

YEAR: 11 Science (Double Award) Biology



Knowledge Focus: 4.1 Classification and biodiversity, 4.2 Cell division and stem cells, 4.3 DNA and inheritance, 4.4 Variation and evolution, 4.5 Response and regulation, 4.6 Disease defence and treatment.

Skills, knowledge and understanding to be developed in this Learning Plan:

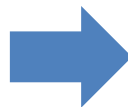
Classify organisms based on featured and scientific names, understand adaptations for survival, investigate population size and factors affecting it, measuring biodiversity and explore conservation methods, use of quadrats and processing data, capture-recapture techniques, evaluate impacts of biological control methods, mitosis, meiosis, stem cells and uses, ethics of stem cells, links between cell division and cancer, DNA structure, base pairing, genetic profiling, single gene inheritance, Punnett squares and gene transfer.

Key terms to be learned in this

LP: binomial, classify, organism, DNA, adenine, thymine, cytosine, guanine, double helix, complementary base, Punnett square, inheritance, homozygous, heterozygous, dominant, recessive, abundance, distribution

Week 1 Learning Objectives: 4.1 Classification and biodiversity

- Classify organisms based on features and scientific names.
- Understand adaptations for survival.
- Investigate population size and factors affecting it.
- Measure biodiversity and explore conservation methods.
- Use quadrats and sampling techniques in fieldwork.
- Apply capture-recapture methods for estimating populations.
- Evaluate impacts of biological control and invasive species.



Objective assessments:

- Be able to classify organisms based off their morphological characteristics
- Be able to explain the need for classification
- Be able to sample biodiversity and explain why we need biodiversity
- Be able to explain how we are protecting biodiversity.

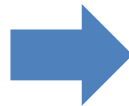
Assessment
4.1 End of Topic

Homework:

Set:
Due:

Week 2 - 3 Learning Objectives: 4.1 Classification and biodiversity, 4.2 cell division and stem cells

- Summarise the need for the preservation of biodiversity.
- Understand what genetic material is, where it found and why it replicates
- Understand what mitosis and meiosis are
- Compare mitosis and meiosis (similarities and differences)
- Explore the uses of stem cells in medicine
- State and explain the ethical arguments surrounding stem cells



Objective assessments:

- Be able to explain how cells divide to create cells with different functions (e.g. growth and repair)
- Be able to analyse the ethical arguments surrounding stem cell usage and sourcing

Assessment
4.2 End of Topic

Homework:

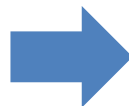
Set:
Due:

Homework:

Set:
Due:

Week 4 - 5 Learning Objectives: 4.3 DNA and inheritance

- Understand the structure of DNA
- Understand the coding of DNA
- Understand what genetic profiling is and how it is used
- Understand single gene inheritance



Objective assessments:

- Be able to: Describe the structure of DNA and explain complementary base pairing.
- Explain the process of genetic profiling and the uses of it.
- Be able to analyse results of a DNA fingerprint and successfully identify matches
- Explain the concept of single gene inheritance

Homework:

Set:
Due:

Week 6 Learning Objectives: 4.3 DNA and inheritance

- Complete Punnett squares to predict the outcomes of monohybrid crosses
- Understand that most phenotypic features are a combination of several genes
- Sex determination of humans (XX and XY)
- What artificial gene transfer is, ethical arguments and advantages/disadvantage



Objective assessments:

Be able to:
Predict the changes of gene expression using Punnett squares from heterozygous or homozygous genes
Explain the process of artificial gene transfer and discuss the ethical arguments alongside advantages and disadvantages.

Homework:

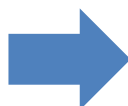
Set:
Due:

Homework:

Set:
Due:

Week 7 - 8 Learning Objectives: 4.4 Variation and evolution

- The production of genetically different offspring through sexual reproduction
- Understand the impact mutations have on DNA and their likelihood of survival
- Understand cystic fibrosis and development of treatments
- Understand the theory of evolution and natural selection
- Understand and explain how antibiotic resistance demonstrates evolution



Objective assessments:

Be able to:
Explain the concept of evolution and how mutations in DNA lead to desirable characteristics (natural selection)

Explain how antibiotic resistance shows evolution and the consequences this can have furthering the importance for understanding of the genome.
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Investigation into variation of organisms

Homework:

Set:
Due: