

## Rationale based on Scripture

God is the Creator of all things, including Science. Our school is committed to providing students with a quality education in science so they can function effectively as Christians in their church, community, and country. A quality education in Science will help students succeed in high school, in the work place, and help them witness to friends, neighbors, and co-workers about our Savior.

# Exit goals for graduation

Students will demonstrate proficiency, understanding, and/or commitment to the following set of exit goals upon graduation. The level of proficiency of these exit goals will be dependent upon the individual gifts and effort of the student and at what grade the student started attending Grace.

- Demonstrate a positive attitude toward Science
- Know and believe that God created the world in six, 24-hour days
- Familiar with the theory of evolution and how to use God's Word to combat it
- Carry out the scientific method in experiments
- Have the ability to follow step-by-step instructions from a text in order to complete a task
- Are familiar with basic use of algebraic formulas for solving math problems (i.e. v= d/t)
- Demonstrate skills of comparing and contrasting two different things
- Make, interpret, analyze, and draw conclusions from graphs
- Have basic knowledge of the following Scientific topics:
  - o Matter
  - o Atoms
  - Gravitation
  - Speed and motion
  - Newton's 3 laws of motion
  - Photosynthesis and cellular respiration
  - Parts of a cell
  - o Cell reproduction
  - Plant processes
  - Principles of ecology
  - o Human body systems
  - o Genetics

## Grade specific measureable objectives

At the end of each school year, students will demonstrate proficiency, understanding, and/or commitment to the following set of grade specific measureable objectives in these classifications: knowledge, skills, and attitudes.

The level of proficiency of these measureable objectives will be dependent upon the individual gifts and effort of the student and at what time of year the student started attending Grace.

### Kindergarten

- 1. Plants
  - a. Understand that plants are organisms with parts that help them get what they need to grow and mature.
  - b. Recognize that a plant is an organism that needs air, water, light, and soil to survive.
  - c. Recognize that plants are organisms that grow and change.
  - d. Recognize that plants can be identified by their parts.
  - e. Identify and explore plants that we eat and the foods that come from different plants.
- 2. Animals
  - a. Understand the basic definition of an animal and explore animals in your neighborhood.
  - b. Recognize that animals are organisms that need air, water, food and shelter to stay alive.
  - c. Learn about bugs, their attributes, and where they live.
  - d. Understand the basic definition of a reptile, its attributes, and where it lives.
  - e. Learn about birds, fish, and other water animals.
  - f. Explore how animals have adapted to their environments.
  - g. Understand how animals grow and change as they mature.
  - h. Explore relationships between people and animals.
- 3. Our Earth, Our Home
  - a. Explore the composition and uses of soil.
  - b. Investigate the characteristics of different rocks.
  - c. Learn characteristics of geographic features that are high and low.
  - d. Learn characteristics of rivers, streams, lakes, and oceans and identify water as a natural resource.
  - e. Learn about Earth's natural resources that are used in everyday life and that resources can be conserved.
  - f. Learn different reasons for and ways of recycling.
- 4. Weather and Sky
  - a. Recognize the characteristics of different kinds of weather, such as wind, sun, rain, and snow.
  - b. Describe clouds and how they change.
  - c. Identify what occurs in nature and what people do in different seasons.
  - d. Recognize changes that occur in the sky from day to night and night to day.
  - e. Recognize that the Sun creates shadows and appears to move through the sky.
- 5. Exploring Matter
  - a. Identify and explore the ways we can use and change paper and cloth.
  - b. Identify and explore the ways we can use and change natural resources, such as wood and metal.
  - c. Identify clay as a natural resource that can be manipulated to make things.
  - d. Identify and explore the properties and changing states of water and investigate objects that sink and float in water.
- 6. Moving Right Along
  - a. Recognize that wheels affect speed and motion and make moving easier.
  - b. Explore ways objects move and forces that cause movement.

- c. Understand that certain objects, like the Sun and the Moon, stay in the sky, while others, like an airplane, are in the sky but return to Earth.
- d. Describe sounds and understand how they are made.
- e. Recognize that magnets can be used to make some objects move without being touched.

#### First Grade –

- 1. Plants
  - a. Identify living and nonliving things.
  - b. Explain why plants are living things and describe their parts.
  - c. Describe seeds and their origins.
  - d. Identify the stages in a plant's cycle.
  - e. Recognize that plants looks and act like their parent plants.
  - f. Describe ways that plants change to meet their meet.
- 2. Animals and their Homes
  - a. Describe different habitats.
  - b. Explain how plants and animals use their habitats.
  - c. Describe a food chain.
  - d. Describe a food web.
  - e. Explain why habitats change.
  - f. Describe what happens when habitats change.
  - g. Compare and contrast woodland forests and rain forests.
  - h. Explain how different animals live in forest habitats.
  - i. Describe desert habitats.
  - j. Explain how plants and animals survive in a dry habitat.
  - k. Describe oceans and ponds.
  - I. Explain how plants and animals live in oceans and ponds.
- 3. Our Earth
  - a. Compare the different landforms on Earth's surface.
  - b. Identify Earth's layers.
  - c. Identify sources of Earth's water.
  - d. Classify how people use water.
  - e. Explain slow and fast changes on Earth.
  - f. Describe how wind and water can change rocks.
  - g. Explain what rocks are and how they are used.
  - h. Explain what minerals are and how they are used.
  - i. Describe what things make up soil.
  - j. Explain how soil is formed.
  - k. Describe how people use natural resources.
  - I. Explain why people should take care of Earth's resources.
- 4. Weather and Sky
  - a. Describe temperature, wind, and precipitation.

- b. Identify and use tools to measure weather.
- c. Identify the different stages of the water cycle.
- d. Describe and illustrate the water cycle.
- e. Predict weather by observing clouds.
- f. Identify different types of clouds and storms.
- g. Identify how Earth rotates to make day and night.
- h. Explain how shadow change as Earth moves.
- i. Describe seasonal and annual patterns on Earth.
- j. Relate seasonal patterns to Earth's orbit around the Sun.
- k. Observe the Moon and its phases as it orbits Earth.
- I. Recognize that the Sun is the closet star to Earth.
- m. Explain the relationship between the planets and the Sun.
- n. Describe the planets in the solar system.
- 5. Matter
  - a. Identify matter as anything that has mass and take up space.
  - b. Compare and contrast different properties of matter.
  - c. Compare and contrast the properties of solids.
  - d. Use different ways to measure solids.
  - e. Describe the properties of liquids and gases.
  - f. Compare and contrast liquids and gases.
  - g. Identify chemical and physical changes.
  - h. Observe how heat can change matter.
  - i. Observe how solids, liquids, and gases mix.

## Second Grade -

- 1. Plants and Animals
  - a. Compare and classify living and nonliving things.
  - b. Explain what plants need to live and grow.
  - c. Identify plant parts such as leaves, stems, and roots.
  - d. Describe what different parts do for the plant.
  - e. Classify and compare different plants.
  - f. Identify some edible plant parts.
  - g. Explain why flowers and fruits are important to plants.
  - h. Describe and compare different seeds.
  - i. Describe and the life cycle of a plant.
  - j. Explain how plants can grow from seeds and other plant parts.
  - k. Describe how plants survive in different places.
  - I. Identify deserts, rain- forest, and arctic environments.
- 2. Habitats
  - a. Observe and describe different kinds of animals.
  - b. Explain how animals are alike and different.
  - c. Identify what animals need to survive.

- d. Explain how different animals meet their needs.
- e. Relate the shape of an animal's teeth to what it eats.
- f. Classify animals according to what they eat.
- g. Describe the life cycles of different kinds of animals.
- h. Explain what animals can do at different ages.
- i. Describe land habitats.
- j. Explain how different animals adapt to different environments.
- k. Describe water habitats.
- I. Explain how plants and animals meet their needs in water habitats.
- m. Explain how plants and animals live together in habitats.
- n. Describe why each part of a food chain is important.
- 3. Weather and Sky
  - a. Identify different weather conditions.
  - b. Investigate ways to move to measure different weather conditions.
  - c. Explain how clouds form and why water falls back to Earth.
  - d. Identify different kinds of clouds.
  - e. Describe how weather changes as seasons change.
  - f. Identify characteristics of spring and summer.
  - g. Describe weather conditions in fall and winter.
  - h. Explain how fall and winter affects plants and animals.
  - i. Classify objects in the sky during day and night.
  - j. Explain why the Sun is important for life on Earth.
  - k. Recognize Earth's movement by observing shadows and seasons.
  - I. Explain the effects of Earth's rotation and orbit around the Sun.
  - m. Observe what the Moon looks like from Earth.
  - n. Explain that eight planets, including Earth, move around the Sun.
- 4. Matter
  - a. Comprehend that all things are made of matter.
  - b. Describe the properties of matter.
  - c. Identify the properties of solids.
  - d. Compare the properties of different solids.
  - e. Describe the properties of liquids and gases.
  - f. Compare properties of different kinds of liquids and gases.
  - g. Observe and describe how solids can change,
  - h. Prepare mixtures of different solids and liquids.
  - i. Explain why some mixtures can be separated and other cannot.
  - j. Describe how heat changes solid, liquids, and gases.
  - k. Explain the processes of freezing, melting, and evaporation.
- 5. Motion and Energy
  - a. Describe the position of an object relation to other objects.
  - b. Observe an object's motion and speed by recording its change in position.
  - c. Identify pushes, pulls, gravity, and friction and forces.

