ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: Kindergarten

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Introduction to Matter**
- **Introduction to Magnetism**

EARTH SCIENCE

- **The Earth**
- **Seasons & Weather**
- **Taking Care of the Earth**

LIFE SCIENCE

- **The Human Body**
- **Animals and Their Needs**
- **Plants and Plant Growth**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

Matter

Students will know the objects can be described in terms of the materials they are made of and their physical properties. (3)
Students will know and understand the properties of water and their change in form. (3)

Introduction to Magnetism

Students will identify familiar everyday uses of magnets. (3)
Students will classify materials according to whether they are or are not attracted by a magnet. (3)
Students will be introduced to the works of George Washington Carver and W.O. White (3)

EARTH SCIENCE

Seasons and Weather

Students will know the four seasons.(3)
Students observe and record characteristic local weather patterns during the different seasons. (3)
Students will experience the light and warmth provided by the sun. (3)
Students will describe daily weather changes, including temperature, clouds, rainfall, and snow. (3)

The Earth

Students will learn that the Earth is composed of land, air and water (3)
Students will understand the characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms. (3)
Students will understand that changes in weather occur from day to day and over seasons, affecting the Earth and its inhabitants. (3)

Taking Care of the Earth

Students will be introduced to conservation of limited resources. (2,3,4)
Students will practice conservation of energy and resources (3,4)
Students will discover materials can be recycled (3,4)
Students will recognize the danger of pollution (3,4)
Students will acknowledge the choice people have to reduce pollution. (3,4)

LIFE SCIENCE

The Human Body

Students will learn to identify basic body parts. (2,3)
Students will explore their five senses and associated body parts. (1,2)
Students will name activities that benefit the body, including exercise, cleanliness, eating healthy, and rest. (2,1)

Plants and Plant Growth

Students will learn what plants need to grow: sufficient warmth, light, and water (3)
Students will learn five basic parts of plants: seed, root, stem, branch and leaf. (3)
Students will recognize that plants make their own food. (3)
Students will explore flower and seeds (3)
Student will differentiate between deciduous and evergreen plants. (3)
Students will observe the process of food coming from the farm to the table. (3)

Animals and their Needs

Students will compare the needs of plants to the needs of animals (3)
Students will recognize that unlike plants and animals get food from eating plants and other living thing. (3)
Students will compare animal offspring to their parents (3)
Students will compare animal offspring (Including humans) need to be cared for when young. (3)
Students will recognize that owners must care for pets' special needs. (3)
Students will be introduced to the work of Jane Goodall. (3)

ASSESSMENT TECHNIQUES

Teacher Observation
Science Workbooks

Hand-On Experiments

INSTRUCTIONAL RESOURCES

Core Knowledge Material
A Year of Hands-on Science
100% Educational Videos
Trade Books
Various Teacher Workbooks
Time Magazine for Kids
Field Trips
ITBS

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: First

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

The First Grade Science program is designed to encourage the students to actively view the world scientifically. The students' scientific awareness will increase through hands-on experience and observation related to living things and their habitat, the human body, and matter.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Matter**
- **Electricity**

EARTH SCIENCE

- **Solar System**
- **Earth**

LIFE SCIENCE

- **Human Body**
- **Living Things**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

Matter

- Students will display an understanding of the concept that everything is made of matter, and that all matter is made of parts too small to see. (3)
- Students will distinguish between the three states of matter: solid, liquid, gas. (3)
- Students will demonstrate the change in matter: water changes to ice. (3)

Electricity

- Students will recognize conductive and nonconductive materials. (3)
- Students will demonstrate the difference between open and closed circuits. (3)
- Students will explore the basic principals of electricity and electrical safety. (3)
- Students will recognize Thomas Edison as the discoverer of electricity. (3)
- Students will demonstrate what static electricity is. (2,3)

EARTH SCIENCE

Solar System

- Students will recognize the sun as the source of energy, heat and light. (3)
- Students will identify phases of the moon. (3)
- Students will become familiar with the names of the planets. (3)
- Students will observe the stars, the Big Dipper, constellations and the sun as a star. (3)

- Students will recognize the earth and its place in the solar system. (3)

Earth

- Students will distinguish geographic features, the shape of the earth, the horizon, oceans, and continents. (3)
- Students will observe the earth's layers: crust, mantle, core. (3)
- Students will recognize the difference between volcanoes and geyers. (3)
- Students will investigate the different kinds of rocks (metamorphic, igneous, sedimentary) and minerals (quartz, coal, gold, sulfur, diamond, iron ore). (3)

LIFE SCIENCE

Human Body

- Students will describe in basic terms the following systems in the human body: skeletal, muscular, digestive, circulatory, and nervous. (3)
- Students will appreciate the need for taking care of the body through exercise, healthy eating, rest, cleanliness, and vaccination. (3)
- Students will recognize the names of Edward Jenner and Louis Pasteur as leaders in discovery of germ-causing diseases and vaccinations. (3)

Living Things

- Students will identify living things in relation to the environments for which the are suited. Specific habitats would be forest, meadow and prairie, undergrouns, desert, and water. (2,3)
- Students will explain how a food chain demonstrates the relationship between living things. (2,3)
- Students will observe that most of the earth is covered with water and will locate the Pacific, Atlantic, Indian, and Arctic Oceans. (3)
- Students will recognize that oceans are salt water and rivers or lakes are freshwater. (3)
- Students will recognize the following oceanic characteristics: coast, shore, waves, tides, currents andlandscapes of the ocean floor (mountain peaks and trenches). (3)
- Students will distinguish the diversity of ocean life (i.e. the difference between small organisms and giant whales). (3)
- Students will recognize dangers to ocean life (i.e. over fishing, pollution). (3)
- Students will recognize Rachel Carson as a leader in the study of environmental change and habitat destruction. (3)
- Students will observe that environments are constantly changing, which can sometimes pose dangers to specific habiatats (i.e. the effects of population and development, rainforest clearing, pollution and litter). (3)
- Students will name special animal classifications (herbivores, carnivores, omnivores, extinct animals) and give examples of each. (2,3)

ASSESSMENT TECHNIQUES

Teacher Observation
Student Interaction
Worksheets
Iowa Tests of Basic Skills

INSTRUCTIONAL RESOURCES

Core Knowledge Material
Trade Books
100% Educational Vdeos
Field Trips
Teacher Workbooks
Time For Kids

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: SECOND

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Magnetism**
- **Simple Machines**

EARTH SCIENCE

- **Water Cycle**
- **Seasonal Cycles**

LIFE SCIENCE

- **Insects**
- **Ecosystems and Habitats**
- **Animal Adaptations**
- **Human Body**
- **Nutrition**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

Magnetism

- Students will recognize that magnetism demonstrates that there are forces we cannot see that act upon objects. (2,3)
- Students will express that most magnets contain iron. (2,3)
- Students will identify lodestones as naturally occurring magnets. (2,3)
- Students will identify north-seeking and south –seeking magnetic poles. (2,3)
- Students will recognize that magnetic fields are strongest at the poles. (2,3)
- Students will define the law of magnetic attraction: unlike poles attract, like poles repel. (2,3)
- Students will recognize that the earth behaves as if it were a huge magnet with north and south poles. (2,3)
- Students will use a magnetized needle in a compass, which will always point to the north. (2,3)

Simple Machines

- Students will identify and explore the use of simple machines (lever, pulley, wheel-and-axle, inclined plane, wedge, screw). (2,3)
- Student s will recognize that simple machines make work easier. (2,3)
- Students will recognize fiction and ways to reduce friction (lubricants, rollers, etc.) (2,3)

EARTH SCIENCE

Cycles in Nature: Water Cycle

- Students will discover that most of the earth is covered in water. (2,3)
- Students will name the parts of the water cycle: (water vapor; humidity; clouds: cirrus, cumulus, and stratus). (2,3)

LIFE SCIENCE

Cycles in Nature: Life Cycles

- Students will name the four seasons and their life processes: (spring: sprouting sap flow in plants, mating and hatching; summer: growth; fall: ripening, migration; winter: plant dormancy, animal hibernation).
- Students will identify the life cycle (birth, growth, reproduction, death)
- Students will identify reproduction in plants and animals (from seed to seed with the plant; from egg to egg with a chicken; frog to frog; from butterfly to butterfly)

Insects

- Students will identify ways insects can be helpful and harmful to people.
- Students will identify the distinguishing characteristics of an insect.
- Students will distinguish between two kinds of life cycles in insects: metamorphosis and incomplete metamorphosis.
- Students will explain that some insects are social.

Ecosystems and Habitats

- Students will learn that living things live in environments and habitats that are suited to them (grassland, woodland, underground, water, etc.)

Animal Adaptations

- Students recognize that God created living things with many characteristics to enable them to adapt to His world: coloring, body type, blubber, body covering, camouflage, diet, instincts, etc.

Human Body

- Students will recognize that all living things are made up of cells to small to be seen without a microscope.

- Students will understand that all cells make up tissues, tissues make up organs, and organs work in systems.
- Students will explore what happens to the food we eat by studying the body parts and functions involved in taking in food and getting rid of waste (reproductive and excretory systems).
- Students will explore what happens to the food we eat by studying body parts and functions involved in taking in food and getting rid of waste.
- Students will recognize the parts of the food pyramid.
- Students will express the importance of vitamins and minerals to our bodies.

Nutrition

- Students will be provided with opportunities for them to develop basic skills needed to identify healthy eating and physical activity choices applicable to their own lives. (2,3)

ASSESSMENT TECHNIQUES

- Teacher observations
- Teacher-generated written and oral assessments
- Student- generated tests (test the teacher)
- Iowa Test of Basic Skills
- Student Journals
- Written and oral reports

INSTRUCTIONAL RESOURCES

- Core Knowledge Series: What Your Second Grader Needs to Know EB.Hirsh
- Core Knowledge Lesson Plans: **www.coreknowledge**. org.
- Resource books (county library and classroom)
- Unit Kits
- Hands-On materials (simple machine models, magnet sets, specimens,etc.)
- Living creatures (walking sticks, Madagascar hissing roaches, mealworms, tomato hornworms, ladybugs, Tibetan Terrier, etc.)
- Internet sites
- Videos/DVD
- Field Trips: Marine Mammal Center, Guide Dogs for the Blind, seasonal visits to Alston Park, Bay Area Discovery Museum
- Resource people (e.g. “the Bug Guy”)
- Dairy Council of America: **Healthy Choices, Healthy Me!**

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: THREE

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Light**
- **Sound**

EARTH SCIENCE

- **Ecology**
- **Astronomy**

LIFE SCIENCE

- **Human Body**
- **Classification of Animals**
- **Health and Nutrition**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

LIGHT

- Students will experience basic phenomena of light and define related vocabulary. (2,3)
- Students will demonstrate that light travels in a straight line and at very high speeds. (2,3)
- Students will distinguish between transparent, opaque, and solid objects. (2,3)
- Students will demonstrate how light reflection works. (2,3)
- Students will experience the use of lenses to magnify and bend light. (3)

SOUND

- Students will learn sound is caused by an object vibrating rapidly. (2,3)
- Students will learn sounds travel through solids, liquids, and gases. (2,3)
- Students will learn sound waves are much slower than light waves. (2,3)
- Students will learn qualities of sound: pitch and intensity. (2,3)
- Students will learn about the human voice: larynx and vocal chords. (2,3)
- Students will learn how the human ear works. (2,3)
- Students will learn about protecting your hearing. (2,3)

EARTH SCIENCE

ECOLOGY

- Students will identify habitats and the inter- and intra-dependence of organisms. (2,3)
- The students will learn the concept “balance of nature”. (2,3)
- The students will learn the parts of the food chain. (2,3)
- The students will observe the effects of environmental and man-made changes on ecosystems. (2,3)

- The students will learn about and participate in protecting the environment. (2,3,4)

ASTRONOMY

- The students will be able to describe the “Big Bang” theory. (2,3)
- The students will learn that the universe is beyond imagining. (2,3)
- The students will name the galaxies Milky Way and Andromeda. (2,3)
- The students will label the objects in a galaxy. (2,3)
- The students will explore planetary motion and their effects on the Earth. (2,3)
- The students will describe telescopes, satellites, rockets, and space shuttles. (2,3)
- The students will learn about stars and constellations. (2,3)

LIFE SCIENCE

CLASSIFICATION OF ANIMALS

- The students will classify animals according to the characteristics they share: warm-blooded or cold-blooded; vertebrates or invertebrates. (2,3)
- The students will learn the different classes of animals and how to identify them: mammals, fish, amphibians, reptiles, birds. (2,3)
- The students will write a report and complete a project on an animal. (2,3)

HUMAN BODY

- The students will be introduced to the main systems of the body. (2,3)
- The students will recognize and name the primary components of the skeletal system. (2,3)
- The students will label the parts of the eye. (2,3)
- The students will distinguish the difference between nearsightedness and farsightedness. (2,3)
- The students will label the parts of the ear. (2,3)
- The students will understand sound as vibration. (2,3)

HEALTH AND NUTRITION

- The students will learn related vocabulary. (2,3)
- The students will tell why liquids, healthful foods, and rest are important during an illness. (2,3)
- The students will infer the need for healthful foods. (2,3)
- The students will identify foods in the five healthful food groups. (2,3)
- The students will communicate the effects of caffeine, alcohol, and nicotine on the body. (2,3)
- The students will be able to identify products that contain caffeine, alcohol, and nicotine. (2,3)
- The students will be able to identify poison safety rules. (2,3)
- The students will be able to communicate the function of the Poison Control Center. (2,3)

ASSESSMENT TECHNIQUES

Teacher observation
Teacher designed assessment worksheets and tests
Merrill Science assessment materials
Hands-on activities
Group and partner activities
Iowa Test of Basic Skills

INSTRUCTIONAL RESOURCES

Merrill Science
Solar System, Wingate Productions
Solar System, Frank Schaffer Publications
Solar System, Edupress
Easy Make and Learn Projects Human Body, Scholastic
Physical Science, Steck Vaughn
The Body Book, Scholastic
Human Body, Teacher Created Materials
Muir Woods and Muir Beach field trip
Albertson's field trip
Assorted videos/DVDs
Napa Valley Symphony

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: FOUR

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand concepts in:

PHYSICAL SCIENCE

- **Chemistry**
- **Electricity and Magnetism**

EARTH SCIENCE

- **Geology**
- **Ecology**

LIFE SCIENCE

- **Human Body-Circulatory and Respiratory Systems**
- **Animal Classification**
- **Health and Nutrition**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

Chemistry

- Students will learn and understand what matter is and how to classify matter. (2,3)
- Students will learn three states of matter. (2,3)
- Students will understand differences between chemical and physical properties.(2,3)
- Students will learn the parts and functions of an atom. (2,3)
- Students will learn that molecules are made up of two or more atoms joined together. (2,3)
- Students will learn what an element is and research some common elements' properties. (2,3)
- Students will explore physical changes in matter. (2,3)
- Students will investigate chemical changes in matter. (2,3)
- Students will learn what a compound is. (2,3)

