

UNIT 1 - SEVEN PROCESSES OF LIFE, CELLS, AND TRANSPORT

BIOLOGY I

Content

- The seven life processes - MRS GREN
- Movement, respiration, sensitivity, growth, reproduction, excretion, nutrition
- The parts and functions of cells - organelles
- Microscope work on cells
- Cells - tissues - organs - organ systems - organisms
- The definitions of diffusion and osmosis
- Experiments on diffusion and osmosis
- Graph skills

Resources & ICT

- Core paper practice questions, worksheets
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- The seven life processes
- The parts and functions of cells
- The definitions of diffusion and osmosis

Students to Understand

- How structure is related to function in specialised cells
- The importance of diffusion and osmosis in animals and plants

Students to be able to Do

- Conduct experiments and construct graphs based on osmosis
- Identify variables to change, measure and keep constant
- Work with a microscope, make their own slides

Cross curricular links

- Mathematics; percentages, bar charts versus line graphs

Types of assessment

- Quizzes
- Question and answer in class
- Chapter summary notes
- Individual practicals and write ups
- Topic test

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Constructing revision sheets
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Edelweiss

NH53 / CC BY 2.0

Global citizenship, internationalism, local environment

- Discuss the adaptations of plants found in Switzerland's (temperate climate), lakes (aquatic adaptations), and mountains (low water adaptations)



BRILLANTMONT
International School

September-October - 5 weeks

UNIT 2 - ANIMAL ORGAN SYSTEMS

Content

- Circulatory system
- Heart structure and function
- Blood vessels
- Blood
- Immunity
- Respiratory system
- Lung structure and function
- Cilia and goblet cells
- Ventilation
- Gas exchange
- Aerobic respiration
- Anaerobic respiration - yeast/ plants, animals
- Diet
- Components of a balanced diet
- Deficiency diseases
- Digestive system
- Parts and function
- Physical digestion
- Chemical digestion
- Absorption

Resources & ICT

- Core paper practice questions
- Work sheets
- Models
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- Heart, blood vessels and blood - labels and functions
- Lungs - labels and functions
- Gas exchange - related to diffusion
- Cellular respiration - word and formula equations (aerobic and anaerobic)
- Diet - the constituents of a balanced diet
- Digestion - labels and functions of the digestive system
- Enzymes - how enzymes work and are affected by temperature and pH

Students to Understand

- How the three systems are linked
- How the energy from respiration is used in animals and plants
- Why a balanced diet is important
- How enzymes are affected by temperature and pH changes

Students to be able to Do

- Relate the structure to the function of parts of the three systems
- Carry out experiments to find out the constituents of food and relate this to diet
- Carry out experiments on enzyme function
- Dissect a heart

Cross curricular links

- PSHE; health, heart and lung disease
- PSHE; balanced diet
- Sports; fitness

Types of assessment

- Homework sheets
- Quizzes
- Question and answer in class
- Chapter summary notes
- Individual practicals and write ups
- Topic test

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Practicals
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Insect larva digesting a planktonic crustacean

Piet Spaans / CC BY-SA 2.5

Global citizenship, internationalism, local environment

- Statistics of heart, lung and digestive system diseases from around the world

UNIT 3 - COORDINATION

Content

- Homeostasis
- Blood sugar balance
- Temperature control
- Negative feedback
- Endocrine system - hormones
- Water balance
- Nervous system
- CNS vs PNS
- Sensory, motor and relay neurones
- Reflex arc

Resources & ICT

- Core paper practice questions
- Models
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- The functions and parts of the endocrine and nervous systems
- The definitions of homeostasis and negative feedback
- How the body balances sugar levels and temperature
- How the nervous system sends impulses

Students to Understand

- How the body's systems work together to maintain a constant internal environment and to react to external stimuli
- Why balance and reaction are so important to the body

Students to be able to Do

- Compare and contrast the endocrine and nervous system
- Carry out experiments on temperature control

