Science
Pre-Kindergarten

PURPOSE:

The purpose of science in pre-kindergarten is to provide opportunities for students to develop critical thinking skills in the area of science. Activities will include exploring the areas of Earth and space science, biology, physical sciences, and technology. Students begin to understand that air is all around us as they feel the blowing wind and learn about the cold and hot temperatures of the seasons. They will develop an understanding of the concepts associated with seeds, and have an opportunity to follow their growth. Students begin to understand natural materials and the weight comparisons of objects. Students will explore the world at their own pace through hands-on materials and experiences, learning spontaneously every day.

OUTCOMES:

A. Earth and Space Science

The students will:

- Begin to understand that there are living things such as plants and animals found on Earth
- Understand that air surrounds us and the wind is moving air
- Discuss and identify daily weather and the four seasons
- Recognize that there is a Sun and we need it to live

B. Life Science (Biology)

The students will:

- Begin to understand that all animals and plants are alive
- Recognize that plants and animals have life cycles
- Begin to recognize that many plants and animals look like their parents
- Begin to recognize that all animals interact with the environment through their five senses

C. Physical Sciences (Chemistry and Physics)

The students will:

- Sort objects by observable properties such as size, shape, and color
- Describe the various ways that objects can move

D. Technology/Engineering

The students will:

- Identify natural materials such as wood, cotton, fur, wool, and non-natural materials, such as plastic and Styrofoam
- Identify and explain some possible uses for natural materials such as: wood, cotton, fur, and wool

- Identify and describe the safe and proper use of tools and materials

TEACHING STRATEGIES

- Teacher directed lessons
- Small group learning
- Cooperative group learning
- Whole group learning
- Modeling behavior
- Brainstorming
- Observing, recording, and graphing
- Following daily routines
- Hands-on centers
- Experiences with objects, water, food, nature, outdoors, and people
- Experimenting
- Calendar
- Props (puppets, posters, pictures)
- Visual literature
- Literature and storytelling
- Poems and rhymes
- Audio tapes
- Music

ASSESSMENT

- Performance assessment and hands-on activities
- Class projects
- Teacher observations
- Interaction with peers and adults
- Progress Reports

RESOURCES

- *Early Childhood News*
- Pre-K Curriculum Guides
  I Am! I Can! by Grace Mitchell and Harriet Chmela
  A Practical Guide to Early Childhood Curriculum by Claudia Eliason and Loa Jenkins
- Fiction and nonfiction literature, included but not limited to Caldecott and Newbery Award books
- Literature big books:
  Jump, Frog, Jump! by Robert Kalan
  The Apple Pie Tree by Zoe Hall
  The Snowy Day by Ezra Jack Keats
  Caps, Hats, Socks, and Mittens by Louise Borden
  Big Sarah's Little Boots by Paulette Bourgeois
  The Wind Blew by Pat Hutchins

Spring by Ron Hirschi
The Carrot Seed by Ruth Krauss
Growing Vegetable Soup by Lois Ehlert
Stellaluna by Janell Cannon
I'm A Caterpillar by Jean Marzollo
Fish Is Fish by Leo Lionni
The Cows Are In The Corn by James Young

- Music
  Our Earth MacMillan Program Sing & Learn
- Satellite library
- Calendar
- Props such as puppets, posters, and pictures
- Visual literature
- Poems and rhymes
- Audio tapes

Science
Kindergarten

PURPOSE:

The purpose of science in kindergarten is to encourage students to enjoy and embrace the world around them. The children will use their five senses to study Earth, space and weather, plants and animals, matter and motion, and technology and engineering. Students will develop their prediction and interpretation skills through observation and discussion. They will be able to communicate their ideas, make discoveries on their own, and share those discoveries with others.

OUTCOMES:

A. Earth and Space Science

The students will:

- Recognize that soil is composed of living and nonliving things
- Understand that soil provides a home to certain animals and supplies nutrients necessary for plants to grow
- Classify rocks according to their characteristics
- Recognize that Earth is made up of various landforms
- Identify the different bodies of water that cover most of the Earth's surface
- Appreciate that it is our job to take care of the Earth's resources by recycling and reusing products
- Recognize the characteristics of different kinds of weather, such as wind, sun, rain, and snow
- Know that weather can change seasonally, daily, or even throughout the day
- Understand that the weather affects the clothes we need to wear
- Recognize and describe different types of clouds
- Realize that the four seasons follow a cyclical pattern
- Recognize that the Sun is a source of energy
- Understand what causes shadows
- Recognize that the objects in the night sky include the moon and the stars
- Know that the phases of the moon occur continuously and stars form patterns in the sky

B. Life Science (Biology)

The students will:

- Understand that plants have different parts that enable them to get what they need to grow and mature

