

Grade 7 Science Class Outline

Unit 1 : Earth's Materials

Chapter 1: The Nature of Science

Section 1-1: How Science Works

Vocabulary: science, technology

1. Groundbreaking News
 - a. Buried Treasure
 - b. Science in Action
 - c. Calling in Experts
2. Researching the Past
 - a. Dr. Lum's Visit
 - b. Technology
 - c. Working Together
3. Digging In
 - a. Clues to the Past
 - b. Lab Work

Section 1-2: Scientific Problem Solving

Vocabulary: scientific method, observation, inference, hypothesis, independent variable, dependent variable, constant, control

1. Scientific Methods
2. Recognizing the Problem
 - a. Observe
 - b. Infer
3. Form a Hypothesis
4. Test Your Hypothesis
 - a. Plan the Experiment
 - b. Do the Experiment
5. Analyze Your Data
6. Draw Conclusions and Communicate

Unit 2 : Earth's Atmosphere and Beyond

Chapter 4: Atmosphere

Section 4-1: Earth's Atmosphere

Vocabulary: *atmosphere, troposphere, ionosphere, ozone layer, ultraviolet radiation, chlorofluorocarbon*

1. Importance of the Atmosphere
2. Makeup of the Atmosphere
 - a. Gases in the Atmosphere
 - b. Solids and Liquids in Earth's Atmosphere
3. Layers of the Atmosphere
 - a. Lower Layers of the Atmosphere
 - b. Upper Layers of the Atmosphere
4. Atmospheric Pressure
5. Temperature in Atmospheric Layers
6. The Ozone Layer
 - a. CFCs
 - b. The Ozone Hole

Section 4-2: Energy Transfer in Atmosphere

Vocabulary: *radiation, conduction, convection, hydrosphere, condensation*

1. Energy from the Sun
2. Heat
 - i. Figure 11
 - b. Radiation
 - c. Conduction
 - d. Convection
3. The Water Cycle
 - i. Figure 13
4. Earth's Atmosphere is Unique

Section 4-3: Air Movement

Vocabulary: *Coriolis effect, jet stream, sea breeze, land breeze*

1. Forming Wind
 - a. Heated Air
 - b. The Coriolis Effect
 - i. Figure 16
2. Global Winds

- a. Surface Winds
- b. Winds in the Upper Troposphere
3. Local Wind Systems
 - a. Sea and Land Breezes

Chapter 6: Climate

Section 6-1: What is climate?

Vocabulary: climate, tropics, polar zones, temperate zone

1. Climate
2. Latitude and Climate
3. Other Factors
 - a. Large Bodies of Water
 - b. Ocean Currents
 - c. Mountains
 - d. Rain Shadows
 - e. Cities

Section 6-2: Climate Types

Vocabulary: adaptation, hibernation

1. Classifying Climates
2. Adaptations
 - a. Structural Adaptations
 - b. Behavioral Adaptations
 - c. Estivation

Section 6-3: Climatic Changes

Vocabulary: season, El Niño, greenhouse effect, global warming, deforestation

1. Earth's Seasons
 - a. Seasonal Changes
 - b. High Latitudes
2. El Niño and La Niña
3. Climatic Change
4. What causes climatic change?
 - a. Atmospheric Solids and Liquids
 - b. Energy from the Sun
 - c. Earth Movements
 - d. Amount of Solar Energy
 - e. Crustal Plate Movement
5. Climatic Changes Today
6. Global Warming
7. Human Activities

- a. Burning Fossil Fuels
- b. Deforestation
- 8. The Carbon Cycle

Chapter 7: Earth in Space

Section 7-1: Earth's Motion and Seasons

Vocabulary: axis, rotation, revolution, orbit, solstice, equinox

- 1. Earth's Physical Data
 - a. Spherical Earth
 - b. Evidence for Earth's Shape
 - c. Influence of Gravity
 - d. Almost a Sphere
- 2. Motions of Earth
 - a. Earth's Orbit
 - b. Seasons
 - c. Earth's Tilt
 - d. Solstices
 - e. Equinoxes
 - f. Earth's Place in Space

