HOMER COMMUNITY SCHOOL DISTRICT

Science Curriculum

Implemented 2014/2015

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Mission Statement

Mission Statement

The Homer Community School District provides a safe, supportive environment in which all students will develop the skills, knowledge, and integrity essential for a successful future. This includes educating students to:

- read with understanding,
- communicate clearly,
- solve problems effectively,
- think critically, and
- act responsibly.

Philosophy and Beliefs

Science Education Philosophy and Beliefs

Philosophy

The Homer Community School District holds the philosophy that science affects every aspect of our lives; therefore, science is a vital part of every student's education. Research indicates students learn most effectively with a curriculum that implements the Scientific Method, which stirs curiosity and imagination through a *hands-on, minds-on* atmosphere making science concepts relevant to each individual. This engaging method encourages students to think objectively, creatively, and critically.

The Homer Community School District has the philosophy that scientific knowledge helps citizens make well informed decisions regarding their careers, health, environment and society in a world of ever changing technology.

Science Education Program Belief Statements

The Homer Community School District believes that:

- All students can learn science and should be held to high expectations.
- All students deserve an excellent program of instruction in science that is challenging, authentic, and interdisciplinary.
- All students will be provided with interventions and enrichment opportunities through hands-on learning experiences via cooperative learning activities and laboratory investigations.
- All students will be able to use appropriate technology and tools to investigate and to increase the understanding of science concepts.
- Assessments will support the learning of science concepts and provide useful information to students, parents, and teachers.
- Assessments will be varied, continuous, and implemented into the instruction in a varied and ongoing manner to assess and enhance instructional effectiveness.
- All science instruction will be inquiry-based and support meta-cognition.

Research and Program Model

Review of Literature

The members of the Science Curriculum Review Committee examined research on effective science instruction to determine what types of programs and strategies significantly impacted student achievement. The following is a summary of the information obtained in that query.

NSTA Elementary Position Statement

The National Science Teachers Association supports the notion that scientific inquiry practices must be a basic in the daily curriculum of every elementary school student at every grade level. In the last decade, numerous reports have been published calling for reform in education. Each report highlighted the importance of early experiences in science so that students develop problem-solving skills that empower them to participate in an increasingly scientific and technological world.

- The elementary science program must provide opportunities for students to develop understandings and skills necessary to function productively as problem-solvers in a scientific and technological world.
- Elementary school students learn science best when—
    1. they are involved in first-hand exploration and investigation and inquiry/process skills are nurtured.
    2. instruction builds directly on the student's conceptual framework.
    3. content is organized on the basis of broad conceptual themes common to all science disciplines.
    4. mathematics and communication skills are an integral part of science instruction.
- The learning environment for elementary science must foster positive attitudes towards self and society, as well as science.
- Elementary school students value science best when—
    1. a variety of presentation modes are used to accommodate different learning styles and students are given opportunities to interact and share ideas with their peers.
    2. the scientific contributions of individuals from all ethnicities and gender are recognized and valued.
    3. other subject areas are infused into science.
    4. inquiry skills and positive attitudes are modeled by the teacher and others involved in the education process.
- Teacher preparation and professional development must enable the teacher to implement science as a basic component of the elementary school curriculum.
- Teacher preparation and professional development must provide for—
    1. experiences that will enable teachers to provide and implement hands-on activities to promote skill development, select content and methods

appropriate for their students, and to design classroom environments that promote positive attitudes toward science and technology.
    2. continuing science in-service programs based on current educational research that encompasses content, skills, techniques, and useful materials.
    3. participation in workshops, conferences, and meetings sponsored by local, state, and national agencies.
- The school administrators must be advocates for elementary science.
- Administrators must provide instructional leadership by—
    1. building consensus for an elementary science program that reflects state and national standards.
    2. implementing and monitoring the progress of the science program.
- Administrators must provide support systems by—
    1. supplying appropriate materials, equipment, and funding.
    2. recognizing exemplary elementary science teaching.
    3. encouraging special science events.
- The instructional implementation and support system for elementary school science must include the combined efforts of all aspects of the community: parents, educators, businesses, and other organizations.
- The community must be advocates for elementary school science by—
    1. participating in ongoing planning, assessment, and funding of elementary science programs.
    2. promoting informal science learning experiences.
- Assessment must be an essential component of an elementary science program.
- Assessment must be aligned with—
    1. what is of value, i.e., the problem-solving model of instruction: concept application, inquiry, and process skills.
    2. the curricular objectives and instructional mode.
    3. the purpose for which it was intended: grading, diagnosis, student and/or parent feedback, or program evaluation.
- Elementary school science instruction must reflect the application and implementation of the most recent educational research.
- Elementary school science programs are improved when—
    1. teachers keep abreast of appropriate science education research.
    2. educational research becomes the premise for change or innovation in elementary school science, and teachers participate in action research in elementary science

NSTA High School Position Statement

Rationale

Science students deserve a safe, effective learning environment. This requires safe and adequate conditions, adequate facilities and equipment, and competent, qualified teachers.

Declarations

The National Science Teachers Association recommends the following standards for creating and maintaining science learning conditions:

- Science teachers should be certified in the science they are teaching.
- New teachers should be assigned master science teachers as mentors.
- Science teaching assignments should provide time for preparations necessary for safe and effective science teaching.
- Science teachers should be scheduled in only one classroom to be able to manage the laboratory safely.
- Science students should learn in classrooms that have the facilities and space for a safe laboratory-oriented program.
- Students need adequate space to work safely. Because of safety considerations and the individual attention needed by students in laboratories, science classes should be limited to 24 students.
- Science rooms/laboratories should be used only for science classes and science activities and should be equipped with:
    - Adequate laboratory space per student and sufficient gas, electrical, and water outlets for student laboratory activities.
    - Safety equipment such as a fire extinguisher, fume hoods, emergency showers, and eyewash stations.
    - Audiovisual equipment such as smartboards, projectors, doc cameras, and one or more computers with Internet access, plus needed software and maintenance service.
    - Sufficient storage for equipment and supplies and preparation space close to the classroom.
    - Support equipment such as a copy machine and telephone in a nearby accessible area.
    - Textbooks or consumable workbooks for each student, laboratory guides, and references as needed.
- Science teachers responsible for classes with special education students in an inclusion setting need;
    - Special education support adequate to safely and successfully meet the individual education plan of each inclusion student in the science classroom.
    - Access to professional development in teaching in an inclusion classroom.
    - Additional planning time with the special education teacher assigned to her or his classroom to modify the learning environment to better facilitate the safe learning process for those students with special needs.
    - Additional resources, professional development, and equipment and materials provided as necessary for inclusion students to be safely and completely involved in the least restricted science learning and activities.

Researched-based Topics for Science Achievement

The following eight instructional practices were researched and cited to determine best practices for science achievement:

1. Modeling
2. Hands-On Science
3. Inquiry Based
4. Science Literacy
5. Scaffolding
6. Event Based Science
7. Project Based
8. Assessment

1. Modeling Instruction: An Effective Model for Science Education

The Modeling Instruction Program (MIP) was recognized as one of the two exemplary K-12 science programs from a pool of 27 programs. The research in this article (Jackson, Dukerich, and Hestenes, 2008) focused on high school students in advanced science classes, usually physics.

A comparative study on 20,000 students indicates those with MIP instruction achieved twice the gains on a standard test measuring conceptual understanding than those with traditional instruction (lecture with demonstration.)

Research indicates the MIP hands-on experience promotes/enhances:

- students recognizing the application of science in daily activities.
- increased participation.
- retention of previously gained knowledge by incorporating spiral effect, building new concepts on previous lessons.
- the uprooting of “deeply rooted” misconceptions held by students.
- *Whiteboarding* – a method students present their process and data to peers.
- a deeper understanding of experiment and information.
- verbal skills.
- all learning styles.
- inquiry approach.
- mathematics and computer technology to analyze data.

Two main stages of MIP

I. Model Development
   A. Pre-lab discussion
   B. Lab investigation
   C. Post-lab discussion
II. Model Deployment
   A. Worksheets

B. Quizzes
C. Lab Practicum
D. Unit Test

2. Hands-On Science

There are four pedagogical practices that can be said to be the best practice for science according to *How Students Learn: History, Mathematics, and Science in the Classroom* (National Research Council, 2005).

- Engaging Resilient Preconceptions (addressing students' initial understanding and preconceptions about topics)
- Organizing Knowledge around Core Concepts (providing a foundation of factual knowledge and conceptual understanding)
- Supporting Metacognition and Student Self-Regulation (teaching strategies that will help students take control of their learning)
- Cooperative Learning (allowing students to learn together)

Armstrong's study (2006) indicated that play in a multisensory environment was essential to maximize early childhood development, laying the foundation for curious children to engage in the scientific exploration of their world and solve problems.

Developmental aspects of young children ages 3-6 included:

A. Children learn best through play.
B. Energy used by a 2-year-old is equal to an adult.
C. By age of three, the child's brain is twice as active as an adult.
D. Activity at that level until about the age of 9 or 10 years. At that time it begins to level out until age of 18/adulthood.
E. Play is leading source of development in preschool years.
F. Child needs rich environment.
G. Concrete concepts must be established before abstract concepts.
H. Research suggest that programs, such as Head Start, that push letters, numbers, rote skills have an early advantage, yet those advantages level off when cognitive demands increase in later grades.
I. ASCD has issued statement that all testing of PK-2 grade children should cease.
J. Technology may not be as developmentally appropriate as educators once thought.
K. Children needs sensory/hands on experiences.
L. ADD/ADHA may be the result of too much technology and television. Not enough movement / interaction with environment.
M. Homework, longer school day, less nap time, and less recess time not good / not appropriate for children.
N. Those who play the "best" have the "best" imagination and interest in learning.
O. Verbiage: *readiness, early intervention, academic kindergarten, play with a purpose* are red flags terms.

Developmentally Inappropriate Practices	**Developmentally Appropriate Practices**
Artificial classroom environment	Open-ended play
Long school day	Short school day
Elimination of naps / recess	Nap time
Lessons in formal academic skills	Informal learning all of time
Homework	Parental involvement
Long periods of seatwork	Learning with movement
Standardized testing	Document (c) play
Teacher-Centered program	(C)-centered program
Computers, television, Internet	No high-tech/use multisensory
Schedule of classes into short time units	Unstructured play
Division of school day into courses	Serendipity, spontaneity, fun
Creation of instructional objectives for (c)	Honor the wholeness of (c)
All (c) do same activity at same time.	(C) chooses own activities

3. **Scientific Inquiry**

Science education reformers recommend scientific inquiry as the preferred instructional method for elementary science classes. It directly engages students' thinking about a problem in the form of a scientific investigation. It is a "hands-on, minds-on" science approach.

Inquiry-based instruction (Allen, 2006) encourages students to learn through concrete experiences and observation rather than memorization. Three types of inquiry are commonly referred to: *structured inquiry, guided inquiry, and open inquiry.* Structured inquiry involves more teacher instruction, but students must decide for themselves which observations are most important to record and interpret their own data. During guided inquiry, students not only choose what data to record and how to interpret it, but they also design the procedure that will answer the main question. Open inquiry is the one in which students make almost all the decisions. They think of the question, consider how to investigate it, what data to collect, and how to interpret that data.

In order to effectively engage in inquiry in the classroom, K-4 students should be able to:

- Ask a question about objects, organisms, and events in the environment.
- Plan and conduct a simple investigation.
- Employ simple equipment and tools to gather data and extend the senses.
- Use data to construct a reasonable explanation.
- Communicate investigations and explanations.

Students in grades 5-8 should be able to:

- Identify questions that can be answered through scientific investigations.
- Design and conduct a scientific investigation.
- Use appropriate tools and techniques to gather, analyze, and interpret data.
- Use evidence to develop descriptions, explanations, predictions, and models.
- Think critically and logically to relate evidence and explanations.
- Recognize and analyze alternative explanations and predictions.
- Communicate scientific procedures and explanations.
- Use mathematics in all aspects of scientific inquiry.

4. Integrating Literacy

Science is the perfect content area to integrate language arts, particularly expository writing in the form of student science notebooks. Student science notebooks are a student's personal record, an extension of their mental activities and a store of personally valued information. Science and literacy also have another strong point of connection through the desire of many educators to develop metacognitive awareness in children. The process of using science notebooks is developmental for both students and classroom teachers (Klentschy, 2008).

Achieving Scientific Literacy

In a scientific literacy curriculum **reading** and **writing** can serve as dynamic vehicles for learning science meaningfully. To prosper in today's world and future centuries; all students must become scientifically literate, embracing science as lifelong learners and by using scientific knowledge as the scientific way of thinking as individuals as well as a society.

Scientific literacy is more than scientific knowledge; students also must have the reading ability to evaluate the print-based information and the writing ability to communicate their thoughts to others which will have a great impact on their thinking.

- "Trendy emphases on hands-on learning activities will not by its self increase scientific literacy. What is additionally needed is a minds-on on emphasis in learning science. **The importance of being able to understand and explain- in clear language – the meaning of fundamental scientific concepts is central to science literacy."**
- **Erwin Schrodinger**-quantum physics "if you can't tell everyone what you have been doing, your doing has been worthless."
- Reading and writing can be important tools that help to engage student's minds on complex reasoning and problem solving processes.

- Modeled a student's cognitive processes; a) perception b) working memory c) long-term memory d) meta-cognition.
- Modeled a **constructivist** approach to teaching.
    1. Students should learn science concepts as organized networks of related information, not lists of facts.

Learning to read and write prepares a student for reading to learn. Students who learn from subject matter textbooks and other print materials rely upon their previously learned science knowledge and science process skills stored in long-term memory.

- Science knowledge should be understood in ways that will enable it to be used.
- Communication skills are essential because "discourse in science, mathematics and technology calls for the ability to communicate ideas and share information and to read and listen with understanding.

Concepts of reading and writing science should be introduced to students in the elementary school years; middle school students should begin to use these concepts with more emphasis on content; high school students should use these previous learned skills in connection with science concepts and develop critical thinking skills used to explain their understandings and connections to future use.

5. Scaffolding and Differentiated Instruction

In *Six Scaffolding Strategies to Use with Your Students*, (Abler, 2011) the author talks about different ways to incorporate scaffolding and differentiating instruction in science lessons. This is not grade-level specific. It also defines scaffolding for anyone who isn't already familiar.

Examples include:

- Show and Tell – not necessarily a student bringing an item to school to show and demonstrate, but a teacher using models for lessons.
- Tap Into Prior Knowledge – using own experiences, hunches, ideas, etc. to connect a student to the content.
- Give Time to Talk – lots of discussion questions during lessons. Letting questions be asked.
- Pre-Teach Vocabulary – learn scientific vocabulary before starting a new unit/lesson/topic/etc.
- Use Visual Aids – similar to 'show and tell.' Using more than just a book to teach lessons. (Videos, models, posters, hands-on, etc.)
- Pause, Ask Questions, Pause, and Review – similar to APL strategies on retaining information. Always giving a student time to reflect through the lesson. Every 3-5 minutes of instruction.

- Trying Something New – Trying different things every time a lesson is taught.

6. Event-Based Science

One of the most important and pervasive goals of schooling is to teach students to think (Padilla, 1990). Science contributes its unique skills with emphasis on hypothesizing, manipulating the physical world and reasoning from data. Most commonly used terms that describe "Science Processing Skills" are: scientific method, scientific thinking and critical thinking.

Basic Science Process Skills

- Observing – using the senses to gather information about an object or event.
- Inferring – Making an "educated guess" about an object or event based on previously gathered data or information.
- Measuring **–** using either standard and nonstandard measures or estimates to describe the dimension of an object or event.
- Communicating**-** using words or graphic symbols to describe an action, an object, or event.
- Classifying**-** grouping or ordering objects or events into categories based on properties or criteria.
- Predicting **–** stating the outcome of a future event based on a pattern of evidence.

Integrated Science Process Skills

- Controlling variables**-** being able to identify variables that can affect an experimental outcome, keeping most constant while manipulating only the independent variable.
- Defining operationally**-** stating how to measure a variable in an experiment or defining vocabulary.
- Formulating a hypothesis**-** stating the expected outcome of an experiment based on previous knowledge.
- Interpreting data**-** organizing data and drawing conclusions from it.
- Experimenting**-** being able to conduct and experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining those variables, designing a fair experiment, conducting the experiment, interpreting the results of the experiment.
- Formulating models – creating a mental or physical model of a process or event.

Many Science Curriculum Improvement Studies show that when the above skills were taught to elementary school students, not only did they excel in science, but students were able to transfer those skills into other subject areas. The students also retained these skills in future science classes. Elementary and high school students also improved when processing skills were considered an important part of the science curriculum. Further studies show that with any skill, physical or mental practice is important and should continue throughout the educational years.

7. Project-Based Learning: Theory, Cases and Recommendations

Project-based learning is a method used to help students understand a topic by "doing" it rather than traditional teaching. Students are able to show what they have learned by creating projects that are personal and meaningful to them. Students are also able to be more responsible for their own learning (Grant, 2002).

8. Assessments

Science assessments are necessary tools for managing and evaluating efforts to ensure all students receive the science education necessary to prepare them for participation in our nation's decision-making processes and lifelong learning of science in a technology-rich workplace (Marshall, 1992).

Meaningful science assessment (Wiggins, 1992) is realized only when stakeholders—students, parents, teachers, school administrators, community members, business persons, policy makers, and government officials—share the responsibility for science learning and associated formative and summative assessments. These stakeholders need to provide adequate resources, equal access, leadership, environment, guidance, enthusiasm, incentives, and motivation for science learning.

Quality science assessments should be mechanisms for accessing information on students':

- understandings of science content and process knowledge and skills.
- abilities to think critically and solve simple to complex problems.
- capabilities of designing scientific experiments, analyzing data, and drawing conclusions.
- capacities to see and articulate relationships between science topics and real-world issues and concerns.
- skills using mathematics as a tool for science learning.