Electricity and Magnetism

- Students will explore how magnets and compasses are similar. (2,3)
- Students will describe the properties of magnets and magnetic fields. (2,3)
- Students will describe the relationship between electricity and magnetism. (2,3)
- Students will construct a simple electric motor and describe how it transforms electrical energy into mechanical energy. (2,3)
- Students will explore different ways to make electricity. (2,3)
- Students will be able to explain why it is important to follow safety rules when using electrical energy. (2,3)

EARTH SCIENCE

Geology

- Students will learn the composition of the earth including the core, mantle, and crust. (2,3)
- Students will develop an understanding of plate tectonics. (2,3)
- Students will apply their knowledge of plate movements in understanding how earthquakes happen. (2,3)
- Students will discover how plate tectonics relate to mountain formation. (2,3)
- Students will learn the definition of and the physical characteristics of a mineral. (2,3)
- Students will learn the definition of a rock and the three main types of rocks—igneous, sedimentary, and metamorphic. (2,3)
- Students will learn how the rock cycle works. (2,3)
- Students will learn to identify and define fossils and their formation. (2,3)
- Students will learn the three types of volcanoes and how they were formed. (2,3)

Ecology

- Students will explore how all the living and nonliving parts of an environment interact. (2,3)
- Students will formulate a model of an ecosystem. (2,3)
- Students will explain the roles played by producers, consumers, and decomposers. (2,3)
- Students will identify various plant and animal communities. (2,3)
- Students will study and observe the life cycle of the steelhead salmon. (2,3)
- Students will learn how they can develop life habits to preserve and maintain the earth's resources. (2,3,4)

LIFE SCIENCE

Human Body

- Students will learn about the process of circulation, including the heart and the blood vessels. (2,3)
- Students will understand what gives red blood cells their red color. (2,3)
- Students will learn about blood and the function of plasma, red blood cells, white blood cells, and platelets. (2,3)
- Students will be able to name the different chambers of the heart. (2,3)
- Students will learn the terminology of the respiratory system. (2,3)
- Students will be able to identify the two types of respiration. (2,3)
- Students will learn the functions of the organs of the respiratory system and identify them on a diagram. (2,3)

Classification

- Students will describe the characteristics of an organism. (2,3)
- Students will explore the similarities and differences between plant and animal cells. (2,3)
- The students will identify the basic parts of a plant and animal cells and describe what each part does. (2,3)
- Students will describe the organization of the classification system. (2,3)
- Students will practice classifying and explain how organisms are named. (2,3)

Health and Nutrition

- The students will identify and value healthy choices in their diet and its impact on overall health. (2,3)
- The students will understand the need for physical activity and its role in maintaining health. (2,3)
- The students will learn basic health habits that can aid in disease prevention. (2,3)

ASSESSMENT TECHNIQUES

Teacher observation
McGraw Hill curriculum materials
Teacher generated worksheets and tests
ITBS

INSTRUCTIONAL RESOURCES

Mc-Graw Hill Science
Rainbow Horizons Publishing (The Human Body, Earth Science, Matter)
Nutrition Pathfinders – California Dairy Council
Field Trips
    Bouverie Preserve
    Explorit Science Center
    Oakland Museum of California
    Warm Springs Fish Hatchery
Films (VHS and DVD)
Posters
Classroom Library Resources – books, magazines
Kids Discover Magazine
PG & E Electric and Gas Safety Booklets

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: FIFTH

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

+ Chemistry: Matter – its Properties and Changes
+ Energy: Forms and Transfer
+ Physics: Mechanical Concepts
  Electromagnetism
  Bridges

EARTH SCIENCE

+ Astronomy: Solar System, Stars, and Galaxies
+ Weather

LIFE SCIENCE

+ Skeletal System: Bones and Muscles

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

+ Chemistry: Matter – its properties and changes

- The learner will identify properties of matter (mass, weight, volume, density, solubility, reactivity, and combustibility). (3)
- The learner will identify the basics of atomic structure. (3)
- The learner will recognize atoms are constantly in motion. (3)
- The learner will recognize the three states of matter and how they change (3)
- The learner will recognize the relationship between atoms, elements, and compounds. (3)
- The learner will recognize the difference between an element and a compound. (3)
- The learner will recognize 20 common elements and their symbols. (3)
- The learner will recognize common compounds and their formulas. (3)
- The learner will be introduced to the Periodic Table and its organization. (3)
- The learner will recognize the properties of metals and non-metals. (3)
- The learner will distinguish between chemical and physical changes. (3)

+ Energy: Forms and Transfer

- The learner will define potential and kinetic energy and their forms (mechanical, thermal, electromagnetic, chemical, and wave). (3)
- The learner will understand Conservation of Energy (3)
- The learner will recognize that energy can change forms. (3)
- The learner will understand energy transfer. (3)

- The learner will understand different sources of heat energy and their environmental impact. (3)
- The learner will name three ways heat energy can be transferred. (3)
- The learner will recognize the three states of matter and how they change. (3)
- The learner will compare and contrast expansion and contraction. (3)

