SCIENCE OUTCOMES

AND

PERFORMANCE INDICATORS

SUBJECT PHILOSOPHY

The source of our approach and viewpoint to science is the Holy Scriptures. The study of God's creation impresses on us that the Lord's handiwork declares His power and glory.

PROGRAM OUTCOMES

1. Understand science to be a wonderful gift from God.
2. Evaluate all theories of science on the basis of Scripture.
3. Instill good stewardship of God's resources.
4. Understand and apply scientific process skills.
5. Apply science knowledge base to solve problems in a God-pleasing way.

(Updated 2010)

KINDERGARTEN

Nature of Science & Engineering

1. Apply science to life. (Apply the following to each outcome)
    1.1. Demonstrate knowledge of science to develop abilities in:
        1.1.1. Higher order thinking (decide, classify, predict, and generalize)
        1.1.2. Communication (present, demonstrate, explain, share)
        1.1.3. Goal-setting and attainment (research, brainstorm, plan, organize, conduct)
        1.1.4. Experience (relate, compare, and conclude)
    1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
    1.3. Use scientific equipment in a proper manner.
        1.3.1. Scale
        1.3.2. Ruler
        1.3.3. Incline plane
        1.3.4. Thermometers
        1.3.5. Balances
    1.4. Use technology to assist in problem-solving
    1.5. Understand God's providence for humans, the environment, and earth's resources, e.g.
        1.5.1. Effects of pollution
        1.5.2. Practices of conservation(reuse, recycle, refuse)
        1.5.3. What we do to promote a healthy world, nutrition, and food pyramid
2. Understand effects of scientific and technological developments on everyday life.
    2.1. Agriculture
    2.2. Medicine
    2.3. Transportation
    2.4. Knowledge

Physical Science

3. Compare similarities and differences in physical properties of objects
    3.1. Size
    3.2. Shape
    3.3. Color
    3.4. Texture
    3.5. Odor
    3.6. Weight

Earth & Space Science

4. Investigate our physical environment
    4.1. Observe how air is all around us.
    4.2. Teach that the earth is made up of land and water
        4.2.1. Research a globe
        4.2.2. Recognize how we need to care for the air, land and water
        4.2.3. Teach the names and the order of the four seasons (Physical changes)
        4.2.4. Observe the weather in each season in the area the student lives.
        4.2.5. Identify the sun and the moon as familiar objects in the solar system
            4.2.5.1. Identify the sun as a source of energy for living things.
        4.2.6. Identify forces of nature (push or pull)

Life Science

5. Establish that our body is a gift from God.
    5.1. Teach about sight
    5.2. Explore about smell
    5.3. Research about touch
    5.4. Discuss about hearing
    5.5. Demonstrate about taste
    5.6. Teach about the visible parts of the body (head, arms, shoulders, legs, knees, Trunk, toes, and fingers)
6. Explore common plants
    6.1. Analyze different common plants (trees, flowers, grass etc.)
    6.2. Discuss where common plants grow
    6.3. Teach about care of common plants
    6.4. Sort objects into two groups
        6.4.1. Those found in nature – living (Trees, worms, humans etc.)
        6.4.2. Those that are human made - non-living (Cars, trains airplanes etc.)
7. Teach about common animals
    7.1. Observe different common animals (farm animals, pets, zoo animals, etc.)
    7.2. Identify where common animals live
    7.3. Explain how different animals move

FIRST GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
    1.1. Use knowledge of science to develop abilities in:
        1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
        1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
        1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
        1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
    1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
        1.2.1. Use scientific equipment in a proper manner.
        1.2.2. Use technology to assist in problem-solving.
        1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
            1.2.3.1. effects of pollution
            1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
            1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Use simple scientific instruments (magnets, magnifying glasses, thermometers).
    2.1. Discuss the care and handling of magnets, magnifying glasses and thermometers.
    2.2. Identify the types of magnets (horseshoe, bar and circle).
    2.3. Show that the magnetic field is stronger at the poles - north and south.
    2.4. Discuss what a magnifying glass is and some common uses.