- d. Explain how different forces change the motion of objects.
- e. Discover how simple machines make it easier to move objects.
- f. Explain the functions of pulleys, levers, and ramps.
- g. Explain why magnets attract some objects and not others.
- h. Identify the two poles on a magnet.
- i. Describe different sources of energy and heat.
- j. Identify vibration as the cause of sound.
- k. Describe the volume and pitch of sounds.
- I. Explain that light passes through some objects but not others.
- m. Describe how people use different light sources.
- n. Describe how people us electricity.

### Third Grade -

- 1. Living Things
  - a. Summarize five functions of living things.
  - b. Compare plant and animal cells.
  - c. Define and compare the kingdoms of living things.
  - d. Describe different types of microorganisms.
  - e. Describe the functions of roots, stems and leaves.
  - f. Explain the processes of photosynthesis and respiration.
  - g. Describe pollination in flowering plants.
  - h. Explain the life cycle of flowering plant.
  - i. Define animal and list the basic needs and characteristics of animals.
  - j. Summarize the characteristics of groups of invertebrates.
  - k. Define vertebrates and describe their characteristics.
  - I. Describe the seven groups of vertebrates.
  - m. Identify seven organ systems of animals.
  - n. Summarize the structures and functions of the seven organ systems.
  - o. Compare incomplete metamorphosis to complete metamorphosis.
  - p. Summarize how traits are passes from parent offspring.
- 2. Weather and Space
  - a. Define the atmosphere as mixture of different gases.
  - b. Describe four properties of weather that can be measured and the tools used to measure them.
  - c. Sequence the steps of the water cycle.
  - d. Identify and describe types of clouds and precipitation.
  - e. Explain how air masses form and identify the types of weather they cause.
  - f. Forecast the weather by interpreting data on a weather map.
  - g. Define and give examples of climate.
  - h. Explain the main factors that determine climate.
  - i. Explain how Earth's rotation causes the cycle of day and night.
  - j. Explain why the sun's apparent motion in the sky differs from season to season.

- k. Explain why the Moon in covered with craters.
- I. Identify the causes of the Moon's phases, solar eclipses, and lunar eclipses.
- m. Define and describe the solar system.
- n. Discuss the properties of the inner and outer planets.
- o. Explore stars, including their composition, appearance, and distance from Earth.
- p. Identify the characteristics of the sun and its importance to life on earth.

#### 3. Forces and Energy

- a. Explain how motion, speed, velocity, and acceleration are related.
- b. Summarize the forces that act on a moving object, including friction and gravity.
- c. Demonstrate a basic understanding of how forces affect motion.
- d. Explain how friction affects motion.
- e. Define work and energy.
- f. Compare and contrast potential and kinetic energy.
- g. Identify the difference kinds of simple machines.
- h. Explain how simple machines work together to make compound machines.
- i. Explain that heat flows from warmer materials to cooler materials.
- j. Describe and define conduction, convection, and radiation
- k. Explain how sounds is produced and how it travels through a medium.
- I. Identify the characteristics of sound, including frequency, pitch, volume, and echoes.
- m. Demonstrate that light travels in a straight line.
- n. Describe ways light can be absorbed, reflected, or refracted by objects.
- o. Describe the characteristics of electrically charged objects.
- p. Explain the difference between static and current electricity.
- q. Describe a magnetic field and the effect of distance on magnetic force.
- r. Understand how an electromagnet, an electric motor, and a generator work.