+ Physics: Mechanical Processes

- The learner will define force, work, speed, acceleration, velocity, power, friction, momentum, inertia, position, and gravity. (3)
- The learner will use mathematical formulas to find speed, force work, and power. (2,3)
- The learner will distinguish between energy and work. (3)
- The learner will identify Newton's three Laws of Motion. (3)
- The learner will identify the Law of Universal Gravitation. (3)
- The learner will understand Center of Gravity. (3)
- The learner will identify the six simple machines (lever, pulley, screw, wedge, inclined plane, and wheel and axle), and different classes for levers and pulleys. (2,3)
- The learner will find the Mechanical Advantage of the six simple machines. (3)

+ Physics: Electromagnetism

- The learner will understand the relationship between electricity and magnetism. (2,3)
- The learner will identify the differences between static and current electricity; open and closed circuits; series and parallel circuits; direct and alternating current; volts, amps, and ohms (Ohm's Law); fuses and circuit breakers; generators and motors. (2,3)
- The learner will demonstrate series and parallel circuits. (2,3)
- The learner will understand Volta's discovery and different types of electric cells. (3)
- The learner will understand electricity safety. (2,3)
- The learner will understand the difference between natural and artificial magnets. (3)
- The learner will demonstrate magnetic force and the Law of Magnetic Poles. (3)
- The learner will be introduced to the domain theory of magnetism. (3)
- The learner will show three methods of making magnets (Induction, Contact, Electromagnets). (2,3)
- The learner will understand that Earth is a giant magnet. (3)

+ Bridges

- The learner will identify types of bridges (beam, arch, truss, and suspension). (3)
- The learner will identify components of different bridges. (3)
- The learner will identify different materials used in building bridges. (3)
- The learner will identify forces acting on bridges (shear, tensile, and compressive). (3)

EARTH SCIENCE

+ Astronomy: Solar System, Stars, and Galaxies

- The learner will define gravity as an attractive force between objects. (3)
- The learner will identify the Law of Universal Gravitation. (3)
- The learner will understand that the sun is our closest star. (3)
- The learner will identify our solar system, its bodies, and forces acting on it. (3)
- The learner will list different types of stars by size, color, and temperature. (3)
- The learner will identify the Milky Way as our galaxy. (3)
- The learner will identify the different shapes of other galaxies in the local group. (3)
- The learner will identify different constellations (circumpolar and seasonal). (3)
- The learner will understand distances in space (astronomical units and light years). (3)
- The learner will identify different space exploration programs. (3)

+ Weather

- The learner will understand in which sphere weather occurs. (3)
- The learner will understand why Earth has seasons. (3)
- The learner will identify the different components that make up weather [air pressure, humidity, precipitation, clouds (cirrus, cumulus, and stratus), wind (local and prevailing)]. (2,3)
- The learner will identify different instruments used to measure weather. (3)
- The learner will identify the Water Cycle and its components. (3)
- The learner will understand different types of air masses (maritime polar, maritime tropical, continental polar, and continental tropical). (3)
- The learner will understand different fronts (warm, cold, stationary, and occluded). (3)
- The learner will understand that meteorologists are weather scientists. (3)
- The learner will understand what climate is and its components. (2,3)
- The learner will understand different climates (microclimates and El Niño) and different climate zones (polar, mountain, temperate, tropical, and desert). (3)
- The learner will understand the greenhouse effect and global warming. (3)

LIFE SCIENCE

+ Skeletal System: Bones and Muscles

- The learner will identify the bones of the human body. (3)
- The learner will understand that bones form joints. (3)
- The learner will understand that ligaments join bone to bone. (3)
- The learner will understand there are three different types of muscle (smooth, skeletal, and cardiac). (3)

- The learner will identify the major skeletal muscle groups of the human body. (3)
- The learner will understand that tendons join muscle to bone. (3)
- The learner will understand muscles are controlled by the central nervous system. (3)

ASSESSMENT TECHNIQUES

+ Teacher observation
+ Hands-on experimentation with write-up
+ Worksheets
+ Unit tests
+ ITBS

INSTRUCTIONAL RESOURCES

+ Harcourt Science
+ Merrill Science
+ BRIDGES! Amazing Structures to Design, Build, and Test
+ Building Toothpick Bridges
+ TOPS Learning Systems
+ Videos, Film Strips, and Transparencies

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: SIXTH

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Chemistry: Matter and Change**
- **Machines and Work**
- **Forces and Motion**
- **Energy, Heat and Energy Transfer**

EARTH SCIENCE

- **Geology**
- **Astronomy: Gravity, Stars, and Galaxies**
- **The Forest**

LIFE SCIENCE

- **Classifying Living Things**
- **Cell Structures and Processes**
- **Plant Structures and Processes**
- **Circulatory, Reproductive, Immune and Endocrine Systems**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the

knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

ENERGY, HEAT, AND ENERGY TRANSGER

- Students will define speed, force, work, energy, and power. (2,3)
- Students will distinguish between energy and work. (2,3)
- Students will recognize that many forms of energy are interchangeable. (2,3)
- Students will explore and recognize sources of heat energy (coal, natural gas, Solar etc.), and mechanical motion (falling water, wind). (1,2,3)
- Students will identify fossil fuels and their environmental impact. (1,2,3)
- Students will understand and explain the processes, advantages, and disadvantages of nuclear energy. (2,3)