Section 7-2: Earth's Moon

Vocabulary: crater, moon phase, solar eclipse, lunar eclipse

- 1. The Moon's Surface and Interior
 - a. Craters
 - b. The Moon's Interior
 - i. Figure 8
- 2. Motions of the Moon
 - a. Revolution and Rotation of the Moon
 - b. Moon Phases
 - i. Figure 10
 - c. The Sun Lights the Moon
 - d. New Moon and Waxing Phases
 - e. Waxing Moon
 - f. Waning Moon
- 3. Eclipses
 - a. Solar Eclipses
 - b. Lunar Eclipses
 - i. Figure 13
- 4. Origin of the Moon
 - a. Collision Hypothesis

Section 7-3: Our Solar System

Vocabulary: solar system, astronomical unit, asteroid, comet, nebula

1. Size of the Solar System
 - a. An Average Star
2. The Planets
3. Inner Planets
 - a. Mercury
 - b. Venus
 - c. Earth
 - d. Mars
4. Outer Planets
 - a. Jupiter
 - b. Jupiter's Moons
 - c. Saturn
 - d. Uranus
 - e. Neptune
 - f. Dwarf Planets
5. Other Objects in the Solar System
6. Origin of the Solar System

Unit 3 : The Basis of Life

Chapter 8: Life's Structures and Classification

Section 8-1: Living Things

Vocabulary: organism, cell, homeostasis

1. What are living things like?
 - a. Living Things Are Organized
 - b. Living Things Grow and Develop
 - c. Living Things Respond
 - d. Living Things Maintain Homeostasis
 - e. Living Things Use Energy
 - f. Living Things Reproduce
2. What do living things need?
 - a. A Place to Live
 - b. Water
 - c. Food Sources

Section 8-2: How are living things classified?

Vocabulary: binomial nomenclature, genus, phylogeny, kingdom

1. Classification
 - a. Binomial Nomenclature

- b. Uses Scientific Names
- c. Modern Classification
 - i. Figure 6
- 2. Tools for Identifying Organisms
 - i. Table 1

Section 8-3: Cell Structure

Vocabulary: *cell theory, cell wall, cell membrane, cytoplasm, ribosome, organelle, nucleus, chloroplast, mitochondrion, endoplasmic reticulum, Golgi Body, tissue, organ, organ system*

- 1. Viewing Cells
- 2. Development of the Cell Theory
 - i. Table 2
- 3. Cellular Organization
 - i. Figure 12
 - b. Cell Wall
 - c. Cell Membrane
 - d. Cytoplasm
 - e. Manufacturing Proteins
 - f. Membrane – Bound Organelles
 - g. Organelles That Process Energy
 - h. Organelles That Process, Transport and Store
 - i. Organelles That Recycle
- 4. Many-Celled Organisms

Section 8-4: Viruses

Vocabulary: *virus, host cell*

- 1. What are viruses?
 - i. Figure 17
 - b. Active Viruses
 - c. Latent Viruses
- 2. How do viruses affect organisms?
- 3. Treating and Preventing Viral Diseases
 - a. Natural Immunity
 - b. Vaccines
- 4. Research with Viruses

Chapter 9: Cell Processes

Section 9-1: Chemistry of Life

Vocabulary: *mixture, organic compound, enzyme, inorganic compound*

- 1. The Nature of Matter

- a. Atoms
 - b. Elements
 - i. Table 1
 - c. Compounds and Molecules
 - d. Molecular Compounds
 - e. Ions
 - f. Ionic Compounds
2. Organic Compounds
 - a. Carbohydrates
 - b. Lipids
 - c. Proteins
 - d. Nucleic Acids
 3. Inorganic Compounds
 - a. Importance of Water
 - b. Characteristics of Water

Section 9-2: Moving Cellular Materials

Vocabulary: *passive transport, diffusion, equilibrium, osmosis, active transport, endocytosis, exocytosis*

1. Passive Transport
 - a. Diffusion of Water
 - b. Osmosis – The Diffusion
 - c. Facilitated Diffusion
2. Active Transport
3. Endocytosis and Exocytosis