2.5. Discuss what a thermometer is and some common uses.
2.6. Show how to read a Celsius or Fahrenheit thermometer.

Earth & Space Science

3. Explore the solar system (planets, sun, moon, year, day, light/dark, and surface).
   3.1. Identify the planets, earth, sun, and the moon.
   3.2. Understand that the earth rotates every 24 hours.
   3.3. Understand the difference between night and day.
   3.4. Discuss that the earth revolves around the sun.
   3.5. Discuss that the moon revolves around the earth.
   3.6. Identify the types of land surfaces (top soil, sand, clay, rock).

Life Science

4. Investigate the parts of a plant.
   4.1. Label the basic structure of plants (roots, stem, leaves, seeds, and flower).
   4.2. Conclude that seeds produce plants.
   4.3. Classify plants by what they have in common.
5. Classify animals using size, shape, body covering, and movement.
   5.1. Identify animal groups as mammals, birds, reptiles, amphibians, fish, and insects.
   5.2. Identify that animals move in different ways (swim, fly, walk, run, and crawl).
   5.3. Identify that animals differ in size and shape.
   5.4. Apply that God created animals to help people.
6. Compare/contrast the difference and similarities between living and non-living things.
   6.1. Explore and classify living and nonliving things.
   6.2. Identify the needs of living things.

SECOND GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
   1.1. Use knowledge of science to develop abilities in:
      1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
      1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
      1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
      1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
   1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
      1.2.1. Use scientific equipment in a proper manner.
      1.2.2. Use technology to assist in problem-solving.
      1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
         1.2.3.1. effects of pollution
         1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
         1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Identify the physical properties of sound, light, and force.
    2.1. Classify sounds by loud or soft, pleasant or unpleasant.
    2.2. Understand that sound is caused by objects that vibrate.
    2.3. Identify that sound travels through our ears.
    2.4. Understand the basic properties of light, including reflection and refraction.
    2.5. Identify different uses of light indoors and outdoors.
    2.6. Understand what force is (push-pull).
    2.7. Identify friction (rough, smooth ease of movement over varied surfaces).
3. Identify and classify matter.
    3.1. Explore and observe matter inside containers.
    3.2. Identify and distinguish differences between solids, liquids, and gases.
    3.3. Explore the ways that matter can change.
    3.4. Define and understand physical change.
    3.5. Define and understand chemical change.

Earth & Space Science

4. Develop an understanding of weather and how it affects our lives.
    4.1. Identify ways that weather can be harmful.
    4.2. Describe how weather affects plants, animals and people.
    4.3. Identify the elements that make up the weather.

Life Science

5. Describe how plants grow.
    5.1. Describe the changes of a plant as it grows.
    5.2. Describe the foods that are obtained from the parts of plants.
    5.3. Identify ways to grow a new plant (bulb, seed, cutting).
    5.4. Identify the requirements for plant growth (light, water, nutrients).
6. Identify the components and characteristics of various plant and animal habitats.
    6.1. Identify the components of habitats (food, water, space, and shelter).
    6.2. Describe a desert environment.
    6.3. Describe a woodland forest environment.
    6.4. Describe a fresh water environment.
    6.5. Describe a salt water environment.
    6.6. Describe a rain forest environment.
    6.7. Describe an arctic environment.
    6.8. Discuss how we can positively affect our environment.

THIRD GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
    1.1. Use knowledge of science to develop abilities in:
        1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
        1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
        1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
        1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare,

simplify, and conclude).

1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).

1.2.1. Use scientific equipment in a proper manner.

1.2.2. Use technology to assist in problem-solving.

1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.

1.2.3.1. effects of pollution

1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)

1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Identify the basic types of force (magnetism, gravity, electrical) and energy (electrical, solar, wind, motion, light, heat).
   2.1. Recognize that magnetism has poles.
   2.2. Describe how magnetism is a force.
   2.3. realize that electricity is a force.
   2.4. Describe the basic elements of magnetism, gravity, friction.
   2.5. List the basic elements of energy.
3. Observe, classify, and explain the properties, states, and changes of matter.
   3.1. Describe the three states of matter.
   3.2. Discern how matter can change.
   3.3. Distinguish the properties of each state of matter.
   3.4. Identify the movement of molecules in each state.

Earth & Space Science

4. Ecosystems and how plants and animals adapt to survive.
   4.1. List what animals need to survive (reproduce, food, shelter, water, survival techniques).
   4.2. List what plants need to survive (water, sun, nutrients, pollination).
   4.3. Describe an ecosystem.
   4.4. Compare how communities affect each other.
   4.5. Compare how communities depend on each other.
   4.6. Link what special features help animals and plants survive (give examples).
   4.7. Give examples of behavioral instincts (migration, hibernation).

Life Science

5. Plants and their processes.
   5.1. Group plants as either seed or non-seed.
   5.2. Distinguish between different types of seed plants (flowers, cones).
   5.3. Discover that flowering plants have two kinds of seeds (monocot, dicot).
   5.4. Find that conifers are identified by their needles and type of cone.
   5.5. Differentiate between the four types of non-seed plants and how they reproduce.
   5.6. Identify examples of non-seed plants.
   5.7. Describe what the plant needs to make food.
   5.8. Describe the purpose of chlorophyll.

FOURTH GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
    1.1. Use knowledge of science to develop abilities in:
        1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
        1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
        1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
        1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
    1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
        1.2.1. Use scientific equipment in a proper manner.
        1.2.2. Use technology to assist in problem-solving.
        1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
            1.2.3.1. effects of pollution
            1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
            1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Distinguish the characteristics and uses of the six simple machines.
    2.1. Uses of the inclined plane.
    2.2. Uses of the screw.
    2.3. Uses of the pulley.
    2.4. Uses of the lever.
    2.5. Uses of the wheel and axle.
    2.6. Define how simple machines make work easier.
    2.7. Uses of the wedge.
    2.8. Identify simple machines within a complex machine.
3. Know the characteristics of light and sound.
    3.1. Identify the sources of light.
    3.2. Describe how the reflection, absorption and transmission of light affect an object's appearance.
    3.3. Explain how flat and curved mirrors affect light.
    3.4. recognize how objects refract light.
    3.5. Compare how light waves and sound waves travel.

Earth & Space Science

4. Understand the causes of the weather.
    4.1. Describe how regional situations affect weather.
    4.2. Compare how elevation affects weather.
    4.3. Explain how angle of the sun affects weather.
    4.4. Recognize how air flow affects weather.
    4.5. Discover how latitude affects weather.
    4.6. Discern how air pressure affects weather.

Life Science

5. Inspect food chains and food webs.
    5.1. Differentiate between producer and consumer.
    5.2. Describe an ocean food chain.
    5.3. Describe a land food chain.
    5.4. Explain the interdependence of a food chain.
    5.5. Compare how nature and people affect a food web.

FIFTH GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
    1.1. Use knowledge of science to develop abilities in:
        1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
        1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
        1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
        1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
    1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
        1.2.1. Use scientific equipment in a proper manner.
        1.2.2. Use technology to assist in problem-solving.
        1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
            1.2.3.1. effects of pollution
            1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
            1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Explore the basics of magnetism.
    2.1. Define terms magnet and electromagnetism.
    2.2. Explain how a magnet works.
3. Identify the concepts of force and motion.
    3.1. Define the following terms: motion, inertia, friction, buoyancy, gravity.
    3.2. Explain Newton's laws of motion.
    3.3. Explain uses of friction.
    3.4. Explain gravitational properties.
4. Investigate the basics of electricity (how generated, how conducted, uses, how transported, limitation, effects on environment).
    4.1. Define terms: static electricity and current electricity.
    4.2. Compare/contrast conductors and insulators.
    4.3. Compare/contrast between open and closed, parallel and series circuits.

Earth & Space Science

5. Examine the earth's surface and changes which affect its surface.
    5.1. Recall the layers which form the earth's crust.
    5.2. Identify characteristics of each layer.

5.3. Identify examples of various layers of the earth's crust.
5.4. Investigate how wind, water, time, geological shifts affect the earth's surface.
5.5. Reflect on how humans change the earth's surface.

Life Science

6. Utilize a process to classify living things.
   6.1. Examine the methods that plants and animals use to get food.
   6.2. Recognize that all living things grow and /or regenerate cells.
   6.3. Explain that cells are the basic unit of all living things.
   6.4. Explain that all living things need air, food, water.
   6.5. Explain that all living things reproduce.
   6.6. Explain that all living things release energy.
   6.7. Identify basic processes of plants (photosynthesis, respiration, transpiration).

SIXTH GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
   1.1. Use knowledge of science to develop abilities in:
      1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
      1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
      1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
      1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
   1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
      1.2.1. Use scientific equipment in a proper manner.
      1.2.2. Use technology to assist in problem-solving.
      1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
         1.2.3.1. effects of pollution
         1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
         1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Evaluate various forms of energy (fossil, wind, nuclear, geothermal, light, sound and electricity).
   2.1. Explore sound energy (sound waves, behavior, and uses).
   2.2. Explore electrical energy (production and uses).
   2.3. Explore light energy (spectrum, nature, behavior and uses).
   2.4. Explore renewable and nonrenewable energy (fossil fuels, wind, nuclear, solar, and geothermal).
   2.5. Compare/contrast the efficiency and effects of each form of energy (fossil fuels, solar, wind, nuclear).
3. Describe the building blocks of matter (atoms, elements, molecules, compounds) and life (cells, tissues, organs, systems).
   3.1. Describe and compare the parts of an atom (neutron, proton, and electron).
   3.2. Define the following terms: atom, molecule, element, compound.

3.3. Define some elements on a periodic chart.
3.4. Define what chemical formulas and symbols are.
3.5. Define the difference between a chemical and physical change.
3.6. Define examples of acids and bases.

Earth & Space Science

4. Review the relationship between the various elements of the universe.
   4.1. Recognize the types of bodies in the solar system (sun, moons, planets, comets, asteroids, meteors).
   4.2. Research the instruments used by astronomers (reflecting, refracting, radio, telescopes, and spectroscope).
   4.3. Investigate the life cycle of a star.
   4.4. Describe the characteristics of pulsars, black holes, constellations, galaxies.
   4.5. Compare the planets in our solar system (relationship to the sun, characteristics).

Life Science

5. Investigate how plant and animal species interact with their environment.
   5.1. Explain energy flows through food chains and food webs.
   5.2. Identify the cycles (water, carbon dioxide, nitrogen).
   5.3. Identify the factors that affect populations in a given environment (plant and animal responses and adaptations).
   5.4. Reason how organisms become extinct.
6. Explore the functions of the major body systems of the human body
   6.1. Skeletal
   6.2. Circulatory
   6.3. Respiratory
   6.4. Digestive
   6.5. Nervous
   6.6. Endocrine
   6.7. Excretory
   6.8. Muscular
   6.9. Reproductive

SEVENTH GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
   1.1. Use knowledge of science to develop abilities in:
      1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
      1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce, recommend, share)
      1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
      1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).
   1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
      1.2.1. Use scientific equipment in a proper manner.
      1.2.2. Use technology to assist in problem-solving.

1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
1.2.3.1. effects of pollution
1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
1.2.3.3. what we can do to promote a healthy world.

2. Use a microscope to work with matter
   2.1. Identify the parts and functions of a microscope.
   2.2. Demonstrate how to properly focus the microscope and observe a slide.

