell membrane, cytoplasm, nucleus, vacuole, cell wall, chloroplast, tissue, organ system, specialised cell, diffusion, osmosis, turgid, flaccid, plasmolysis, active transport (higher tier only), enzyme, substrate, enzyme-substrate complex, product, denature, lock and key, successful collision, kinetic energy, temperature, pH, enzyme concentration, substrate concentration, limiting factor (higher tier only)

Deilliannau Dysgu / Learning Outcomes

Meini Prawf / Success Criteria

Asesiad/ Assessment

Gwaith Cartref / Homework

Deilliannau Dysgu Gweithgaredd 1 / Activity 1 Learning Outcomes

Draw and label animal and plant cells. State the function of each cell structure. Compare cells – identifying similarities and differences.

Learners should:

Identify and describe the function of the cell membrane, cytoplasm, nucleus, mitochondria, cell wall, vacuole and chloroplast.
Draw clear scientific diagrams with a sharp pencil and label each cell structure correctly.

Cell crossword

Deilliannau Dysgu Gweithgaredd 2 / Activity 2 Learning Outcomes

Prepare a microscope slide and view a magnified image of cells and tissues using a light microscope.

Learners should :

Prepare microscope slides using animal (cheek cells) and plant (onion and Elodea) tissue.
Understand the need for staining cells.
Focus an image successfully and increase magnification using objective lenses.
Calculate the total magnification of an image.
Compare the light microscope with the electron microscope – the electron microscope gives greater magnification, but can only view dead tissues.

Deilliannau Dysgu Gweithgaredd 3 / Activity 3 Learning Outcomes

Identify and describe the function of specialised cells. Understand that specialised cells are adapted to their functions.
Understand that complex, multicellular organisms are organised into tissues, organs and systems.

Learners should:

Describe the adaptation and functions of ciliated cells, sperm cells, red blood cells, palisade cells and root hair cells.
Complete the TEEP Marketplace challenge to define tissues, organs and systems and give some examples.



YSGOL BRYNREFAIL

Deilliannau Dysgu / Learning Outcomes	Meini Prawf / Success Criteria	Aseiad / Assessment	Gwaith Cartref / Homework
<p>Deilliannau Dysgu Gweithgaredd 4 / Activity 4 <i>Learning Outcomes</i></p> <p>Calculate the magnification of an image</p>	<p>Learners should:</p> <p>Measure the length of a cell in mm. Divide the length by the total magnification.</p>	<p>Develop exam technique by applying knowledge to past exam questions</p>	
<p>Deilliannau Dysgu Gweithgaredd 5 / Activity 5 <i>Learning Outcomes</i></p> <p>Understand the concept of diffusion Diffusion can be modelled in the laboratory using a semi-permeable membrane such as Visking tubing List the factors which can affect the rate of diffusion</p>	<p>Learners should :</p> <p>Define diffusion and apply understanding to new situations Carry out an investigation using Visking tubing to illustrate diffusion using glucose and starch Understand that particle/molecule size, temperature, membrane thickness and concentration gradient (the difference in concentration between two areas) can limit the rate of diffusion</p>		<p>Describe the diffusion of carbon dioxide out of an animal cell</p>
<p>Deilliannau Dysgu Gweithgaredd 6 / Activity 6 <i>Learning Outcomes</i></p> <p>Understand the concept of the movement of water, across a cell membrane by osmosis and its importance to cells</p>	<p>Learners should:</p> <p>Define and apply osmosis to new situations Water enters and leaves cells by osmosis. Animal cells may swell and burst if water enters by osmosis. In plant cells the inelastic cell wall resists swelling, increasing the pressure in the cell – causing the cell to become turgid. Animal cells shrink if water leaves the cell by osmosis. In plant cells plasmolysis occurs as the cytoplasm and vacuole shrink and the cell membrane pulls away from the cell wall. Plasmolysed plant cells are flaccid.</p>		<p>Exam question – extended QER answer</p>
<p>Deilliannau Dysgu Gweithgaredd 7 / Activity 7 <i>Learning Outcomes</i></p> <p>Investigating changes in mass in potato cylinders bathed in increasing concentrations of sucrose. Presenting data using a line graph Explaining changes in mass/length using scientific understanding</p>	<p>Learners should:</p> <p>Plan an investigation to demonstrate osmosis in potato cylinders Record data systematically and calculate % change in mass Plot a line graph Annotate the graph to demonstrate scientific knowledge and understanding</p>		
<p>Deilliannau dysgu Gweithgaredd 8 / Activity 8 <i>Learning Outcomes</i></p> <p>Higher Tier only – Define active transport and give examples</p>	<p>Learners should:</p> <p>Define active transport Understand that active transports allows cells to absorb useful substances, even at really low external concentrations e.g. nitrate from soil water into root hair cells</p>		<p>Exam questions – transport across cell membranes</p>