Section 9-3: Energy for Life

Vocabulary: *metabolism, photosynthesis, cellular respiration, fermentation*

1. Trapping and Using Energy
 - i. Figure 12
 - b. Photosynthesis
 - c. Producing Carbohydrates
 - d. Storing of Carbohydrates
 - e. Cellular Respiration
 - f. Breaking Down Carbohydrates
 - g. Fermentation
 - h. Related Processes

Chapter 10: Cell Reproduction

Section 10-1: Cell Division and Mitosis

Vocabulary: *mitosis, chromosomes, asexual reproduction*

1. Why is cell division important?
2. The Cell Cycle
 - a. Length of Cycle
 - b. Interphase
3. Mitosis and Cell Division
 - a. Stages of Mitosis
 - i. Figure 5
 - b. Cell Division
 - c. Results of Mitosis and Cell Division
4. Asexual Reproduction
 - a. Cellular Asexual Reproduction
 - b. Budding and Regeneration

Section 10-3: DNA

Vocabulary: *DNA, gene, RNA, mutations*

1. What is DNA?
 - a. Discovering DNA
 - b. DNA's Structure
 - i. Figure 14
 - c. A DNA Model
 - d. Copying DNA
 - i. Figure 15
2. Genes
 - i. Figure 16
 - b. Making Proteins
 - i. Figure 17
 - c. Ribonucleic Acid
 - d. Controlling Genes
3. Mutations
 - a. Results of a Mutation

Chapter 11: Heredity

Section 11-1: Genetics

Vocabulary: *heredity, allele, genetics, hybrid, dominant, recessive, Punnett square, genotype, phenotype, homozygous, heterozygous*

1. Inheriting Traits
 - a. What is genetics?
2. Mendel – The Father of Genetics
3. Genetics in a Garden
 - a. Dominant and Recessive Factors
 - b. Using Probability to Make Predictions
 - c. Punnett Squares
 - d. Alleles Determine Traits

- e. Making a Punnett Square
- f. Principles of Heredity

Section 11-2: Genetics since Mendel

Vocabulary: incomplete dominance, polygenic inheritance, sex-linked gene

1. Incomplete Dominance
 - a. Multiple Allele
2. Polygenic Inheritance
 - a. Impact of the Environment
3. Human Genes and Mutations
 - a. Chromosome Disorders
4. Recessive Genetic Disorders
5. Gender Determination
6. Sex- Linked Disorders
7. Pedigrees Trace Traits
 - i. Figure 9
 - b. Using Pedigrees

Section 11-3: Advances in Genetics

Vocabulary: genetic engineering

1. Why is genetics important?
2. Genetic Engineering
 - a. Recombinant DNA
 - b. Gene Transfer
 - c. Genetically Engineered Plants
3. Composition of Ocean Water
 - a. Salinity
 - i. Figure 3
 - b. Dissolved Gases
4. Water Temperatures and Pressure

Chapter 12: Adaptations over Time

Section 12-1: Ideas About Evolution

Vocabulary: species, evolution, natural selection, variation, adaptation, gradualism, punctuated equilibrium

1. Early Models of Evolution
 - a. Hypothesis of Acquired Characteristics
2. Darwin's Model of Evolution
 - a. Darwin's Observations
3. Natural Selection
 - a. Darwin's Theory
4. Variation and Adaptation

- a. Changes in the Source of Genes
- b. Geographic Isolation
- 5. The Speed of Evolution
 - a. Gradualism
 - b. Punctuated Equilibrium
 - c. Punctuated Equilibrium Today

Section 12-2: Clues About Evolution

Vocabulary: *sedimentary rock, radioactive element, embryology, homologous, vestigial structure*

- 1. Clues from Fossils
- 2. Types of Fossils
- 3. Determining a Fossil's Age
 - a. Relative Dating
 - b. Radiometric Dating
- 4. Fossils and Evolution
- 5. More Clues About Evolution
 - a. Embryology
 - b. Homologous Structures
 - c. Vestigial Structures
 - d. DNA

Section 12-3: The Evolution of Primates

Vocabulary: *primate, hominid, Homo sapiens*

- 1. Primates
 - a. Hominids
 - b. African Origins
 - c. Early Humans
- 2. Humans
 - a. Neanderthals
 - b. Cro-Magnon Humans

