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

BIOLOGY 2

Content

- MRS GREN - the seven life processes
- Movement, respiration, sensitivity, growth, reproduction, excretion, nutrition
- Plant, animal, fungi and bacteria cells - differences and similarities
- Labels and functions of parts of cells and why viruses are not considered to be alive
- Classification of the five kingdoms of organisms - bacteria, protists, fungi, plantae, animalia
- Cell membranes and transport across cell membranes
- Diffusion
- Osmosis
- Active transport

Resources & ICT

- Keynote presentation and associated key point sheets and quizzes
- Past paper practice questions
- Work sheets on keys
- Microscope slides on cells, tissues and organs
- Digital microscope
- memrise.com

Types of assessment

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

Students to Know

- The seven life processes
- The parts and functions of cells
- The characteristics that define groups of organisms
- The definitions of diffusion, osmosis and active transport

Students to Understand

- How scientists have defined life and grouped organisms based on shared, derived characteristics
- How structure is related to function
- The importance of diffusion, osmosis and active transport in animals and plants

Students to be able to Do

- Construct a key
- Identify organisms by group
- Conduct experiments and construct graphs based on osmosis

Cross curricular links

- Discussion of the history of naming species and why Latin and Greek are often used

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions

Hungry birds

Global citizenship, internationalism, local environment

- Discussion of the types of organisms found locally and in the students' home countries

UNIT 2 - ANIMAL ORGAN SYSTEMS

BIOLOGY 2

Content

- Circulatory system
- Heart structure and function
- Pressure in the heart
- Blood vessels - the differences between arteries, veins and capillaries
- Blood - components and what they do, heat transfer around the body
- Respiratory system
- Lungs and breathing
- Specialised cells in the respiratory system
- Alveoli and gas exchange
- Diet: carbohydrates, proteins, lipids, fibre, vitamins, minerals, water
- Digestive system
- Mouth - teeth and saliva
- Oesophagus - peristalsis
- Stomach - gastric juice
- Duodenum, pancreas, gall bladder
- Ileum - villi and absorption
- Large intestine - water absorption
- Rectum and anus - egestion

Resources & ICT

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

Types of assessment

- Key points homework sheets
- Quizzes
- Question and answer in class,
- Chapter summary notes
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- Topic test

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 become denatured

Students to be able to Do

- Relate the structure to the function of parts of the three systems
- Interpret enzyme graphs
- Dissect a heart

Cross curricular links

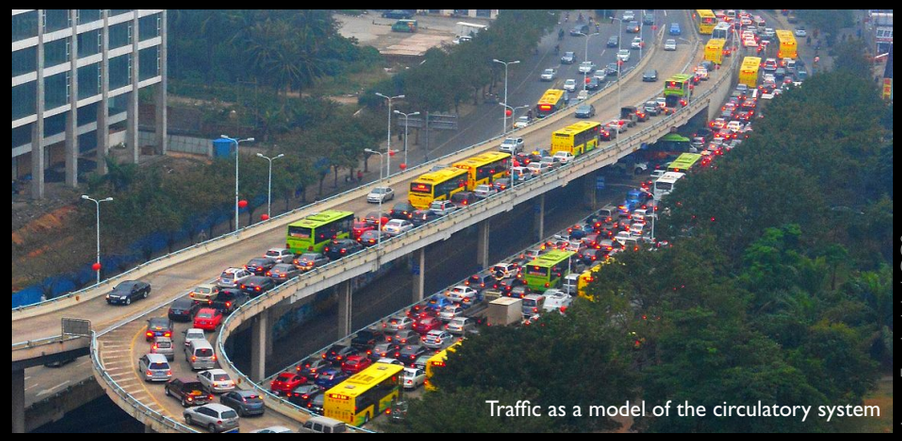
- PSHE; health, heart and lung disease
- PSGE; balanced diet
- Sports; fitness

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Traffic as a model of the circulatory system

Anna Frodesiak / CC0

Global citizenship, internationalism, local environment

- Where our food comes from; local versus international and problems associated with transport
- Problems of malnutrition around the world.
- Statistics of heart, lung and digestive system diseases from around the world
- Comparing the circulatory system to the road systems of Europe

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October-November - 3 weeks

UNIT 3 - COORDINATION AND EXCRETION

BIOLOGY 2

Content

- Homeostasis
- Blood sugar balance
- Diabetes
- Water balance
- Temperature control
- Endocrine system - hormones - insulin, glucagon, ADH, adrenalin
- Nervous system
- Neurones - sensory, relay, motor
- Synapses
- Reflex arc
- Excretory system
- Lungs review - carbon dioxide and excess water
- Skin - excess water, salts and urea
- Gall bladder - bile
- Kidneys - urea, excess water and salt
- Negative feedback