CHEMISTRY: MATTER AND CHANGE

- Students will list the three phases of matter (solid, liquid, gas). (2,3)
- Students will compare and contrast expansion and contraction. (2,3)
- Students will distinguish between freezing and boiling points. (2,3)
- Students will recognize that different amounts of energy are required to change phases of matter. (2,3)
- Students will identify the basics of atomic structure (2,3)
- Students will explain the relationship between atoms and compounds. (2,3)
- Students will recognize common compounds and their formulas. (2,3)

- Students will recognize the difference between an element and a compound. (2,3)
- Students will recognize 20 well known elements and their symbols. (2,3)
- Students will distinguish between metals and non-metals. (2,3)
- Students will distinguish between chemical change and physical change. (2,3)

EARTH SCIENCE

ASTRONOMY: GRAVITY, STARTS, AND GALAXIES

- Students will define gravity as an attractive force between objects. (2,3)
- Students will recognize how gravity keeps planets in orbit. (2,3)
- Students will understand the sun is a star. (2,3)
- Students will list the types of stars; giants, dwarfs, and pulsars. (2,3)
- Students will define supernova and black holes. (2,3)
- Students will recognize familiar constellations. (2,3)
- Students will be introduced to the concept of “light years”. (2,3)
- Students will identify the Milky Way as our galaxy. (2,3)
- Students will identify the Andromeda Galaxy (closest to the Milky Way) (2,3)
- Students will define Quasar as the most distant visible objects. (2,3)

GEOLOGY

- Students will understand the surface of the earth is in constant movement. (2,3)
- Students will define the layered structure of the earth. (2,3)
- Students will understand the crusts movements. (2,3)
- Students will understand volcanoes as openings in the crust where magma is released as fiery rock or lava from the mantle. (2,3)
- Students will recognize famous volcanoes. (2,3)

FOREST

- Students will explain the concept of interdependence of forest life. (1,2,3)
- Students will distinguish between a tropical rainforest and a temperate hardwood forest, their locations, and their plant species. (2,3)
- Students will explain the environmental effects of deforestation. (2,3)
- Students will define perennial. (2,3)
- Students will distinguish between trees and shrubs. (2,3)
- Students will label the growth and structure of trees and stems. (2,3)
- Students will define the “crown” of a tree. (2,3)

LIFE SCIENCE

CLASSIFYING LIVING THINGS

- Students will identify the five kingdoms (Plant, Animal, Fungus, Protist, and Moneran) (2,3)
- Students will be introduced to the smaller sub groupings (kingdom, phylum, class, order, family, genus, and species). (3)

CELL STRUCTURES AND PROCESSES

- Students will understand that all living things are made up of cells. (1,2,3)
- Students will identify all the structures of the cell (cell membranes, nucleus, cytoplasm (organelles, mitochondria, vacuoles) and their functions. (2,3)
- Students will identify single celled organisms (amoebae, protozoan, etc.) (2,3)
- Students will recognize that different shaped cells perform different functions. (2,3)
- Students will recognize the progression from cells to systems. (2,3)

PLANT STRUCTURES AND PROCESSES

- Students will explain the difference between non-vascular plants and their functions. (2,3)
- Students will identify components of the process of photosynthesis (sunlight, chlorophyll, carbon dioxide, and water) and the by products (oxygen and sugar). (2,3)
- Students will be introduced to the various forms of plant reproduction. (2,3)
- Students will use a Punnett square to determine genetic characteristics in plants. (2,3)
- Student will label the parts of plants. (2,3)
- Students will identify seed parts. (2,3)
- Students will explain the difference between monocots and dicots. (2,3)

THE HUMAN BODY

- Students will identify the parts of the circulatory system. (2,3)
- Students will define lymph nodes, white cells, tonsils, blood cells, blood pressure, and hardening of the arteries. (2,3)
- Students will explain the function of the immune system. (2,3)
- Students will distinguish between communicable and non-communicable diseases. (2,3)
- Students will distinguish between viral and bacterial diseases. (2,3)
- Students will identify parts of the reproductive and endocrine systems. (2,3)
- Students will identify physical changes that take place in puberty. (2,3)

- Students will distinguish between duct glands and ductless glands. (2,3)
- Students will identify hormone producing glands (pituitary, thyroid, pancreas, adrenal) and their functions. (2,3)

ASSESSMENT TECHNIQUES

Teacher Observation
Tests
Hands-on activities
ITBS

INSTRUCTIONAL RESOURCES

Science Harcourt Text Book
Prentice Hall Astronomy Text Book
FOSS- Solar Houses- Solar Energy
Lawrence Hall of Science – Murder Mystery
Lawrence Hall of Science – Bottle Biology
Rain Forest- Computer Project
Voyage of the Mimi II Study of the Mayan Ruins - Rainforest
Chabot – Planetarium Field Trip
Exploratorium Field Trip

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: SEVENTH

STATEMENT OF BELIEF

It is the goal of St. John's Lutheran School that students develop an understanding and appreciation of the natural order of God's creation. Students will learn about the world in which they live through observation, experimentation, and discovery. Students will become contributing members of today's scientific and technological society, and take an active role in the protection and preservation of the world around them.

COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

(the interactions of forces that make all physical activity possible)

EARTH SCIENCE

(the motion of the earth's crust, formation of raised features on and changes within the earth's surface, identification of rocks and minerals, and the processes of weathering, erosion and deposition)

LIFE SCIENCE

(the structure and function of living systems and the components of personal health and wellness)

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

- Students will define and calculate formulas involving speed velocity and acceleration. (3)
- Students will define force, and state and apply Newtons' laws of motion and his law of universal gravitation. (2,3)
- Students will describe forces in fluids, and state and apply Archimedes' principle and Bernoulli's principle. (2,3)
- Students will explain work and power, and describe simple machines. (2,3)
- Students will define energy, identify its forms, and stae the law of the conservation of energy. (2,3)

EARTH SCIENCE

- Students will describe and explain the motion of the earth's crust. (2,3)
- Students will describe the formation of mountains, plateaus, and domes. (1,2,3,4)
- Students will describe what occurs during earthquakes. (2,3)
- Students will describe the types of volcanoes and state the locations of major zones of volcanic activity. (2,3)
- Students will discuss the theory of continental drift, ocean-floor spreading, and plate tectonics, and list the major lithospheric plates. (1,2,3,4)
- Students will define mineral and explain how minerals are identified and used. (2,3)

- Students will define rock, describe the three basic types of rocks and explain the rock cycle. (2,3)
- Students will describe weathering and soil formation. (2,3)
- Students will identify the factors that cause erosion and deposition. (2,3)

LIFE SCIENCE

- Students will identify the levels of organization in the body. (1,2,3,4)
- Students will identify and describe the four basic type of tissue in the human body. (2,3)
- Students will define homeostasis. (1,2,3)
- Students will describe the physical responses to stress and ways to deal with stress.(1,2,3,4)
- Students will name and describe the three components of wellness (1,2,3,4)
- Students will identify the functions of the skeletal system, muscular system, and skin and explain the role each plays in the human body, identify common injuries and health-related problems, and list ways that individuals can stay healthy. (2,3,4)
- Students will list and describe each of the six nutrients needed by the body and describe the function of water in the body. (2,3)
- Students will learn healthy eating habits. (2,3,4)
- Students will describe the general functions carried out by the digestive system. (2,3)
- Students will describe the function of the cardiovascular system and behaviors that maintain cardiovascular health. (2,3)
- Students will identify the functions of the respiratory and excretory system. (2,3)
- Students will explain how tobacco smoke harms the respiratory and circulatory systems. (1,2,3,4)
- Students will explain the causes of infectious and noninfectious diseases and identify the kinds of organisms that cause disease. (2,3)
- Students will identify the functions of the nervous system. (2,3)
- Students will name some commonly abused drugs and state how they affect the body. (1,2,3,4)
- Students will explain how alcohol abuse harms the body. (1,2,3,4)
- Students will identify the organs of the endocrine system and their functions. (1,2,3)
- Students will identify the organs or the male and female reproductive system and identify their function, list the stages of human development, and describe the mental and social changes associated with puberty and adolescence. (1,2,3,4)

ASSESSMENT TECHNIQUES

Class discussion
Daily written work
Quizzes and tests

Group activities and labs
Animal dissection

INSTRUCTIONAL RESOURCES

Prentice Hall Science – Dynamic Earth (1997)
Prentice Hall Science – Motion, Forces, and Energy (1994)
Prentice Hall Science Explorer – Human Biology and Health (2000)
Tops Learning Systems – Motion
Supplementary Materials and Videos

ST. JOHN'S LUTHERAN SCHOOL

COURSE OF STUDY

SUBJECT: SCIENCE GRADE: 8

STATEMENT OF BELIEF

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COMPONENTS

Students will actively participate in and understand:

PHYSICAL SCIENCE

- **Chemistry**
- **Sound**
- **Light**

EARTH SCIENCE

- **Petroleum**

LIFE SCIENCE

- **Monerans**
- **Protists**
- **Fungi**
- **Plants**

ESLRs ADDRESSED

I. Students will understand the saving knowledge of Jesus Christ and grow in their **relationship with Him** through daily living in God's Word.

II. Students will become **confident individuals** as they identify, develop, and use their God-given gifts and abilities.

III. Students will become **academically capable individuals** by obtaining the knowledge and skills needed to reach their potential and finding effective ways to apply what they learn to real life situations and challenges.

IV. Students will celebrate God's love by **serving Christ, His Church, and His world.**

PROCESS OUTCOMES

- Students will understand and use the scientific method (ask questions, develop a theory, experiment, observe and record, draw conclusions).
- Students will learn appropriate critical thinking skills.
- Students will apply and demonstrate deductive reasoning skills.
- Students will work effectively with other students to accomplish tasks.
- Students will present information in a visual form.
- Students will understand and analyze data.
- Students will practice lab safety.
- Students will practice patience and perseverance.
- Students will extend themselves beyond the expected answer, question results, and find alternative conclusions.
- Students will use a variety of research methods and sources.
- Students will learn and utilize scientific vocabulary.