Unit 4: Human Body Systems

Chapter 13: Circulation and Immunity

Section 13-1: Blood

Vocabulary: *plasma, hemoglobin, platelet*

- 1. Functions of Blood
- 2. Parts of Blood

- a. Plasma
- b. Blood Cells
3. Blood Clotting
4. Blood Types
 - i. Table 1
 - b. The ABO Identification System
 - c. The Rh Factor
5. Diseases of Blood

Section 13-2: Circulation

Vocabulary: *capillary, artery, vein, lymph*

1. The Body's Delivery System
2. The Heart
3. Types of Circulation
 - a. Coronary Circulation
 - b. Pulmonary Circulation
 - i. Figure 6
 - c. Systemic Circulation
4. Blood Vessels
 - i. Figure 7
 - b. Arteries
 - c. Veins
 - d. Capillaries
5. Blood Pressure
 - a. Controlling Blood Pressure
6. Cardiovascular Diseases
 - a. Atherosclerosis
 - b. Hypertension
 - c. Preventing Cardiovascular Disease
7. Functions of the Lymphatic System
 - a. Lymph

Section 13-3: Immunity

Vocabulary: *antigen, antibody, active immunity, passive immunity*

1. Lines of Defense
 - a. First-Line Defenses
 - b. Internal First-Line Defenses
 - c. White Blood Cells
 - d. Inflammation
 - e. Specific Immunity
 - f. Memory B Cells
 - g. Active Immunity
 - h. Vaccination

- i. Passive Immunity

Section 13-4: Diseases

Vocabulary: *plankton, nekton, ecosystem, produces, chemosynthesis, consumer, decomposer, food chain*

1. Types of Ocean Life
 - a. Plankton
 - b. Nekton
 - c. Bottom Dwellers
2. Ocean Ecosystems
 - a. Producers
 - b. Consumers and Decomposers
 - c. Food Chain
3. Ocean Nutrients
 - a. Coral Reefs and Nutrient Recycling

Chapter 14: Digestion, Respiration, and Excretion

Section 14-1: The Digestive System

Vocabulary: *nutrient, enzyme, peristalsis, chime, villi*

1. Functions of the Digestive System
2. Enzymes
 - a. Enzymes in Digestion
 - b. Other Enzyme Actions
3. Organs of the Digestive System
 - i. Figure 2
 - b. The Mouth
 - c. The Esophagus
 - d. The Stomach
 - e. The Small Intestine
 - f. The Large Intestine
4. Bacteria Are Important

Section 14-2: Nutrition

Vocabulary: *amino acid, vitamin, carbohydrate, mineral*

1. Why do you eat?
2. Classes of Nutrients
 - a. Proteins
 - b. Proteins Building Blocks
 - c. Carbohydrates
 - d. Fats
 - e. Vitamins

- f. Minerals
- g. Water
- h. Why do you get thirsty?
- 3. Food Groups
 - a. Other Recommendations
 - b. Food Labels

Section 14-3: The Respiratory System

Vocabulary: *larynx, trachea, bronchi, alveoli*

- 1. Functions of the Respiratory System
 - i. Figure 10
- 2. Organs of the Respiratory System
 - a. Pharynx
 - b. Larynx and Trachea
 - c. Bronchi and the Lungs
- 3. Why do you breathe?
 - a. Inhaling and Exhaling
- 4. Diseases and Disorders of the Respiratory System
 - a. Respiratory Infections
 - b. Chronic Bronchitis
 - c. Emphysema
 - d. Lung Cancer
 - e. Asthma

Section 14-4: The Excretory System

Vocabulary: *nephron, ureter, bladder*

- 1. Functions of the Excretory System
- 2. The Urinary System
 - a. Regulating Fluid Levels
 - b. Organs of the Urinary System
 - i. Figure 16
 - c. Filtration in the Kidney
 - d. Urine Collection and Release
 - i. Figure 17
 - e. Urinary Disease and Disorders
 - i. Dialysis

Chapter 15: Support, Movement, and Responses

Section 15-1: The Skin

Vocabulary: *epidermis, dermis, melanin*

1. Skin Structures
 - i. Figure 1
 - b. Melanin
2. Skin Functions
 - a. Thermal Energy and Waste Exchange
3. Skin Injuries and Repair
 - a. Bruises