Assessment feedback (Linn, 2001) reflects the learning setting and should be used to adjust course content, teaching techniques, or learning strategies to improve student learning in science. Moreover, the assessment data should be used to craft appropriate teacher professional development experiences, identify students who need extra help

and/or learning accommodations, and revisit and redesign assessment tools to better reflect the learning goals and instructional setting.

In closing, these were the findings of the Science Curriculum Committee which formed the basis for its recommendations for revising the K-12 science curriculum at Homer Community School.

Recommendations

The 2013-2014 Homer Community School Science Curriculum Committee makes the following recommendations to strengthen our current K-12 science program of study. We advocate the following actions to enlighten and excite our students about the aspects of science in their daily activities. We propose these enhancements to infuse hands-on, minds-on activities with technology. These recommendations will heighten our students' science skills as they pursue their formal education, talents and abilities beyond high school, thus becoming productive adults.

Recommendations to Enhance Elementary Science Curriculum:

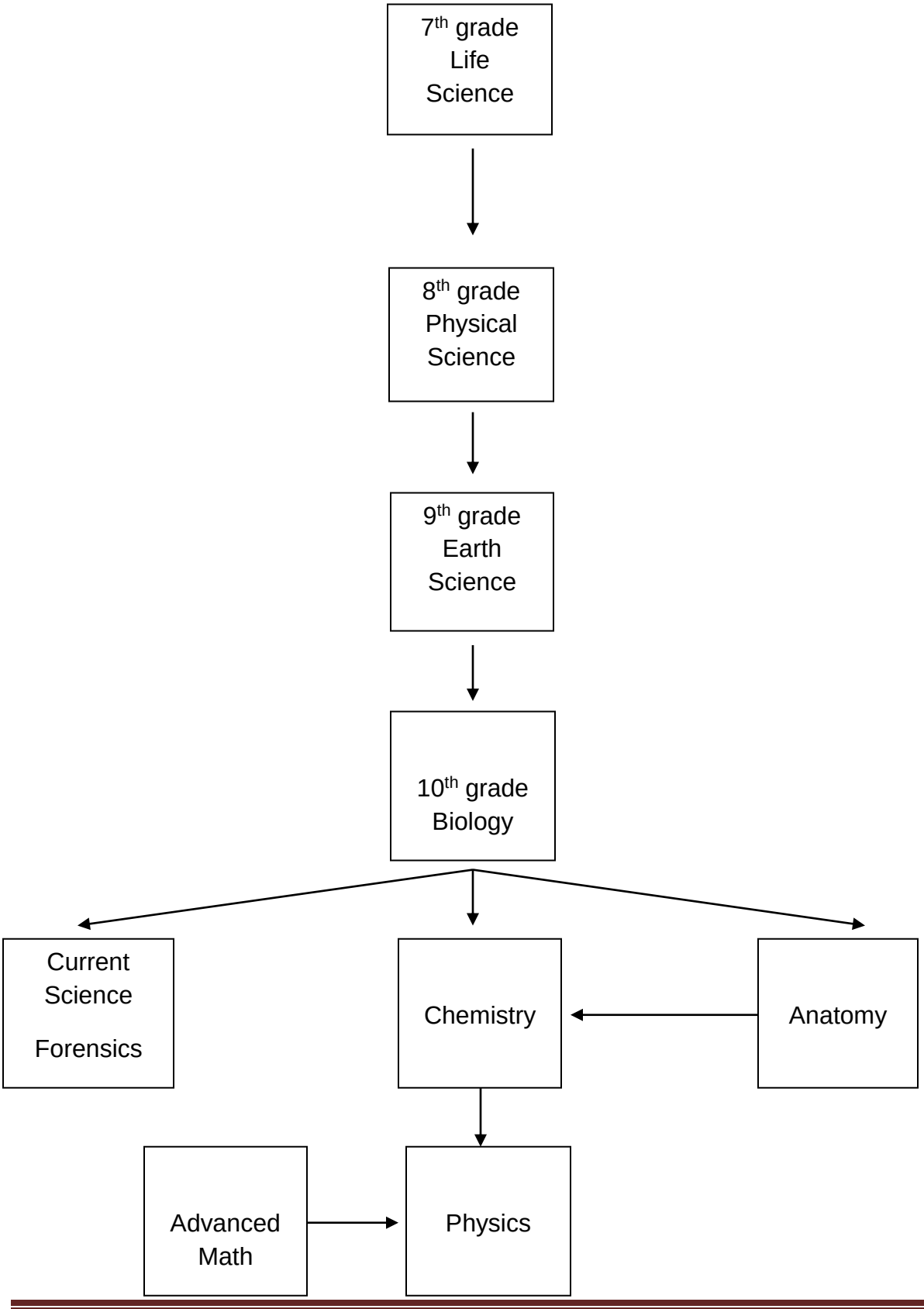
- Purchase the series **Science Fusion** by Houghton Mifflin Harcourt publishing company.
- Purchase the tool/equipment kits that come with **Science Fusion** for each classroom to maximize the committee's research and recommendations for more hands-on, inquiry based activities.
- Provide an elementary storage room or cabinet for large science tools/equipment and opportunity to share materials.
- Sixth grade curriculum will emphasize Earth Science to specifically comply with state standards 8.4.4a & 8.4.4b in order for students to be prepared for the NeSA test in ninth grade. (Homer Community School does not offer Earth Science in grades seven or eight.)

Recommendations to Enhance High School Science Curriculum:

- Remodel Science Room #202 to become more conducive to hands on learning by creating lab stations similar to lab stations in Science Room #201. That would involve:
    - removal of the upper cabinets, which are currently a fire hazard, but retain the storage under the new lab stations.
    - redirection of plumbing and gas jets.
    - reposition the fume hood over one of the new lab stations.
- A third high school science classroom.
- Purchase of the **Glenco Science** materials for the courses of *Life Science, Physical Science* and *Earth Science*.
- Change the course title *Current Science/Forensics* which is currently a one semester (half-year) course to *"Science Investigations,"* which would make it a two semester course (whole year.)
- Earth Science Standard 8.4.4a and 8.4.4b included in the sixth grade curriculum.

- The sequence of course offerings at the secondary level meets Nebraska state requirements therefore no additional classes are needed at this time.

Secondary Course Sequence



Curriculum Frameworks

Kindergarten – Second Grade

SC 1: Inquiry, the Nature of Science, and Technology **Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence.**	
SC 1.1	Abilities to do Scientific Inquiry
SC 2.1.1	Students will ask questions and conduct investigations that lead to observations and communication of findings
	Scientific Questioning
	2.1.1.a Ask questions that relate to a science topic
	Scientific Investigations
	2.1.1.b Conduct simple investigations
	Scientific Tools
	2.1.1.c Select and use simple tools appropriately
	Scientific Observations
	2.1.1.d Describe objects, organisms, or events using pictures, words, and numbers
	Scientific Data Collection
	2.1.1.e Collect and record observations
	Scientific Communication
	2.1.1.f Use drawings and words to describe and share observations with others
	Mathematics
	2.1.1.g Use appropriate mathematics in all aspects of scientific inquiry
SC 2: Physical Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world**.	
SC 2.1	Matter
SC 2.2.1	Students will observe and describe properties of objects and their behavior
	Properties and Structure of Matter
	2.2.1.a Observe physical properties of objects (freezing and melting, sinking and floating, color, size, texture, shape, weight)
	2.2.1.b Separate and sort objects by physical attributes
	2.2.1.c Measure objects using standard and non-standard units
	States of Matter
	2.2.1.d Identify solids and liquids and recognize that liquids take the shape of their container
SC 2.2	Force and Motion
SC 2.2.2	Students will compare relative position and motion of objects
	Motion
	2.2.2.a State location and/or motion relative to another object or its surroundings (in front of, behind, between, over, under, faster, slower, forward and backward, up and down)

	2.2.2.b Describe how objects move in many different ways (straight, zigzag, round and round, back and forth, and fast and slow)
SC 3: Life Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Life Sciences to make connections with the natural and engineered world.**	
SC 3.1	Structure and Function of Living Systems
SC 2.3.1	Students will investigate the characteristics of living things
	Structure and Function of Living Systems
	2.3.1 Students will investigate the characteristics of living things
	Characteristics of Life
	2.3.1.a Differentiate between living and nonliving things
	Characteristics of Living Organisms
	2.3.1.b Identify the basic needs of living things (food, water, air, space, shelter)
	2.3.1.c Identify external parts of plants and animals
	2.3.1.d Observe and match plants and animals to their distinct habitats
SC 3.2	Heredity
SC 2.3.2	Students will recognize changes in living things
	Inherited Traits
	2.3.2.a Describe how offspring resemble their parents
	Reproduction
	2.3.2.b Describe how living things change as they grow
SC 3.4	Biodiversity
SC 2.3.4	Students will recognize changes in organisms
	Biological Adaptations
	2.3.4.a Recognize seasonal changes in animals and plants
SC 4: Earth and Space Sciences **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of Earth and Space Sciences to make connections with the natural and engineered world.**	
SC 4.1	Earth in Space
SC 2.4.1	Students will observe and identify objects of the sky
	Objects in the Sky and Universe
	2.4.1.a Identify objects in the sky (the Sun, the Moon, the stars) and when they are observable
	Motion of Objects in the Solar System
	2.4.1.b Identify objects that appear to move in the sky (the Sun, the Moon, stars)

SC 4.2	Earth Structures and Processes
SC 2.4.2	Students will observe, identify, and describe characteristics of Earth's materials
	Properties of Earth Materials
	2.4.2.a Describe Earth materials (sand, soil, rocks, water)
	Use of Earth Materials
	2.4.2.b Recognize ways in which individuals and families can conserve Earth's resources by reducing, reusing, and recycling
SC 4.3	Energy in Earth's Systems
SC 2.4.3	Students will observe simple patterns of change on Earth
	Energy Sources
	2.4.3.a Observe that the Sun provides heat and light
	Weather and Climate
	2.4.3.b Observe and describe simple daily changes in weather
	2.4.3.c Describe simple seasonal weather indicators and how they impact student choices (activities, clothing)

Kindergarten Science Vocabulary

Animal
Fall
Living things
Nonliving things
Ocean
Plant
Soil
Spring
Summer
Sun
Weather
Wind
Winter

First Grade Science Vocabulary

Air
Clouds
Equator
Floating
Flower
Gas
Habitat
Insect
Liquid
Mammals
Matter
Moon
Oxygen
Paleontologist
Pollen
Rock
Seasonal
Seeds
Shelter
Sinking
Soil
Stem
Temperature
The Senses
Thermometer

Second Grade Science Vocabulary

(*) NeSA Vocabulary
*Animal
Attract
*Balance
*Basic needs
*Centimeters
*Change
Chemical change
Desert
Energy
*External
*Floating
Force
Forest
*Freezing
Fulcrum
*Growth
*Habitat
*Hand lens
*Inches
Inclined plane
Landslide
Larva
*Length
Lever
*Liquid
*Living
*Location (object)
Machine
Magnet
Magnetic field
*Measure
*Melting
Mixture
*Moon
*Motion (object)
*Nonliving
*Observation
*Offspring
*Parents
Physical change
*Plant
Poles
Pond
Pulley
Pulling
Pushing
Rain forest
Ramp
*Recycle

*Reduce
Repel
*Reuse
Roots
*Ruler
Screw
*Seasonal
*Shape
*Sinking
*Size
Solar System
*Solid
*Stars
Stream
*Sun
*Sunrise
*Sunset
*Texture
*Weather
*Weight

Grades 3-5

SC 1: Inquiry, the Nature of Science, and Technology Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence.	
SC 1.1	Abilities to do Scientific Inquiry
SC 5.1.1	Students will plan and conduct investigations that lead to the development of explanations
	Scientific Questioning
	5.1.1.a Ask testable scientific questions
	Scientific Investigations
	5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation
	Scientific Tools
	5.1.1.c Select and use equipment correctly and accurately
	Scientific Observations
	5.1.1.d Make relevant observations and measurements
	Scientific Data Collection
	5.1.1.e Collect and organize data
	Scientific Interpretations, Reflections and Applications
	5.1.1.f Develop a reasonable explanation based on collected data
	Scientific Communication
	5.1.1.g Share information, procedures, and results with peers and/or adults
	5.1.1.h Provide feedback on scientific investigations
	Mathematics
	5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry
SC 1.2	Nature of Science
SC 5.1.2	Students will describe how scientists go about their work
	Scientific Knowledge
	5.1.2.a Recognize that scientific explanations are based on evidence and scientific knowledge
	Science and Society
	5.1.2.b Recognize that new discoveries are always being made which impact scientific knowledge
	Science as a Human Endeavor
	5.1.2.c Recognize many different people study science
SC 1.3	Technology
SC 5.1.3	Students will solve a simple design problem
	Abilities to do Technical Design
	5.1.3.a Identify a simple problem
	5.1.3.b Propose a solution to a simple problem
	5.1.3.c Implement the proposed solution

	5.1.3.d Evaluate the implementation
	5.1.3.e Communicate the problem, design and solution
*	5.1.3.f Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans (Clarification Statement: Examples of solutions could include designing an earthquake-resistant building and improving monitoring of volcanic activity.)
SC 2: Physical Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world.**	
SC 2.1	Matter
SC 5.2.1	Students will explore and describe the physical properties of matter and its changes
	Properties and Structure of Matter
	5.2.1.a Identify mixtures and pure substances and if mixing results in a new substance
	5.2.1.b Identify physical properties of matter (color, odor, elasticity, weight, volume)
	5.2.1.c Use appropriate metric measurements to describe physical properties
	States of Matter
	5.2.1.d Identify state changes caused by heating and cooling solids, liquids, and gases
*	5.2.1.e Develop a model to describe matter that is made of particles too small to be seen
SC 2.2	Force and Motion
SC 5.2.2	Students will identify the influence of forces on motion
	Motion
	5.2.2.a Describe motion by tracing and measuring an object's position over a period of time (speed)
	Forces/Newton's 2nd law
	5.2.2.b Describe changes in motion due to outside forces (push, pull, gravity)
	Universal Forces
	5.2.2.c Describe magnetic behavior in terms of attraction and repulsion
SC 2.3	Energy
SC 5.2.3	Students will observe and identify signs of energy transfer
	Sound/Mechanical Waves
	5.2.3.a Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration
	Light
	5.2.3.b Recognize that light travels in a straight line and can be reflected by an object (mirror)

	5.2.3.c Recognize that light can travel through certain materials and not others (transparent, translucent, opaque)
	Heat
	5.2.3.d Identify ways to generate heat (friction, burning, incandescent light bulb)
	5.2.3.e Identify materials that act as thermal conductors or insulators
	Electricity/Magnetism
	5.2.3.f Recognize that the transfer of electricity in an electrical circuit required a closed loop
*	5.2.3.g Recognize changes in energy when objects collide.
*	5.2.3.h Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to issustrate the wavelength and amplitude of waves.)
*	5.2.3.i Develop a model to describe that light reflecting from objects and entering the eyes allows objects to be seen
*	5.2.3.j Generate and compare multiple solutions that use patterns to transfer information. (Clarification Statement. Examples of solutions could include drums sending coded information through sound waves, using a grid of 1s and 0s representing black and white to send information about a picture, and using Morse code to send text.)
SC 3: Life Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Life Sciences to make connections with the natural and engineered world.**	
SC 3.1	Structure and Function of Living Systems
SC 5.3.1	Students will investigate and compare the characteristics of living things
	Characteristics of Life
	5.3.1.a Compare and contrast characteristics of living and nonliving things
	Characteristics of Living Organisms
	5.3.1.b Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)
SC 3.2	Heredity
SC 5.3.2	Students will identify variations of inherited characteristics and life cycles
	Inherited Traits
	5.3.2.a Identify inherited characteristics of plants and animals
	Reproduction
	5.3.2.b Identify the life cycle of an organism

*	5.3.2.c Use evidence to support the explanation that traits can be influenced by the environment
SC 3.3	Flow of Matter and Energy in Ecosystems
SC 5.3.3	Students will describe relationships within an ecosystem
	Flow of Energy
	5.3.3.a Diagram and explain a simple food chain beginning with the Sun
	5.3.3.a Identify the role of producers, consumers, and decomposers in an ecosystem
	Ecosystems
	5.3.3.c Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem
	Impact on Ecosystems
	5.3.3.d Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live
SC 3.4	Biodiversity
SC 5.3.4	Students will describe changed in organisms over time
	Biological Adaptations
	5.3.4.a Describe adaptations made by plants or animals to survive environmental changes
*	5.3.4.b Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago. (Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.
*	5.3.4.c Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (Clarification Statement: Examples of cause and effect relationships could be that plants that have larger thorns than other plants may be less likely to be eaten by predators and animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.)
*	5.3.4.d Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (Clarification Statement: Examples of evidence could include the needs and characteristics of the organisms and habitats involved. The organisms and their habitats make up a system in which the parts depend on each other.)
*	5.3.4.e Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. (Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other

	organisms.)
SC 4: Earth and Space Sciences **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Earth and Space Sciences to make connections with the natural and engineered world.**	
SC 4.1	Earth in Space
SC 5.4.1	Students will observe and describe characteristics, patterns and changes in the sky
	Objects in the Sky and Universe
	5.4.1.a Recognize that the observed shape of the Moon changed from day to day during a one month period
	Motion of Objects in the Solar System
	5.4.1.b Recognize the motion of objects in the sky (the Sun, the Moon, stars) change over time in recognizable patterns
*	5.4.1.c Recognize the sun's relative distance to the Earth compared to other stars
SC 4.2	Earth Structures and Processes
SC 5.4.2	Students will observe and describe Earth's materials, structure, and processes
	Properties of Earth Materials
	5.4.2.a Describe the characteristics of rocks, minerals, soil, water, and the atmosphere
	Earth's Processes
	5.4.2.b Identify weathering, erosion, and deposition as processes that build up or break down Earth's surface
	Use of Earth Materials
	5.4.2.c Identify how Earth materials are used (fuels, building materials, sustaining plant life)
*	5.4.2.d Obtain information that energy and fuels are derived from natural resources and their use affects the environment
SC 4.3	Energy in Earth's Systems
SC 5.4.3	Students will observe and describe the effects of energy changes on Earth.
	Energy Sources
	5.4.3.a Describe the Sun's warming effect on the land and water
	Weather and Climate
	5.4.3.b Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)
	5.4.3.c Recognize the difference between weather, climate and seasons
*	5.4.3.d Design a solution that reduces the impacts of a weather related hazard (food barriers, lightning rods)
SC 4.4	Earth's History