- Know that plants need water, sunlight, air, nutrients from the soil, and space in order to survive
- Recognize that plants begin their life cycle as a seed which develops into a seedling, grows into a plant, flowers, and sometimes forms fruit
- Classify plants by their leaves or flowers
- Know that people can eat some plants and certain plant parts
- Discover that there are a variety of animals which are alike and different in many ways
- Learn that all animals need food, water, air, and shelter in order to live and grow
- Recognize that animals change and grow over time and their life cycles can vary
- Describe ways that animal offspring look like their parents
- Know that people use animal products to make food, but also keep some animals as pets
- Differentiate between living and nonliving things according to their characteristics

C. Physical Science (Chemistry and Physics)

The students will:

- Sort substances by observing their physical properties
- Investigate water as a natural resource that exists in solid, liquid, and gas form
- Identify and explore the properties and changing states of water
- Understand that materials have different properties that can be changed and manipulated to make a variety of objects
- Know that motion is a change in an object's position
- Describe sounds and understand how they are made

D. Technology/Engineering

The students will:

- Identify and describe characteristics of raw materials and processed materials
- Know that the material that makes up an object is selected to meet the specific requirement of the object and its function
- Recognize and illustrate various tools that are needed to construct certain objects
- Identify tools and simple machines and their uses
- Compare and contrast the specific ways people and animals use body parts as tools

TEACHING STRATEGIES

- Teacher directed lessons
- Whole class activities
- Small group activities
- Working with a partner
- Individual activities
- Brainstorming
- Modeling
- Conducting experiments

ASSESSMENT

- Questions at the end of each lesson
- Chapter worksheets
- Supplementary worksheets
- Performance during various activities
- Scoring rubric
- Word Power vocabulary
- Class projects
- Art projects
- *John Collins Writing Program*

RESOURCES

- *Science* Teacher's Edition Macmillan/McGraw-Hill
- *Science* Flipbook Macmillan/McGraw-Hill
- *Science A to Z Activity Book* Macmillan/McGraw-Hill
- *Practice and Learn* by J. L. Smith
- *Discovery World* by The Child's World
- *Time for Kids*
- Photo sorting cards
- Extend activity cards
- Science kit materials
- Collectibles for experiments
- Manipulatives
- Supplementary posters
- Technology
- Satellite Library
- Smart Board
- Leveled Readers:
  Plant Parts by Amy Jo
  Plants Grow by Kathleen Haye
  All Kinds of Plants by Linda Ross
  Good Morning by Nancy Horn
  Our Desert Home by Judy Nayer
  Animals Grow by Peggy Ann Torney
  What's in the Soil? by Judy Nayer
  Rocks by Jessica Levine-Bacal

All Kinds of Rocks by Judy Nayer
Land High and Low by Kathleen Hayes
Clouds by Karen Young
A Favorite Season by Linds Ross
The Night Sky by Cindy Walter
Working with Wood by Kathleen Hayes
Working with Clay by Susan Greenbaum
Water Moves by Rita Myers
What Sinks? What Floats? by Wendy Vierow
Toys That Move by Wendy Vierow
Making Sounds by Donna Zarpaylic

Science
Grade One

PURPOSE:

The purpose of science in grade one is to engage students to develop skills they need to think in a scientific manner. This will be done through observations, questions, and experiments. They will be encouraged to generate their own questions and design their own investigations and answers.

OUTCOMES:

A. Earth and Space Science

The student will:

- Explore water, rocks, soil and living organisms as a natural resource
- Explore what may be found in air
- Identify different types of pollution found in air, water, and land
- Describe and chart weather changes from day to day and throughout the seasons
- Recognize that the Sun supplies us with heat and light, and is necessary for life
- Identify events around us that have repeating patterns, including the seasons
- Understand the changes that take place in appearance as the seasons change

B. Life Science (Biology)

The students will:

- Recognize that all animals and plants are living things that and need food, air, and water to grow and reproduce
- Recognize the differences between living and nonliving things
- Understand plant and life cycles
- Begin to understand the parts of a plant
- Understand the changes that take place in appearance of the world around them throughout the seasons
- Recognize that people and other living things interact through their senses of hearing, sight, touch, smell, and taste

C. Physical Sciences (Chemistry and Physics)

The students will:

- Sort objects by size, shape, color, mass, and texture
- Identify materials and objects as solid, liquid, or gas
- Recognize that liquids take the shape of their container
- Describe ways that objects can move
- Demonstrate the way to change the position of an object by applying force, such as a push or a pull
- Use a balance to compare the mass of objects
- Demonstrate how change in temperature can affect the state of mass and water
- Ask questions, observe, and predicate outcomes

D. Technology/Engineering

The students will:

- Explain and describe the safe and proper use of tools and materials to construct simple structures
- Identify and describe characteristics of natural materials and non-natural materials