Earth & Space Science

3. Research the interrelationship between living things and their environment.
   3.1. Recall the needs in an environment.
   3.2. Define producers, consumers and decomposers are.
   3.3. Define mutualism, competition, predatation, and parasitism
   3.4. Explore cyclic responses to the environment (hibernation, migration, adaption, dormancy).
   3.5. Define habitat, niche, ecosystem, community, and population.
   3.6. Inspect the human effects on the environment.

Life Science

4. Describe how life exists on earth.
   4.1. Apply knowledge that living things need energy, food, water, oxygen, living space, and proper temperature.
   4.2. Compare the relationship between each component of life.
   4.3. Review that the sun is the initial source of all energy.
5. Explain that the cell is a basic unit of life.
   5.1. Explore the cell theory.
   5.2. Recall the parts and functions of plant and animal cells.
   5.3. Explain cell division and reproduction.
   5.4. List examples of organisms that reproduce sexually and asexually.
   5.5. Identify the processes of sexual and asexual reproduction.
   5.6. Explain the stages of development in sexual (zygote, embryo, etc.) and asexual reproduction.
6. Classify and identify living organisms using their characteristics.
   6.1. Identify the seven levels of the classification system.
   6.2. Recall the characteristics of plant animal, protest, and fungi kingdoms.
7. Explore food chains and humans effect on them.
   7.1. Investigate the components and illustration of a basic food chain.
   7.2. Explain the difference between decomposer, producer and consumer.
   7.3. Explain how food chains relate to food webs and energy pyramids.
   7.4. Explain how parts of food chains affect the energy flow.
   7.5. Consider the effect of human interference on the food chain.

EIGHTH GRADE

Nature of Science & Engineering

1. Apply science to life (apply the following to each outcome).
   1.1. Use knowledge of science to develop abilities in:
      1.1.1. higher order thinking (decide, classify, predict, estimate, and generalize)
      1.1.2. communication (present, persuade, demonstrate, explain, defend, consider, deduce,

recommend, share)
1.1.3. goal-setting and attainment (research, envision, brainstorm, plan, organize, conduct, persist)
1.1.4. experience (collaborate, ethics, relate, summarize, record, interpret, compare, simplify, and conclude).

1.2. Use the scientific method with problems and experiments (think/talk about, decide, try, and see if you were right).
1.2.1. Use scientific equipment in a proper manner.
1.2.2. Use technology to assist in problem-solving.
1.2.3. Understand God's providence for humans, the environment, and earth's resources, e.g.
1.2.3.1. effects of pollution
1.2.3.2. practices of conservation (reuse, reduce, recycle, refuse)
1.2.3.3. what we can do to promote a healthy world.

Physical Science

2. Utilize physical properties and chemical composition to classify rocks and minerals.
2.1. Identify common minerals.
2.2. Identify the three rock groups.
2.3. Observe physical characteristics for identification purposes.
2.4. Identify rocks and minerals by using reference materials.
2.5. Recognize uses of rocks and minerals.

Earth & Space Science

3. Define terms relevant to earth science.
3.1. Define terms in simple language.
3.2. Relate terms to a concrete example.
4. Investigate the uniqueness of the earth and its ongoing processes of development.
4.1. Identify landforms.
4.2. Explore the forces that change the shape of the earth.
4.3. Reflect on how humans change the shape of the earth.
5. Analyze the factors related to weather and the importance to life.
5.1. Examine the components of air.
5.2. Investigate the effects of heat on weather.
5.3. Recognize the factors that affect humidity.
5.4. Explain the causes and effect of air pressure.
5.5. Consider the types of air masses and predict weather results.
6. Consider the universe in relationship to the earth.
6.1. Examine the composition of solar bodies.
6.2. Explain motions of solar bodies.
6.3. Assess the value (social and economic) of space exploration.
6.4. Recognize the position of celestial bodies.
7. Recognize the importance of oceans and water to our planet.
7.1. Examine the composition of sea water.
7.2. Explore the economic values of minerals and food gathered from water.
7.3. Illustrate movements of currents and their importance.
7.4. Explain the effects of oceans on weather.
7.5. Explain how oceans support life.