### Fourth Grade -

- 1. Ecosystems
  - a. Define an ecosystem.
  - b. Understand how energy move through a food chain.
  - c. Identify the roles of different organisms in a food web.
  - d. Identify different ecosystems.
  - e. Describe the characteristics of different ecosystems.
  - f. Recognize adaptations that allow organisms to survive in certain environments.
  - g. Explain how adaptations help organisms survive.
  - h. Identify ways that living things change their environments.
  - i. Explain how different organisms compete with each other for food, water, and shelter.
  - j. Show how environmental changes affect living things.
  - k. Explain what it means for an animal to be endangered.
  - I. Explain how scientist learn about ancient plant and animals by studying fossils.
  - m. Show how present-day organisms are similar to those that lived long ago.
- 2. Earth and Its Resources

- a. Identify Earth's landforms and the features of the ocean floor.
- b. Describe the layers of Earth.
- c. Describe earthquakes and volcanoes and identify their effects.
- d. Describe the effects of landslides and floods.
- e. Describe and identify the forces that cause weathering and erosion.
- f. Analyze how people change the land.
- g. Compare and contrast properties of minerals.
- h. Describe how three main kinds of rocks form.
- i. Explore soil and identify its components.
- j. Compare and contrast different soils.
- k. Model and describe how fossils form.
- I. List examples of fossil fuels and other sources of energy.
- m. Describe how air and water are used as resources.
- n. Explain reasons and methods for conserving and protecting air and water.

#### 3. Matter

- a. Define matter as anything that has mass and takes up space.
- b. Describe properties can be used to identify matter.
- c. Measure matter using tools that record standard units.
- d. Compare and contrast weight and mass.
- e. Define the three common states of matter: solid, liquid, and gas.
- f. Explain the properties of solids, liquids, and gases.
- g. Measure and record the temperature of water in different states.
- h. Identify the effects of heating and cooling matter.
- i. Define physical changes as those that do not change the identity of a material.
- j. Describe how to make and separate mixtures.
- k. Describe chemical changes.
- I. Understand that chemical changes are part of our everyday life.

## Fifth – Sixth Grade (Even Years)

- 1. Diversity of Life
  - a. Describe cells and explain how they are organized in living things.
  - b. Compare and contrast the structures of animal cells and plant cells.
  - c. Describe kingdom and species.
  - d. Describe organisms in the six kingdoms.
  - e. Discuss the process by which leaves carry out photosynthesis.
  - f. Describe the structure and function of roots, stems, and leaves.
  - g. Define invertebrates; describe invertebrate groups.
  - h. Define vertebrates; describe the major vertebrate groups.
  - i. Summarize the functions of animal systems.
  - j. Describe how the body systems work together to perform like functions.
  - k. Explain sexual and asexual reproduction.
  - I. Compare and contrast sexual and asexual reproduction.

- m. Describe the life cycles of mosses and ferns.
- n. Learn about the angiosperm life cycle.
- o. Understand the conifer life cycle.
- p. Define complete and incomplete metamorphosis.
- q. Discuss fertilization and explain how the process of external and internal fertilization work.
- r. Describe how traits are passed from one generation to the next.
- s. Explain dominant and recessive traits.
- 2. Weather and Space
  - a. Explain how Earth's shape and tilt affect temperatures and winds.
  - b. Describe how global and local winds form.
  - c. Explain how clouds and precipitation form.
  - d. Summarize how air masses and fronts affect the weather.
  - e. Summarize the different kinds of severe storms.
  - f. Explain how severe storms form.
  - g. Explain what determines an area's climate.
  - h. Summarize the factors that affect climate.
  - i. Describe the movements of Earth and the Sun.
  - j. Explain how Earth's movements cause the seasons and day and night.
  - k. Describe the features of the Moon, and identify the relative positions of the Moon, Earth, and the Sun that produce each of the Moon's major phases.
  - I. Explain how eclipses and tides occur.
  - m. Describe the plants and some of their major features, as well as asteroids, meteors, and comets.
  - n. Describe how humans have explored the solar system.
  - o. Learn about the cycles, colors, and sizes of stars.
  - p. Identify star systems and learn about the big bang theory and how the Bible contradicts it.
- 3. Forces and Energy
  - a. Understand the relationship between position, motion, velocity, and acceleration.
  - b. Calculate velocity and acceleration.
  - c. Learn about balanced and unbalanced forces.
  - d. Understand how gravity and friction affect motion.
  - e. Learn how to apply Newton's three laws of motion.
  - f. Define work and energy.
  - g. Understand how work and energy are related.
  - h. Identify the six types of simple machines.
  - i. Calculate the output force and output distance for a given effort force and effort distance.
  - j. Learn the difference between heat and temperature.
  - k. Find out how heat is transferred by conduction, convection, and radiation.
  - I. Find out how a sound wave travels and how echolocation works.
  - m. Learn the parts of a wave: frequency, pitch, and volume.
  - n. Learn that light is a wave and a particle.
  - o. Recognize that light can be reflected and bent, and that it has wavelengths and colors.

