



Our Savior Christian Academy

Curriculum Framework for: **Science**

Our Savior Christian Academy's "Curriculum Framework for Science" is designed as a tool that will follow the same format for all grades K-4. Each grade level will have a separate section based on classroom structure, and it will be up to each individual teacher to design a lesson plan that fits their classroom needs based on these standards and suggestions.

Our Savior Christian Academy's "Curriculum Framework for Science" is offered to the glory of God that it may be a blessing among Lutheran school educators and their students.

✠ **PHILOSOPHY** ✠

God is the Creator of all things living and non-living. He lovingly upholds all created things. God's glory and His character are revealed through exploration, observation, and scientific study of His world. Man's fall into sin has impacted all of creation, and it literally groans in expectation waiting for Christ's second return, when all things will be made new. We seek to serve God as wise stewards of His resources and work to restore Creation's original beauty.

Our Savior Christian Academy

Broad Goals

Our Savior Christian Academy's Science goals include:

- Incorporating Jesus Christ in all core areas of Science.
- Providing the children with a wide range of knowledge, skills, and related activities that help him/her to develop an understanding of the physical world.
- Encouraging the children to be confident and to communicate Science effectively through reading, writing, speaking, and listening.
- Using higher order thinking skills including comprehension, application, analysis, evaluation, and synthesis in the learning concepts in life science, earth science, and physical science.
- Displaying respect in their interactions with the environments of which they are members.
- Exhibiting organizational skills, intellectual curiosity and growth, and application of what has been learned in science both to future schoolwork and to lifelong learning.
- Providing learning experiences in which students will recognize, develop, and apply effective communication skills at or above grade level in the areas of Science.
- Students are shown strategies on how to be knowledgeable and proficient thinkers who will make positive Christ-like contributions to society.

Our Savior Christian Academy obtains this through:

- Keeping Our Savior, Jesus Christ, as the center focus on our campus and in our curriculum
- Fascinating and significant Science experiences through multi-sensory activities that incorporate the world around them.
- Applying Science to other core areas of learning.
- Adapting other subjects to add valuable perspectives to the Science curriculum.
- Teaching on an individual basis with the knowledge that children acquire an understanding of Science in an uneven way.
- Continuous assessment for analysis and planning in Science.
 - Focuses on the identification of the children's existing knowledge and strategies.
 - Updating curriculum to meet changing state standards along with student needs.
 - Provides information that will enable the teacher to cater for individual differences in ability, previous learning and learning style, and to resist pressure to push the child to premature mastery.
- Work samples and results that are shared with the parents, congregants, and community.

Strand 1: Properties and Principles of Matter and Energy

Strand 1-Integrating Faith by teaching the scientific principles to explore, discover, and classify God’s creation.

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued	
	Fifth
C	<i>Scope and Sequence – Water Cycle and Weather</i>
Properties of matter can be explained in terms of moving particles too small to be seen without tremendous magnification	<p>a. Describe how changes in state (i.e., freezing/melting, condensation/evaporation/boiling) provide evidence that matter is made of particles too small to be seen</p> <p>Curriculum: Create a water cycle/weather diorama. Read from Discovery works</p>
DOK	a – 1

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued	
	Fifth
D	<i>Scope and Sequence – Water cycle and Weather</i>
Physical changes in the state of matter that result from thermal changes can be explained by the Kinetic Theory of Matter	<p>a. Classify matter as a solid, a liquid, or a gas, as it exists at room temperature, using physical properties (i.e., volume, shape, ability to flow)</p> <p>b. Predict the effect of heat (thermal energy) on the physical properties of water as it changes to and from a solid, liquid, or gas (i.e., freezes/melts, evaporates/condenses/boils)</p> <p>Curriculum: Students explore various states of matter, recognizing the properties of each state of matter and recognizing the similarities and differences between the three states of matter. Investigate thermal heat and its relationship to weather. In this earth science lesson, experiment with water at different temperatures.</p>
DOK	a – 1, b – 2