SC 5.4.4	Students will describe changes in Earth
	Past/Present Earth
	5.4.4.a Describe how slow processes (erosion, weathering, deposition) and rapid processes (landslides, volcanic eruptions, earthquakes) change Earth's surface
*	5.4.4.b Analyze and interpret data from maps to describe patterns of Earth's features
*	5.4.4.c Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hysrosphere, atmosphere, and biosphere are each a system
*	5.4.4.d Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth

Third Grade Science Vocabulary

Competition
Endangered
Environment
Environment changes
Erosion
Evaporation
Extinct
Food chain
Food web
Fossil
Friction
Ground water
Igneous rock
Land form
Life cycle
Living organism
Magnetic attraction
Magnetic repulsion
Metamorphic rock
Migration
Mineral
Organism
Parasite
Plant root
Prey
Properties of soil
Properties of sound
Properties of water
Rock composition
Scavenger
Sedimentary rock
Water capacity
Water Cycle

Fourth Grade Science Vocabulary

Acceleration
Adaptation
Amphibian
Astronomy
Atmosphere
Axis
Boiling point
Camouflage
Carnivore
Classify
Condensation
Conduction
Conductor
Constellation
Consumer
Density
Drought
Earth's axis
Earth's orbit
Earthquake
Ecosystem
Fresh water
Generator
Glacier
Herbivore
Inherited characteristic
Invertebrate
Mass
Melting point
Moon's orbit
Moon's phases
Omnivore
Outer space
Pitch
Planet
Pollution
Population
Producer
Predator
Recycle
Reproduction
Rock Cycle
Solar System
Tide
Vertebrate

Fifth Grade Science Vocabulary

(*) NeSA vocabulary
*Adaptations
*Atmosphere
Atom
*Attraction (magnetic)
*Beneficial
*Celsius
*Centi
Change of state
*Climate
Communicate
*Community
Compound
*Conductor
*Consumer
Convection
*Data
*Decomposer
*Deposition
*Detrimental
*Dimensions
*Ecosystem
*Elasticity
*Electrical circuit
Element
*Erosion
*Explanation
*Fahrenheit
*Feedback
*Food chain
*Force
*Friction
*Function
*Gas
*Gravity
Hypothesis
Igneous rock
*Inherited characteristics
*Insulator
Invertebrate
Inertia
*Investigation (experiment)
*Kilo
*Life cycle
*Liter
*Magnetism
*Matter
*Measurement
Metamorphic rock
*Meter
*Metric
*Microscope
*Milli
*Minerals
*Mixture
Observe
*Opaque
*Organism
Photosynthesis
*Physical properties
*Pitch
*Position
Prediction
*Procedure
*Producer
*Pure substance
*Reflection
*Repulsion
Rock cycle
*Rocks
Scientific Method
*Seasons
Sedimentary rock
*Soil
*Sound
*Speed
*Structure
*Survival
*Telescope
*Temperature
*Testable question
*Thermometer
Tissue
*Transparent
*Translucent
*Variable
Vertebrate
*Volume
*Water
*Weathering
*Weight

Grades 6-8

SC 1: Inquiry, the Nature of Science, and Technology **Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence**	
SC 1.1	Abilities to do Scientific Inquiry
SC 8.1.1	Students will design and conduct investigations that will lead to descriptions of relationships between evidence and explanations
	Scientific Questioning
	8.1.1.a Formulate testable questions that lead to predictions and scientific investigations
	Scientific Investigations
	8.1.1.b Design and conduct logical and sequential investigations including repeated trials
	Scientific Controls and Variables
	8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables
	Scientific Tools
	8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques
	Scientific Observations
	8.1.1.e Make qualitative and quantitative observations
	Scientific Data Collection
	8.1.1.f Record and represent data appropriately and review for quality, accuracy and relevancy
	Scientific Interpretations, Reflections and Applications
	8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information
	Scientific Communication
	8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences
	8.1.1.i Analyze and provide appropriate critique of scientific investigations
	Mathematics
	8.1.1.j Use appropriate mathematics in all aspects of scientific inquity
SC 1.2	Nature of Science
SC 8.1.2	Students will apply the nature of science to their own investigations
	Scientific Knowledge
	8.1.2.a Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations
	Science and Society
	8.1.2.b Describe how scientific discoveries influence and change

	society
	Science as a Human Endeavor
	8.1.2.c Recognize scientists from various cultures have made many contributions to explain the natural world
SC 1.3	Technology
SC 8.1.3	Students will solve a design problem which involves one or two science concepts.
	Abilities to do Technical Design
	8.1.3.a Identify problems for technical design
	8.1.3.b Design a solution or product
	8.1.3.c Implement the proposed design
	8.1.3.d Evaluate completed technological designs or products
	8.1.3.e Communicate the process of technical design
	Understanding of Technical design
	8.1.3.f Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)
	8.1.3.g Describe how science and technology are reciprocal
	8.1.3.h Recognize that solutions have intended and unintended consequences
	8.1.3.i Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge
SC 2: Physical Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world**	
SC 2.1	Matter
SC 8.2.1	Students will identify and describe the particulate nature of matter including physical and chemical interactions.
	Properties and Structure of Matter
	8.2.1.a Compare and contrast elements, compounds, and mixtures
	8.2.1.b Describe physical and chemical properties of matter
	States of Matter
	8.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature
	8.2.1.d Compare and contrast solids, liquids, and gases based on properties of these states of matter
	Physical and Chemical Changes
	8.2.1.e Distinguish between physical and chemical changes (phase changes, dissolving, burning, rusting)
	8.2.1.f Recognize conservation of matter in physical and chemical changes
	Classification of Matter
	8.2.1.g Classify substances into similar groups based on physical properties

SC 2.2	Force and Motion
SC 8.2.2	Students will investigate and describe forces and motion
	Motion
	8.2.2.a Describe motion of an object by its position and velocity
	Inertia/Newton's 1st law
	8.2.2.b Recognize an object that is not being subjected to a force will continue to more at a constant speed in a straight line or stay at rest (Newton's 1st law)
	Forces/Newton's 2nd law
	8.2.2.c Compare the motion of objects related to the effects of balanced and unbalanced forces
	Universal Forces
	8.2.2.d Recognize that everything on or around Earth is pulled towards Earth's center by gravitational force
SC 2.3	Energy
SC 8.2.3	Students will identify and describe how energy systems and matter interact
	Sound/Mechanical Waves
	8.2.3.a Recognize that vibrations set up wave-like disturbances that spread away from the source (sound, seismic, water waves)
	8.2.3.b Identify that waves move at different speeds in different materials
	Light
	8.2.3.c Recognize that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection)
	8.2.3.d Recognize that to see an object, light from the surface of the object must enter the eye; the color seen depends on the properties of the surface and the color of the available light sources
	Heat
	8.2.3.e Recognize that heat moves from warmer objects to cooler objects until both reach the same temperature
	Conservation
	8.2.3.f Describe transfer of energy from electrical and magnetic sources to different energy forms (heat, light, sound, chemical)
	8.2.3.g Recognize all energy is neither created nor destroyed
SC 3: Life Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Life Sciences to make connections with the natural and engineered world**	
SC 3.1	Structure and Function of Living Systems
SC 8.3.1	Students will investigate and describe the structure and function of living organisms.
	Characteristics of Life
	8.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)
	Cellular Composition of Organisms

	8.3.1.b Recognize that all organisms are composed of one or many cells; that these cells must grow, divide, and use energy; and that all cells function similarly
	8.3.1.c Recognize specialized cells perform specialized functions in multicellular organisms
	8.3.1.d Identify the organs and functions of the major systems of the human body and describe ways that these systems interact with each other
	Behavior
	8.3.1.e Describe how plants and animals respond to environmental stimuli
SC 3.2	Heredity
SC 8.3.2	Students will investigate and describe the relationship between reproduction and heredity
	Inherited Traits
	8.3.2.a Recognize that hereditary information is contained in genes within the chromosomes of each cell
	Reproduction
	8.3.2.b Compare and contrast sexual and asexual reproduction
SC 3.3	Flow of Matter and Energy in Ecosystems
SC 8.3.3	Students will describe populations and ecosystems
	Flow of Energy
	8.3.3.a Diagram and explain the flow of energy through a simple food web
	8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem
	Ecosystems
	8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis
	8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support
	8.3.3.e Recognize a population is all the individuals of a species at a given place and time
	8.3.3.f Identify symbiotic relationships among organisms
	Impact on Ecosystems
	8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem
SC 3.4	Biodiversity
SC 8.3.4	Students will identify characteristics of organisms that help them survive
	Biological Adaptations
	8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate
	Biological Evolution
	8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change

	8.3.4.c Use anatomical features of an organism to infer similarities among other organisms
SC 4: Earth and Space Sciences **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of Earth and Space Sciences to make connections with the natural and engineered world.**	
SC 4.1	Earth in Space
SC 8.4.1	Students will investigate and describe Earth and the solar system
	Objects in the Sky and Universe
	8.4.1.a Describe the components of the solar system (the Sun, planets, moons, asteroids, comets)
	Motion of Objects in the Solar System
	8.4.1.b Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons
	Gravitational Effects
	8.4.1.c Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system
SC 4.2	Earth Structures and Processes
SC 8.4.2	Students will investigate and describe Earth's structure, systems and processes
	Properties of Earth Materials
	8.4.2.a Describe the layers of Earth (core, mantle, crust, atmosphere)
	8.4.2.b Describe the physical composition of soil
	8.4.2.c Describe the mixture of gases in Earth's atmosphere and how the atmosphere's properties change at different elevations
	8.4.2.d Describe evidence of Earth's magnetic field
	Earth's Processes
	8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface
	8.4.2.f Describe the rock cycle
	8.4.2.g Describe the water cycle (evaporation, condensation, precipitation)
	Use of Earth Materials
	8.4.2.h Classify Earth materials as renewable or nonrenewable
SC 4.3	Energy in Earth's Systems
SC 8.4.3	Students will investigate and describe energy in Earth's systems
	Energy Sources
	8.4.3.a Describe how energy from the Sun influences the atmosphere and provides energy for plant growth
	Weather and Climate
	8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of Earth, humidity, air pressure, air masses)
	8.4.3.c Describe atmospheric movements that influence weather and

	climate (air masses, jet stream)
SC 4.4	Earth's History
SC 8.4.4	Students will use evidence to draw conclusions about changes in Earth
	Past/Present Earth
	8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)
	8.4.4.b Describe how environmental conditions have changed through use of the fossil record

Sixth Grade Science Vocabulary

Adaptation
Asexual reproduction
Biodiversity
Biotic
Cell Theory
Conservation of energy
Dependent variable
Dominance
Experimental control
Gene
Heterozygous
Homozygous
Independent variable
Law
Mass
Meiosis
Mitosis
Nucleus
Punnett square
Recessive
Sexual reproduction
Theory
Tropism
Virus
Volume
Weight

Seventh Grade Science Vocabulary

* NeSA testing term
Acquired trait
Adaptive characteristics
*Active transport
Addiction
Alternative explanation of data
Amino acid
Animal behavior
Aorta
Artery
Asexual reproduction
Atherosclerosis
Atmosphere
Atom atomic arrangement
Autotrophs
*Behavioral
Behavioral changes
Behavioral response
Binomial Nomenclature
Body plan
Capillary
*Carbohydrate
Carcinogens
Cardiac muscle
*Cell
Cell division
Cell growth
*Cell membrane
*Cell theory
*Cell wall
*Cellular transport
*Cellular respiration
Cerebellum
Cerebrum
Characteristics of life
Chemical compound
Chemical element
Chlorophyll
*Chloroplast
Chromosome
Circulatory system
Classification
Climate
Climate change
Clone
Cnidarian
Common ancestry
Confirmation by observation
Conflicting interpretations
Connective tissue
Continuation of species
Coronary artery
Cytokinesis
*Cytoplasm
Data
Debris
Decomposer
*Diffusion
Digestive system
*DNA
Dominant trait
Ecology
Ecosystem
Egg cell
Emergence of life
Endoplasmic Reticulum
Engineer
Epidermis
Epiglottis
Epithelial tissue
Erosion resistance
Esophagus
Eukaryotic
Excretory system
Experimental confirmation
Experimental control
Exotic species
External feature
Francesco Redi
Fundamental unit of life
Fungus
Gall bladder
*Gene
Genetics
*Genotype
Gregor Mendel
Hemoglobin
Hereditary information
Heterotrophs
*Heterozygous
Homeostasis
*Homozygous
Host
*Hypothesis
Hypothesis testing
Immune system
Infection
Inferring
*Inheritance
*Instinct
Insulin
Interdependence of organisms
Internal structure
Invertebrate
Involuntary muscle
Joint
Kidney
Life-sustaining functions
Ligament
*Lipid
Logic
Louis Pasture
Lymph node
*Lysosome
Marrow
*Meiosis
Melanin
*Metabolism
*Mitochondria
*Mitosis

*Molecule
*Mutation
Multicellular organisms
Muscular system
Mutualism
Nervous system
Nucleus
Nicotine
*Observation
Organ
Organ system
*Organelle
Organ system failure
Oxygen
Pace maker
*Passive transport
Parasite
*Pedigree
Peer review
Peristalsis
Pharynx
*Phenotype
*Photosynthesis
Plant tissue
Plasma
Platelet
Predation
Prediction
Prey
Probability
Prokaryotic
*Protein
Pulley
Pulse
*Punnett square
Recycling of matter
Reproduction system
Research question
Respiratory system
*Ribosomes
*RNA
Satellite
Scientific interpretation
*Scientific method
Scientific skepticism
Sense
Screening
Separation method
Sexual reproduction
Skeletal system
Specialized cells
Specialized organ
Specialized tissue
Species
Species diversity
Sperm cell
Spontaneous generation
*Stimulus
Taxonomy
Technology
Tendon
Theoretical model
Tissue
Tolerance
Toxic
Trachea
*Trait
Unicellular organism
Unity of life
Universal solvent
Ureter
Urethra
Urine
Vaccine
*Vacuole
Valve
Vein
Ventricle
Vertebrate
Voluntary muscle
Water cycle

Eighth Grade Science Vocabulary

***** NeSA testing term
*Acceleration
*Acid
Air resistance
Albert Einstein
Allotropes
Antoine Lavoisier
*Atom
Atomic arrangement
Atomic configuration
Atomic energy
Atomic mass
Atomic nucleus
Atomic number
Atomic number
Atomic reaction
Atomic theory
Atomic weight
Average Atomic mass
Balanced force
*Base
Bias
Binary compound
Boiling point
Catalyst
Centripetal force
Charging by contact
Charging by induction
*Chemical bond
Chemical Change
Chemical compound
Chemical element
Chemical energy
*Chemical equation
Chemical formula
Chemical properties of elements
*Chemical reaction
Circuit
Coefficient
Colloid
Combustion
Composition of matter
*Conduction
Confirmation by observation
Conflicting interpretations
*Conservation
*Conservation of energy
Constant speed
*Control group
Covalent bond
*Convection currents
Copernicus
Coulomb's law
Crystal
Data
Debris
Deceleration
Density
Dependent variable
Diatomic molecule
Diffusion
Direction of force
*Displacement
Distance
Distillation
Double-displacement reaction
Ductile
Elastic potential energy
Electric current
Electrical energy
*Electric force
Electrically neutral
Electrolyte
*Electromagnetic field
*Electromagnetic force
*Electron
Electron cloud
Electron configuration
Electron sharing
Electron transfer
Element stability
*Endothermic reaction
*Enzyme
Ernest Rutherford
Ethics in Science
*Exothermic reaction
*Experiment
Experimental confirmation
Experimental control
*Experimental group
*F=ma
Fahrenheit
Filtering
Forms of matter
Friction
*Gravitational force
Gravitational potential energy
Gravity
*Heat
Heat convection
Heat emission
Heat energy
Heat engine
Heat retention
Hydrate
*Hypothesis
Hypothesis testing
*Inertia
*Inferring
Inhibitor
Insulator
*Ion
*Ionic bond
*Isotope
Joule
Kelvin
*Kinetic energy
Law of conservation of charge
Law of conservation of energy
Law of conservation of mass
Luster
Mass
Mass number

Mechanical energy
Mechanical motion
Metal reactivity
Metallic
Metalloid
*Molecule
Momentum
*Net force
*Neutron
*Newton's Laws of Motion
Nonpolar molecule
Nonreactive gas
Nuclear fission
*Nuclear fusion
*Nuclear reactions
Nuclear reactor
*Nucleus
Observation
Ohm's Law
Organic compound
Oxidation number
Oxidation-reduction reactions
Oxygen
Parallel circuit
*Periodic law
Periodic table of elements
*Ph
Physical change
Physical property
Polar
Polyatomic ion
*Potential energy
Precipitate
Properties of elements
*Proton
Pulley
Quarks
Radiant energy
*Radiation
*Rate of chemical reaction
*Radioactive dating
Reactant
Reaction rate
Release of energy
*Repulsion
Research question
Resistance
Scientific interpretation
Scientific law
Scientific method
Scientific skepticism
Screening
Semiconductors
Separation method
Solution
Solvent
Static electricity
Subatomic particles
Sublimation
Substance
Suspension
Synthetic
Technology
Temperature
Theoretical model
*Theory
Thermal energy
Thermodynamics
Tolerance
Toxic
*Transformation of energy
Transition elements
Tyndall effect
Universal solvent
*V = d/t
Variable
Velocity
Viscosity
Voltage difference
Volume
Weight