- p. Understand static electricity and the attraction between charged objects.
- q. Describe the different types of electric circuits.
- r. Explain how magnetism works and how electromagnets work and are used.
- s. Describe how generators produce electricity.

## Fifth – Sixth Grade (Odd Years)

- 1. Patterns of Life
  - a. Compare dominant and recessive traits.
  - b. Summarize the importance of Mendel's work.
  - c. Explain how the sex of an offspring is determined.
  - d. Summarize how a pedigree shows patterns of inheritance.
  - e. Explain the structure of DNA molecule.
  - f. Summarize the process of genetic engineering.
  - g. Explain how variations help animals survive over time.
  - h. Summarize the process of natural selection.
  - i. Describe how abiotic factors cycle in an ecosystem.
  - j. Explain symbiosis, and give examples of parasitism, mutualism, and commensalism.
  - k. Compare the roles of producers, consumers, and decomposers.
  - I. Describe how energy is transferred in food chains and food webs.
  - m. Explain how climate affects organisms that live in a biome.
  - n. Compare climate conditions that determine biomes.
  - o. Summarize changes in ecosystems caused by humans and nature.
  - p. Describe evidence that shows how environments have changed over time.
- 2. Earth and Its Resources
  - a. Describe the layers that make up Earth.
  - b. Explain how to use latitude and longitude.
  - c. Discuss evidence for continental drift and plate tectonics.
  - d. Explain seafloor spreading.
  - e. Identify types of landforms and the processes that form them.
  - f. Describe what happens when an earthquake occurs.
  - g. Describe the two main types of weathering.
  - h. Summarize how soil is formed and why it is important.
  - i. Distinguish between relative age and absolute age.
  - j. Discuss the future of Earth's life and geologic structures.
  - k. Identify minerals by their properties.
  - I. Discuss the formation of igneous, sedimentary, and metamorphic rocks.
  - m. Summarize the importance of air.
  - n. Describe the water cycle.
  - o. Compare renewable and nonrenewable resources.
  - p. Describe how human activities affect the environment.
  - q. Describe practices used to conserve Earth's land, water, and air.
  - r. Discuss alternative energy sources and methods of reducing pollution from fossil fuels.

- 3. Matter
  - a. Measure the density of a given substance.
  - b. Classify the different states of matter.
  - c. Compare protons, neutrons, and electrons.
  - d. Compare atoms, molecules, elements, and compounds.
  - e. Explain boiling point and melting point.
  - f. Understand the relation of temperature, pressure, and volume.
  - g. Classify different types of mixtures.
  - h. Explain solutions and solubility.
  - i. Describe three types of chemical reactions.
  - j. Compare exothermic and endothermic reactions.
  - k. Describe the periodic table.
  - I. Explain how to test for acids or bases.
  - m. Discuss the uses of organic compounds.
  - n. Describe organic compounds in foods.
  - o. Compare nuclear fission and nuclear fusion.
  - p. Explain how radioactivity can be used.

#### Seventh – Eighth Grade (Even Years)

- 1. Energy
  - a. Define energy is and the forms it takes.
  - b. Distinguish between potential energy and kinetic energy.
  - c. Explain the differences among temperature, thermal energy, and heat.
  - d. List important uses of thermal energy.
  - e. Describe how thermal energy moves.
  - f. Explain where chemical energy is found.
  - g. Explain how reaction rates are changed.
- 2. Motion and Forces
  - a. Demonstrate how to measure speed.
  - b. Demonstrate how to measure acceleration.
  - c. Relate how gravity pulls on everything.
  - d. Describe what forces are and how they act.
  - e. Distinguish between weight and mass.
  - f. Explain how friction affects all motion.
  - g. Describe how Newton's laws are used to understand motion.
- 3. Work and Simple Machines
  - a. Determine whether work is being done in a given situation.
  - b. Define work is and describe how it's calculated.
  - c. Explain how power is related to work.
  - d. Describe what a simple machine is and the different types.
  - e. Explain how machines ease the burden of a heavy load.
- 4. Earth's Atmosphere