1. Changes in properties and states of matter provide evidence of the atomic theory of matter -- Continued	
	Fifth
I	<i>Scope and Sequence – Water Cycle and Weather</i>
Mass is conserved during any physical or chemical change	<p>a. Observe the mass of water remains constant as it changes state (as evidenced in a closed container)</p> <p>Curriculum: Students record their steps and observations as the class weighs a container of water and then weighs it again after freezing it. Using chocolate bars, weigh the full bar; cut it and weigh again; melt and then weigh a third time. Compare the weights and record data and observations in journals.</p>
DOK	a – 1

Strand 1: Properties and Principles of Matter and Energy

2. Energy has a source, can be stored, and can be transferred but is conserved within a system	
	Fifth
A	<i>Scope and Sequence – Solar System</i>
Forms of energy have a source, a means of transfer (work and heat), and a receiver	<p>a. Observe and explain light being transferred from the source to the receiver (eye) through space in straight lines</p> <p>b. Observe and explain how an object (e.g., moon, mirror, objects in a room) can only be seen when light is reflected from that object to the receiver (eye)</p> <p>Curriculum: Mix the primary colors of light by using red, green, and blue lights. Use pieces of colored glass to filter the light and create a wide variety of colors. Determine how light is absorbed and transmitted by each color of glass.</p> <ul style="list-style-type: none"> • Discuss how light can be transferred from source to receiver
DOK	a – 2, b – 2, c – 1
C	<i>Scope and Sequence – Water Cycle and Weather/Solar System</i>
Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth	<p>a. Identify the Sun as the primary source of energy for temperature change on Earth</p> <p>Curriculum: Students create a poster using a picture of the sun and incorporating Genesis 1:3.</p>
DOK	a – 1

Strand 2: Properties and Principles of Matter and Energy

Strand 2-Integrating Faith by being able to use scientific principles to explore, discover, and classify God’s creation.

2. Forces affect motion	
	Fifth
A	<i>Scope and Sequence – Work and Simple Machines</i>
Forces are classified as either contact (pushes, pulls, friction, buoyancy) or non-contact forces (gravity, magnetism), that can be described in terms of direction and magnitude	<p>a. Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load</p> <p>Curriculum: Launch a charged particle into a chamber. Charged particles can be added into the chamber to influence the path of the moving particle. The launch speed can be changed as well. Try to match a given path by manipulating the fixed particles in the chamber. Student Exploration Sheet: http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=632</p>
DOK	a – 2
D	<i>Scope and Sequence – Work and Simple Machines</i>
Newton’s Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion	<p>a. Describe how friction affects the amount of force needed to do work over different surfaces or through different media</p> <p>Curriculum: Explore the laws of motion using a simple fan cart. Use the buttons to select the speed of the fan and the surface, and press Play to begin. You can drag up to three objects onto the fan cart. The speed of the cart is displayed with a speedometer and recorded in a table and a graph. Student Exploration Sheet: http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=614</p>
DOK	a – 2
F	<i>Scope and Sequence – Work and Simple Machines</i>
Work transfers energy into and out of a mechanical system	<p>a. Explain how work can be done on an object (force applied and distance moved) (No formula calculations at this level)</p> <p>Curriculum: Launch a charged particle into a chamber. Charged particles can be added into the chamber to influence the path of the moving particle. The launch speed can be changed as well. Try to match a given path by manipulating the fixed particles in the chamber. Student Exploration Sheet: http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=632</p> <p>b. Identify the simple machines in common tools and household items</p> <p>c. Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines</p> <p>d. Observe and explain that simple machines change the amount of effort force and/or direction of force</p> <p>Curriculum:</p> <ul style="list-style-type: none"> • http://www.lisd.org/technology/itswebs/elem/curr/science/Lesson%20Plans/simple%20machines.pdf • http://www.brainpopjr.com/science/forces/simplemachines/grownups.weml
DOK	a – 1, b – 1, c – 1, d – 1

Strand 3: Characteristics and Interactions of Living

Strand 3-Integrating Faith by teaching that God created the heavens and the earth, including all things visible and invisible, amazingly large and atomically small, living and non-living.

1. There is a fundamental unity underlying the diversity of all living organisms -- Continued

	Fifth
D	<i>Scope and Sequence – Classification of Plants and Animals</i>
Plants and animals have different structures that serve similar functions necessary for the survival of the organism	<p>a. Compare structures (e.g., wings vs. fins vs. legs; gills vs. lungs; feathers vs. hair vs. scales) that serve similar functions for animals belonging to different vertebrate classes</p> <p>Curriculum:</p> <ul style="list-style-type: none"> • Students will also demonstrate understanding of the distinguishing factors of various animal types by including those characteristics in their children's book projects. • Given an animal guessing game, students will be able to identify and compare structures
DOK	a – 2

1. There is a fundamental unity underlying the diversity of all living organisms -- Continued

	Fifth
E	<i>Scope and Sequence – Classification of Plants and Animals</i>
Biological classifications are based on how organisms are related	<p>a. Explain how similarities are the basis for classification</p> <p>b. Distinguish between plants (which use sunlight to make their own food) and animals (which must consume energy-rich food)</p> <p>c. Classify animals as vertebrates or invertebrates</p> <p>d. Classify vertebrate animals into classes (amphibians, birds, reptiles, mammals, fish) based on their characteristics</p> <p>e. Identify plants or animals using simple dichotomous keys</p> <p>Curriculum:</p> <ul style="list-style-type: none"> • Students will also demonstrate understanding of the distinguishing factors of various animal types by including those characteristics in their children's book projects. • Given an animal guessing game, students will be able to identify both classes and various species of animals on the basis of distinguishing characteristics.
DOK	a – 2, b – 1, c – 1, d – 1, e – 1

Strand 3: Characteristics and Interactions of Living

2. Living organisms carry out life processes in order to survive	
C	Fifth
<p>Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means</p>	<p><i>Scope and Sequence – Classification of Plants and Animals</i></p> <p>a. Compare the major organs/organ systems (e.g. support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes</p> <p>Curriculum:</p> <ul style="list-style-type: none"> • Students will also demonstrate understanding of the distinguishing factors of various animal types by including those characteristics in their children's book projects. • Given an animal guessing game, students will be able to identify major organ/organ systems
DOK	a – 1

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

Strand 5: Integrating Faith by teaching that God loves His creation and continually cares and provides for it.

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures

Fifth	
B	<i>Scope and Sequence – Water Cycle and Weather</i>
The hydrosphere is composed of water (a material with unique properties) and other materials	<p>a. Classify major bodies of surface water (e.g., rivers, lakes, oceans, glaciers) as fresh or salt water, flowing or stationary, large or small, solid or liquid, surface or groundwater</p> <p>Curriculum: Go through ppt. and discuss the different characteristics http://betterlesson.com/document/114050/geography-bodies-of-water?from=search</p>
DOK	a – 1

1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures -- Continued

Fifth	
C	<i>Scope and Sequence – Water Cycle and Weather</i>
The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles	<p>a. Recognize the atmosphere is composed of a mixture of gases, water, and minute particles</p> <p>Curriculum: Read from our text, Discovery Works.</p>
DOK	a – 1

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes -- Continued

Fifth	
E	<i>Scope and Sequence – Water Cycle and Weather</i>
Changes in the form of water as it moves through Earth's systems are described as the water cycle	<p>a. Describe and trace the path of water as it cycles through the hydrosphere, geosphere, and atmosphere (i.e., the water cycle: evaporation, condensation, precipitation, surface run-off/ groundwater flow)</p> <p>b. Identify the different forms water can take (e.g., snow, rain, sleet, fog, clouds, dew) as it moves through the water cycle</p> <p>Curriculum: Students will be able to diagram the water cycle (evaporation, precipitation, condensation) on a molecular level by doing investigations on condensation and evaporation; presenting conclusions from investigations; engaging in a study of the water cycle. http://betterlesson.com/lesson/32177/water-cycle-day-8-and-9#</p>
DOK	a – 1, b – 1

Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere)

2. Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes -- Continued

	Fifth
F	<i>Scope and Sequence Water Cycle and Weather</i>
Climate is a description of average weather conditions in a given area due to the transfer of energy and matter through Earth's systems	<p>a. Identify and use appropriate tools (i.e., thermometer, anemometer, wind vane, rain gauge, satellite images, weather maps) to collect weather data(i.e., temperature, wind speed and direction, precipitation, cloud type and cover.)</p> <p>b. Identify and summarize relationships between weather data (e.g., temperature and time of day, cloud cover and temperature, wind direction and temperature) collected over a period of time.</p> <p>Curriculum: Use tools to collect weather data and chart over a period of time. Summarize relationship in paper.</p>
DOK	a – 2, b – 3

3. Human activity is dependent upon and affects Earth's resources and systems

	Fifth
A	<i>Scope and Sequence – Water Cycle and Weather</i>
Earth's materials are limited natural resource's affected by human activity	<p>a. Explain how major bodies of water are important natural resources for human activity(e.g., food recreation, habitat, irrigation, solvent, transportation)</p> <p>b. Describe how human needs and activities (e.g., irrigation damming of rivers, waste management, sources of drinking water) have affected the quantity and quality of major bodies of fresh water</p> <p>c. Propose solutions to problems related to water quality and availability that result from human activity</p> <p>Curriculum:</p> <ul style="list-style-type: none"> • Students will create a power point presentation on the major bodies of water on how human activity relies on, needs, and has caused problems for the major bodies of water. Research. • Natural resources: http://www.brainpopjr.com/science/conservation/naturalresources/grownups.weml
DOK	a – 2, b – 3, c – 3

Strand 6: Composition and Structure of the Universe and the Motion of the Objects Within It

Strand 6: Integrating Faith by creating a book about the seven days of creation.

1. The universe has observable properties and structure

Fifth	
A	<i>Scope and Sequence – Solar System</i>
The Earth, Sun, and Moon are part of a larger system that includes other planets and smaller celestial bodies	<p>a. Observe and identify the Earth is one of several planets within a solar system that orbits the Sun</p> <p>b. Observe and identify the Moon orbits the Earth in about a month</p> <p>c. Identify that planets look like stars and appear to move across the sky among the stars</p> <p>Curriculum: Guide students through the PowerPoint presentation. Each slide is organized with graphics and text to lead students through the components of the solar system. At the end of the presentation, students will be assessed with an interactive card game and/or a Jeopardy style game.</p>
DOK	a – 1, b – 1, c – 1
B	<i>Scope and Sequence – Solar System</i>
The Earth has a composition and location suitable to sustain life	<p>a. Describe physical features of the planet Earth that allows life to exist (e.g., air, water, temperature) and compare these to the physical features of the Sun, the Moon, and other planets</p> <p>Curriculum: Students break into groups. Each group will be assigned to plan a trip to a planet. Students will create a proposal for a trip to their assigned planet. Students will use what they have discovered through research to argue for or against planning a trip to the planet.</p>
DOK	a – 2

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces

B	<i>Scope and Sequence – Solar System</i>
The apparent position of the moon, as seen from Earth, and its actual position relative to Earth change in observable patterns	<p>a. Sequence images of the lit portion of the Moon seen from Earth as it cycles day-to-day in about a month in order of occurrence</p> <p>Curriculum: Read from our text, Discovery Works. Students create their own “Space Book” where they give definitions and examples</p>
DOK	a – 2

2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces -- Continued

Fifth	
C	<i>Scope and Sequence – Solar System</i>
The regular & predictable motions of the Earth and Moon relative to the Sun explain natural phenomena on Earth, such as day, month, year, shadows, moon phases, eclipses, tides, & seasons	<p>a. Identify that the Earth rotates once every 24 hours</p> <p>b. Relate changes in the length and position of a shadow to the time of day and apparent position of the Sun in the sky, as determined by Earth’s rotation</p> <p>c. Relate the apparent motion of the Sun, Moon, and stars in the sky to the rotation of the Earth (Do not assess apparent motion of polar constellations)</p> <p>Curriculum: Read from our text, Discovery Works. Students create their own “Space Book” where they give definitions and examples</p>
DOK	a – 1, b – 2, c – 2

Strand 8: Impact of Science, Technology and Human Activity

Strand 8: Integrating faith by helping students understand how to use scientific principles to explore, discover, and classify God’s creation.

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking	
	Fifth
A	<i>Scope and Sequence - All Units</i>
Scientific inquiry includes the ability of students to formulate a testable question and explanation, and to select appropriate investigative methods in order to obtain evidence relevant to the explanation	a. Formulate testable questions and explanations (hypotheses) b. Recognize the characteristics of a fair and unbiased test c. Conduct a fair test to answer a question d. Make suggestions for reasonable improvements or extensions of a fair test Curriculum: Use scientific inquiry (a,b,c,d) to learn about previous Science Standards.
DOK	a – 3, b – 2, c – 2, d – 3
B	<i>Scope and Sequence - All Units</i>
Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations	a. Make qualitative observations using the five senses b. Determine the appropriate tools and techniques to collect data c. Use a variety of tools and equipment to gather data (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scales) d. Measure length to the nearest centimeter, mass to the nearest gram, volume to the nearest milliliter, temperature to the nearest degree Celsius, force/weight to the nearest Newton e. Compare amounts/measurements f. Judge whether measurements and computation of quantities are reasonable Curriculum: Use scientific inquiry (a,b,c,d) to learn about previous Science Standards.
DOK	a – 1, b – 2, c – 1, d – 1, e – 2, f – 3
C	<i>Scope and Sequence - All Units</i>
Scientific inquiry includes evaluation of explanations (laws/principles, theories/models) in light of evidence (data) and scientific principles (understandings)	a. Use quantitative and qualitative data as support for reasonable explanations b. Use data as support for observed patterns and relationships, and to make predictions to be tested c. Evaluate the reasonableness of an explanation d. Analyze whether evidence supports proposed explanations Curriculum: Use the Scientific Inquiry process to meet previous standards.
DOK	a – 3, b – 3, c – 3, d – 3
D	<i>Scope and Sequence - All Units</i>
The nature of science relies upon communication of results and justification of explanations	a. Communicate the procedures and results of investigations and explanations through: ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, single line, pictograph) ⇒ writings Curriculum: Use the Scientific Inquiry process to meet previous standards. For example: write a persuasive paragraph, encouraging people to take care of the earth.
DOK	a – 2

Strand 8: Impact of Science, Technology and Human Activity

1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs	
	Fifth
A	<i>Scope and Sequence – Work and Simple Machines</i>
Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all	<p>a. Design and construct a machine, using materials and/or existing objects, that can be used to perform a task (Assess Locally)</p> <p>Curriculum: Students design and construct a machine. Be able to explain how they created it and demonstrate it working.</p>
DOK	a – 3
B	<i>Scope and Sequence – Work and Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals</i>
Advances in technology often result in improved data collection and an increase in scientific information	<p>a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers)</p> <p>Curriculum: Read from our text, Discovery Works</p>
DOK	a – 2

1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs -- Continued	
	Fifth
C	<i>Scope and Sequence – Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals</i>
Technological solutions to problems often have drawbacks as well as benefits	<p>a. Identify how the effects of inventions or technological advances (e.g., complex machinery, technologies used in space exploration, satellite imagery, weather observation and prediction, communication, transportation, robotics, tracking devices) may be helpful, harmful, or both (Assess Locally)</p> <p>Curriculum: Read from our text, Discovery Works. Divide into teams; each team chooses a topic and researches it. One team member shares the potential helpful aspects, one focuses on the potential harmful aspects.</p>
DOK	a – 3

Strand 8: Impact of Science, Technology and Human Activity

2. Historical and cultural perspectives of scientific explanations help to improve understanding of the nature of science and how science knowledge and technology evolve over time	
	Fifth
A	<i>Scope and Sequence – All units</i>
People of different gender and ethnicity have contributed to scientific discoveries and the invention of technological innovations	<p>a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (Assess Locally)</p> <p>Curriculum: Given a scientist or inventor, students research and then share information. One student can pretend to be the scientist, the other can be the interviewer.</p>
DOK	a – 3
3. Science and technology affect, and are affected by, society	
	Fifth
A	<i>Scope and Sequence - All Units</i>
People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done	<p>a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)</p> <p>b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)</p> <p>Curriculum: Given the question, How can our school “Go Green”, students will work together to create some possible responses and then share these ideas with the class.</p>
DOK	a – 3, b – 3