Grades 9-12

SC 1: Inquiry, the Nature of Science and Technology **Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence**	
SC 1.1	Abilities to do Scientific Inquiry
SC 12.1.1	Students will design and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models
	Scientific Questions
	12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation
	Scientific Investigations
	12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations
	Scientific Controls and Variables
	12.1.1.c Identify and manage variables on constraints
	Scientific Tools
	12.1.1.d Select and use lab equipment and technology appropriately and accurately
	Scientific Observations
	12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations
	Scientific Data Collections
	12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner
	Scientific Interpretations, Reflections, and Applications
	12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations
	12.1.1.h Use results to verify or refute a hypothesis
	12.1.1.i Propose and/or evaluate possible revisions and alternate explanations
	Scientific Communication
	12.1.1.j Share information, procedures, results, conclusions and defend findings to a scientific community (peers, science fair audience, policy makers)
	12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate
	Mathematics
	12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry
SC 1.2	Nature of Science
SC 12.1.2	Students will apply the nature of scientific knowledge to their own investigations and in the evaluation of scientific explanations

	Scientific Knowledge
	12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications and must be based upon historical and current scientific knowledge
	Science and Society
	12.1.2.b Describe how society influences the work of scientists and how science, technology and current scientific discoveries influence and change society
	Science as a Human Endeavor
	12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world
	12.1.2.d Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted
SC 1.3	Technology
SC 12.1.3	Students will solve a complex design problem
	Abilities to do Technical design
	12.1.3.a Propose designs and choose between alternative solutions of a problem
	12.1.3.b Assess the limits of a technical design
	12.1.3.c Implement the selected solution
	12.1.3.d Evaluate the solution and its consequences
	12.1.3.e Communicate the problem, process and solution
	Understanding of Technical Design
	12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology
	12.1.3.g Explain how science advances with the introduction of new technology
	12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering
SC 2: Physical Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world**	
SC 2.1	Matter
SC 12.2.1	Students will investigate and describe matter in terms of its structure, composition and conservation
	Properties and Structure of Matter
	12.2.1.a Recognize bonding occurs when outer electrons are transferred (ionic) or shared (covalent)
	States of Matter
	12.2.1.b Describe the energy transfer associated with phase changes between solids, liquids, and gases
	12.2.1.c Describe the three normal states of matter (solid, liquid, gas)

	in terms of energy, particle arrangement, particle motion, and strength of bond between molecules
	Physical and Chemical Changes
	12.2.1.d Recognize a large number of chemical reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base) between reacting ions, molecules, or atoms
	12.2.1.e Identify factors affecting rates off chemical reactions (temperature, particle size, surface area)
	Atomic Structure
	12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons)
	12.2.1.g Describe properties of atoms, ions, and isotopes
	Classification of Matter
	12.2.1.h Describe the organization of the periodic table of elements with respect to patterns of physical and chemical properties
SC 2.2	Force and Motion
SC 12.2.2	Students will investigate and describe the nature of field forces and their interactions with matter.
	Motion
	12.2.2.a Describe motion with respect to displacement and acceleration
	Inertia/Newton's 1st law
	12.2.2.b Describe how the law of inertia (Newton's 1st law) is evident in a real-world event
	Forces/Newton's 2nd law
	12.2.2.c Make predictions based on relationships among net force, mass and acceleration (Newton's 2nd law)
	Newton's 3rd law
	12.2.2.d Recognize that all forces occur in equal and opposite pairs (Newton's 3rd law)
	122.2.e Describe how newton's 3rd law of motion is evident in a real-world event
	Universal Forces
	12.2.2.f Describe gravity as a force that each mass exerts on another mass, which is proportional to the masses and the distance between them
	12.2.2.g Recognize that an attractive or repulsive electric force exists between two charged particles and that this force is proportional to the magnitude of the charges and the distance between them
SC 2.3	Energy
SC 12.2.3	Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter
	Sound/Mechanical Waves
	12.2.3.a Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium

	12.2.3.b Recognize that the energy in waves can be changed into other forms of energy
	Light
	12.2.3.c Recognize that light can behave as a wave (diffraction and interference)
	Heat
	12.2.3.d Distinguish between temperature (a measure of the average kinetic energy of atomic or molecular motion) and heat (the quantity of thermal energy that transfers due to a change in temperature)
	12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection and radiation
	Electricity/Magnetism
	12.2.3.f Recognize that the production of electromagnetic waves is a result of changes in the motion of charges or by a changing magnetic field
	12.2.3.g Compare and contrast segments of the electromagnetic spectrum (radio, micro, infrared, visible, ultraviolet, x-rays, gamma) based on frequency and wavelength
	Nuclear
	12.2.3.h Recognize that nuclear reactions (fission, fusion, radioactive decay) convert a fraction of the mass of interacting particles into energy, and this amount of energy is much greater than the energy in chemical interactions
	Conservation
	12.2.3.i Interpret the law of conservation of energy to make predictions for the outcome of an event
	Mechanical Energy
	12.2.3.j Identify that all energy can be considered to be either kinetic, potential, or energy contained by a field (e.g. electromagnetic waves)
	Chemical Energy
	12.2.3.k Identify endothermic and exothermic reactions
SC 3: Life Science **Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Life Sciences to make connections with the natural and engineered world**	
SC 3.1	Structure and Function of Living Systems
SC 12.3.1	Students will investigate and describe the chemical basis of the growth, development and maintenance of cells
	Characteristics of Life
	12.3.1.a Identify the complex molecules (carbohydrates, lipids, proteins, nucleic acids) that make up living organisms
	Cellular Composition of Organisms
	12.3.1.b Identify the form and function of sub-cellular structures that regulate cellular activities

	12.3.1.c Describe the cellular functions of photosynthesis, respiration, cell division, protein syntheses, transport of materials and energy capture/release
	Behavior
	12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival
SC 3.2	Heredity
SC 12.3.2	Students will describe the molecular basis of reproduction and heredity
	Inherited Traits
	12.3.2.a Identify that information passed from parents to offspring is coded in DNA molecules
	12.3.2.b Describe the basic structure of DNA and its function in genetic inheritance
	12.3.2.c Recognize how mutations could help, harm or have no effect on individual organisms
	Reproduction
	12.3.2.d Describe that sexual reproduction results in a largely predictable, variety of possible gene combinations in the offspring of any two parents
SC 3.3	Flow of Matter and Energy in Ecosystems
SC 12.3.3	Students will describe, on a molecular level, the cycling of matter and the flow of energy between organisms and their environment
	Flow of Energy
	12.3.3.a Explain how the stability of an ecosystem is increased by biological diversity
	Ecosystems
	12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere
	12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
	Impact on Ecosystems
	12.3.3.d Analyze factors which may influence environmental quality
SC 3.4	Biodiversity
SC 12.3.4	Students will describe the theory of biological evolution
	Biological Adaptations
	12.3.4.a Identify different types of adaptations necessary for survival (morphological, physiological, behavioral)
	Biological Evolution
	12.3.4.b Recognize that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive

	and leave offspring
	12.3.4.c Explain how natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms
	12.3.4.d Apply the theory of biological evolution to explain diversity of life over time
SC 4: Earth and Space Sciences Students will integrate and communicate the information, concepts, principles, processes, theories and models of Earth and Space Sciences to make connections with the natural and engineered world.	
SC 4.1	Earth in Space
SC 12.4.1	Students will investigate and describe the known universe
	Objects in the Sky and Universe
	12.4.1.a Describe the formation of the universe using the Big Bang Theory
	12.4.1.b Recognize that stars, like the Sun, transform matter into energy by nuclear reactions which leads to the formation of other elements
	12.4.1.c Describe stellar evolution
SC 4.2	Earth Structures and Processes
SC 12.4.2	Students will investigate the relationships among Earth's structure, systems and processes
	Properties of Earth Materials
	12.4.2.a Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter
	Earth's Processes
	12.4.2.b Describe how heat convection in the mantle propels the plates comprising Earth's surface across the face of the globe (plate tectonics)
	Use of Earth Materials
	12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land and fossil fuels)
SC 4.3	Energy in Earth's Systems
SC 12.4.3	Students will investigate and describe the relationships among the sources of energy and their effects on Earth's systems
	Energy Sources
	12.4.3.a Describe how radiation, conduction, and convection transfer heat in Earth's systems
	12.4.3.b Identify internal and external sources of heat energy in Earth's systems
	12.4.3.c Compare and contrast benefits of renewable and nonrenewable energy sources
	Weather and Climate
	12.4.3.d Describe natural influences (Earth's rotation, mountain

	ranges, oceans, differential heating) on global climate
SC 4.4	Earth's History
SC 12.4.4	Students will explain the history and evolution of Earth
	Past/Present Earth
	12.4.4.a Recognize that in any sequence of sediments or rocks that has not been overturned, the youngest sediments or rocks are at the top of the sequence and the oldest are at the bottom (law of superposition)
	12.4.4.b Interpret Earth's history by observing rock sequences, using fossils to correlate the sequences at various locations, and using data from radioactive dating methods
	12.4.4.c Compare and contrast the physical and biological differences of the early Earth with the planet we live on today

Ninth Grade Science Vocabulary

* NeSA testing term
Abrasion
Absolute magnitude
Air mass
Apparent Magnitude
Aquifer
Asteroid
Asthenosphere
Atmosphere
*Atom
Atomic Mass
Atomic Number
Axis
Basaltic
beaches
Bias
*Big bang theory
Biomass energy
Black hole
Blizzard
Cave
Cementation Fossil Fuel
Channel
Chemical weathering
Chromospheres
Climate
Coal
Comet
Compaction
Compound
Condensation
*Conduction
Constant
Constellation
Continental Drift
Contour farming
*Control
*Convection
Convection currents
Coriolis Effect
Corona
Creep
Deflation
Density
*Dependent variable
Deposition
Dew point
Drainage basin
Dune
Earth
Earth Science
*Electromagnetic Spectrum
*Electron
Element
Ellipse
Equinox
Erosion
Ethics
Extrusive
*Fission
Fog
Foliated
Front
Full moon
*Fusion
Galaxy
Geothermal energy
Geyser
Giant
Glacier
Granitic
Great Red Spot
*Groundwater
Heterogeneous Mixture
Homogeneous Mixture
Horizons
Humidity
Humus
Hurricane
Hydroelectric energy
Hydrosphere
*Hypothesis
Ice wedging
Igneous Rock
Impact basin
Impermeable
*Independent Variable
Intrusive
*Ion
Ionosphere
Isobar
Isotherm
*Isotope
Jet stream
Jupiter
Land breeze
Lava
Leaching
Light-year
Lithosphere
Litter
Loess
Longshore current
Lunar eclipse
Maria
Mars
Mass movement
Matter
Meander
Mechanical weathering
Mercury
Metamorphic Rock
Meteor
Meteorite
Meteorologist
Mixture
*Molecule
Moon Phase
Moraine
Natural gas
Nebula
Neptune
*Neutron
Neutron star
New Moon
Nonfoliated
No-till farming
*Nuclear Energy
Observatory
Oil
Orbit

Outwash
Oxidation
Ozone layer
Pangaea
Permeable
Photosphere
Plate
Plate tectonics
Plucking
Pluto
Precipitation
Project Apollo
Project Gemini
Project mercury
*Proton
*Radiation
Radio telescope
Reflecting telescope
Refracting telescope
Relative humidity
Reserve
Revolution
Rock
Rock Cycle
Rocket
Rotation
Runoff
Satellite
Saturn
Science
Scientific law
Scientific Method
*Scientific Theory
Sea breeze
Seafloor spreading
Sediment
Sheet erosion
Slump
Soil
Soil profile
Solar eclipse
Solar Energy
Solar system
Solstice
Solution
Space probe
Space shuttle
Space station
Sphere
Spring
Station model
Sunspot
Supergiant
Technology
terracing
Till
Tornado
Troposphere
Ultraviolet radiation
Uranus
Variable
Venus
Waning
Water table
Waxing
Weather
Weathering
White dwarf
Wind Farm

Tenth Grade Biology Vocabulary

* NeSA testing term
*Abiotic
Achondroplasis
Acid precipitation
Acquired trait
*Active transport
*Adaptation
Adaptive characteristics
Adenine
Adenosine triphosphate
Age structure
Albert Einstein
Albinism
*Allele
Alternative explanation of data
Amino acid
Amino acid sequence
Anaphase
Aphotic zone
Apoptosis
Atmosphere
Autotrophs
Bacteria
Bacteriophage
*Behavioral
Behavioral changes
Behavioral response
Binary fission
Binomial Nomenclature
*Biodiversity
*Biogeochemical cycles
Biological adaptation
Biological augmentation
*Biological evolution
*Biology
Biomass
*Biome
*Bioremediation
*Biosphere
*Biotic
Boreal forest
*Biosphere
*Carbon cycle
Carbon dioxide
*Carbohydrate
Carnivore
Carrier
Carrying capacity
*Cell
Cell cycle

Cell division
Cell function
Cell growth
*Cell membrane
Cell organelle
*Cell theory
*Cell wall
*Cellular respiration
*Cellular transport
Centrioles
Centromere
Character
Characteristics of life
Chlorophyll
*Chloroplast
Chromatin
Chromosome
Circadian
Cladistics
Cladogram
Class
Classification
Climate
Climate change
Climax community
Clone
Codominance
Codon
Colony
Commensalism
Common ancestry
Community
Confirmation by observation
Conflicting interpretations
Conjugation
Conservation biology
Continuation of species
*Control group
Crossing over
*Cytokinesis
*Cytoplasm
Cytosine
Data
Debris
Decomposer
Demography
Density-dependent factor
Density-independent factor
Dependent variable
Derived traits
Development
Diagram
*Diffusion
Diploid
*DNA
DNA fingerprinting
DNA ligase
DNA polymerase
Domain
Dominant trait
*Double helix
Dynamic equilibrium
*Ecological succession
Ecology
Ecosystem
Ecosystem diversity
Edge effect
Egg cell
Emigration
Endoplasmic Reticulum
Engineer
Entropy
*Environmental quality
*Enzyme
Epiglottis
Epiphyte
Epistasis
Erosion resistance
Estuary
Ethics in science
Eukaryotic
Eutrophication
Evidence of unity among organisms
*Evolution
Exocytosis
Exon
Exotic species
Experimental confirmation
*Experimental control
*Experimental group
External feature
Extinction
*Enzyme
Facilitated diffusion
Fahrenheit
Fertilization
Filial generation
Flagellum
Flow of energy
Flow of matter
Fluid mosaic model
Food chain
Food web
*Fossil fuels
Fundamental unit of life
Fungus
Gamete
*Gene
Gene regulation
Gene therapy
*Genetic diversity
Genetic engineering
Genetic mutation
*Genetic recombination
*Genetic variation
Genetics
Genome
*Genotype
Germ theory
Glycolysis
Golgi apparatus
Gregor Mendel
*Ground water
Guanine
Habitat fragmentation
Haploid
Hemoglobin
Herbivore
Hereditary information

Hermaphrodite
Heterotrophs
*Heterozygous
*Homeostasis
*Homozygous
Homologous chromosome
Host
Human genetics
Hybrid
Hypertonic solution
*Hypothesis
Hypothesis testing
Hypotonic solution
Immigration
Inbreeding
Incomplete dominance
Infection
*Inference
*Inferring
*Inheritance
Innate behavior
Interdependence of organisms
Interphase
Intertidal zone
Introduced species
Intron
Invertebrate
Life-sustaining functions
*Lipid
Littoral zone
Logic
Lysosome
Matter
*Meiosis
Mendelain genetics
Messenger RNA
*Metabolism
Metaphase
Metric system
*Mitochondria
*Mitosis
*Molecule
*Multiple alleles
Mutagen
*Mutation
Mutualism
Natural resource
*Natural selection
Niche
Nitrogen cycle
Nitrogen fixation
Nondisjunction
Nonrenewable resource
*Nucleus
*Nucleic acid
Nucleoid
Nucleolus
Nucleotide
Nucleus
Nutrient
*Observation
Okazaki fragment
Omnivore
Order
*Organelle
Organism
Organism system failure
Organization of life
Origin of life
Osmosis
Overexploitation
*Passive transport
Parasite
Parasitism
Parental generation
Pathogen
*Pedigree
Peer review
Phenotype
Phospholipid bilayer
Photic zone
*Photosynthesis
*Photosynthesis
Phylogeny
Phylum
Pigment
Plankton
Plasma
Plasma membrane
Plasmid
*Phenotype
Polar body
Polygenic trait
Polyploidy
Population
Population density
Population growth rate
Predation
Predation
Prediction
Prey
Primary succession
Probability
Prokaryotic
Prokaryotic
Prophase
*Protein
Protein synthesis
Protest
*Punnett Square
Recessive trait
*Recombinant DNA
Recycling of matter
Renewable resource
Research question
Restriction enzyme
Ribosomal RNA
*Ribosome
*RNA
RNA polymerase
Science
Scientific interpretation
*Scientific Method
Scientific skepticism
Screening
Secondary succession
Sediment
Segregation
Selective breeding
*Selective permeability
Serendipity
Seventh Grades
Sex chromosome

Sex-linked trait
Sex-linked trait
Sexual selection
Sister chromatids
Solution
Solvent
Specialized cells
Specialized organ
Specialized tissue
*Species
Species diversity
Sperm cell
Stem cell
*Stimulus
Symbiosis
Taxon
Taxonomy
Technology
*Theory
Telomere
Telophase
Temperate forest
Tendon
Test
Test cross
Theoretical model
*Theory
Theory of biogensis
Thylakiod
Thymine
Tissue
Tolerance
Toxic
*Trait
Transcription
Transfer RNA
Transgenic organism
translation
Transpiration
Transport protein
Trophic level
Tropical rain forest
Tropical savanna
Tropical seasonal forest
Tundra
Unicellular organism
Unity of life
Universal solvent
Vaccine
*Vacuole
Valve
Vein
Ventricle
Vertebrate
Voluntary muscle
*Water cycle
Weather
Wetland
Woodland
Zero population growth
Zygote