Cross curricular links

- PSHE; the liver - alcohol, drugs and health
- PSHE; the effects of caffeine and alcohol on reactions and organs

Types of assessment

- Homework sheets
- Quizzes
- Question and answer in class
- Chapter summary notes
- Individual practicals and write ups
- Topic test

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Practicals
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



© Samuel Blanc / www.sblanc.com

Global citizenship, internationalism, local environment

- Discussing the problems of temperature control when in cold conditions, e.g. skiing

UNIT 4 - DNA AND GENETICS

Content

- DNA
- Structure
- Inheritance
- Dominant-recessive
- Co-dominant
- Sex-linked characteristics
- Genetic diseases
- Cystic fibrosis
- Sickle cell anaemia
- Haemophilia

Resources & ICT

- Core paper practice questions
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- DNA structure
- How characteristics are passed on genetically

Students to Understand

- How DNA relates to proteins and our characteristics
- How characteristics are passed down from parents to offspring

Students to be able to Do

- How to construct diagrams to work out inheritance based on dominant-recessive and co-dominant inheritance

Cross curricular links

- European history; inheritance of characteristics (e.g. the 'Habsburg jaw' and haemophilia in the royal families of Europe)

Types of assessment

- Key points homework sheets
- Quizzes
- Question and answer in class
- Chapter summary notes
- Individual practicals and write ups
- Topic test

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Carlos II, the last king of the Habsburg dynasty in Spain

Juan Carreño de Miranda / Public domain

Global citizenship, internationalism, local environment

- Genetic similarities and differences in regions of the world



UNIT 5 - PLANT SYSTEMS

Content

- Transport of water and minerals
- Xylem
- Roots, stems, leaves
- Transport of sugars and amino acids
- Phloem
- Photosynthesis
- Word and symbol equations
- Limiting factors of photosynthesis
- Germination
- Growth

Resources & ICT

- Core paper practice questions
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- The structure of a plant, major organs
- How xylem and phloem works
- How a leaf is designed for photosynthesis
- What affects the germination and growth of plants

Students to Understand

- How water moves up xylem
- What is needed and produced by photosynthesis
- The need for germination

Students to be able to Do

- Recognise tissues in seeds, roots, stems and leaves from diagrams and down a microscope
- Conduct experiments on the rate of water transport and photosynthesis

Cross curricular links

- Geography; the carbon cycle

Types of assessment

- Key points homework sheets
- Quizzes
- Question and answer in class
- Chapter summary notes
- Individual practicals and write ups
- Topic test

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Constructing revision sheets
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Photosynthesising leaf

Jon Sullivan / PefPhoto / Public domain

Global citizenship, internationalism, local environment

- Different plants and adaptations of plants to diverse habitats around the world
- How plants are adapted to live in lakes and high on mountains

UNIT 6 - EXPERIMENT TECHNIQUES

Content

- Experiment techniques
- Planning
- Constant variables
- Independent/input variables
- Dependent/out come variables
- Safety
- Hypothesis vs theory
- Data handling
- Anomalies
- Calculations on data
- Tables and graphs
- Describing graphs
- Conclusions
- Scientific explanations
- Errors and improvements

Resources & ICT

- Core paper practice questions
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Students to Know

- How to plan, carry out and write a conclusion and analysis for an experiment

Students to Understand

- How variables affect results
- The difference between accuracy and reliability

Students to be able to Do

- Handle equipment safely
- Carry out experiments in an organised manner
- Learn from early experiments how to improve accuracy and reliability in further trials
- Write up an experiment

Cross curricular links

- Physics, chemistry; experimental technique

Types of assessment

- Question and answer in class
- Individual practicals and write ups

Differentiation incl. EAL

- Put students into groups based on relative strengths and weaknesses
- Set work to cover basics depending on prior knowledge
- Extension work

Learning styles activities

- Question and answer
- Experiments - in groups and individually
- Application of knowledge to unfamiliar questions



AmitcheII125 / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Investigate local plants and compare them to ones from other regions