- a. Name the gases in Earth's atmosphere.
- b. Describe the structure of Earth's atmosphere.
- c. Explain what causes air pressure.
- d. Identify three things that happen to the energy Earth receives from the sun.
- e. Contrast the differences among radiation, conduction, and convection.
- f. Describe the water cycle.
- g. Explain why different latitudes receive different amounts of solar energy.
- h. Describe the Coriolis effect, sea breezes, and land breezes.
- i. Explain how to locate doldrums, trade winds, prevailing westerlies, polar easterlies, and jet streams.
- 5. Earth's Weather
  - a. Explain the role of water vapor in the atmosphere and how it affects weather.
  - b. Explain how clouds form and how they are classified.
  - c. Describe how rain, hail, sleet, and snow develop.
  - d. Identify what weather is associated with fronts and high- and low- pressure areas.
  - e. Explain how low-pressure systems form at fronts.
  - f. Relate thunderstorms to tornadoes.
  - g. Explain the collection of data for weather maps and forecasts.
  - h. Explain the symbols used in a weather station model.
- 6. Earth's Climate
  - a. Describe what determines the climate of an area.
  - b. Explain how latitude and natural features affect the climate of a region.
  - c. Describe a climate classification system.
  - d. Describe how organisms adapt to particular climates.
  - e. Discuss what causes seasons.
  - f. Describe how El Nino affects the climate.
  - g. Describe theories about climatic change.
- 7. Classifying Living Things
  - a. Discuss the history leading to cell theory.
  - b. Explain the difference between the compound light microscope and the electron microscope.
  - c. Explain the importance of the cell theory.
  - d. Diagram a plant cell and an animal cell.
  - e. Identify the parts and the function of each part.
  - f. Describe the importance of the nucleus in a cell.
  - g. Explain the difference among tissues, organ, and organ systems and explain how they compare.
  - h. Describe the structure of a virus and explain how viruses reproduce and cause disease.
  - i. Explain the benefits of vaccines.
  - j. Describe some helpful uses of viruses.
  - k. Give examples that show the need for classification systems.
  - I. Describe Aristotle's system of classification.

- m. Explain Linnaeus' system of classification.
- n. Name the six kingdoms of living things.
- o. Identify characteristics and members of each kingdom.
- p. List the groups within each kingdom.
- q. List reasons that scientific names are more useful to scientists than common names.
- r. Identify the function of a dichotomous key.
- s. Demonstrate how to use a dichotomous key.
- t. Describe the characteristics of bacterial cells.
- u. Compare aerobic and anaerobic organisms.
- v. Identify some ways bacteria are helpful.
- w. Explain the importance of nitrogen-fixing bacteria.
- x. Explain how some bacteria cause disease.
- y. Identify the characteristics share by all protists.
- z. Describe the three groups of protists.
- aa. Compare and contrast the protist groups.
- bb. Identify the characteristics shared by all fungi.
- cc. Classify fungi into groups based on their methods of reproduction.
- dd. Describe the difference between the imperfect fungi and all other fungi.
- 8. Plants and Animals
  - a. List characteristics of plants.
  - b. Describe adaptations of plants that made it possible for them to survive on land.
  - c. Compare vascular and nonvascular plants.
  - d. Compare seedless nonvascular plants with seedless vascular plants.
  - e. State the importance of nonvascular and vascular plants.
  - f. List the characteristics of seed plants.
  - g. Describe the structures and functions of roots, stems, and leaves.
  - h. Describe the main characteristics of gymnosperms and angiosperms and their importance.
  - i. Compare monocots and dicots.
  - j. Identify the characteristics of animals.
  - k. Distinguish between vertebrates and invertebrates.
  - I. Determine how the body plans of animals differ.
  - m. Identify the structures that make up sponges and cnidarians.
  - n. Describe how sponges and cnidarians obtain food and how they reproduce.
  - o. Compare the body plans of flatworms and roundworms.
  - p. Identify the characteristics of mollusks.
  - q. Determine the similarities and differences between an open and closed circulatory system.
  - r. Describe the characteristics of segmented worms.
  - s. Describe the structures and digestive process of an earthworm.
  - t. Identify features used to classify arthropods.
  - u. Relate the structure of the exoskeleton to its function.
  - v. Identify the features of echinoderms.
  - w. Identify the major characteristics of chordates.

- x. Explain the differences between ectotherms and endotherms.
- y. Describe the characteristics that identify the three classes of fish.
- z. Describe the adaptations that amphibians have for living in water and on land.
- aa. Describe frog metamorphosis.
- bb. Identify the adaptations that enable reptiles to live on land.
- cc. Identify the characteristics of birds.
- dd. Identify the adaptations birds have for flight.
- ee. Identify the characteristics of mammals.
- ff. Explain how mammals adapt to different environments.
- gg. Distinguish among monotremes, marsupials, and placental mammals.
- hh. Distinguish between innate and learned behavior.
- ii. Recognize reflex and instinctive actions and explain how they help organisms survive.
- jj. Describe and give examples of imprinting and conditioning.

## Seventh – Eighth Grade (Odd Years)

- 1. Electricity
  - a. Explain how objects can become electrically charged.
  - b. Describe how electric charges affect other electric charges.
  - c. Distinguish between insulators and conductors.
  - d. Explain how electric discharges such as lightning occur.
  - e. Explain how voltage is related to the electric energy carried by an electric current.
  - f. Describe how a battery produces an electric current.
  - g. Explain why materials have electric resistance.
  - h. Explain how voltage, current, and resistance are related in an electrical circuit.
  - i. Differentiate between series and parallel circuits.
  - j. Explain what determines the electrical power used in a circuit.
  - k. Discuss how to avoid dangerous electric shock.
- 2. Magnetism
  - a. Describe how magnets act.
  - b. Explain what a magnetic field is.
  - c. Describe the relationship between electricity and magnetism.
  - d. Explain how electricity can produce magnetism.
  - e. Explain how magnetism can produce electricity.
- 3. Oceans
  - a. Learn where evolutionists believe Earth's origins originated from and what God's Word says.
  - b. Explain why the ocean is salty.
  - c. Describe the composition of seawater.
  - d. Determine how winds, the Coriolis effect, and continents influence surface currents.
  - e. Explain the temperatures of coastal water.
  - f. Describe density currents.
  - g. Define a wave.
  - h. Explain how water particles move in a wave and how wave energy moves.

- i. Describe how ocean tides form.
- j. Differentiate the continental shelf from the continental slope.
- k. Describe a mid-ocean ridge, an abyssal plain, and an ocean trench.
- I. Describe seafloor mining.
- m. List five things that the oceans provide for organism.
- n. Describe how photosynthesis and chemosynthesis transfer energy into the ocean's food chain.
- o. List the key characteristics of plankton, nekton, and benthos.
- 4. Cell Processes
  - a. The differences among atoms, elements, molecules, and compounds.
  - b. How to recognize the relationship between chemistry and life science.
  - c. The differences and similarities among inorganic and organic compounds.
  - d. The function of a selectively permeable membrane.
  - e. The processes of diffusion and osmosis.
  - f. The differences between passive transport and active transport.
  - g. The differences between producers and consumers.
  - h. The processes of photosynthesis and respiration.
  - i. How cells get energy from glucose through fermentation.
- 5. Cell Reproduction
  - a. Describe mitosis and explain its importance.
  - b. Explain differences between mitosis in plant and animal cells.
  - c. Give two examples of asexual reproduction.
  - d. Describe the stages of meiosis and its end products.
  - e. Name the cells involved in fertilization and explain how fertilization occurs in sexual reproduction.
  - f. Construct and identify the parts of a model of a DNA molecule.
  - g. Describe how DNA copies itself.
  - h. Describe the structure and function of each kind of RNA.
- 6. Heredity
  - a. Explain how traits are inherited.
  - b. Explain Mendel's role in the history of genetics.
  - c. Use a Punnett square to predict the results of crosses.
  - d. Explain difference between genotype and phenotype.
  - e. Explain incomplete dominance.
  - f. Compare multiple alleles and polygenic inheritance, and examples of each.
  - g. Describe two human genetic disorders and how they are inherited.
  - h. Explain inheritance of sex-linked traits.
  - i. Explain the importance of genetic engineering.
- 7. Human Body Systems
  - a. Identify the five major functions of the skeletal system.
  - b. Compare and contrast movable and immovable joints.
  - c. Describe the major function of muscles.