YSGOL BRYNREFAIL

Deilliannau Dysgu / Learning Outcomes	Meini Prawf / Success Criteria	Aseiad / Assessment	Gwaith Cartref / Homework
<p>Deilliannau Dysgu Gweithgaredd 9 / Activity 9 <i>Learning Outcomes</i></p> <p>Understand the importance of proteins and their basic structure Understand the importance of enzymes as biological catalysts Aware of the factors which affect enzyme activity – temperature, pH, enzyme concentration and substrate concentration Describe the lock and key hypothesis using key terms Understanding that high temperatures denature an enzyme by changing the shape of the active site which no longer allows the substrate to fit</p>	<p>Learners should:</p> <p>Observe animations illustrating enzyme activity and complete a diagram showing an enzyme-substrate complex. Use the terms enzyme, active site, substrate, successful collision and enzyme -substrate complex. Carry out a short investigation using liver tissue and hydrogen peroxide to demonstrate catalase activity, then test for oxygen using a glowing splint. Using high temperatures to denature the enzymes in the liver tissues and apply knowledge to explain their observations. Annotate an enzyme/temperature graph using all the key terms</p>		
<p>Deilliannau Dysgu Gweithgaredd 10 / Activity 10 <i>Learning Outcomes</i></p> <p>Higher tier only - Plan a full scientific investigation into the effect of temperature on catalase activity</p>	<p>Learners should:</p> <p>Identify variables, plot a line graph and come to a scientific conclusion using all the key terms</p>		
<p>Deilliannau Dysgu Gweithgaredd 11 / Activity 11 <i>Learning Outcomes</i></p> <p>Carry out an investigation to demonstrate the effect of changing pH on the enzyme protease using photographic film. Make clear observations and apply knowledge and understanding</p>	<p>Learners should:</p> <p>Understand that photographic film is coated with gelatine, which is a protein (the substrate) Protease is an enzyme which breaks down gelatine into amino acids Follow instructions carefully, record observations and come to a brief scientific conclusion</p>		<p>Extension task (higher tier only)– research the effect of increasing substrate concentration on enzyme activity</p>
<p>Deilliannau Dysgu Gweithgaredd 12 / Activity 12 <i>Learning Outcomes</i></p> <p>Demonstrate understanding Develop exam technique</p>	<p>Learners should:</p> <p>Higher tier only - Present the extension task findings</p> <p>All pupils – apply knowledge to exam questions and peer assess in pairs Complete an enzyme activity summary</p>	<p>Peer assessment – enzyme exam questions</p>	<p>Revision – end of unit test</p>



YSGOL BRYNREFAIL

Deilliannau Dysgu / Learning Outcomes

Meini Prawf / Success Criteria

**Aseiad /
Assessment**

**Gwaith Cartref /
Homework**

**Deilliannau Dysgu Gweithgaredd 13/14 / Activity
13/14 Learning Outcomes**

Activity 13 - Sit an end of unit test under exam conditions
Activity 14 - Use a marking scheme to improve answers and develop exam technique. Complete a self assessment to highlight strengths and weaknesses

Learners should:

Activity 13 - Prepare thoroughly prior to the test
- see the revision list at the back of the work book
Read the exam questions carefully and highlight key terms/information
Answer every question fully by incorporating knowledge with information provided in the question
Activity 14 - Improve answers using marking schemes/model answers
Complete the self assessment sheet and identify questions which need further work
Record results on the tracing sheet

Teacher
assessment – end
of unit test

File work carefully
and complete any
unfinished tasks



YSGOL BRYNREFAIL

Yr hanner tymor hwn: Sgiliau, Gwybodaeth a Dealltwriaeth i'w ddatblygu;

During this half term: Skills, Information and Understanding to be developed;

Sgiliau – Erbyn diwedd yr Uned bydd y dysgwyr yn gallu: / Skills – By the end of the Unit the learners will be able to:

Write out the word equations for aerobic and anaerobic respiration. Compare aerobic and anaerobic respiration. Label and state the function of each part of the thorax. Compare a bell jar model to the thorax. Describe how muscular contraction and relaxation ventilates the lungs. Explain why the composition of inhaled and exhaled air changes. Describe how smoking damages the lungs. Use new key terms with understanding and in the correct context. Read and follow instructions carefully. Develop exam technique.

