ISS Course Syllabus

Teacher: Peter **Grade:**
Course Title: Biology

Course Description:

1. Principles of Biology: Students work with the concepts, principles, and theories that enable them to understand the living environment. They recognize that living organisms are made of cells or cell products that consist of the same components as all other matter involve the same kinds of transformations of energy and move using the same kinds of basic forces. Students investigate, through laboratories and fieldwork, how living things functions and how they interact with one another.

2. Historical Perspectives of Biology: Students gain understanding of how the scientific enterprise operates through examples of historical events. Through the study of these events, they understand that new ideas are limited by the context in which they are conceived, are often rejected by the scientific establishment, sometimes spring from unexpected findings, and grow or transform slowly through the contributions of many different investigators.

Course Contents:

Unit 1: The Basis of Life

Week	Main topics
1	Study of life – characteristics of living things, scientific method, proteins, carbohydrates, fats, atomic structure, bonding
2	Chemical reactions, enzymes, water and solutions, pH
3	Structure of a cell, organelles and function, diversity, prokaryotes and eukaryotes
4	Transport – diffusion, osmosis, active transport, photosynthesis and the Calvin Cycle
5	Photosynthesis cont. (charts for wall) Introduce respiration
6	Respiration – glycolysis, Krebs cycle and electron transport, aerobic and anaerobic respiration

Unit 2: Genetics

Week	Main topics
1	Cell division – mitosis and meiosis and stages
2	Inheritance – Mendels work and hypothesis, principles of inheritance, Punnet squares
3	DNA structure and replication, genes, genome project, sex linkage
4	Protein synthesis, DNA, RNA, transcription and translation, mutations, phenotype
5	Biotechnology, breeding, genetic engineering, DNA fingerprinting

Unit 3: Diversity and Change

Ideal field work – trip to museum based on human evolution

Week	Main topics
1	Theory of evolution, Darwin, variation, adaptation, artificial selection, origin of species
2	Earth's early history, first organic compounds, origin or living cells, organellogenesis, extinctions
3	Human history, primates, hominids, Homo sapiens
4	Classification, five kingdoms, keys, identifying organisms

Unit 4: Monerans, Protists and Fungi

Week	Main topics
1	Characteristics of viruses, retroviruses, diseases, origins and diversity of monerans, Protists, protozoans
2	Algae, mold, fungi and characteristics

Unit 5: Plants

Week	Main topics
1	Structure of plants and leaves, stem tissues, plants in the biosphere and diversity
2	Transport and nutrition in plants, action of stomata, gas exchange, leaf structure, primary/2ndry growth
3	Plant responses, auxins, exps. Of Went and Darwin, germination, asexual/sexual reproduction
4	Natural history of plants, plant kingdom, mosses, ferns, conifers, flowering plants

Unit 6: Invertebrate Animals

Week	Main topics
1	Sponges, cnidaria, worms and molluscs
2	Arthropods – crustaceans, insects, arachnids

Unit 7: Vertebrate Animals

Week	Main topics
1	Fish, amphibians, reptiles
2	Bird, mammals
3	Behaviour – innate, learned, Pavlov, conditioning

Unit 8: Human Biology

Week	Main topics
1	Body systems and associated organs
2	Digestive system, excretory system, food pyramid
3	Respiratory system, lung capacity, circulatory system
4	Blood – blood groups, blood pressure, immune system
5	Diseases, endocrine system, hormone
6	Reproduction, menstrual cycle, human development, birth, STDs
7	Nervous system, reflex arc, structure of the brain, senses drugs

Unit 9: Organisms and the Environment

Week	Main topics
1	Characteristics of the biosphere, abiotic factors, climate, biomes
2	Population growth, limits, communities, ecological succession
3	Food chains, energy levels, food pyramids, carbon and nitrogen cycles, water cycle
4	Biodiversity, waste, energy sources, water pollution, greenhouse effect, recycling

Resources:

Strauss, Eric and Marylin Liswoski. Biology: The Web of Live. Scoot Foresman – Addision Wesley

Evaluation System:

Component	%	Comments
Tests/Quizzes		Unit tests
Labs and Assignments Home Work		• Formal Lab reports as well as informal write-ups • Oral Presentations • Projects • Posters
Daily work		Homework, in-class assignments
Exams 100%		50 % mid-term exam, 50 % final exam
Total		A maximum of 100 % is available

Progress marks will be calculated and reported quarterly.
Marks do not close until the final exam has been written.

Additional Comments:

Teaching Strategies and Instructional Methods

Direct Teaching Strategies

- Lectures
- Demonstrations
- Directed problem-solving
- Note taking
- Portfolios
- Posters
- Teacher led review
- Work and Task Sheets

Indirect Teaching Strategies

- Science Experiments
- Oral Presentations
- Drawings

Interactive Teaching Strategies

- Small group cooperative group work
- Small group discussions