- d. Compare and contrast three types of muscles.
- e. Explain how muscle action results in movement of body parts.
- f. Compare and contrast the epidermis and dermis of the skin.
- g. List the functions of the skin.
- h. Discuss how skin protects the body from disease and how it heals itself.
- i. List the six classes of nutrients.
- j. Describe the importance of each type of nutrient.
- k. Explain the relationship between diet and health.
- I. Distinguish between mechanical and chemical digestion.
- m. Name the organs of the digestive system and what takes place in each.
- n. Explain how homeostasis is maintained in digestion.
- o. Compare arteries, veins, and capillaries.
- p. Trace the pathway of blood through the chambers of the heart.
- q. Describe pulmonary and systemic circulation.
- r. Describe the characteristics and functions of the blood.
- s. Explain the importance of checking blood types before a transfusion is given.
- t. Describe a disease and disorders of blood.
- u. Describe the functions of the lymphatic system.
- v. Explain where lymph comes from.
- w. Explain the role of lymph organs in fighting infections.
- x. State three functions of the respiratory system.
- y. Explain how oxygen and carbon dioxide are exchanged in the lungs and in tissues.
- z. Trace the pathway of air in and out of the lungs.
- aa. Name three effects of smoking on the respiratory system.
- bb. Distinguish between the excretory and urinary systems.
- cc. Describe how your kidneys work.
- dd. Explain what happens when urinary organs don't work.
- ee. Describe the basic structure of a neuron and how an impulse moves.
- ff. Compare the central and peripheral nervous system.
- gg. Explain how drugs affect the body.
- hh. List the sensory receptors in each sense organ.
- ii. Explain what type of stimulus each sense organ responds to and how.
- jj. Explain the need for healthy senses.
- kk. Explain the function of hormones.
- II. Name three endocrine glands and the effects of their hormones.
- mm. Explain how a feedback system works.
- nn. Explain the function of the reproductive system.
- oo. Identify the major structures of the male and female reproductive system.
- pp. Explain the stages of the menstrual cycle.
- qq. Describe how an egg becomes fertilized.
- rr. Identify the major events in the stages of development of an embryo and fetus.
- ss. Differentiate between fraternal and identical twins.

- tt. State the sequence of events of childbirth.
- uu. Compare the stages of infancy and childhood.
- vv. Relate adolescent development and preparation for adulthood.
- ww. Describe the work of Pasteur, Koch, and Lister in the discovery and prevention of disease.
- xx. List diseases caused by viruses and bacteria.
- yy. Discuss sexually transmitted diseases (STDs), they causes, and treatments.
- zz. Explain the natural defenses your body has against disease.
- aaa. Describe differences between active and passive immunity.
- bbb. Explain how HIV affects the immune system.
- ccc. Discuss noncommunicable diseases.
- ddd. Describe the basic characteristics of cancer.
- eee. Discuss what happens during an allergic reaction.

## Evidence of continuity from grade to grade

The curriculum is constructed using skill-based measurable objectives so that the knowledge, attitudes, and skills learned in each grade form building blocks for what is taught in the succeeding grades.



Physical Science									
	Magnetism	Motion	Force	Light/Color	Energy	Machines/Work	punos	States of Matter	Electricity
K	Х	Х	Х		Х		Х	Х	
1 <sup>st</sup>								Х	
2 <sup>nd</sup>	Х	Х	Х	Х	Х	Х	Х	Х	Х
3 <sup>rd</sup>	Х	Х	Х	Х	Х	Х	Х		Х
4 <sup>th</sup>								Х	
5 <sup>th</sup>	Х	Х	Х	Х	Х	Х	Х		Х
6 <sup>th</sup>									
7 <sup>th</sup>		Х	Х		Х	Х			
8 <sup>th</sup>	Х								Х



## Assessment of the academic growth and achievement of each student

Each individual teacher will assess the academic growth of their students on a regular basis. Teachers assess students in a variety of ways (e.g. worksheets, class discussions, paragraph writing, projects, quizzes, and tests). The length and level of the assessment is dependent on the grade level being taught. Students in grades K-8 participate in MAP Growth science testing three times each year. This data is another important tool the faculty of Grace Lutheran School can use to assess the academic growth and achievement of each student.