Chemistry Vocabulary

Absolute zero
Accuracy
Acid-base indicator
Acidic solution
Acid ionization constant
Actinide series
Activated complex
Activation energy
Active site
Actual yield
Addition polymerization
Addition reaction
Alcohol
Aldehyde
Aliphatic compound
Alkali metals
Alkaline earth metals
Alkane
Alkene
Alkyl halide
Alkyne
Allotrope
Alloy
Alpha particle
Alpha radiation
Amide
Amines
Amino acid
Amorphous solid
Amphoteric
Amplitude
Anabolism
Anion
Anode
Applied research
Aqueous solution
Aromatic compounds
Arrhenius model
Aryl halide
Asymmetric carbon
Atmosphere
Atom
Atomic emission spectrum
Atomic mass
Atomic mass unit (amu)
Atomic number
Atomic orbital
ATP
Aufbau principle
Avogadro's number
Avogadro's principle
Band of stability
Barometer
Base ionization constant
Base unit
Basic solution
Battery
Beta particle
Beta radiation

Boiling point
Boiling-point elevation
Boyle's lay
Breeder reactor
Bronsted-Lowry model
Brownian notion
Buffer
Buffer capacity
Calorie
Calorimeter
Carbohydrates
Carbonyl group
Carboxyl group
Carboxylic acid
Catabolism
Catalyst
Cathode
Cathode ray
Cation
Cellular respiration
Charles's law
Chemical bond
Chemical change
Chemical equation
Chemical equilibrium
Chemical potential energy
Chemical property
Chemical reaction
Chemistry
Chirality
Chromatography
Coefficient
Colligative property
Collision theory
Colloids
Combined gas law
Combustion reaction
Common ion
Common ion effect
Complete ionic equation
Complex reaction
Compound
Concentration
Conclusion
Condensation
Condensation polymerization
Condensation reaction
Conjugate acid
Conjugate acid-base pair
Conjugate base
Control
Conversion factor
Coordinate covalent bond
Corrosion
Covalent bond
Cracking
Critical mass
Crystal lattice
Crystalline solid
Crystallization
Cyclic hydrocarbon
Cycloalkane
Dalton's atomic theory
Dalton's law of partial pressures
De Broglie equation
Decomposition reaction
Dehydration reaction
Dehydrogenation reaction
Delocalized electrons
Denaturation
Denatured alcohol
Density
Dependent variable
Deposition
Derived unit
Diffusion
Dimensional analysis
Dipole-dipole forces
Disaccharide
Dispersion forces
Distillation
Double-replacement reaction
Dry cell
Elastic collision
Electrochemical cell
Electrolysis
Electrolyte
Electrolytic cell
Electromagnetic radiation
Electromagnetic spectrum
Electron
Electron capture
Electron configuration
Electron-dot structure
Electron sea model
Electronegativity
Element
Elimination reaction
Empirical formula
Endothermic
End point
Energy
Energy sublevels
Enthalpy
Enthalpy (heat) of combustion
Enthalpy (heat) of reaction
Entropy
Enzyme
Equilibrium constant
Equivalence point
Error
Ester ether
Evaporation
Excess reactant
Exothermic experiment
Extensive property
Fatty acid
Fermentation
Filtration
Formula unit
Fractional distillation
Free energy
Freezing point

Freezing-point depression
Frequency fuel cell
Functional group
Galvanization
Gamma rays
Gas
Gay-Lussac's law
Geometric isomers
Graham's law of effusion
Graph
Ground state
Group
Half-cells
Half-life
Half-reaction
Halocarbon
Halogen
Halogenation
Heat
Heat of solution
Heisenberg uncertainty principle
Henry's law
Hess's law
Heterogeneous catalyst
Heterogeneous equilibrium
Heterogeneous mixture
Homogeneous catalyst
Homogeneous equilibrium
Homogeneous mixture
Homologous series
Hund's rule
Hybridization
Hydrate
Hydration of reaction
Hydrocarbon
Hydrogenation reaction
Hydrogen bond
Hydroxyl group
Hypothesis
Ideal gas constant (R)
Ideal gas law
Immiscible
Independent variable
Induced transmutation
Inhibitor
Inner transition metal
Insoluble
Instantaneous rate
Intensive property
Intermediate
Ion
Ionic bond
Ionic compounds
Ionization energy
Ionizing radiation
Ion product constant for water
Isomers
Isotopes
Joule
Kelvin
Ketone
Kilogram
Kinetic-molecular theory
Lanthanide series
Lattice energy
Law of chemical equilibrium
Law of conservation of energy
Law of conservation of mass
Law of definite proportions
Law of multiple proportions
Le Chatelire's principle
Lewis model
Lewis structure
Limiting reactant
Lipids
Liquid
Liter
Mass
Mass defect
Mass number
Matter
Melting point
Metabolism
Metal
Metallic bond
Metalloid
Meter
Method of initial rates
Miscible
Mixture
Model
Molality
Molar enthalpy (heat) of fusion
Molar enthalpy (heat) of vaporization
Molarity
Molar mass
Molar volume
Mole
Molecular formula
Molecule
Mole fraction
Mole ratio
Monatomic ion
Monomer
Monosaccharides
Net ionic equation
Neutralization reaction
Neutron
Noble gas
Nonmetals
Nuclear equation
Nuclear fission
Nuclear fusion
Nuclear reaction
Nucleic acid
Nucleons
Nucleotide
Nucleus
Octet rule
Optical isomers
Optical rotation
Organic compounds

Osmosis
Osmotic pressure
Oxidation
Oxidation number
Oxidation-number method
Oxidation-reduction reaction
Oxidizing agent
Oxyacid
Oxyanion
Parent chain
Pascal
Pauli Exclusion Principle
Penetrating power
Peptide
Peptide bond
Percent by mass
Percent composition
Percent error
Percent yield
Period
Periodic law
Periodic table
pH
Phase change
Phase diagram
Phospholipid
Photoelectric effect
Photon
Photosynthesis
Physical change
Physical property
Pi bond
Planck's constant (h)
Plastic
pOH
Polar covalent bond
Polyatomic ion
Polymerization reaction
Polymers
Polysaccharide
Positron
Positron emission
Precipitate
Precision
Pressure
Primary battery
Principal energy levels
Principal quantum number (n)
Product
Protein
Proton
Pure research
Qualitative data
Quantitative data
Quantum
Quantum mechanical model of the atom
Quantum number
Radiation
Radioactive decay
Radioactive decay series
Radioactivity
Radiochemical dating
Radioisotopes
Radiotracer
Rate-determining step
Rate law
Reactant
Reaction mechanism
Reaction order
Reaction rate
Redox reaction
Reducing agent
Reduction
Reduction potential
Representative elements
Resonance
Reversible reaction
Salt
Salt bridge
Salt hydrolysis
Saponification
Saturated hydrocarbon
Saturated solution
Scientific law
Scientific methods
Scientific notation
Second
Second law of thermodynamics
Secondary battery
Sigma bond
Significant figures
Single-replacement reaction
Solid
Solubility
Solubility product constant
Soluble
Solute
Solution
Solvation
Solvent
Species
Specific heat
Specific rate constant
Spectator ion
Spontaneous process
Standard enthalpy (heat) of formation
Standard hydrogen electrode
States of matter
Stereoisomers
Steroids
Stoichiometry
Strong acid
Strong base
Strong nuclear force
Structural formula
Structural isomers
Sublimation
Substance
Substituent groups
Substitution reaction
Substrate
Supersaturated solution
Surface tension
Surfactant

Surroundings
Suspension
Synthesis reaction
System
Technology
Temperature
Theoretical yield
Theory
Thermochemical equation
Thermochemistry
Thermonuclear reaction
Thermoplastic
Thermosetting
Titrant
Titration
Transition elements
Transition metal
Transition state
Transmutation
Transuranium element
Triglyceride
Triple point
Tyndall effect
Unit cell
Universe
Unsaturated hydrocarbon
Unsaturated solution
Valence electrons
Vapor
Vaporization
Vapor pressure
Vapor pressure lowering
Viscosity
Voltaic cell
VSEPR model
Wavelength
Wax
Weak acid
Weak base
Weight
X-ray

Anatomy Vocabulary

* NeSA testing term
Abdominopelvic
Absorption
Accommodation
Acetylcholine
*Acid
Actin
Action potential
*Active transport
Adipose
ADP
Allergen
Amino Acids
Anatomy
Antagonist
Antibody
Antigen
Apical Surface
Appendicular
Arrector Pili Muscle
Articular Cartilage
Assimilation
Atom
Atomic Number
Atomic Weight (mass)
ATP
Atrium
Autonomic Nervous System
Axial
Axon
*Base
Basement Membrane
Blood
Bone
Bursa
Canaliculus
*Carbohydrates
Cardiac
Cardiac cycle
Cardiac output
Cartilage
Cartilaginous joint
Catalysts
*Cell Membrane
Cell mediated Immunity
*Cellular respiration
*Cellular Transport
Central Nervous System
Centrosome
Chemical Reaction
Chemoreceptor
Chromosome
Circulation
Clone
Cochlea
Columnar
Compact bone
Complement
Compound
Connective
Convergence
Cornea
*Covalent Bond
Creatine phosphate
Cuboidal
*Cytoplasm
Cytoskeleton
Decomposition

Dendrite
Dermis
Diaphysis
Diastole
Differentiation
*Diffusion
Disaccharides
*DNA
Dynamic Equilibrium
Effector
Electrocardiogram
*Electrons
Element
Endocardium
Endochondral Bone
Endocrine
*Endocytosis
Endoplasmic Reticulum
Endosteum
*Enzymes
Epicardium
Epidermis
Epiphyseal disk
Epiphysis
Epithelial
Equilibrium
Exchange
Exocrine
*Exocytosis
Facilitated Diffusion
Facilitation
Fascia
Fats
Fatty Acids
Fibrous joint
Filtration
Ganglion
Glands
Glycerol
Golgi Apparatus
Hair Follicle
Hapten
Hematoma
Hematopoiesis
Hemoglobin
Homeostasis
Immunity
Immunoglobulin
Inflammation
Inorganic
Insertion
Integumentary
Interferons
*Ion
*Ionic Bond
Joint/articulation
Keratin
Keratinization
Labyrinth
Ligaments
*Lipids
Lymph
Lymph node
Lymphatic pathway
Lymphocyte
Lysosome
Macrophage
Marrow
Mechanoreceptor
Medullary cavity
*Meiosis
Melanin
Melanocytes
Meninges
Meniscus
*Metabolism
*Mitochondrion
Mitosis
Molecule
Monosacccharides
Motor end plate
Motor neuron
Motor unit
Mucous Membrane
Muscle
Muscle impulse
Myelin
Myocardium
Myofibril
Myoglobin
Myosin
Negative feedback
Nervous
Neurilemma
*Neurons
Neurotransmitter
Neurotransmitter
Neutrons
Nissl Body
*Nucleic Acids
Nucleolus
*Nucleus
*Organelle
Organic
Organism
Origin
*Osmosis
Osteoblast
Osteoclast
Osteocyte
Osteon
Osteonic Canal
Oxygen debt
Pain Receptor
Parasympathetic Nervous system
Parietal
*Passive Transport
Pathogen
Pericardial
Pericardium
Periosteum
Peripheral Nervous System
Peristalsis
Peritoneal
*pH
Phagocytosis
Phospholipid
Photoreceptor
Pinocytosis
Pleural
Plexus
Polysaccharides
Prime mover

Projection
*Protein Synthesis
Proteins
Protons
Pseudostratified
Pulmonary circuit
Recruitment
Referred pain
Reflex
Refraction
Reproduction
Respiration
Reticuloendthelial tissue
Retina
*Ribosome
RNA
Sarcomere
Scar
Sclera
Sebaceous Gland
*Selectively Permeable
Sensory Adaptation
Sensory Receptor
Simple
Skeletal
Smooth
Somatic Nervous System
Species resistance
Spleen
Spongy Bone
Squamous
Static Equilibrium
Steroid
*Stimulus
Stratified
Stratum Basale
Stratum Corneum
Subcutaneous layer
Suture
Sweat Gland
Sympathetic Nervous System
Synapse
Synergist
Synovial Joint
Synthesis
Systemic Circuit
Systole
Tendons
Thermoreceptor
Thoracic
Threshold stimulus
Thymus Arteriole
Tissue
Vasoconstriction
Vasodilation
Ventricle
Venule
Vesicle
Visceral
Viscosity

Forensics – Current Science Vocabulary

*Denotes NeSA testing terms
*Acceleration
*Acid
*Active transport
*Alleles
*Amplitude (wave)
Atom
Atomic Mass
Atomic Number
*Attraction (electric)
*Base
*Behavioral
Bias
*Big Bang
*Biogeochemical cycle
*Biological diversity
*Biological evolution
*Biome
*Biosphere
*Carbohydrate
*Cell membrane
*Cell wall
*Cellular respiration
*Cellular transport
*Chloroplast
Compound
*Conduction
*Conservation
Constant
Constraints
Control
*Control group
*Convection
*Cytoplasm
Density
Dependent variable
Diffraction
*Diffusion
*Displacement
*DNA
*Dominant
*Double helix
*Electric force
*Electromagnetic spectrum
*Electromagnetic wave
*Electron
Element
*Endocytosis
*Environmental quality
*Enzyme
Ethics
*Exocytosis
*Experimental group
*Fission
*Force
*Fossil correlation
*Fossil fuels
*Fossil record

*Frequency (wave)
*Fusion
*Genetic variability
*Genotype
*Kinetic energy
*Lipid
*Geochemical cycles
*Groundwater
*Heat
Heterogeneous Mixture
*Heterozygous
Homogeneous Mixture
*Homozygous
*Hypothesis
Independent Variable
*Inertia
*Inheritance
*Interference
*Ion
*Isotope
Matter
Mechanical wave properties
Medium
*Meiosis
*Metabolism
*Mitochondria
*Mitosis
Mixture
*Molecule
*Morphological
*Mutation
*Natural selection
*Net force
*Neutron
*Newton's 2nd law
*Newton's 3rd law
*Newton's Law of universal gravitation
*Nuclear fusion
*Nuclear reactions
*Nucleic acid
*Nucleotide
*Nucleus (cell)
*Organelle
*Osmosis
*Passive transport
*Periodic law
*pH
*Phenotype
*Photosynthesis
*Physiological
*Potential energy
*Protein
*Protein synthesis
*Proton
*Punnet Square
*Radiation
*Radioactive dating
*Recessive
*Recombination
*Repulsion (electric)
*Ribosomes
Scientific law
Scientific Method
Scientific Theory
*Selectively permeable Solution
*Stellar evolution
*Stimulus
Technology
*Theory
*Trait
*Transformation of energy
*Vacuole
*Valence electrons
Variable
*Velocity
*Wavelength

PK - 6 Science Glossary (K-2)	
Vocabulary	Definition
(*)	NeSA vocabulary
air	an invisible mixture of nitrogen, oxygen, water vapor, and small amount of other gases that is colorless and usually odorless
***animal**	a living thing that eats other plants or animals for food
attract	to draw by a physical force causing or tending to cause to approach, adhere, or unite; pull
***balance**	a tool that measures mass
***basic needs**	things needed to stay alive including food, water, air, space, and shelter
***centimeters**	metric unit of measure for length
***change**	when something becomes different
chemical change	when matter changes into different matter
clouds	tiny drops of water that collect in the sky
desert	a place that gets very little rain
energy	what makes matter move or change
equator	the imaginary line around the middle of Earth that separates the northern part from the southern part
***external**	on the outside
fall	the season after summer
***floating**	sits on the surface of a liquid
flower	the part of the plant that makes seeds; the blossom of a plant
force	strength; energy; power; intensity
forest	a place with many trees and other plants
***freezing**	to change from a liquid into a solid by getting colder
fulcrum	the support, or point of rest, on which a lever turns in moving a body
gas	a state of matter that spreads out to fill its container
***growth**	to become larger or more complex
***habitat**	a place where an animal or plant live and their basic needs are met
***hand lens**	a tool that makes objects viewed through it appear larger
***inches**	a standard unit of measure for length
inclined plane	one of the simple machines, a plane surface inclined to the horizon, or forming with a horizontal plane any angle but a right angle
insect	animals with three body parts and six legs
landslide	the sudden movement of soil down a hill
larva	the stage in the life cycle of a butterfly when the insect is a caterpillar
***length**	how far from end to end

PK - 6 Science Glossary (K-2)	
Vocabulary	Definition
(*)	NeSA vocabulary
lever	a simple machine made of a bar that rests on a fixed point
***liquid**	anything that takes the shape of its container
***living**	things that need food, water, air, space, and shelter
***location (object)**	where an object is or where it could be
machine	something that transmits or changes energy or motion
magnet	an object with a powerful magnetic field that will attract iron, steel, nickel and cobalt
magnetic field	the area around a magnet where its force pulls
mammals	a group of animals with hair or fur that feed milk to their young
matter	what makes up all things
***measure**	to find the size or amount of an object
***melting**	to change from a solid to a liquid by getting warmer
mixture	two or more different things put together
***Moon**	a natural object in the sky which changes its shape in a recognized pattern
***motion (object)**	an object changing its location
***nonliving**	things that do not need food, water, air, space, or shelter
***observation**	the act of viewing and noting characteristics of objects or events
ocean	the large connected body of salt water that covers almost three fourths of the Earth's surface
***offspring**	the young produced by a parent
oxygen	a gas found in the air we breathe
paleontologist	a scientist who studies things that lived long ago
***parents**	mother and father
physical change	a usually reversible change in the physical properties of a substance, as size or shape:
***plant**	a living thing that usually has leaves, stems, and roots
poles	either of the two regions or parts of an electric battery, magnet, or the like, that exhibits electrical or magnetic polarity
pollen	the fertilizing element of flowering plants, consisting of fine, powdery, yellowish grains or spores, sometimes in masses
pond	a body of water smaller than a lake, sometimes artificially formed, as by damming a stream
pulley	a wheel, with a grooved rim for carrying a line, that turns in a frame or block and serves to change the direction of or to transmit force, as when one end of the line is pulled to raise a weight at the other end: one of the simple machines
pulling	a force that moves something closer to you
pushing	a force that moves something away from you
rain forest	a tropical forest, usually of tall, densely growing, broad-leaved evergreen trees in an area of high annual rainfall
ramp	a sloping surface connecting two levels; incline