Section 15-2: The Muscular System

Vocabulary: *voluntary muscle, involuntary muscle, tendon*

1. Movement of the Human Body
 - a. Muscle control
2. Classification of Muscle Tissue
3. Your Body's Simple Machines – Levers
4. Working Muscles
 - a. Change in Muscles
 - b. How Muscles Move

Section 15-3: The Skeletal System

Vocabulary: *periosteum, cartilage, joint, ligament*

1. Functions of Your Skeletal System
2. Bone Structure
 - i. Figure 10
 - b. Bone Tissue
 - c. Cartilage
3. Bone Formation
 - i. Figure 11
4. Joints
 - a. Immovable Joints
 - b. Movable Joints
 - c. Moving Smoothly
 - d. Common Joint Problems

Section 15-4: The Nervous System

Vocabulary: *neuron, synapse, central nervous system, peripheral nervous system*

1. How the Nervous System Works
 - a. Responding to Stimuli
 - b. Homeostasis
2. Nerve Cells
 - i. Figure 15
 - b. Synapse
3. The Divisions of the Nervous System

- a. The Peripheral Nervous System
- b. Somatic and Autonomic Systems
- 4. Safety and the Nervous System
 - a. Reflexes
- 5. The Senses
 - a. Vision
 - i. Figure 18
 - b. Images
 - c. Hearing
 - i. Figure 19
 - d. Balance
 - e. Smell
 - f. Taste
 - g. Smell and Taste
- 6. Drugs Affect the Nervous System
 - a. Stimulants

Unit 4: How Are Plants & Medicine Cabinets Connected?

Chapter 17: Plants

Section 17-1: An Overview of Plants

Vocabulary: cuticle, cellulose, vascular plant, nonvascular plant

- 1. What is a plant?
 - a. Plant Characteristics
 - b. Plant Cells
- 2. Origin and Evolution of Plants
 - a. Fossil Record
- 3. Line of Land
- 4. Adaptations to Land
 - a. Protection and Support
 - b. Other Cell Wall Substances
 - c. Reproduction
- 5. Classification of Plants
 - a. Naming Plants

Section 17-2: Seedless Plants

Vocabulary: rhizoid, pioneer species

- 1. Seedless Nonvascular Plants
 - a. Mosses
 - b. Liverworts

- c. Hornworts
- d. Nonvascular Plants and the Environment
- 2. Seedless Vascular Plants
 - a. Types of Seedless Vascular Plants
 - b. Ferns
 - c. Club Mosses
 - d. Horsetails
- 3. Importance of Seedless Plants
 - a. Peat
 - b. Uses of Seedless Vascular Plants

Chapter 18: Interactions of Living Things

Section 18-1: The Environment

Vocabulary: *ecology, abiotic factor, biotic factor, population, community, ecosystem, biosphere*

- 1. Ecology
- 2. Abiotic Factors
 - a. Water
 - b. Light and Temperature
 - c. Air
 - d. Soil
- 3. Biotic Factors
 - a. Levels of Organization
 - i. Figure 6
 - b. Populations
 - c. Communities
 - d. Ecosystems
 - e. Biomes
 - f. The Biosphere

Section 18-2: Interactions Among Living Organisms

Vocabulary: *population density, limiting factor, symbiosis, niche, habitat*

- 1. Characteristics of Populations
 - a. Population Size
 - b. Population Density
 - c. Population Spacing
 - d. Limiting Factors
 - e. Carrying Capacity
 - f. Biotic Potential
- 2. Symbiosis and Other Interactions
 - a. Body Forms

- b. Cnidarian Reproduction
- 3. Flatworms
 - a. Tapeworms
- 4. Round Worms

Section 17-3: Mollusks and Segmented Worms

Vocabulary: *mollusk, mantle, gill, radula, open circulatory system, closed circulatory system*

- 1. Mollusks
 - a. Common Characteristics
 - b. Body Systems
- 2. Types of Mollusks
 - a. Gastropods
 - b. Bivalves
 - c. Cephalopods
- 3. Segmented Worms
 - a. Earthworms
 - i. Figure 14
 - b. Leeches
 - c. Marine Worms
 - d. Body Types