Resources & ICT

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

Types of assessment

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

Students to Know

- The functions and parts of the endocrine, nervous and excretory system
- The definitions of homeostasis, assimilation, excretion
- How the body balances sugar levels and temperature
- How wastes are excreted
- 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

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions

Skier

Global citizenship, internationalism, local environment

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

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November-January - 5 weeks

UNIT 4 - DEVELOPMENT OF ORGANISMS AND THE CONTINUITY OF LIFE

BIOLOGY 2

Content

- DNA
- Cell division - mitosis versus meiosis
- Animal reproduction
- Production of sperm and ova
- Fertilisation
- Implantation
- Development of a foetus
- Birth
- Inheritance
- Dominant-recessive
- Co-dominant
- Sex linked
- Genetics
- Evolution - observable changes e.g. bacteria resistance to antibiotics
- Natural selection - the theory of how evolution takes place
- Adaptation

Resources & ICT

- Past paper practice questions
- Work sheets on keys
- Microscope slides on cells, tissues and organs
- Models
- memrise.com

Types of assessment

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

Students to Know

- DNA structure
- How cells divide
- How the human foetus develops
- How characteristics are passed on genetically
- How new species develop

Students to Understand

- How DNA relates to proteins and our characteristics
- The difference between mitosis and meiosis
- How natural selection leads to the evolution of new species
- 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
- Interpret graphs of hormone concentration during the menstrual cycle

Cross curricular links

- PSHE; sexual intercourse and birth
- European history; inheritance of characteristics (e.g. The 'Hapsburg chin' and haemophilia in the royal families of Europe)
- History; the industrial revolution - how pollution affected natural selection

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions

Camouflage as a survival strategy: the leafy sea dragon sways like seaweeds

Global citizenship, internationalism, local environment

- Genetic similarities and differences in regions of the world
- The spread of humans and how character traits appeared in different regions of the world

UNIT 5 - PLANT SYSTEMS

BIOLOGY 2

Content

- Plant reproduction - sexual versus asexual
- Flowers - structure and function
- Pollination
- Fertilisation
- Seeds
- Dispersal
- Transport of water, minerals and sugars
- Xylem
- Phloem
- Photosynthesis - equation
- Experiments on plant growth, water transport and photosynthesis
- Germination and growth

Resources & ICT

- Past paper practice questions
- Work sheets on keys
- Microscope slides on cells, tissues and organs
- Models
- memrise.com

Types of assessment

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

Students to Know

- The structure of a plant, major organs
- How plants are pollinated and their seeds dispersed
- How a seed germinates
- How xylem and phloem works
- How a leaf is designed for photosynthesis

Students to Understand

- The difference between asexual reproduction (budding) and sexual reproduction (pollination)
- How water moves up xylem
- What is needed and produced by photosynthesis
- The need for NPK fertilisers

Students to be able to Do

- Recognise tissues in seeds, roots, stems and leaves from diagrams and down a microscope
- Interpret graphs on limiting factors of photosynthesis

Cross curricular links

- Geography; the carbon cycle

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions

Flowering plant

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

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February-March - 3 weeks

UNIT 6 - ECOLOGY AND THE EFFECTS OF HUMANS ON THE ENVIRONMENT

BIOLOGY 2

Content

- Food webs and chains
- Energy transfer from the sun to producers to consumers
- Energy losses
- Trophic levels
- Accumulation of poisons
- Carbon, water and nitrogen cycles
- Importance and relationship to biological processes
- Farming, industry, pollution, conservation
- Pollution of the atmosphere, water and earth
- Recycling
- Zoos, national parks, seed banks

Resources & ICT

- Past paper practice questions
- Work sheets
- Presentation
- memrise.com

Types of assessment

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

Students to Know

- How energy is transferred through food chains and webs
- The carbon, water and nitrogen cycles
- How human activity has affected the environment

Students to Understand

- How energy flows through systems
- How humans have changed the environment around them and how this will impact us
- The importance of carbon, water and nitrogen in ecosystems
- How we can make a difference by conserving energy and recycling

Students to be able to Do

- Calculate energy losses and biomass changes in food webs and chains
- Debate and discuss Human's effects on the environment and evaluate the evidence for global warming

Cross curricular links

- History; the history of industrial development
- Geography; different problems faced in LEDC's and MEDC's
- Economics; economic impacts

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 keys
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions

Deforestation in Tierras Bajas project, Bolivia, 2001

NASA / Public domain

Global citizenship, internationalism, local environment

- Problems faced by LEDC's when trying to develop a competitive economy
- Problems faced when trying to unite multiple countries behind environmental policies, the work of the UN, WWF, amongst others

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March-April - 3 weeks