

UNIT 1 - COORDINATION

Content

- Homeostasis
- Temperature control
- Sugar balance
- Insulin versus glucagon
- Diabetes
- Osmoregulation
- Kidneys
- Structure and function
- Excretion
- Endocrine system
- Hormones - ADH
- Nervous system
- Structure of neurones
- Motor versus relay/intermediate versus sensory
- Receptor potentials
- Action potentials
- Propagation of nerve impulses
- Transmission across synapses
- Cholinergic synapse
- ACh and neurotransmitters
- Reflex arcs

Resources & ICT

- YouTube playlists
- Past paper practice questions
- Microscope slides on cells, tissues and organs
- Digital microscope

Students to Know

- How hormones work
- The key features of neurones
- The structure and function of the kidney

Students to Understand

- How protein and lipid based hormones work
- How an action potential transmits an impulse along a neurone
- How neurotransmitter pass the impulse between neurones
- How ultrafiltration and selective reabsorption balances the constituents of the blood and removes waste

Students to be able to Do

- Interpret action potential graphs
- Compare nervous and hormonal communication

Cross curricular links

- PSHE; the effects of drugs on the nervous system
- Chemistry; electrochemical gradients and circuits

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
- Practical and model work (in groups and independently)
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Dromedaries in the Negev, Israel

Mark A. Wilson / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- How animals from different environments deal with nitrogenous waste - deserts, temperate, aquatic (fresh and salt water)
- How scientists from around the world have given their names to parts of the body - Bowman, Henle, Schwann, Langerhans

UNIT 2 - RESPIRATION AND PHOTOSYNTHESIS

ADV. BIOLOGY 2

Content

- Adaptations of mitochondria
- Glycolysis
- Link reaction
- Krebs's cycle
- Electron transport chain
- Substrate level phosphorylation
- Oxidative phosphorylation
- Respiratory quotients
- Respiratory substrates
- Aerobic versus anaerobic
- Anaerobic respiration in yeast and plants
- Anaerobic respiration in animals
- Oxygen debt
- Adaptations of leaves, palisade cells and chloroplasts
- Light dependent and independent reactions
- Calvin cycles
- Limiting factors of photosynthesis

Resources & ICT

- YouTube playlists
- Virtual experiments
- Past paper practice questions

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

- Glycolysis, link reaction, Krebs's cycle and electron transfer chain
- Substrate level and oxidative phosphorylation
- Cyclic and non-cyclic reaction, Calvin cycle
- Photophosphorylation

Students to Understand

- How ATP is produced during glycolysis and the Krebs's cycle
- How chemiosmosis works
- How photo systems capture light energy
- How carbon is fixed in plants

Students to be able to Do

- Experiments to measure the rate of oxygen consumption and carbon dioxide production in organisms
- Interpret results to indicate the substance being restored
- Distinguish between aerobic and anaerobic respiration

Cross curricular links

- Mathematics; rates

Differentiation incl. EAL

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- Set work to cover basics depending on prior knowledge
- Extension work
- By outcome - summary notes

Learning styles activities

- Question and answer
- Practical and model work (in groups and independently)
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



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Global citizenship, internationalism, local environment

- The discovery of the Krebs's cycle by Krebs and Szent-Gyorgyi
- The discovery of the Calvin cycle by Calvin, Bassham and Benson



BRILLANTMONT
International School

November - 2 weeks
January - 2 weeks

UNIT 3 - DNA - REPRODUCTION, INHERITANCE, EVOLUTION, TECHNOLOGY

ADV. BIOLOGY 2

Content

- Meiosis
- Phases and importance
- Gametogenesis
- Ovary and testes structure
- Reproductive hormones
- Use of hormones in IVF
- The contraceptive pill
- Inheritance
- Mono and dihybrid
- Codominant
- Sex linked inheritance
- Chi squared test
- Hardy Weinberg equations
- Genetic engineering
- Lac operon
- Insulin
- Ethical and moral dilemmas
- Use in medicines and agriculture
- Classification of the kingdoms
- Biodiversity
- Conservation
- Breeding programmes
- Endangered species
- Keystone species

Resources & ICT

- Past paper practice questions
- Microscope slides on cells, tissues and organs
- Digital microscope
- Electrophoresis kits

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 stages of meiosis
- The key points of gametogenesis
- Inheritance of single and linked characteristics
- The uses of genetic engineering
- The theory of evolution

Students to Understand

- How reproductive hormones interact and affect gametogenesis
- How characteristics are passed from generation to generation
- The benefits and draw backs of genetic engineering
- The difference between natural selection, speciation and evolution

