



Online Courses for High School Students
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Course Outline

Biology

Biology Basics

What is Science?

- Beginnings
- Wonder Years
- Modern Science
- Scientific Method
- Metric System
- Conversions
- Length
- Volume
- Mass

Characteristics of Life & Science Tools

- Characteristics of Life
- Branches of Study
- Scientific Tools
- Microscope Limitations
- Electron Microscope

Basic Chemistry

- Physical/Chemical Props
- Atoms
- Subatomic Particles
- Periodic Table
- Bonding
- Atom/Bonding Review

Biochemistry

- Classification of Matter
- Acids & Bases
- Finding the pH
- Chemicals of Life
- Carbohydrates
- Lipids
- Proteins
- Nucleic Acids

The Cell

Cell Structure & Function

- Cell History
- Cell Theory
- Cell Membrane
- Passive Transport
- Active Transport
- Cellopolis
- Summary

DNA

- DNA History
- DNA Structure
- DNA Replication
- RNA
- Transcription, Translation, & Protein Synthesis
- Transcription
- Protein Synthesis

Cell Growth

- Levels of Organization
- Homeostasis
- Cell Growth
- Cell Division
- Mitosis/Cell Cycle
- Mitosis Stages

Energy for Life

- Raw Materials/Enzymes
- Photosynthesis

- Photosynthesis Reactions
- Respiration

Genetics

Mendelian Genetics

- Gregor Mendel
- Genes
- Punnet Squares
- Heredity
- Monohybrid Cross
- M. Cross Outcome
- Dihybrid Crosses
- D. Cross Outcome
- Probability

Meiosis

- Diploid & Haploid
- Mitosis vs. Meiosis
- Meiosis I
- Meiosis II
- Genes

Gene Expression

- Eukaryotes
- Jumping Genes
- Punnet Squares
- Incomplete Dominance
- Codominance
- Sex-Determination
- Sex-Linked Traits
- Pedigrees
- Mutations

Biotechnology & Genetic Engineering

- Genetic Disorders
- Changing Our World
- Genetic Engineering
- Agriculture
- Plant
- Animal
- Gene Sequencing

Evolution & Classification

Life Origins

- Spontaneous Generation
- Life Begins
- Topic 3 Geologic Time
- Mass Extinctions

Evidence of Change

- Charles Darwin
- Hutton/Lyell
- Fossil Record
- Fossil Formation
- Relative/Radioactive Dating
- Galapagos
- Evidence of Change

How Does Change Occur?

- Lamarckism
- Natural Selection
- Niche
- Topic 4: Geographical Isolation
- New Species
- Gradual/Rapid Change
- Mutation
- Mutation Types

Taxonomy

- Classification
- History
- Taxa
- Kingdoms
- Monera/Protista
- Fungi, Plantae, Animalia
- Dichotomous Key

Viruses, Prokaryotes, and Protists

Viruses

- Discovery of Viruses
- What Is A Virus?
- Viruses and Hosts
- Viral Genomes
- Replication and Infection Cycles
- Focus on Viral Infections

Prokaryotes

- History of Prokaryotes
- Archaeabacteria
- Eubacteria
- Mycoplasmas
- Replication and Infection Cycles
- Focus on Bacterial Activity

Protists

- Animallike Protists
- Plantlike Protists
- Funguslike Protists
- Focus on Seaweed as a Human Food Source

Fungi and Plants

Fungi

- Fungi Structure and Reproduction
- Fungi Energy Resources
- Zygomycota
- Ascomycota
- Basidiomycota
- Deuteromycota
- Mycorrhizae
- Lichens
- Focus on Penicillin

Plants

- Photosynthesis
- Bryophytes
- Introduction to Vascular Plants
- Seedless Vascular Plants
- Focus On Coal Forests

Seed Plants

- Gymnosperms
- Angiosperms
- Angiosperms -- Fruit
- Secondary Growth
- Form Follows Function
- Adaptations of Plants
- Focus on Angiosperms' Aids in Reproduction

Invertebrates

Animals

- Porifera (Sponges)
- Cnidaria (Sea Anemones, Corals, Jellyfish, and Hydrozoans)
- Ctenophora (Comb Jellies)
- Platyhelminthes (Flatworms)
- Nematoda (Roundworms)
- Focus on Heartworm

Annelids

- Polychaeta (Marine Worms)
- Mollusks
- Focus On Zebra Mussel "Pollution"

Arthropods

- Chelicerata (Spiders, Scorpions, Ticks, Mites, and Horseshoe Crabs)
- Echinoderms (Starfish, Sea Urchins, Sand Dollars, and Sea Cucumbers)
- Focus on Silk Worms

Vertebrates

Fish and Amphibians

- Subphylum Vertebrata
- Jawless Fish
- Cartilaginous Fish
- Bony Fish
- Amphibians
- Focus on the Coelacanth

Reptiles and Birds

- Reptiles
- Birds

- Focus on Dinosaur/Bird Connection

Mammals

- Mammals
- Monotremes
- Marsupials
- Placental Mammals
- Focus on the Cetacea

Ecology

Biomes and Ecosystems

- Terrestrial Biomes
- Aquatic Biomes: Freshwater Biomes
- Aquatic Biomes: Marine Biomes
- Coral Reefs
- Estuaries
- Focus on Estuaries

Population Dynamics

- Relationships Between Organisms
- Food Chains and Food Webs
- Energy Pyramid
- Community Structure
- Population Stability and Diversity
- Succession
- Patterns of Population Dynamics
- Focus on Secondary Extinction

Human Impact on Biodiversity

- Energy Consumption
- Pollution in the Atmosphere
- Water Pollution
- Desertification
- Deforestation
- Destabilization and Extinction
- Focus on Conservation - Biology