PK - 6 Science Glossary (K-2)	
Vocabulary	Definition
(*)	NeSA vocabulary
***recycle**	to use old materials to make new things; examples include metal, plastic, and paper to make other things
***reduce**	to use a smaller amount of things or products (i.e., water, power)
repel	to drive or force back
***reuse**	a product or thing that can be used over and over (i.e., grocery bags)
rock	Most rocks are made up of two or more minerals. They can be very hard or very soft. Rocks are classified according to the way they are formed. There are three types: igneous, sedimentary and metamorphic.
roots	a part of the body of a plant that develops, typically, from the radicle and grows downward into the soil, anchoring the plant and absorbing nutriment and moisture
***ruler**	a tool used to determine length or distance
screw	a threadlike cylindrical pin or rod with a head on one end, engaging a threaded hole and used either as a fastener or as a simple machine for applying power, as in a clamp, jack, etc.
***seasonal**	a time of the year (e.g. spring, summer, fall, winter)
seeds	the small part of a flowering plant that grows into a new plan
***shape**	describes how things look based on the outline of the object
shelter	a place where animals can live and be safe
***sinking**	to move downward below the surface of a liquid
***size**	how big or small something is
soil	The top layer of Earth's surface. It is compose of rock and mineral particles and decaying organic matter (humus.) Soil provides the nutrients that many plants need to grow.
solar system	the sun together with all the planets and other bodies that revolve around it
***solid**	anything that holds its own shape
spring	the season after winter
***stars**	natural objects in the sky that give off light
stem	the plant part through which water and food move
stream	a body of water flowing in a channel or watercourse, as a river, rivulet, or brook
summer	the season after spring
***Sun**	the star closest to the Earth; it is the source of Earth's heat and light
***sunrise**	the time of day when the Sun is first visible in the east
***sunset**	the time of day when the Sun is no longer visible in the west
temperature	how warm or cool something is
***texture**	how something feels
the senses	what you use to find out about the world around you

PK - 6 Science Glossary (K-2)	
Vocabulary	Definition
(*)	NeSA vocabulary
thermometer	a tool used for measuring temperature
***weather**	what it is like outside at a certain time and place
***weight**	the lightness or heaviness of an object
wind	moving air
winter	the season after fall

PK - 6 Science Glossary (3-4)	
Vocabulary	Definition
acceleration	any change in the speed or direction of a moving object
amphibian	a cold-blooded vertebrate that spends part of its life in water and part of its life on land
astronomy	the study of celestial objects such as the stars, planets, galaxies, moons, and nebulae
atmosphere	the blanket of gasses that surrounds Earth
axis	a real or imaginary line that a spinning object turns around
boiling point	the temperature at which a substance can change from a liquid to a gas
camouflage	an adaptation by which an animal can hid by blending in with its surroundings
carnivore	a consumer that eats only animals
classify	to place things that share properties together in groups
competition	the struggle among organisms for water, food, or other needs
condensation	the process in which water particles change from a gas to a liquid
conductor	a material through which heat or electricity flows easily
constellation	a number of stars that appears to form a pattern
consumer	any organism that eats the food producers make, or that eats other consumers
crater	a hollow area or pit in the ground
density	the amount of matter in a given space
drought	a long period of time with little or no precipitation
Earth's axis	an imaginary straight line in which an object rotates
Earth's orbit	the path one object takes around another
earthquake	movement or vibration in the rocks that make up Earth's crust
endangered	close to becoming extinct; having very few of its kind left
environment	the things that make up an area, such as land, water, and air
evaporation	to change from a liquid to a gas
extinct	died out, leaving no more of that type of organism alive
food chain	a series of organisms that depend on one another for food
food web	several food chains that are connected
fossil	the imprint or remains of something that lived long ago

PK - 6 Science Glossary (3-4)	
Vocabulary	Definition
friction	a force that occurs when one object rubs against another
generator	a device that creates alternating current by spinning an electric coil between the poles of a powerful magnet
glacier	a large mass of snow and ice that slowly moves downward and outward over the land
gravity	a force that tried to pull to objects toward each other
ground water	water stored in the cracks of underground rocks and soil
herbivore	a consumer that eats only plants
host	an organism that a parasite lives with
inherited behavior	a behavior that is inborn, not learned
land form	a feature of the Earth's surface
life cycle	all the stages in an organism's life
magnetism	the property of an object that makes it attracts iron
migration	to move to another place
mineral	a naturally occurring substance, neither plant nor animal
omnivore	a consumer that eats both plants and animals
organism	any living thing
orbit	the path an object follows as it revolves
parasite	an organism that lives in or on a host
pitch	the highness or lowness of a sound as determined by its frequency
planet	a satellite of the sun
pollution	the adding of harmful substances to the water, air, or land
population	one type of organism living in an area
precipitation	water in the atmosphere that falls to Earth as rain, snow, hail, or sleet
predator	any organism that exists by preying on other organisms
prey	an animal hunted for food
producer	an organism, such as a plant, that makes food
recycle	to use again
reproduction	the making of offspring
reptile	a cold-blooded vertebrate that lives on land, has a backbone, an endoskeleton, and waterproof skin with scales or plates
scavenger	an animal that gets its food by eating dead organisms
solar system	the sun and all the objects that orbit around it
surface water	water above the ground in lakes, rivers, oceans
tide	**t**he rise and fall of ocean water levels
water cycle	the movement of Earth's water over and over from a liquid to a gas and from a gas to a liquid

5th Grade Science Glossary	
Vocabulary	Definition
(*)	NeSA vocabulary
***adaptations**	changes made to organisms to help it meet its needs
***atmosphere**	the layer of air that surrounds Earth
atom	the smallest component of an element having the chemical properties of the element, consisting of a nucleus containing combinations of neutrons and protons and one or more electrons bound to the nucleus by electrical attraction; the number of protons determines the identity of the element
***attraction (magnetic)**	a magnetic force drawing objects together and resisting separation
***beneficial**	producing or promoting a positive result
***Celsius**	a metric unit of temperature
***centi**	prefix meaning 100
change of state	the act of changing something into something different in essential characteristics
***climate**	the average temperature and rainfall of an area over many years
communicate	to impart knowledge of; make known
***community**	a group of organisms that live together and share resources
compound	composed of two or more parts, elements, or ingredients
***conductor**	a substance that can allow electricity heat, or sound to pass through it easily
***consumer**	organisms that eat other organisms to gain energy
convection	the transfer of heat by the circulation or movement of the heated parts of a liquid or gas
***data**	information, often in the form of facts or figures, obtained from experiments or surveys
***decomposer**	organism that feeds on dead organisms
***deposition**	the state of being deposited or precipitated
***detrimental**	causing damage, harm, or disadvantage
***dimensions**	measurement of the size of an object (length, width, height)
***ecosystem**	a system formed by the interaction of a community of organisms with their environment
***elasticity**	ability to go back to the original shape or size after being stretched, pressed, or squeezed together
***electrical circuit**	a complete path along which electricity moves (closed loop)

element	one of a class of substances that cannot be separated into simpler substances by chemical means
(*)	NeSA Vocabulary
***erosion**	the process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves, etc.
***explanation**	a statement giving reasons for information obtained from experiments
***Fahrenheit**	a nonmetric measure of temperature
***feedback**	the return of informational about the result of a scientific investigation which modify, correct, or strengthen the investigation
***food chain**	the sequence of who eats whom in a biological community
***force**	a push or a pull
***friction**	the force that resists motion between objects that are touching
***function**	the way something works
***gas**	matter that takes the shape and volume of its container
***gravity**	a force that attracts all objects to each other
hypothesis	a proposition, or set of propositions, set forth as an explanation for the occurrence of some specified group of phenomena, either asserted merely as a provisional conjecture to guide investigation (working hypothesis) or accepted as highly probable in the light of established facts
igneous rock	rocks formed by the cooling and solidifying of molten materials. Igneous rocks can form beneath the Earth's surface, or at its surface, as lava
***inherited characteristics**	a characteristic that is passed from parent to offspring
***insulator**	a substance that does not allow electricity, heat, or sound to pass through it easily
invertebrate	pertaining to creatures without a backbone
inertia	the property of matter by which it retains its state of rest or its velocity along a straight line so long as it is not acted upon by an external force
***investigation (experiment)**	a series of controlled steps, which can be repeated, for the purpose of answering a testable question
***kilo**	prefix meaning 1,000
***life cycle**	stages that an organism goes through as it grows and matures
***liter**	a metric unit of volume
***magnetism**	the force between poles of magnets
***matter**	something that takes up space

***measurement**	an amount or size determined by comparison with a known quantity
(*)	NeSA Vocabulary
metamorphic rock	rock that was once one form of rock but has changed to another under the influence of heat, pressure, or some other agent without passing through a liquid phase
***meter**	a metric unit of length
***metric**	a universal system of measurement
***microscope**	a tool that uses a combination of lenses to produce a greatly magnified image of an object too small to be seen in detail by the naked eye
***milli**	prefix meaning one thousandth (.001)
***minerals**	a basic Earth material that makes up rocks
***mixture**	when two or more things are combined, but the things do not change (e.g. cement, trail mix, salad)
observe	to see, watch, perceive, or notice
***opaque**	not allowing light to pass through
***organism**	any living thing
photosynthesis	the complex process by which carbon dioxide, water, and certain inorganic salts are converted into carbohydrates by green plants, algae, and certain bacteria, using energy from the sun and chlorophyll
***physical properties**	how something looks, smells, feels (e.g. color, texture, floating, weight, odor)
***pitch**	the highness or lowness of a sound
***position**	the place where a person or thing is located
prediction	the act of using prior knowledge to create an educated guess of an outcome or experience
***procedure**	a series of steps, done in a particular order, to answer testable (scientific) questions
***producer**	organisms that make their own food
***pure substance**	matter that cannot be separated into other kinds of matter by any physical process
***reflection**	light bouncing off an object
***repulsion**	a magnetic force pushing objects apart and resisting separation
rock cycle	a continuous process, by which rocks are created, changed from one form to another, destroyed, and then formed again
***rocks**	an Earth material made up of different minerals
scientific method	a method of research in which a problem is identified, relevant data are gathered, a hypothesis is formulated from these data, and the hypothesis is empirically tested
***seasons**	periods of the year with different weather conditions

(*)	NeSA Vocabulary
sedimentary rock	rock that has formed through the deposition and solidification of sediment, especially sediment transported by water (rivers, lakes, and oceans), ice (glaciers), and wind. Sedimentary rocks are often deposited in layers, and frequently contain fossils
***soil**	the loose minerals and natural material in which plants can grow on the surface of Earth
***sound**	waves caused by vibrations through a material which can be heard when they reach an ear
***speed**	the distance an object moves over a given amount of time
***structure**	the way something is put together
***survival**	ability of an organism to stay alive
***telescope**	a tool that uses a combination of lenses to make distant objects appear larger and nearer
***temperature**	the measure of the warmth or coldness of something
***testable question**	a question that can be answered through an investigation where one part of an experiment is allowed to change and all other parts are kept the same
***thermometer**	a tool to measure temperature
tissue	an aggregate of similar cells and cell products forming a definite kind of structural material with a specific function, in a multi-cellular organism
***transparent**	allows all light to pass through (objects can be seen clearly)
***translucent**	allows some light to pass through (does not produce detailed images)
***variable**	a measurable object, condition, or event, which can be changed
vertebrate	having vertebrae; having a backbone or spinal column
***volume**	amount of space an object takes up
***water**	a natural material made up of hydrogen and oxygen
***weathering**	the various mechanical and chemical processes that cause exposed rock to decompose
***weight**	the measure of the force of gravity acting on an object

6th Grade Science Glossary	
adaptation	any alteration in the structure or function of an organism or any of its parts that results from natural selection and by which the organism becomes better fitted to survive and multiply in its environment
asexual reproduction	reproduction, as budding, fission, or spore formation, not involving the union of gametes
biodiversity	diversity among and within plant and animal species in an

	environment
biotic	pertaining to life
cell theory	a basic tenet of modern biology that cells are the basic units of structure and function in living organisms
conservation of energy	the principle that in a system that does not undergo any force from outside the system, the amount of energy is constant, irrespective of its changes in form
dependent variable	having a value depending on that assumed by a related independent variable
dominance	high status in a social group, usually acquired as the result of aggression, which involves the tendency to take priority in access to limited resources, as food, mates, or space
experimental control	functioning as an experiment or used for experimentation
gene	The basic physical unit of heredity; a linear sequence of nucleotides along a segment of DNA that provides the coded instructions for synthesis of RNA, which, when translated into protein, leads to the expression of hereditary character
heterozygous	having dissimilar pairs of genes for any hereditary characteristic
homozygous	having identical pairs of genes for any given pair of hereditary characteristics
independent variable	a variable whose value determines the value of other variables
law	a phenomenon of nature that has been proven to invariably occur whenever certain conditions exist or are met; also, a formal statement about such a phenomenon; also called natural law
mass	a body of coherent matter, usually of indefinite shape and often of considerable size
meiosis	part of the process of gamete formation, consisting of chromosome conjugation and two cell divisions, in the course of which the diploid chromosome number becomes reduced to the haploid
mitosis	the usual method of cell division, characterized typically by the resolving of the chromatin of the nucleus into a threadlike form, which condenses into chromosomes, each of which separates longitudinally into two parts, one part of each chromosome being retained in each of two new cells resulting from the original cell
nucleus	the positively charged mass within an atom composed of neutrons and protons, and possessing most of the mass but occupying only a small fraction of the volume of the atom

Punnett square	in genetics, a type of grid used to show the gametes of each parent and their possible offspring; a type of grid that can indicate all the possible outcomes of a genetic cross
recessive	that one of a pair of alternative alleles whose effect is masked by the activity of the second when both are present in the same cell or organism
sexual reproduction	reproduction involving the union of gametes
theory	a coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a class of phenomena
tropism	an orientation of an organism to an external stimulus, as light, especially by growth rather than by movement
virus	an ultramicroscopic, infectious agent that replicates only within the cells of living hosts, mainly bacteria, plants, and animals: composed of an RNA or DNA core, a protein coat, and, in more complex types, a surrounding envelope
volume	the amount of space, measured in cubic units, that an object or substance occupies
weight	the force that gravitation exerts upon a body, equal to the mass of the body times the local acceleration of gravity: commonly taken, in a region of constant gravitational acceleration, as a measure of mass

NeSA-Science Vocabulary

INQUIRY, THE NATURE OF SCIENCE, AND TECHNOLOGY		
Grade 2		
Abilities to do Scientific Inquiry	**SC2.1.1 Students will ask questions and conduct investigations that lead to observations and communication of findings.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.1.1.c Select and use simple tools appropriately	balance	a tool used to determine the weight of an object
	hand lens	a tool that makes objects viewed through it appear larger
	ruler	a tool used to determine length or distance
SC2.1.1.e Collect and record observations	observation	the act of viewing and noting characteristics of objects or events
Grade 5		
Abilities to do Scientific Inquiry	**SC5.1.1 Students will plan and conduct investigations that lead to the development of explanations.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.1.1.a Ask testable scientific questions	testable question	a question that can be answered through an investigation where one part of an experiment is allowed to change and all other parts are kept the same
SC5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation	investigation (experiment)	a series of controlled steps, which can be repeated, for the purpose of answering a testable question
	variable	a measurable object, condition, or event, which can be changed
SC5.1.1.c Select and use equipment correctly and accurately	microscope	a tool that uses a combination of lenses to produce a greatly magnified image of an object too small to be seen in detail by the naked eye
	telescope	a tool that uses a combination of lenses to make distant objects appear larger and nearer
	thermometer	a tool to measure temperature
SC5.1.1.d Make relevant observations and measurements	measurement	an amount or size determined by comparison with a known quantity
SC5.1.1.e Collect and organize data	data	information, often in the form of facts or figures, obtained from experiments or surveys
SC5.1.1.f Develop a reasonable explanation based on collected data	explanation	a statement giving reasons for information obtained from experiments
SC5.1.1.g Share information, procedures, and results with peers and/or adults	procedure	a series of steps, done in a particular order, to answer testable (scientific) questions
SC5.1.1.h Provide feedback on scientific investigations	feedback	the return of information about the result of a scientific investigation which modify, correct, or strengthen the investigation
SC5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry		

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Grade 8		
INQUIRY, THE NATURE OF SCIENCE, AND TECHNOLOGY		
Abilities to do Scientific Inquiry	**SC 8.1.1 Students will design and conduct investigations that will lead to descriptions of relationships between evidence and explanations.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations	prediction	a statement about what may happen in the future based on prior experience or knowledge
SC 8.1.1.b Design and conduct logical and sequential investigations including repeated trials	repeated trials	the number of times procedures are repeated, usually 3-5, during a scientific experiment in order to achieve a more accurate result
SC 8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables	controlled variables	the variables in an experiment which are held constant to test the effect of the independent variable upon the dependent variable
	dependent variable (responding)	the variable, within a scientific experiment, which is affected by changes in the independent variable of the experiment
	independent variable (manipulated)	a variable that is changed by the person conducting the experiment and not changed by other variables in the experiment
SC 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques	graduated cylinder	a tall, narrow container with a volume scale used to measure liquids
SC 8.1.1.e Make qualitative and quantitative observations	qualitative observation	characteristics of objects or events, other than actual numerical measurements
	quantitative observation	characteristics of objects or events which can be measured using numeric values
SC 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy		
SC 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/ relationships, and account for non-relevant information	conclusion	a decision made after considering relevant facts and evidence
	inference	a conclusion drawn from evidence or reasoning
	law	a descriptive generalization about how some aspect of the natural world behaves under stated circumstances
SC 8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences		
SC 8.1.1.i Analyze and provide appropriate critique of scientific investigations	scientific critique	an analysis of the strengths and weaknesses of a scientific investigation
SC 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry		