TEACHING STRATEGIES

- Teacher directed lessons
- Cooperative group work
- Partner work
- Experiments
- Record keeping
- Graphing

ASSESSMENT

- Vocabulary writing
- Chapter assessments
- *John Collins Writing Program*
- Quizzes

RESOURCES

- Weekly weather charts
- Graphs
- Records of data
- Classroom presentations
- Computer lab
- *Time for Kids*
- *Science* MacMillan/McGraw-Hill
- Classroom satellite library

Science Curriculum
Grade Two

PURPOSE:

The purpose of teaching science in grade two is to help students develop the skills they need to think like scientists. They will pursue an understanding of Earth and space science, life science, physical science, and technology and engineering. The students will need to learn to observe, infer, classify, measure, communicate, use numbers, predict, form a hypothesis, experiment, make a model, define based on observation, and name and use simple equipment and tools.

OUTCOMES:

A. Earth and Space Science

The students will:

- Recognize that water, rocks, soil, and living organisms are found on Earth's surface
- Recognize and draw a water cycle
- Understand that air is a mixture of gases and that wind moves the air
- Describe the weather changes from day to day and make weather forecasts and predictions
- Recognize vocabulary for weather conditions, tools, and instruments
- Understand the process of erosion
- Understand how Earth's surfaces and landforms can change
- Recognize that the Sun is a star that supplies heat and light to the Earth and is necessary for life
- Understand that there is a relationship between the rotation of the Earth and Sun

B. Life Science (Biology)

The students will:

- Identify and classify animals and plants by their characteristics
- Understand that all animals and plants are living things that need food, air, light, and water to grow
- Explore living and nonliving things according to their characteristics, and understand how they are alike and how they are different
- Describe ways in which animals and plants resemble their parents
- Understand that plants and animals have life cycles and they vary among species

- Label and identify parts of a plant
- Recognize what clues scientists get from animals today to learn about dinosaurs
- Recognize that fossils provide us with information about living things that inhabited Earth millions of years ago
- Recognize differences between types of dinosaurs
- Understand the difference between endangered and extinct in relation to animals of the past
- Identify scientific theories for dinosaur extinction
- Recognize that all animals interact with the environment through their five senses and that the environment impacts all animals
- Recognize the effects seasonal changes have on animals and plants
- Identify the ways in which an organism's habitat provides for its basic needs

C. Physical Sciences (Chemistry and Physics)

The students will:

- Sort various objects by observable properties such as size, shape, color, mass, and texture
- Identify objects and materials as solid, liquid, or gas
- Recognize that solids have a definite shape, that liquids take the shape of their container and gases have no shape

D. Technology and Engineering

The students will:

- Describe and use characteristics of natural materials and human-made materials
- Explain some possible uses for natural materials and human-made materials
- Describe the safe and proper use of tools and materials to construct simple structures
- Recognize tools and simple machines used for a specific purpose
- Describe how human beings use parts of the body as tools, and compare their use with the ways in which animals use those parts of their bodies
- Demonstrate the way to change the motion of an object by applying a force of a push or pull

TEACHING STRATEGIES

- Cooperative group work
- Teacher directed lesson plans
- Experiments
- Oral presentations
- Videotaped presentations – 5 day Meteorologist Presentations
- Pair work
- Journaling
- Data entries
- Recording observations

ASSESSMENT

- Teacher generated tests and quizzes
- Class projects including Animal and Dinosaur Dioramas and Weather Disaster Trioramas
- Written reports
- Classroom observations
- Science centers
- Experiments
- *John Collins Writing Program*
- Videotaped presentations on Weather Forecasting

RESOURCES

- *Reading in Science Workbook* MacMillan McGraw-Hill
- *Science Test Preparation and Practice The Princeton Review* MacMillan McGraw-Hill
- *Science Cross Curricular Projects* MacMillan McGraw-Hill
- Books
- Charts
- Posters
- Graphs
- Globes
- Poems
- Videotapes
- Overhead transparencies
- Workbooks
- Science Kit
- *Time for Kids*
- *Eyewitness News* Video Library
- Smart Board
- Satellite Library

Science
Grade Three

PURPOSE:

The purpose of science in grade three is to develop the scientific method of thinking through observation, questioning, experimentation, and collecting data. The students will learn some of the concepts of Earth and Space Science, including rocks and their properties, soil, Earth's history, and Earth in the solar system. They will study Life Science, including the characteristics of plants and animals, plant structures and functions, and the adaptations of living things. They will also be introduced to Physical Sciences, including chemistry and physics. The study of properties of objects and materials, states of matter, and forms of energy will be implemented through reading and experimentation.