Students to be able to Do

- Calculate chi squared
- Discuss genetic engineering

Cross curricular links

- PSHE; sexual health
- Maths; statistics
- Physics; electrophoresis

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
- Practical and model work (in groups and independently)
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Wheat
Akshay Paramatmani / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- The implications of genetic engineering on the future of medicine, farming and our every day lives
- Discussing the variety of species both locally and internationally



UNIT 4 - BIOTECHNOLOGY, CROP PLANTS, PLANT HORMONES

ADV. BIOLOGY 2

Content

- Fermenters
- Batch fermentation
- Continuous fermentation
- Primary and secondary metabolites
- Monoclonal antibodies
- Biosensors
- Blood sugar tests
- Pregnancy tests
- Crop plants
- C4 plants
- Rice
- Sorghum
- Maize
- Wheat
- Plant hormones
- Germination

Resources & ICT

- Microscopes and digital microscope
- Crop plant slides
- Past paper practice questions

Students to Know

- How monoclonal antibodies are produced
- The differences between continuous and batch cultures
- How plant hormones operate and are used in agriculture

Students to Understand

- How the type of fermenter is related to the product - primary or secondary metabolite
- How C4 plants are adapted to hot, dry conditions

Students to be able to Do

- Interpret experimental results with respect to the hormones involved
- Interpret graphs of fermenter products

Cross curricular links

- Geography; climates and habitats of Asia, Africa, North America and Europe with respect to the crop plant grown

Types of assessment

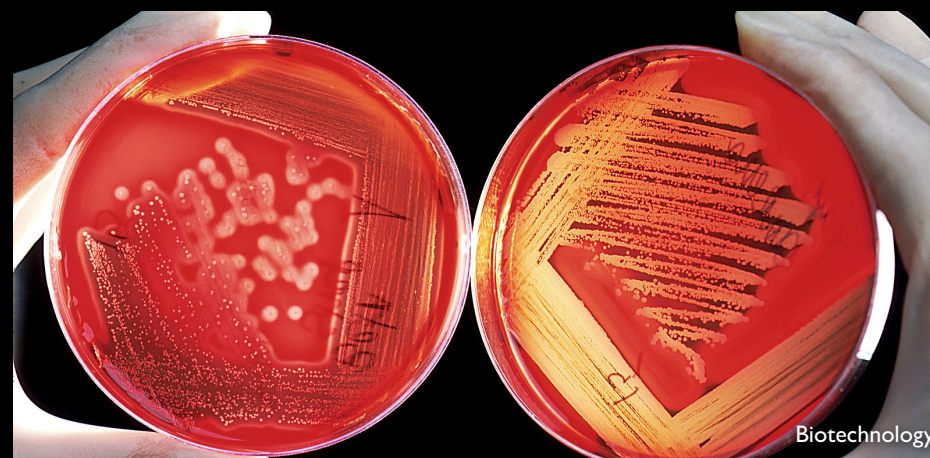
- Key points homework sheets
- Quizzes
- Question and answer in class,
- Chapter summary notes
- Individual practicals and write ups
- Topic test

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
- Practical and model work (in groups and independently)
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Bill Branson / NIH / Public domain

Global citizenship, internationalism, local environment

- The use of biotechnology in medicine
- The problems of food delivery and supply



BRILLANTMONT
International School

February-March - 3 weeks

UNIT 5 - STATISTICS AND PAPER 5

Content

- Statistical tests
- Chi squared
- T-test
- Mean, mode
- Standard deviation
- Standard error
- Bell curves/normal distribution
- 95% confidence limits
- Null hypothesis
- Planning experiments
- Data manipulation
- Analysis and evaluation
- Accuracy and reliability
- Exam practice

Resources & ICT

- Past paper practice questions

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 to increase the level of reliability by statistical tests
- How to calculate mean, confidence limits, standard deviation, standard error
- Chi squared and t-tests
- How to analyse experimental results independent and dependent variable

Students to Understand

- When to use chi squared or t-tests
- The difference between reliability and accuracy
- How to analyse data

Students to be able to Do

- Calculations based on chi squared and t-tests
- Explain which statistical test to use
- Plan investigations
- Suggest improvements

Cross curricular links

- Maths; statistics

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
- Practical and model work (in groups and independently)
- Summary of chapter notes including diagrams
- Application of knowledge to unfamiliar questions



Deutsche Bundesbank / Public domain

Global citizenship, internationalism, local environment

- Using examples of environmental studies from different habitats and regions of the world