Erbyn diwedd yr Uned bydd y dysgwyr yn gwybod ac yn deall / By the end of the Unit the learners will know and understand:

Respiration releases energy from glucose to produce ATP – this occurs in plant and animal cells. Understand that aerobic respiration releases more energy and is more efficient than anaerobic respiration. Anaerobic respiration causes an oxygen debt which must be repaid. Muscular contraction/relaxation changes the volume and pressure of the thorax causing ventilation of the lungs. Understand the limitations of the bell jar model of the thorax. Understand why attitudes to smoking have changed and provide evidence for this.

Geiriau/Termau Allweddol / Key Terms/Words;

Aerobic, anaerobic, respiration, glucose, oxygen, carbon dioxide, water, energy, ATP, lactic acid, oxygen debt, lungs, trachea, bronchi, bronchioles, alveoli, ribs, intercostal muscles, thorax, ciliated epithelium, cilia, goblet cells, mucus, lung cancer, emphysema, gaseous exchange, diffusion, inhale, exhale

Deilliannau Dysgu / Learning Outcomes

Meini Prawf / Success Criteria

Asesiad / Assessment

Gwaith Cartref / Homework

Deilliannau Dysgu Gweithgaredd 1 / Activity 1 Learning Outcomes

Aerobic respiration breaks down glucose in the presence of oxygen; the energy released is used to produce ATP. Respiration occurs in the cytoplasm of every living cell. Glucose and oxygen are needed, carbon dioxide and water are waste products. Substances enter and leave the cell by diffusion, down a concentration gradient.

Learners should:

Write out the word equation for aerobic respiration. Understand the role of the respiratory, digestive and circulatory systems. Apply knowledge to past exam questions.

Develop exam technique by applying knowledge to past exam questions

Deilliannau Dysgu Gweithgaredd 2 / Activity 2 Learning Outcomes

Understand that respiration occurs in plant cells too. Understand that only living cells can carry out respiration. Plan an investigation using peas and a thermos flask.

Learners should :

Compare temperatures of flasks containing living and dead peas. Describe the function of each piece of equipment: thermometer, thermos flask, cotton wool and disinfectant. Apply knowledge to an exam question.

Develop exam technique by applying knowledge to past exam questions

Deilliannau Dysgu Gweithgaredd 3 / Activity 3 Learning Outcomes

Anaerobic respiration releases small amounts of energy (in the absence of oxygen) and produces less ATP than aerobic respiration. Lactic acid is formed as a waste product. Oxygen debt is the difference between the oxygen needed by the body and the oxygen provided by the body. The oxygen debt must be repaid.

Learners should:

Write out the word equation for anaerobic respiration. Use the Einstein pulse sensors to determine recovery time after vigorous exercise. Explain why the pulse and breathing rate remain high even after the exercise stops. Complete the source grids to compare different types of activity and link oxygen uptake to lactic acid production.

Use the source grid strategy to develop graph interpretation skills and exam technique