OUTCOMES:

A. Earth and Space Science

The students will:

- Compare and contrast the physical properties of rocks and minerals
- Explain the categories of rocks based on how they are formed
- Give examples of the ways in which soil is formed and explain each process
- Recognize and discuss the different properties of soil
- Develop an understanding of changes in weather
- Distinguish among the various forms of precipitation
- Compare and contrast weather and climate
- Explain how the surfaces of Earth change due to the forces of nature
- Recognize that Earth is part of the solar system
- Explain the differences between rotation and revolution of the objects in the solar system
- Describe the changes in the appearance of the moon that can be observed during the course of a month

B. Life Science (Biology)

The students will:

- Learn that plants and animals are grouped according to their physical characteristics
- Identify the parts of plants and their functions
- Recognize and explain the life cycles of plants and animals
- Differentiate between the stages of the life cycles of the frog and butterfly
- Learn the differences between inherited and learned traits

- Give examples of how inherited characteristics may change over time as plants and animals respond to their environment
- Describe how some plants and animals can survive harsh environments based on seasonal changes
- Explain how the changes in ecosystems affect the plants and animals that live there
- Describe how energy derived from the sun is used by plants and transferred within the food chain from producers to consumers to decomposers

C. Physical Science (Chemistry and Physics)

The students will:

- Recognize the different properties of objects
- Compare and contrast solids, liquids, and gases
- Describe how water can be changed into different states of matter
- Identify the basic forms of energy
- Recognize that energy is the ability to cause motion or create change
- Give examples of how energy can be transformed from one form to another
- Recognize that magnets have poles that repel and attract
- Identify and classify objects and materials that a magnet may attract or repel
- Learn that sound is produced by vibrating objects and needs a medium through which to travel
- Recognize that light travels in a straight line until it strikes an object or travels from one medium to another
- Describe how light can be reflected, refracted, and absorbed

D. Technology/Engineering

The students will:

- Recognize and explain materials used to accomplish a specific task based on a given property
- Identify and explain the appropriate use of materials and tools
- Learn and explain the differences between complex and simple machines

TEACHING STRATEGIES

- Cooperative learning groups
- Teacher directed lessons
- Experiments

- Graphic organizers
- Foldables

ASSESSMENT

- *Reading in Science Resources* Macmillan/McGraw-Hill
- Teacher assessments
- Chapter tests
- Teacher observations
- *John Collins Writing Program*
- *Science Fair rubric for Science Fair project*

RESOURCES

- *Science* Macmillan/McGraw-Hill
- *Reading in Science Workbook* Macmillan/McGraw-Hill
- Internet sites
- *Electrical Inventions* by Lisa Benjamin
- *There and Back, Then and Now* by Patricia Baehr
- *Stormy Weather* by Dona Smith
- *Save Our Park Trees* by Barbara Adams
- *Acoma: The Sky City* by D.L Birchfield
- *Claws and Wings and Other Neat Things* by Joanne Mattern
- *Up, Up and Away!* by Howard Gutner
- G*et a Grip* by Shirley Granahan
- *Machines That Build* by Whit Fisher
- *Mars Discovery* by Andrew Gutelle
- *A Ride Over the Serengeti* by Linda Cernak
- *Sharks* by Anne Miranda
- *The Hurricane Hero* by Robin Bloksberg
- *I Can't Believe My Eyes!* by Joanne Mattern
- *The Old Swimming Hole* by Mary Carol Nagel
- *The Wolves' Winter* by Alice Pernick
- *Kit Foxes by* Jennifer Jacobson
- *Rescue at First Encounter Beach* by Pearl Neuman

Science
Grade Four

PURPOSE:

The purpose of science in grade four is to further explore and understand the concept of scientific method. Students will continue to observe, question, experiment, and draw conclusions as an interactive way of learning about the natural world around us. Students will explore science in the areas of life science, Earth science, physical science, technology and engineering.

OUTCOMES:

A. Earth and Space Science

The students will:

- Explain what a mineral is and give examples of its physical properties
- Test for the physical properties of minerals
- Identify the three categories of rock based on how they are formed
- Explain and give examples of the way in which soil is formed
- Recognize and discuss the different properties of soil
- Explain the meaning of weather
- Distinguish among the various forms of precipitation
- Describe how the jet streams and water currents influence local weather in measurable terms
- Differentiate between weather and climate
- Describe the water cycle on Earth
- Give examples of how the surface of the Earth changes due to gradual and rapid processes
- Recognize that the Earth revolves around the sun annually and that the Earth rotates on its axis once approximately every 24 hours

B. Life Science (Biology)

The students will:

- Identify plants and animals according to their physical characteristics
- Recognize the structures in plants that are responsible for their reproduction processes
- Understand that plants and animals go through predictable life cycles

- Give examples of how inherited characteristics may change over time as an organism adapts to changes in the environment
- Describe the effect of behavior of organisms in their environment
- Compare and contrast instinctive behavior and learned behavior
- Recognize the way plants grow in relation to their environment
- Give examples of how organisms can adapt to and affect the ecosystem
- Describe the process of photosynthesis