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Grade 11		
INQUIRY, THE NATURE OF SCIENCE, AND TECHNOLOGY		
Abilities to do Scientific Inquiry	**SC12.1.1 Students will design and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation	hypothesis	a testable statement about the natural world that can be used to develop inferences and explanations
SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations	control group	a group of subjects, closely resembling the experimental group but not receiving the factor under study, which serves as a comparison to the experimental group
	experimental group	a group of subjects which receive the factor under study
SC12.1.1.c Identify and manage variables and constraints	constraints	the limitations imposed on possible solutions to problems or challenges
SC12.1.1.d Select and use lab equipment and technology appropriately and accurately		
SC12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations		
SC12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner		
SC12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations	theory	a well-substantiated explanation of some aspect of the natural world that can incorporate facts, laws, inferences, and tested hypotheses
SC12.1.1.h Use results to verify or refute a hypothesis		
SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations		
SC12.1.1.j Share information, procedures, results, conclusions, and defend findings to a scientific community (peers, science fair audience, policy makers)		
SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate		
SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry		

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PHYSICAL SCIENCE		
Grade 2		
Matter	**SC2.1.1 Students will observe and describe properties of objects and their behavior.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.1.1.a Observe physical properties of objects (freezing and melting, sinking and floating, color, size, texture, shape, weight)	color	one of many ways to describe how things look (e.g. red, blue, yellow)
	floating	sits on the surface of a liquid
	freezing	to change from a liquid into a solid by getting colder
	melting	to change from a solid to a liquid by getting warmer
	shape	describes how things look based on the outline of the object
	sinking	to move downward below the surface of a liquid
	size	how big or small something is
	texture	how something feels
	weight	the lightness or heaviness of an object
SC2.1.1.b Sort objects by physical properties (freezing and melting, sinking and floating, color, size, texture, shape, weight)		
SC2.1.1.c Measure objects using standard and non-standard units	centimeters	metric unit of measure for length
	inches	a standard unit of measure for length
	length	how far from end to end
	measure	to find the size or amount of an object
SC2.1.1.d Identify solids and liquids and recognize that fluids take the shape of their container	liquid	anything that takes the shape of its container
	solid	anything that holds its own shape
Force and Motion	**SC2.2.2 Students will compare relative position and motion of objects.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.2.2.a State location and/or motion relative to another relative to another object or its surroundings (in front of, behind, between, over, under, faster, slower, forward and backward, up and down)	location (object)	where an object is or where it could be
	motion (object)	an object changing its location
SC2.2.2.b Describe how objects move in many different ways (straight, zigzag, round and round, back and forth, and fast and slow)		

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Grade 5		
PHYSICAL SCIENCE		
Matter	**SC5.2.1 Students will explore and describe the physical properties of matter and its changes.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.2.1.a Identify mixtures and pure substances	matter	something that takes up space
	mixture	when two or more things are combined, but the things do not change (e.g. cement, trail mix, salad)
	physical properties	how something looks, smells, feels (e.g. color, texture, floating, weight, odor)
	pure substance	matter that cannot be separated into other kinds of matter by any physical process
SC5.2.1.b Identify physical properties of matter (color, odor, elasticity, weight, volume)	Celsius	a metric unit of temperature
	dimensions	measurement of the size of an object (length, width, height)
	elasticity	ability to go back to the original shape or size after being stretched, pressed, or squeezed together
	Fahrenheit	a nonmetric unit of temperature
	temperature	the measure of the warmth or coldness of something
	volume	amount of space an object takes up
	weight	the measure of the force of gravity acting on an object
SC5.2.1.c Use appropriate metric measurements to describe physical properties	centi	prefix meaning 100
	kilo	prefix meaning 1,000
	liter	a metric unit of volume
	meter	a metric unit of length
	metric	a universal system of measurement
	milli	prefix meaning one thousandth (.001)
SC5.2.1.d Identify state change caused by heating and cooling solids, liquids, and gasses	gas	matter that takes the shape and volume of its container
Force and Motion	**SC5.2.2 Students will identify the influence of forces on motion.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.2.2.a Describe motion by tracing and measuring an object's position over a period of time (speed)	speed	the distance an object moves over a given amount of time
SC5.2.2.b Describe changes in motion due to outside forces (push, pull, gravity)	force	a push or a pull
	friction	the force that resists motion between objects that are touching
	gravity	a force that attracts all objects to each other
SC5.2.2 c Describe magnetic behavior in terms of attraction and repulsion	attraction (magnetic)	a magnetic force drawing objects together and resisting separation
	magnetism	the force between poles of magnetics
	repulsion	a magnetic force pushing objects apart and resisting separation

Grade 5		
PHYSICAL SCIENCE		
Energy	**SC5.2.3 Students will observe and identify signs of energy transfer.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.2.3.a Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration	sound	waves caused by vibrations through a material which can be heard when they reach an ear
	pitch	the highness or lowness of a sound
SC5.2.3.b Recognize that light travels in a straight line and can be reflected by an object (mirror)	reflection	light bouncing off an object
SC5.2.3.c Recognize that light can travel through certain materials and not others (transparent, translucent, opaque)	opaque	not allowing light to pass through
	translucent	allows some light to pass through (does not produce detailed images)
	transparent	allows all light to pass through (objects can be seen clearly)
SC5.2.3.d Identify ways to generate heat (friction, burning, incandescent light bulb)		
SC5.2.3.e Identify materials that act as thermal conductors or insulators	conductor	a substance that can allow electricity, heat, or sound to pass through it easily
	insulator	a substance that does not allow electricity, heat, or sound to pass through it easily
SC5.2.3.f Recognize that the transfer of electricity in an electrical circuit requires a closed loop	electrical circuit	a complete path along which electricity moves (closed loop)

Grade 8		
PHYSICAL SCIENCE		
Matter	**SC 8.2.1 Students will identify and describe the particulate nature of matter including physical and chemical interactions.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.2.1.a Compare and contrast elements, compounds, and mixtures	compound	a pure substance composed of two or more elements chemically combined
	element	a pure substance that cannot be broken down by chemical or physical means
SC 8.2.1.b Describe physical and chemical properties of matter	chemical properties	characteristics of a substance that determines how it interacts with other substances
	density	calculation of an object's mass divided by its volume
	mass	a measure of the amount of matter an object has
SC 8.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature	condensation	change in the physical state of matter from gas to the liquid phase
	evaporation	change in the physical state of matter from liquid to gas phase that occurs only on the surface of the liquid
	sublimation	change in the physical state of matter from solid to the gas phase without passing through the liquid phase
	vaporization	change in the physical state of matter from liquid to the gas phase
SC 8.2.1.d Compare and contrast solids, liquids, and gasses based on properties of these states of matter		
SC 8.2.1.e Distinguish between physical and chemical changes (phase changes, dissolving, burning, rusting)	burning	a chemical change in which the substance is broken down and releasing heat and light
	dissolving	a physical change in which particles of a substance are separated by water particles
	phase change	a change in state of matter (e.g. solid to liquid, liquid to gas)
	rusting	a chemical change in which a metal reacts with oxygen to form a different compound
SC 8.2.1.f Recognize conservation of matter in physical and chemical changes	conservation of matter	matter can neither be created nor destroyed
SC 8.2.1.g Classify substances into similar groups based on physical properties	periodic table	arrangement of the known elements organized by their properties
Force and Motion	**SC 8.2.2 Students will investigate and describe forces and motion.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.2.2.a Describe motion of an object by its position and velocity	constant speed	distance traveled in set amount of time (speed = distance / time)
	velocity	speed of an object in a specified direction
SC 8.2.2.b Recognize an object that is not being subjected to a force will continue to move at a constant speed in a straight line or stay at rest (Newton's 1st law)		
SC 8.2.2.c Compare the motion of objects related to the effects of balanced and unbalanced forces	balanced forces	two or more forces that act upon an object and result in no change in motion
	unbalanced forces	two or more forces resulting in a change in an object's motion
SC 8.2.2.d Recognize that everything on or around Earth is pulled towards Earth's center by gravitational force	gravitational force	the force of attraction between all masses in the universe

Grade 8		
PHYSICAL SCIENCE		
Energy	**SC 8.2.3 Students will identify and describe how energy systems and matter interact.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.2.3.a Recognize that vibrations set up wave-like disturbances that spread away from the source (sound, seismic, water waves)	wave (mechanical)	the transfer of energy moving through a medium (sound, seismic, water)
SC 8.2.3.b Identify that waves move at different speeds in different materials	medium	material that energy can transfer through
SC 8.2.3.c Recognize that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection)	absorption	the transfer of light energy into an object
	refraction	the bending of the path of light when it passes from one medium into another
	scattering	light reflected in all directions by an uneven surface
	transmission	to pass through air or some other medium
SC 8.2.3.d Recognize that to see an object, light from the surface of the object must enter the eye; the color seen depends on the properties of the surface and the color of the available light sources		
SC 8.2.3.e Recognize that heat moves from warmer objects to cooler objects until both reach the same temperature		
SC 8.2.3.f Describe transfer of energy from electrical and magnetic sources to different energy forms (heat, light, sound, chemical)		
SC 8.2.3.g Recognize all energy is neither created nor destroyed	energy	ability to cause change or do work
	Law of Conservation of Energy	energy can neither be created nor destroyed in chemical and physical changes

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Grade 11		
PHYSICAL SCIENCE		
Matter	**SC12.2.1 Students will investigate and describe matter in terms of its structure, composition and conservation.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.2.1.a Recognize bonding occurs when outer electrons are transferred (ionic) or shared (covalent)	chemical bonding	force of attraction between two or more atoms resulting in the formation of different chemical substances
	covalent bond	a chemical bond characterized by the sharing of a pair of valence electrons between atoms
	ionic bond	a chemical bond characterized by transfer of electrons from one atom to another resulting in the attraction of oppositely charged ions
	molecule	a group of atoms bonded together forming the smallest fundamental unit of a pure substance
	valence electrons	the electrons in the outer shell (energy level) that are available for bonding
SC12.2.1.b Describe the energy transfer associated with phase changes between solids, liquids, and gasses		
SC12.2.1.c Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle arrangement, particle motion, and strength of bond between molecules		
SC12.2.1.d Recognize a large number of chemical reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base) between reacting ions, molecules, or atoms	acid	substances that dissolve in water to release hydrogen ions (H^+)
	base	substances that dissolve in water to release hydroxide ions (OH^-)
	chemical reactions	changes in chemical substances involving bond breaking and/or bond forming resulting in different chemical substances
SC12.2.1.e Identify factors affecting rates of chemical reactions (temperature, particle size, surface area)	pH	the measure of acidity or alkalinity of a solution
SC12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons)	electron	a negatively charged subatomic particle located outside the nucleus
	neutron	a neutral subatomic particle located inside the nucleus
	proton	a positively charged subatomic particle located inside the nucleus
SC12.2.2.1.g Describe properties of atoms, ions, and isotopes	atom	the basic unit of matter
	ion	an atom or group of atoms in which the number of electrons is different from the number of protons resulting in a net charge other than zero
	isotopes	atoms of the same element with different numbers of neutrons
SC12.2.1.h Describe the organization of the periodic table of elements with respect to patterns of physical and chemical properties	periodic law	the law stating many physical and chemical properties of the elements recur periodically as their atomic numbers increase

Grade 11		
PHYSICAL SCIENCE		
Force and Motion	**SC12.2.2 Students will investigate and describe the nature of field forces and their interactions with matter.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.2.2.a Describe motion with respect to displacement and acceleration	acceleration	change in velocity over time ($a = \Delta v / \Delta t$)
	displacement	change in position from one point to another (distance and direction)
	velocity	velocity = displacement / time
SC12.2.2.b Describe how the law of inertia (Newton's 1st law) is evident in a real-world event	inertia	the tendency of an object to resist any change in its motion
SC12.2.2.c Make predictions based on relationships among net force, mass, and acceleration (Newton's 2nd law)	force	a vector quantity, having both magnitude and direction, resulting from the interaction between two objects
	net force	vector sum of all forces acting upon an object
	Newton's 2nd Law	the relationship among net force, mass, and acceleration ($F = ma$)
SC12.2.2.d Recognize that all forces occur in equal and opposite pairs (Newton's 3rd law)	Newton's 3rd Law	all forces occur in equal and opposite pairs (action/reaction)
SC12.2.e Describe how Newton's 3rd law of motion is evident in a real-world event		
SC12.2.2.f Describe gravity as a force that each mass exerts on another mass, which is proportional to the masses and the distance between them	Newton's Law of Universal Gravitation	every mass attracts every other mass with a force directly proportional to the masses and inversely proportional to the distance between them squared
SC12.2.2.g Recognize that an attractive or repulsive electric force exists between two charged particles and that this force is proportional to the magnitude of the charges and the distance between them	attraction (electric)	opposite charges pull towards one another
	electric force	the force between two charged particles that is directly proportional to the magnitude of the charges and inversely proportional to the distance between them squared
	repulsion (electric)	like charges push away from one another

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Grade 11		
PHYSICAL SCIENCE		
Energy	**SC12.2.3 Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.2.3.a Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium	amplitude (wave)	amount of wave energy measured from resting position to either the crest or to the trough
	frequency (wave)	number of complete waves that pass a point per second
	mechanical wave properties	frequency, wavelength, and speed of a wave through a medium are related by the formula $v=f\lambda$
	medium	the substance that carries a wave
	wavelength	distance between adjacent corresponding points on a wave
SC12.2.3.b. Recognize that the energy in waves can be changed into other forms of energy	transformation of energy	energy can transfer from one form to another (e.g. nuclear to heat, chemical to mechanical, electrical to light)
SC12.2.3.c Recognize that light can behave as a wave (diffraction and interference)	diffraction	bending of light as it passes around the edge of an object
	interference	the effect of waves coinciding to create a new wave pattern
SC12.2.3.d Distinguish between temperature (a measure of the average kinetic energy of atomic or molecular motion) and heat (the quantity of thermal energy that transfers due to a change in temperature)	heat	the kinetic energy that flows between two samples of matter due to their difference in temperature
SC12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation	conduction	transfer of heat energy between heat substances that are in direct contact with one another
	convection	the movement of ensembles of molecules within gasses and liquids
	radiation	heat energy transfer due to electromagnetic waves
SC12.2.3.f Recognize that the production of electromagnetic waves is a result of changes in the motion of charges or by a changing magnetic field	electromagnetic wave	form of energy emitted and absorbed by charged particles as it travels through space
SC12.2.3.g Compare and contrast segments of the electromagnetic spectrum (radio, micro, infrared, visible, ultraviolet, x-rays, gamma) based on frequency and wavelength	electromagnetic spectrum	a continuum of all electromagnetic waves arranged according to frequency and wavelength
SC12.2.3.h Recognize that nuclear reactions (fission, fusion, radioactive decay) convert a fraction of the mass of interacting particles into energy, and this amount of energy is much greater than the energy in chemical interactions	fission	nuclear process of splitting atoms
	fusion	nuclear process of joining atoms
	nuclear reactions	reactions that convert a fraction of mass into energy (e.g. fission, fusion, radioactive decay)
SC12.2.3.i Interpret the law of conservation of energy to make predictions for the outcome of an event	kinetic energy	energy of motion
	potential energy	stored energy
SC12.2.3.j Identify that all energy can be considered to be either kinetic, potential, or energy contained by a field (e.g. electromagnetic waves)		
SC12.2.3.k Identify endothermic and exothermic reactions	endothermic reaction	chemical reaction in which heat is absorbed
	exothermic reaction	chemical reaction in which heat is released

LIFE SCIENCE		
Grade 2		
Life Science	**SC2.3.1 Students will investigate the characteristics of living things.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.3.1.a Differentiate between living and nonliving things	living	things that need food, water, air, space, and shelter
	nonliving	things that do not need food, water, air, space, or shelter
SC2.3.1.b Identify the basic needs of living things (food, water, air, space, shelter)	basic needs	things needed to stay alive including food, water, air, space, and shelter
SC2.3.1.c Identify external parts of plants and animals	external	on the outside
	plant	a living thing that usually has leaves, stems, and roots
	animal	a living thing that eats other plants or animals for food
SC2.3.1.d Observe and match plants and animals to their distinct habitats	habitat	a place where an animal or plant live and their basic needs are met
Heredity	**SC2.3.2 Students will recognize changes in living things.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.3.2.a Describe how offspring resemble their parents	offspring	the young produced by a parent
	parents	mother and father
SC2.3.2.b Describe how living things change as they grow	change	when something becomes different
	growth	to become larger or more complex
Biodiversity	**SC2.3.4 Students will describe changes in organisms.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.3.4.a Recognize seasonal changes in animals and plants	seasonal	a time of the year (e.g. spring, summer, fall, winter)

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Grade 5		
LIFE SCIENCE		
Structure and Function of Living Systems	**SC5.3.1 Students will investigate and compare the characteristics of living things.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.3.1.a Compare and contrast characteristics of living and nonliving things		
SC5.3.1.b Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)	structure	the way something is put together
	function	the way something works
Heredity	**SC5.3.2 Students will identify variations of inherited characteristics and life cycles.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.3.2.a Identify inherited characteristics of plants and animals	inherited characteristics	a characteristic that is passed from parent to offspring
SC5.3.2.b Identify the life cycle of an organism	life cycle	stages that an organism goes through as it grows and matures
	organism	any living thing
Flow of Matter and Energy in Ecosystems	**SC5.3.3 Students will describe relationships within an ecosystem.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.3.3.a Diagram and explain a simple food chain beginning with the Sun	food chain	the sequence of who eats whom in a biological community
SC5.3.3.b Identify the role of producers, consumers, and decomposers in an ecosystem	community	a group of organisms that live together and share resources
	consumer	organisms that eats other organisms to gain energy
	decomposer	organism that feeds on dead organisms
	ecosystem	a community of organisms and its environment
	producer	organisms that make their own food
SC5.3.3.c Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem	survival	ability of an organism to stay alive
SC5.3.3.d Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live	beneficial	producing or promoting a positive result
	detrimental	causing damage, harm, or disadvantage
Biodiversity	**SC5.3.4 Students will describe changes in organisms over time.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.3.4.a Describe adaptations made by plants or animals to survive environmental changes	adaptations	changes made to organisms to help it meet its needs