Section 17-4: Arthropods and Echinoderms

Vocabulary: *Arthropod, appendage, exoskeleton, metamorphosis*

- 1. Arthropods
 - a. Insects
 - b. Circulatory System
 - c. Metamorphosis
 - i. Figure 18
 - d. Arachnids
 - e. Centipedes and Millipedes
 - f. Crustaceans
- 2. Echinoderms
 - a. Water-Vascular System
 - i. Figure 23

Chapter 18: Vertebrate Animals

Section 18-1: Chordate Animals

Vocabulary: *chordate, ectotherm, endotherm, cartilage*

- 1. What is a chordate?
 - a. Vertebrates
 - b. Body Temperature

2. Fish
3. Types of Fish
 - a. Bony Fish
 - i. Figure 5
 - b. Jawless and Cartilaginous Fish

Section 18-2: Amphibians and Reptiles

Vocabulary: hibernation, estivation, amniotic egg

1. Amphibians
 - a. Amphibians Adaptation
 - b. Amphibian Characteristics
 - c. Amphibian Metamorphosis
2. Reptiles
 - a. Types of Reptiles
 - b. Reptile Adaptations

Section 18-3: Birds

Vocabulary: contour feather, down feather

1. Characteristics of Birds.
2. Adaptations for Flight
3. Functions of Feathers
 - a. Care of Feathers

Section 18-4: Mammals

Vocabulary: herbivore, carnivore, omnivore, monotremes, marsupial, placental

1. Mammal Characteristics
 - a. Mammary Glands
 - b. Different Teeth
 - c. Body Systems
2. Mammal Types
 - a. Marsupials
 - b. Placentals
3. Mammals Today

Chapter 19: The Human Body

Section 19-1: Body Systems

Vocabulary: skeletal system, melanin, muscle, nutrient, respiratory system, alveoli, capillary, reflex

1. Structure and Movement
 - a. The Skeletal System

- b. Joints
- c. The Skin
- d. The Muscular System
- 2. Digestion and Excretion
 - a. Organs of the Digestive System
 - i. Figure 5
 - b. Nutrients
 - c. Digested Nutrients
 - d. Other Nutrients
 - e. The Urinary System
 - f. Other Organs of the Excretory System
- 3. Respiration and Circulation
 - a. The Respiratory System
 - i. Figure 9
 - b. The Circulatory System
 - c. Blood
 - d. Blood Types
 - e. The Lymphatic System
 - f. Immunity
- 4. Control and Coordination
 - a. The Nervous System
 - i. Figure 12
 - b. The Endocrine System

Chapter 20: The Roles of Genes in Inheritance

Section 20-2: Genetics – The Study of Inheritance

Vocabulary: heredity, genetics, gene, variation, mutation

- 1. Heredity
 - a. Genes
- 2. What determines traits?
 - a. Dominant and Recessive Alleles
 - b. Expression of Traits
- 3. Passing Traits to Offspring
- 4. Differences in Organisms
 - a. Multiple Alleles and Multiple Genes
 - b. Mutations – The Source of New Variation
 - c. Selective Breeding

Chapter 21: Ecology

Section 21-1: What is an ecosystem?

Vocabulary: ecosystem, ecology, biosphere, biotic factor, abiotic factor

1. Ecosystems
 - a. The Study of Ecosystems
 - b. The Largest Ecosystems
2. Living Parts of Ecosystems
3. Nonliving Parts of Ecosystems
 - a. Soil
 - b. Temperature
 - c. Water
 - d. Sunlight
4. A Balanced System

Chapter 21: Ecology

Section 21-2: Relationships Among Living Things

Vocabulary: population, community, limiting factor, niche, habitat

1. Organizing Ecosystems
 - a. Groups of Organisms
 - b. Groups of Population
 - c. Characteristics of Populations
 - d. Population Density
 - e. Studying Population
2. Limits to Populations
3. Interactions in Communities
 - a. Eat or Be Eaten
 - b. Organisms That Live Together
4. Where and How Organisms Live

Section 21-3: Energy Through the Ecosystem

Vocabulary: producer, consumer, decomposer

1. It's All About Food
 - a. Producers and Consumers
 - b. Decomposers
2. Modeling the Flow of Energy
3. Cycling of Materials