C. **Physical Sciences (Chemistry and Physics)**

The students will:

- Differentiate between physical properties of objects
- Demonstrate an understanding of the three states of matter
- Describe how water can be changed from one state to another by increasing or decreasing heat
- Identify the basic forms of energy and explain how they can be transferred from one form to another
- Explain the process of an electric circuit
- Introduce objects and materials that conduct electricity and objects and materials that are insulators of electricity
- Explain how electromagnets can be made and give examples of how they can be used
- Identify and classify objects that contain magnetic materials and those that do not
- Explore sound and how it is produced by vibrating objects and requires a medium through which to travel
- Recognize that the path light travels changes as it passes from one medium to another

D. Technology/Engineering

The students will:

- Explain that certain materials are used to accomplish a design task based on a specific property
- Identify and explain the appropriate materials and tools needed to construct a given prototype
- Identify a problem that reflects the need for shelter, storage, or convenience
- Describe the different ways in which a problem can be visually represented
- Identify relevant design features needed for building prototype

- Explain solar energy

TEACHING STRATEGIES

- Teacher directed lessons
- Cooperative group work
- Partner work
- Experiments
- Technology

ASSESSMENTS

- Chapter tests
- Quizzes
- *John Collins Writing Program*
- Presentation of individual reports
- Presentation and explanation of individual experiments

RESOURCES

- *Science* MacMillan McGraw Hill
  Volume 1 Life Science
  Volume 2 Physical Science
  Volume 3 Earth Science
- *Reading in Science Workbook* MacMillan McGraw Hill
- *Time for Kids*
- Leveled Readers
- Vocabulary cards
- Manipulatives
- Experiments
- Microscopes
- Technology

Science
Grade Five

PURPOSE:

The purpose of science in grade five is to give students an understanding of what an experiment requires through discovery, cooperation and decision making. In life science they will learn about the characteristics of living things and their environments, plant structure and functions. In Earth science they will learn about Earth and its resources by investigating its position in the solar system. They will learn about astronomy, weather patterns and climate. In physical science they will learn about the properties of matter and energy, Newton's laws of motion, sound energy and light energy.

OUTCOMES:

A. Earth and Space Science:

a. Rocks and their Properties

The students will:

- Give a simple explanation of minerals
- Identify the physical properties of minerals and explain how they can be tested for different physical properties.
- Identify the three categories of rocks based on how they are formed and explain the natural and physical processes that create these rocks

b. Soil

The students will:

- Explain and give examples of the way in which soil is formed
- Recognize and discuss the different properties of soil

c. Weather

The students will:

- Explain how air temperature, moisture, wind speed, and precipitation make up the weather
- Distinguish among the various forms of precipitation making connections to the weather
- Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms
- Differentiate between weather and climate

d. The Water Cycle

The students will:

- Describe how water on Earth cycles in different forms
- Describe how the water cycle affects climate

e. Earth's History

The students will:

- Give examples of how the surface of Earth changes due to slow and rapid process

B. Life Science (Biology)

a. Characteristics of Plants and Animals

The students will:

- Classify plants and animals according to their physical characteristics

b. Plant Structure and Function

The students will:

- Identify the structures in plants that are responsible for food production, support, water transport, reproduction, growth, and protection
- Understand that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death
- Describe in detail the major stages that characterize the life cycle of the frog and the butterfly as they go through metamorphosis
- Observe and explain the characteristics of plants and animals that are fully inherited and those that are affected by climate or environment

c. Adaptation of Living Things

The students will:

- Give detailed examples of how inherited characteristics may change over time as organisms need to adapt to their environment
- Give examples of how changes in the environment have caused some plants to die and some animals to change habitats
- Describe how organisms meet some of their needs in an environment in response to external stimuli
- Recognize plant behaviors such as the way seedling stems grow toward the light and their roots grow downward in response to gravity
- Recognize that many plants and animals can survive harsh environments because of seasonal adaptations
- Give examples of how organisms can manipulate their environment to ensure survival

d. Energy and Living Things

The students will:

- Describe in detail the process of photosynthesis

C. Physical Science (Chemistry and Physics)

a. Properties of Objects and Materials

The students will:

- Differentiate between the size, shape, weight and properties of solid objects and the color, texture and hardness of materials

b. State of Matter

The students will:

- Compare and contrast solids, liquids, and gases based on the basic properties of matter
- Demonstrate and explain how water can be changed from one state to another by adding or taking away heat

c. Forms of Energy

The students will:

- Identify the basic forms of energy
- Recognize that energy is the ability to cause motion or create change
- Give examples of how energy can be transferred from one form to another

d. Electrical Energy

The students will:

- Recognize that electricity in circuits requires a complete loop through which an electrical current can pass and that electricity can produce light, heat, and sound
- Identify and classify objects and materials that are insulators and materials and objects that are conductors of electricity
- Explain how electromagnets can be made and give examples of how they can be used

e. Magnetic Energy

The students will:

- Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will repel

f. Sound Energy

The students will:

- Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relocate the rate of vibrations to the pitch of the sound

g. Light Energy

The students will:

- Recognize that light can be reflected, refracted, and absorbed

D. Technology and Engineering

The students will:

- Identify materials used to accomplish a design task based on a specific property
- Identify and explain the appropriate materials and tools to construct a given prototype
- Identify and explain the difference between simple and complex mechanisms
- Identify relevant design features for building a prototype of a solution to a given problem
- Compare natural systems with mechanical systems that are designed to serve similar purposes

TEACHING STRATEGIES

- Teacher directed lessons
- Experiments
- Projects
- Cooperative learning
- Transparencies
- Graphic organizers
- Lectures
- Foldable
- Personal knowledge

ASSESSMENT

- *John Collins Writing Program*
- Summaries
- Chapter Tests
- Research projects
- Presentations
- Quizzes
- Workbook pages
- Homework
- *Science* assessment book

- Science Fair Rubric

RESOURCES

- *Science* Macmillan McGraw-Hill
- *Explore* – activity video
- Vocabulary cards
- Reading aid transparencies
- *Activity Resources*- Macmillan McGraw-Hill
- *Reading in Science Resources* –Macmillan McGraw-Hill
- *Time for Kid*s
- Overhead projector
- Leveled readers
- Technology

Science
Grade Six

PURPOSE:

The purpose of science in grade six is to learn some of the concepts from the areas of physical sciences (chemistry and physics). The standards included are, but not limited to: properties of matter, elements, compounds and mixtures, motion of objects, forms of energy, heat energy, electricity, magnetism. The students will gain a greater understanding of the physical and chemical components of our world. The students will learn through a variety of types of lessons and will be assessed in many different ways.

OUTCOMES:

A. Physical Sciences (Chemistry and Physics)

a. Properties of Matter

The students will:

- Identify the basic properties of matter including: length, mass, volume, and density
- Find the length, mass, volume, and density of a variety of regular and irregularly shaped objects
- Describe the properties of matter using the correct science vocabulary terms
- Recognize and compare objects that are composed of matter and ones that are not composed of matter
- Classify objects according to their physical properties

b. Elements, Compounds and Mixtures

The students will:

- Define and differentiate elements, compounds, and mixtures
- Compare and contrast the compositions of elements, compounds and mixtures
- Detail how atoms, elements, molecules, compounds, and mixtures are related to each other

c. Motion of Objects

The students will:

- Identify and describe the concept of motion
- List and explain Newton's three laws of motion
- Explain how mass, acceleration, and velocity are related to and affect the speed of an object
- Detail and describe a how the concepts of motion affect real objects

d. Forms of Energy

The students will:

- Define and explain the term energy, the causes of energy, and its forms
- Recognize the relationship between potential, kinetic, and heat energy
- Describe real life experiences that show the relationship among the forms of energy
- Identify and apply the Law of Conservation of Energy
- Recognize how heat energy is measured through temperature
- Describe the three types of transfer of energy: conduction, convection, and radiation

e. Heat Energy

The students will:

- Define chemical reactions and describe the steps in a chemical reaction
- Identify the different signs of chemical reactions
- Explain the difference between an endothermic and an exothermic reaction
- Define the Law of Conservation of Mass

f. Electricity and Magnetism

The students will:

- Explain what electric charges and forces are and how they affect each other
- Identify and describe charging by induction and charging by contact
- Describe conductors and insulators and give example of both
- Construct a simple electric circuit and explain how the electrons flow
- Define magnetism in detail and explain what properties cause some objects to attract and some to repel
- Describe a magnetic field and identify magnetic materials
- Explain the difference between a temporary and a permanent magnet
- Construct an electromagnet and explain how it works

B. Technology/Engineering

a. Engineering Design

The students will:

- Explain and evaluate all of the steps in an engineering process

- Represent the solutions to a design problem in a variety of visual and graphic ways
- Describe and explain in detail the purpose of a certain prototype
- Identify the appropriate materials, tools, and machines needed to carry out a design plan for a certain prototype
- Explain in detail how design features would affect the construction of a certain prototype
- Identify the five elements of a universal systems model

C. Science Fair

The students will:

- Plan a science project according to the scientific method
- Conduct a science project
- Display and explain their science project and all the steps at the Science Fair

TEACHING STRATEGIES

- Teacher directed lessons
- Cooperative group work
- Partner work
- Lab experiences
- Videos
- Technology

ASSESSMENT

- Tests and quizzes
- Performance assessment
- Lab reports
- Oral reports
- Written reports
- *John Collins Writing Program*
- Midterm and Final