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Grade 8		
LIFE SCIENCE		
Structure and Function of Living Systems	**SC 8.3.1 Students will investigate and describe the structure and function of living organisms.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)	cell	basic unit of life found in all living things
	organ	a group of tissues that work together to carry out a specific function
	organ system	a group of organs that work together, within an organism, to carry out a specific function
	organism	any living thing
	tissue	a group of specialized cells
SC 8.3.1.b Recognize that all organisms are composed of one or many cells; that these cells must grow, divide, and use energy; and that all cells function similarly	cell division	process by which a cell splits into two new cells
	cell growth	process by which a cell increases its size
SC 8.3.1.c Recognize specialized cells perform specialized functions in multicellular organisms	multicellular	having or consisting of many cells
	unicellular	consisting of a single cell
SC 8.3.1.d Identify the organs and functions of the major systems of the human body and describe ways that these systems interact with each other	circulatory system	system that provides a flow of nutrients throughout the body
	digestive system	system that breaks down food into energy for the body
	endocrine system	system of glands that make hormones to regulate the body
	excretory system	system that removes excess, unneeded, or dangerous materials from the body
	immune system	system that protects the body against infection
	integumentary system	system that is the natural outer covering of an organism
	nervous system	system that regulates the body's response to stimuli
	muscular system	system that allows movement of an organism
	reproductive system	system that allows the production of offspring
	respiratory system	system that brings oxygen into the body and releases carbon dioxide
	skeletal system	system that supports and protects the body
SC 8.3.1.e Describe how plants and animals respond to environmental stimuli	response	reaction of an organism to a stimulus
	stimulus	signal to which an organism responds
Heredity	**SC 8.3.2 Students will investigate and describe the relationship between reproduction and heredity.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.3.2.a Recognize that hereditary information is contained in genes within the chromosomes of each cell	chromosome	structure found in the cell that carries the genetic information for an organism
	gene	small part of a chromosome that determines a specific trait
	heredity	passing of traits from one generation to another
SC 8.3.2.b Compare and contrast sexual and asexual reproduction	asexual reproduction	process by which a single organism can reproduce by itself
	sexual reproduction	process by which sex cells from two organisms join to create a new organism

Grade 8		
LIFE SCIENCE		
Flow of Matter and Energy in Ecosystems	**SC 8.3.3 Students will describe populations and ecosystems.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.3.3.a Diagram and explain the flow of energy through a simple food web	food web	complex interactions of food chains that interact in an ecosystem
	predator	organism that captures and feeds on another organism
	prey	organism that is captured and fed upon by another organism
SC 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem		
SC 8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis	photosynthesis	process by which organisms use light energy to make food energy
SC 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support	biotic	any living part of the environment that affect organisms
	abiotic	any nonliving part of the environment that affect organisms
	carrying capacity	largest number of individuals of a species that a particular environment can support
SC 8.3.3.e Recognize a population is all the individuals of a species at a given place and time	population	group of organisms of the same species that live in the same area
	species	a group of organisms that is capable of reproducing similar organisms
SC 8.3.3.f Identify symbiotic relationships among organisms	commensalism	relationship between organisms where one benefits and the other is unaffected
	mutualism	a relationship between organisms where both benefit
	parasitism	relationship between organisms where one organism benefits and the other is harmed
	symbiosis	a close, long-term interaction between species
SC 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem		
Biodiversity	**SC 8.3.4 Students will identify characteristics of organisms that help them survive.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate	survival rate	number of individuals alive after a given period
SC 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change	extinction	end of an organism or group of organisms
SC 8.3.4.c Use anatomical features of an organism to infer similarities among other organisms	anatomical	relating to the structure of the body

Grade 11		
LIFE SCIENCE		
Structure and Function of Living Systems	**SC12.3.1 Students will investigate and describe the chemical basis of the growth, development, and maintenance of cells.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.3.1.a Identify the complex molecules (carbohydrates, lipids, proteins, nucleic acids) that make up living organisms	carbohydrate	molecule that is the major source of energy for an organism
	lipid	molecule that stores energy and is the main structure of cell membranes
	protein	molecule needed by organisms for growth and repair
	nucleic acid	building block of living organisms that passes genetic information from one generation to the next (e.g. DNA)
SC12.3.1.b Identify the form and function of sub-cellular structures that regulate cellular activities	cell membrane	thin barrier that surrounds all cells that controls what enters and leaves the cell
	cell wall	strong supporting layer around the cell membrane in some cells
	chloroplast	organelle found in plant cells that carries out photosynthesis
	cytoplasm	the fluid portion of a cell's interior
	mitochondria	organelle that converts digested food into cellular energy
	nucleus	organelle that regulates the production of proteins and contains genetic material
	organelle	subcellular structure that has a specific function
	ribosomes	organelle that is the site of protein synthesis
	vacuole	organelle that is used to store materials
SC12.3.1.c Describe the cellular functions of photosynthesis, respiration, cell division, protein synthesis, transport of materials, and energy capture/release	active transport	cell transport that does require energy (e.g. endocytosis, exocytosis)
	cellular respiration	process that releases energy by breaking down food molecules, in the presence of oxygen
	cellular transport	the movement of materials into, out of, or within of a cell
	enzyme	protein that speeds up biological reactions
	diffusion	the passive movement of molecules or particles along a concentration gradient or from regions of higher to regions of lower concentration
	endocytosis	the process by which a cell membrane folds inward to take in substances bound to its surface
	exocytosis	a process by which the contents of a cell vacuole are released to the cell exterior
	metabolism	set of chemical reactions in the cells of living organisms to sustain life
	osmosis	the diffusion of fluids through membranes or porous partitions
	passive transport	cell transport that does not require energy (e.g. Diffusion, osmosis)
	photosynthesis	process by which energy rich molecules are made from water and carbon dioxide in the presence of light
	protein synthesis	formation of proteins using information coded on DNA
	selectively permeable	property of biological membranes that allows some substances to pass across, while others cannot
SC12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival	stimulus	any physical or chemical input that is sensed

Grade 11		
LIFE SCIENCE		
Heredity	**SC12.3.2 Students will describe the molecular basis of reproduction and heredity.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.3.2.a Identify that information passed from parents to offspring is coded in DNA molecules	DNA	nucleic acid that contains all of the genetic instructions for an organism
	inheritance	passing of genetic material from parent to offspring
	trait	specific characteristic of an individual
SC12.3.2.b Describe the basic structure of DNA and its function in genetic inheritance	double helix	the shape of DNA that resembles a spiral staircase or a twisted ladder
	mitosis	nuclear division in organisms that have a nucleus
	nucleotide	building block of a nucleic acid; consisting of a sugar, phosphate, and a nitrogen base (e.g. adenine, guanine, cytosine, thymine)
SC12.3.2.c Recognizes how mutations could help, harm, or have no effect on individual organisms	mutation	change in the genetic material of a cell
SC12.3.2.d Describe that sexual reproduction results in a largely predictable, variety of possible gene combinations in the offspring of any two parents	alleles	alternate forms of a gene
	dominant	one form of a gene that masks the presence of another gene
	genotype	genetic makeup of an organism
	heterozygous	having two different alleles for a particular gene
	homozygous	having two identical alleles for a particular gene
	meiosis	the process of nuclear division that reduces the number of chromosomes in a cell by half
	phenotype	physical characteristics of an organism
	Punnett square	model used to determine probabilities of a genetic cross
	recessive	form of a gene that is masked by the presence of another gene
Flow of Matter and Energy in Ecosystems	**SC12.3.3 Students will describe, on a molecular level, the cycling of matter and the flow of energy between organisms and their environment.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.3.3.a Explain how the stability of an ecosystem is increased by biological diversity	biological diversity	the degree of variation of life forms within a given ecosystem
SC12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere	biogeochemical cycle	cycle by which materials necessary for organisms are circulated through the environment (e.g. water, carbon, nitrogen)
	biosphere	area on and around Earth where life exists
SC12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials	biome	a group of ecosystems that share similar climates and organisms
SC12.3.3.d Analyze factors which may influence environmental quality	environmental quality	the state of environmental conditions

Grade 11		
LIFE SCIENCE		
Biodiversity	**SC12.3.4 Students will describe the theory of biological evolution.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.3.4.a Identify different types of adaptations necessary for survival (morphological, physiological, behavioral)	behavioral	related to the way something acts
	morphological	the form or structure of something
	physiological	related to the way something functions
SC12.3.4.b Recognize that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring	biological evolution	descent with modification of organisms from common ancestors
	genetic variability	tendency of individual genetic characteristics in a population to differ from one another
	recombination	formation of new and different sets of chromosomes or genes
SC12.3.4.c Explain how natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms	natural selection	process by which organisms that are most suited to their environment survive and reproduce most successfully
	fossil record	collection of preserved organisms or their traces stored in Earth
SC12.3.4.d Apply the theory of biological evolution to explain diversity of life over time		

EARTH AND SPACE SCIENCES		
Grade 2		
Earth in Space	**SC2.4.1 Students will observe and identify objects of the sky.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.4.1.a Identify objects in the sky (the Sun, the Moon, the stars) and when they are observable	Moon	a natural object in the sky which changes its shape in a recognized pattern
	stars	natural objects in the sky that give off light
	Sun	the star closest to Earth; it is the source of Earth's heat and light
SC2.4.1.b Identify objects that appear to move in the sky (the Sun, the Moon, stars)	sunrise	the time of day when the Sun is first visible in the east
	sunset	the time of day when the Sun is no longer visible in the west
Earth Structures and Processes	**SC2.4.2 Students will observe, identify, and describe characteristics of Earth's materials.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.4.2.a Describe Earth materials (sand, soil, rocks, water)		
SC2.4.2.b Recognize ways in which individuals and families can conserve Earth's resources by reducing, reusing, and recycling	recycle	to use old materials to make new things; examples include metal, plastic, and paper to make other things
	reduce	to use a smaller amount of things or products (i.e., water, power)
	reuse	a product or thing that can be used over and over (i.e., grocery bags)
Energy in Earth's Systems	**SC2.4.3 Students will observe simple patterns of change on Earth.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC2.4.3.a Observe that the Sun provides heat and light		
SC2.4.3.b Observe and describe simple daily changes in weather	weather	what it is like outside at a certain time and place
SC2.4.3.c Describe simple seasonal weather indicators and how they impact student choices (activities, clothing)		

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Grade 5		
EARTH AND SPACE SCIENCES		
Earth in Space	**SC5.4.1 Students will observe and describe characteristics, patterns, and changes in the sky.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.4.1.a Recognize that the observed shape of the Moon changes from day to day during a one month period		
SC5.4.1.b Recognize the motion of objects in the sky (the Sun, the Moon, stars) change over time in recognizable patterns	position	the place where a person or thing is located
Earth Structures and Processes	**SC5.4.2 Students will observe and describe Earth's materials, structure, and processes.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.4.2.a Describe the characteristics of rocks, minerals, soil, water, and the atmosphere	atmosphere	the layer of air that surrounds Earth
	minerals	a basic Earth material that makes up rocks
	rocks	an Earth material made up of different minerals
	soil	the loose minerals and natural material in which plants can grow on the surface of Earth
	water	a natural material made up of hydrogen and oxygen
SC5.4.2.b Identify weathering, erosion, and deposition as processes that build up or break down Earth's surface	deposition	the dropping of eroded soil and rock pieces in a new place
	erosion	movement of Earth materials by water, wind, or ice
	weathering	the process by which rocks are broken down into smaller pieces
SC5.4.2.c Identify how Earth materials are used (fuels, building materials, sustaining plant life)		
Energy in Earth's Systems	**SC5.4.3 Students will observe and describe the effects of energy changes on Earth.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.4.3.a Describe the Sun's warming effect on the land and water		
SC5.4.3.b Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)		
SC5.4.3.c Recognize the difference between weather, climate, and seasons	climate	the average temperature and rainfall of an area over many years
	seasons	periods of the year with different weather conditions
Earth's History	**SC5.4.4 Students will describe changes in Earth.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC5.4.4.a Describe how slow processes (erosion, weathering, deposition) and rapid processes (landslides, volcanic eruptions, earthquakes) change Earth's surface		

Grade 8		
EARTH AND SPACE SCIENCES		
Earth in Space	**SC 8.4.1 Students will investigate and describe Earth and the solar system.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.4.1.a Describe the components of the solar system (the Sun, planets, moons, asteroids, comets)	asteroids	small, rocky bodies that move with a solar system
	comets	a small body of ice and dust that orbits the Sun
	planets	a round object that orbits the Sun and dominates its orbit
SC 8.4.1.b Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons	axis	a line through an object around which it rotates
	eclipse	the blocking of the light from one astronomical body by the shadow of another body
	phase	the portion of a moon or planet that is illuminated by the Sun
	revolution	the motion of one body around another, like Earth's orbit around the Sun
	rotation	the spinning of a body, like Earth, on its axis
SC 8.4.1.c Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system	tides	the alternating rise and fall of the ocean or other large bodies of water
Earth Structures and Processes	**SC 8.4.2 Students will investigate and describe Earth's structure, systems, and processes.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.4.2.a Describe the layers of Earth (core, mantle, crust, atmosphere)	core	the innermost layer of Earth, located beneath the mantle
	crust	the thin, rocky outer layer of Earth, above the mantle
	mantle	the layer of rock between Earth's crust and core
SC 8.4.2.b Describe the physical composition of soil		
SC 8.4.2.c Describe the mixture of gasses in Earth's atmosphere and how the atmosphere's properties change at different elevations		
SC 8.4.2.d Describe evidence of Earth's magnetic field	magnetic field	a region where a magnetic force can be observed
SC 8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface	convergence	the process where tectonic plates collide at a boundary
	divergence	the process where tectonic plates move away from a boundary
	tectonic plate	pieces of Earth's crust and uppermost mantle that cause changes in Earth's surface by their movements
	transform	the process where tectonic plates slide past each other at a boundary
SC 8.4.2.f Describe the rock cycle	igneous	rock that forms when magma or lava cools and solidifies
	metamorphic	rock that forms from other rocks as a result of intense heat, pressure, or chemical processes
	sedimentary	rock that forms from the weathering and erosion of other rocks (these sediments are deposited, compacted, and cemented)
SC 8.4.2.g Describe the water cycle (evaporation, condensation, precipitation)	precipitation	any form of water that falls to Earth's surface from the clouds
SC 8.4.2.h Classify Earth materials as renewable or nonrenewable	nonrenewable	a limited resource that cannot be replaced within a human lifetime once it is consumed
	renewable	a resource that can be managed in order to replace it at the same rate it is consumed

Grade 8		
EARTH AND SPACE SCIENCES		
Energy in Earth's Systems	**SC 8.4.3 Students will investigate and describe energy in Earth's systems.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.4.3.a Describe how energy from the Sun influences the atmosphere and provides energy for plant growth		
SC 8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)	air mass	a large body of air with similar temperature and moisture throughout
	air pressure	the force of the weight of air pushing on a surface
	humidity	the amount of water vapor in the air
SC 8.4.3.c Describe atmospheric movements that influence weather and climate (air masses, jet stream)	jet stream	a high speed wind current in the upper level of the atmosphere
Earth's History	**SC 8.4.4 Students will use evidence to draw conclusions about changes in Earth.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC 8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)		
SC 8.4.4.b Describe how environmental conditions have changed through use of the fossil record	fossil	any remains, impressions, or traces of a living thing found in Earth of a former geologic age

Grade 11		
EARTH AND SPACE SCIENCES		
Earth in Space	**SC12.4.1 Students will investigate and describe the known universe.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.4.1.a Describe the formation of the universe using the Big Bang Theory	big bang	the prevailing theory that the universe began as one mass that then expanded into the current universe
SC12.4.1.b Recognize that stars, like the Sun, transform matter into energy by nuclear reactions which leads to the formation of other elements	nuclear fusion	the process by which nuclei of less massive atoms combine to form a new, more massive nucleus during which energy is released
SC12.4.1.c Describe stellar evolution	stellar evolution	sequence of changes that occurs in a star as it ages; this process is driven by gravity due to mass, and pressure due to nuclear fusion
Earth Structures and Processes	**SC12.4.2 Students will investigate the relationships among Earth's structure, systems, and processes.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.4.2.a Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter	geochemical cycles	the movement of elements between Earth's land, water, atmosphere, and living things
SC12.4.2.b Describe how heat convection in the mantle propels the plates comprising Earth's surface across the face of the globe (plate tectonics)	convection	heat transfer in a fluid by the circulation of currents due to differences in density
SC12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)	conservation	the careful use of natural resources including preservation, protection, or restoration
	fossil fuels	a nonrenewable energy source from the remains of organisms of a former geologic age that can be used as fuel (examples include coal, oil, and natural gas)
	groundwater	water that is within Earth's surface
Energy in Earth's Systems	**SC12.4.3 Students will investigate and describe the relationships among the sources of energy and their efforts on Earth's systems.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.4.3.a Describe how radiation, conduction, and convection transfer heat in Earth's systems		
SC12.4.3.b Identify internal and external sources of heat energy in Earth's systems		
SC12.4.3.c Compare and contrast benefits of renewable and nonrenewable energy sources		
SC12.4.3.d Describe natural influences (Earth's rotation, mountain ranges, oceans, differential heating) on global climate		

Grade 11		
EARTH AND SPACE SCIENCES		
Earth's History	**SC12.4.4 Students will explain the history and evolution of Earth.**	
CURRICULAR INDICATOR	**TERM**	**DEFINITION**
SC12.4.4.a Recognize that in any sequence of sediments or rocks that has not been overturned, the youngest sediments or rocks are at the top of the sequence and the oldest are at the bottom (law of superposition)		
SC12.4.4.b Interpret Earth's history by observing rock sequences, using fossils to correlate the sequences at various locations, and using data from radioactive dating methods	fossil correlation	a determination of the relative age of rock layers reached by studying fossils contained in the rock sequences
	radioactive dating	the method of calculating the absolute ages of rocks and minerals that contain radioactive isotopes
SC12.4.4.c Compare and contrast the physical and biological differences of the early Earth with the planet we live on today		

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