GRADE LEVEL OBJECTIVES

PHYSICAL SCIENCE

CHEMISTRY

- Students will explain chemical bonding on the basis of unfilled energy levels (2,3)
- Students will describe the formation of ions and ionic bonds (2,3)
- Students will describe the formation of covalent bonds (2,3)
- Students will relate metallic bonding to the properties of metals (2,3)
- Students will explain oxidation numbers (2,3)
- Students will identify the relationship among an atom' position in the periodic table, its oxidation number, and the type of bond it forms (2,3)
- Students will describe the characteristics of chemical reactions (2,3)
- Students will write balanced chemical equations (2,3)
- Students will classify chemical reactions as synthesis, decomposition, single replacement, or double replacement (2,3)
- Students will describe energy changes in exothermic and endothermic reactions (2,3)
- Students will apply the collision theory to factors that affect the reaction rate (2,3)
- Students will describe the properties and uses of acids and bases (2,3)
- Students will relate pH number to the strength of acids and bases (2,3)
- Students will describe organic, hydrocarbon, and substituted hydrocarbon compounds (2,3)
- Students will define radioactivity and compare the three types of nuclear radiation (2,3)
- Students will describe the process of radioactive decay and artificial transmutation (2,3)
- Students will compare nuclear fission and nuclear fusion (2,3)
- Students will identify instruments that can detect and measure radioactivity (3)

- Students will learn several uses of radioactive substances (2,3)

SOUND
- Students will explain how waves are related to energy (2,3)
- Students will describe the basic characteristics of waves (2,3)
- Students will classify waves as transverse, longitudinal, or both (2,3)
- Students will relate wave speed to frequency and wavelength (2,3)
- Students will describe sound and its transmission (2,3)
- Students will identify the properties of sound (2,3)
- Students will distinguish the differences between noise and music (2,3)
- Students will know several uses of sound (2,3)
- Students will understand how the human ear works (2,3)

LIGHT
- Students will describe the properties of electromagnetic waves (2,3)
- Students will explain how electromagnetic waves are produced (2,3)
- Students will identify the regions of the electromagnetic spectrum (2,3)
- Students will know the uses of electromagnetic waves of different frequencies (2,3)
- Students will explain the three ways luminous objects produce light (2,3)
- Students will describe the particle nature of electromagnetic waves (2,3)
- Students will describe the nature of a light ray (2,3)
- Students will compare regular and diffuse reflections (2,3)
- Students will describe the process of refraction (2,3)
- Students will account for the color of opaque and transparent objects (2,3)
- Students will learn how the human eye works (2,3)
- Students will describe the operation and uses of optical instruments (2,3)
- Students will explain how a laser works and learn some of its uses (2,3)

EARTH SCIENCE

PETROLEUM
- Students will explain what petroleum is and where it comes from (2,3)
- Students will identify the major fractions of petroleum (2,3)
- Students will describe the process of fractional distillation (2,3)
- Students will explain how polymers are formed from monomers (2,3)
- Students will describe the process of polymerization (2,3)
- Students will learn important natural and synthetic polymers (2,3)

LIFE SCIENCE

MONERANS, PROTISTS, FUNGI, and PLANTS
- Students will give examples of the ways classification is used in science and in everyday life (2,3)
- Students will explain how binomial nomenclature is used to name living things (2,3)
- Students will know the seven major classification groups (2,3)
- Students will describe the general characteristics of each of the five kingdoms (2,3)

- Students will know the structure of a virus (2,3)
- Students will describe how a virus reproduces and causes disease (2,3)
- Students will name and describe the parts of a moneran (2,3)
- Students will compare autotrophic and heterotrophic monerans (2,3)
- Students will discuss the helpful and harmful effects of monerans (2,3)
- Students will compare and contrast the four types of animallike protists (2,3)
- Students will describe plantlike protists and their unique characteristics (2,3)
- Students will compare slime molds to other types of protists (2,3)
- Students will know the major characteristics of fungi (2,3)
- Students will compare mushrooms, yeasts, and molds (2,3)
- Students will understand ways in which fungi interact with other living things (2,3)
- Students will describe the three groups of multicellular algae (2,3)
- Students will know the major characteristics of mosses, liverworts, and hornworts (2,3)
- Students will understand how ferns are different from other kinds of plants without seeds (2,3)
- Students will describe the structure of roots, stems, and leaves (2,3)
- Students will know the general equation for photosynthesis (2,3)
- Students will describe the four phyla of gymnosperms (2,3)
- Students will know and be able to describe the major parts of a flower (2,3)
- Students will classify plants according to how long it takes them to produce flowers and how long they live (2,3)
- Students will describe how environment effects plant growth (2,3)

ASSESSMENT TECHNIQUES

Homework assignments
Teacher observation
Student demonstrations and experiments
Chapter Tests

INSTRUCTIONAL RESOURCES

Parade of Life: Monerans, Protists, Fungi, and Plants. Prentice Hall, 1997.
Chemistry of Matter. Prentice Hall, 1997.
Sound and Light. Prentice Hall, 1994.
Teacher generated reinforcement and enhancement activities.
Topic related videos.