RESOURCES

- *Science Level Red* Glencoe Science
- *The Boston Globe* Health and Science Section
- *Schlesinger Science Videos* various titles
- *Eyewitness Science Videos* various titles
- Red.msscience.org
- Technology

- Classroom satellite library

Science
Grade Seven

PURPOSE:

The purpose of Science in grade seven is to learn some of the concepts from the areas of Earth and Space Science as well as from life science (Biology). The standards included are, but not limited to: Earth's structure, heat transfer in the Earth' system, weather, climate, the Earth in the solar system, classification of organisms, structure and function of cells, systems of living things, and reproduction and heredity. The students will gain a greater understanding of Earth and the living organisms that inhabit it. The students will learn through a variety of types of lessons and will be assessed in many different ways.

OUTCOMES:

A. Earth and Space Science

b. Earth's Structure

The students will:

- Create and describe models of Earth's physical features
- Label and describe the layers of Earth
- Identify and describe the layers of Earth's atmosphere
- Compare and contrast the layers of Earth's atmosphere

c. Heat Transfer in the Earth's System

The students will:

- Recognize and describe the three types of energy transfer in Earth's atmosphere
- Describe in detail the water cycle and explain how it affects the weather and climate of an particular area
- Describe the major wind patterns on Earth and their effects on climate and weather
- Explain the Coriolis' effect and its effect on global climates

c. Weather

The students will:

- List and describe the factors that causes different types of weather
- Differentiate and describe various cloud formations, and explain what effects each type has on the weather of a particular location
- Explain in detail the what causes the different types of precipitation
- Identify the causes and effects of various weather patterns
- Describe the factors that cause severe weather conditions
- Detail the effects and impact of different types of severe weather events

- Label the parts of a weather station model
- Apply the information from a weather station model to forecast weather in a particular geographic location

d. Climate

The students will:

- Describe the climate of various geographic locations
- Compare and contrast the behavioral adaptations of various animals to their climates
- Detail the factors that could lead to climate change in area or over the entire Earth
- Recognize the possible effects of excessive greenhouse gases and their connections to global warming
- Identify the human activities that are believed to be contributing to global warming
- Identify ideas and strategies that could lead to a reduction of greenhouse gases

e. The Earth in the Solar System

The students will:

- Describe the shape of the Earth and give supportive criteria for the shape
- Describe physical properties of the Earth
- Detail and explain how the tilt of the Earth is the main cause of seasonal difference in various geographic locations on the Earth
- Describe the physical characteristics and properties of the Earth's moon
- Explain the different theories for Earth's and the moon's origin
- Describe in detail the properties of all planets
- Compare and contrast the properties of the planets
- Identify and explain other objects in the solar system

f. Earth's History

The students will:

- Describe and give examples of composition of the Earth, in particular the formation of rocks
- Describe and be able to identify mineral through various property tests
- Explain and describe how weathering erosion, and the deposition of sediments all contribute to the building of the Earth's surface features

B. Life Science (Biology)

a. Classification of Organisms

The students will:

- List and describe the different levels of classification for organisms
- Describe how organisms are classified by a variety of characteristics
- Compare and contrast a variety of organisms at each level of the classification system

b. Structure and Function of Cells

The students will:

- Recognize that all organisms are made of one or more cells
- Compare and contrast the functions of cells in one-celled organisms and in multi-celled organisms
- Differentiate the structures of cells in plants and in animals
- Explain why plants have a cell wall and a cell membrane
- Explain why animals only have a cell membrane
- Describe the functions and structures of animals cells
- Recognize the characteristics of viruses
- Detail the methods of treating and preventing viral diseases
- Describe the different types of cellular transport

c. Systems of Living Things

The students will:

- Outline the order of organization within multi-celled organisms
- Describe the different ways that organisms obtain and use energy
- Identify the phases of mitosis in organisms
- Explain the reasons for each phases of mitosis
- Describe the different types of asexual reproduction
- Identify the phases of meiosis in organisms
- Explain the reasons for each phase of mitosis
- Compare and contrast processes of mitosis and meiosis
- Describe DNA's structure and purpose
- Identify various types of mutations and their possible causes
- Describe RNA's structure and purpose
- Describe the functions and purposes of the major human body systems

d. Reproduction and Heredity

The students will:

- Describe the study of genetics and its history

- Recognize the terms related to the study of genetics
- Detail many of the experiments of Gregor Mendel and explain his principles of heredity
- Explain the difference between dominant and recessive traits
- Understand and use Punnett squares to predict outcomes
- Identify and explain inheritance by multiple alleles and polygenic inheritance, and give examples of each
- Describe some of the methods and uses of genetic engineering

C. Technology/Engineering

a. Construction Technologies

The students will:

- Describe and explain the parts of a building structure
- Identify and describe three major types of bridges
- Explain how the forces of tension, compression, torsion, bending, and shearing affect the performance of bridges
- Describe the explain the effects of loads and structural shape on bridges