Exam questions – respiration and oxygen debt



YSGOL BRYNREFAIL

Deilliannau Dysgu / Learning Outcomes	Meini Prawf / Success Criteria	Aseiad / Assessment	Gwaith Cartref / Homework
<p>Deilliannau Dysgu Gweithgaredd 4 / Activity 4 <i>Learning Outcomes</i></p> <p>Label parts of the thorax and describe the function of each. Describe how muscle contraction/relaxation leads to changes in thorax volume and pressure allowing lung ventilation.</p>	<p>Learners should:</p> <p>Identify key terms in the passage and use them to label the thorax. Pupils should identify the trachea, bronchi, bronchioles, alveoli, ribs, intercostal muscles and diaphragm. Describe the function of each part of the thorax. Watch a BBC bite size video and then summarise the ventilation mechanism by completing a table. Apply knowledge to an extended exam QER exam question</p>	<p>Develop exam technique by applying knowledge to past exam questions</p>	
<p>Deilliannau Dysgu Gweithgaredd 5 / Activity 5 <i>Learning Outcomes</i></p> <p>Compare a bell jar model to the thorax. Understand the limitations of the model.</p>	<p>Learners should :</p> <p>Draw the bell jar model and label fully. Compare the model to the living thorax by completing a table. Discuss limitations of the model and draw a mind map or spider chart.</p>		<p>Exam question – extended QER answer</p>
<p>Deilliannau Dysgu Gweithgaredd 6 / Activity 6 <i>Learning Outcomes</i></p> <p>Alveoli are highly adapted for gaseous exchange</p>	<p>Learners should:</p> <p>Complete a diagram of an alveolus by adding red blood cells to the capillary, labelling the bronchiole and adding arrows showing the direction of movement of oxygen and carbon dioxide (by diffusion). Draw a diagram from memory. Describe how thin walls, moist inner lining, large surface area and a good blood supply facilitate diffusion (BBC Bitesize video).</p>	<p>Develop exam technique by applying knowledge to past exam questions</p>	
<p>Deilliannau Dysgu Gweithgaredd 7 / Activity 7 <i>Learning Outcomes</i></p> <p>Compare the composition of air in inhaled and exhaled air. Lime water can be used to test for higher concentrations of carbon dioxide.</p>	<p>Learners should:</p> <p>Demonstrate that exhaled air contains higher concentrations of carbon dioxide using conical flasks, containing lime water, and delivery tubes. Describe and explain the colour change. Use a source grip to compare and contrast the composition of inhaled and exhaled air. Explain these changes in the table. Apply knowledge by answering an exam question.</p>	<p>Develop exam technique by applying knowledge to past exam questions</p>	
<p>Deilliannau dysgu Gweithgaredd 8 / Activity 8 <i>Learning Outcomes</i></p> <p>Understand the function of ciliated epithelial cells and goblet cells. Understand how smoking affects the lungs. Describe the causes and effects of lung cancer and emphysema.</p>	<p>Learners should:</p> <p>Draw a labelled ciliated cell and a goblet cell. Describe the function of each. Compare images of the cilia of a smoker and non-smoker and write a caption beneath each image. Watch a smoking machine video to illustrate the large amount of tar which accumulated in the lungs. Write observation in the table provided.</p>		<p>Research the causes and effects of lung cancer and emphysema. Summarise finding in the table. Prepare to present a summary of their finding to the class in a 2 minute presentation.</p>



YSGOL BRYNREFAIL

Deilliannau Dysgu / Learning Outcomes	Meini Prawf / Success Criteria	Aseiad / Assessment	Gwaith Cartref / Homework
<p>Deilliannau Dysgu Gweithgaredd 9 / Activity 9 <i>Learning Outcomes</i></p> <p>Provide evidence that attitudes to smoking have and continue to change</p>	<p>Learners should:</p> <p>Pupils present their findings on lung cancer and emphysema. Pupils improve their own work as they listen to their peers.</p> <p>Discuss in groups attitudes to smoking now and in the past. Summarise the discussion as a spider chart or mind map.</p> <p>Apply knowledge to a QER extended answer question</p>	<p>Short oral presentations assessed by the teacher and peers.</p> <p>Develop exam technique by applying knowledge to past exam questions</p>	<p>Revision – end of unit test</p>
<p>Deilliannau Dysgu Gweithgaredd 10/11 / Activity 10/11 <i>Learning Outcomes</i></p> <p>Activity 10 - Sit an end of unit test under exam conditions</p> <p>Activity 11 - Use a marking scheme to improve answers and develop exam technique. Complete a self assessment to highlight strengths and weaknesses</p>	<p>Learners should:</p> <p>Activity 10 - Prepare thoroughly prior to the test - see the revision list at the back of the work book</p> <p>Read the exam questions carefully and highlight key terms/information</p> <p>Answer every question fully by incorporating knowledge with information provided in the question</p> <p>Activity 11 - Improve answers using marking schemes/model answers</p> <p>Complete the self assessment sheet and identify questions which need further work</p> <p>Record results on the tracing sheet</p>	<p>Teacher assessment – end of unit test</p>	<p>File work carefully and complete any unfinished tasks</p>