D. Science Fair

The students will:

- Plan a science project according to the scientific method
- Conduct a science project
- Display and explain their science project and all the steps at the Science Fair

TEACHING STRATEGIES

- Teacher directed lessons
- Cooperative group work
- Partner work
- Lab experiences
- Videos
- Technology

ASSESSMENT

- Quizzes and tests
- Anecdotal reporting
- Lab reports
- Oral reports
- Written reports
- *John Collins Writing Program*
- Midterm and Final

RESOURCES

- *Science Level Green* Glencoe Science
- *The Boston Globe* Health and Science Section
- *Schlesinger Science Videos* various titles
- *Eyewitness Science Videos* various titles
- Green.msscience.org
- Science lab materials
- Classroom satellite library
- Technology

Science
Grade Eight

PURPOSE:

The purpose of science in grade eight is to investigate some of the concepts from the areas of Earth and space science, life science (Biology), technology and engineering. The standards included are, but not limited to: Earth's history, Earth's structure, systems of living things, evolution and biodiversity, living things in their environment, energy and living things, elements, compounds and mixtures, as well as changes in ecosystems over Time. The students will learn through a variety of types of lessons and will be assessed through the use different types of assessment tools.

OUTCOMES:

A. Physical Sciences (Chemistry and Physics)

a. Elements, Compounds, and Mixtures

The students will:

- Recognize that there are over one hundred elements on the Periodic Table of Elements
- Detail how the Periodic Table is organized and explain the meaning of the symbols, numbers, and abbreviations
- Compare and contrast the properties of atoms, elements, molecules, compounds, and mixtures
- Recognize and describe examples of elements, compounds, and mixtures
- Write some basic chemical formulas for elements, compounds, and mixtures
- Differentiate between physical changes and chemicals changes and describe examples of both
- Read and write basic chemical equations
- Explain the Law of Conservation of Mass using chemical equations

B. Life Science (Biology)

a. Systems of Living Things

The students will:

- Explain how the major human body systems interact and describe how they affect each other
- Describe how the human body regulates itself through negative feedback mechanisms to maintain homeostasis and through positive feedback mechanisms

b. Evolution and Biodiversity

The students will:

- Detail the ways genes vary and how environmental factors can affect genes
- Describe the different ways organisms have evolved and some factors that contribute to the evolution of a species
- Explain the roles and relationships among producers, consumers, and decomposers in a variety of ecosystems; and how they can affect an organism's survival

c. Living Things and Their Environment

The students will:

- Explain how different organisms interact and have different roles within an ecosystem
- Describe different types of symbiotic relationships and give examples

d. Energy and Living Things

The students will:

- Detail the decomposition process and how it is important for all members of a food web
- Explain the ways by which organisms take in and use energy through the processes of photosynthesis, respiration, and fermentation as they relate to different organisms in a food web

e. Changes in Ecosystems Over Time

The students will:

- Describe how different ecosystems have changed through out geologic time because of physical conditions, the interactions of organisms, and the effects of human activities
- Describe some changes that have happened to climates on the Earth and to its geological structures
- Identify the changes in the types and number of a variety of organisms and species during each significant era of geologic time
- Explain how the process of evolution accounts for the great variety or organisms and species.
- Recognize that species development and the geology of the Earth is shaped by two main processes of gradualism and punctuated equilibrium
- Describe in detail how slow gradual processes, like Continental Drift have shaped the Earth

- Describe in detail the more sudden catastrophic events that are believed to have caused the extinction of the dinosaurs and other mass extinctions
- Recognize and describe different types of fossils and how they support the theory of evolution
- Recognize and describe how the comparative anatomy of species also supports the theory of evolution
- Trace the evolution of a variety of species through geologic time, recognizing that there are still gaps in the evolutionary record of many species

C. Technology /Engineering:

a. Bioengineering technologies

The students will:

- Explain and describe examples of adaptive or assistive devices
- Describe, explain, and give examples of bioengineered products

D. Science Fair

The students will:

- Plan a science project according to the scientific method
- Conduct a science project
- Display and explain their science project and all the steps at the Science Fair

TEACHING STRATEGIES

- Teacher directed lessons
- Cooperative group work
- Partner work
- Lab experiences
- Videos
- Technology

ASSESSMENT

- Quizzes and tests
- Performance assessment
- Lab reports
- Oral reports
- Written reports
- *John Collins Writing Program*
- Midterm and Final

RESOURCES

- *Science Level Blue* Glencoe Science
- *The Boston Globe* Health and Science Section
- *Schlesinger Science Videos* various titles
- *Eyewitness Science Videos* various titles
- Blue.msscience.org
- *Silent Spring* by Rachel Carson
- Technology
- Classroom satellite library