# Secondary Science Core Endorsement Specs

## Purpose

This endorsement, when attached to a current Educator License, verifies that the individual has the skills and knowledge necessary to teach students three-dimensionally in a secondary science classroom and is required to teach Middle School Science Courses in Grades 6, 7, or 8. Additionally, this endorsement is required as a prerequisite to earn any high school Level-1 or Level-2 content specific science endorsement.

## Endorsement Requirement Areas

The Science Core Endorsement has the following 7 requirement areas:

1. Earth Science Content Knowledge
2. Life Science Content Knowledge
3. Chemistry Content Knowledge
4. Physics Content Knowledge
5. Three-Dimensional Science and Engineering Pedagogical Knowledge
6. Science Education Teaching
7. Science Classroom Lab Safety Knowledge

## Endorsement Type

A professional endorsement will be awarded when all of the requirement areas have been met. An associate endorsement will be awarded if the applicant has passed the required Praxis Test **OR** has completed at least 3 of the 7 requirement areas.

## Requirement Area Options

The different options available to complete each of the requirement areas are described below. Quick links to the requirement area competencies are linked in parentheses.

### Requirement Area 1: Earth Science Content Knowledge (SC.1.ESS)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- Any 3+ credit university course (passed with a grade of C or higher) in General Earth Science, Astronomy, Geology, or Meteorology
    - Introduction level (1010) and For-Major level courses are accepted for this endorsement
    - Lab course is not required but recommended
    - A course in Physical Science does not meet this requirement

**Praxis Exam (Meets Requirement Areas 1-4 for this endorsement)**

- Middle School Science Content Knowledge Praxis (5442) with score of 152 or higher
- Other equivalent state or national exams that meet competencies and approved by USBE

### Requirement Area 2: Life Science Content Knowledge (SC.1.LS)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- Any 3+ credit course (passed with a grade of C or higher) in General Biology
    - Introduction level (1010) and For-Major level courses are accepted for this endorsement
    - Lab course is not required but recommended

**Praxis Exam** (Meets Requirement Areas 1-4 for this endorsement)

- As described in Requirement Area 1 description

## Requirement Area 3: Chemistry Content Knowledge (SC.1.PS.1)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- Any 3+ credit course (passed with a grade of C or higher) in General Chemistry
    - Introduction level (1010) and For-Major level courses are accepted for this endorsement
    - Lab course is not required but recommended
    - A course in Physical Science does not meet this requirement

**Praxis Exam** (Meets Requirement Areas 1-4 for this endorsement)

- As described in Requirement Area 1 description

## Requirement Area 4: Physics Content Knowledge (SC.1.PS.2-4)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- Any 3+ credit course (passed with a grade of C or higher) in General Physics
    - Introduction level (1010) and For-Major level courses are accepted for this endorsement
    - Lab course is not required but recommended
    - A course in Physical Science does not meet this requirement

**Praxis Exam** (Meets Requirement Areas 1-4 for this endorsement)

- As described in Requirement Area 1 descriptio

## Requirement Area 5: Three-Dimensional Science and Engineering Pedagogical Knowledge (SC.1.ETS, 2.SEP, 2.CCC, 2.PBT)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- A 3+ credit course (passed with a grade of C or higher) in 3 Dimensional Science and Engineering
    - *Currently Only Approved through the following options:*
        - *Utah Science Teachers Association's Foundations of Science: Foundations of Science: 3D Course*
        - *BYU's 3D-RST Program*

**Elementary Science Endorsement**

- Earning the competency based Elementary Science Endorsement meets all the required competencies for the Three-Dimensional Science and Engineering Pedagogical Knowledge requirement area.
    - The Elementary STEM endorsements do not meet all the competencies.

**Microcredential Stack**

- Three-Dimensional Science and Engineering Microcredential Stack
    - Nature of Science and Nature of Engineering
    - The Crosscutting Concepts
    - The Science and Engineering Practices
    - The Disciplinary Core Ideas
    - Phenomenon-Based Teaching and Learning
    - Equity and Accessibility in Science Teaching and Learning
    - STEM and Society
    - 3D Science Assessments

**Approved USBE or District Course**

- Course must be approved by USBE Science Specialist and meet following requirements:
    - Aligned to competencies SC.1.ETS.1-2, 2.SEP, 2.CCC, 2.PBT of this endorsement
    - Posted in the MIDAS system for verification purposes
    - Require participants to engage and implement 3D Teaching and Learning
- District and charter leaders seeking approval of a 3D Science and Engineering course must show alignment to competencies and receive pre-approval before offering courses.
    - *Currently Only Approved through the following options:*
        - *Nebo School District's Deep Science Learning program for Nebo teachers*
        - *Canyons School District's Science Leadership Cohort for Canyons teachers*

## Requirement Area 6: Science Education Teaching and Dispositions Knowledge (SC.2.STM, SC.3.SED)

*Complete one of the following options to show evidence of competency in this Requirement Area*

**University Courses**

- A 3+ credit course (passed with a grade of C or higher) in Science Teaching Methods
    - While a course specific to secondary science is preferred, and elementary methods course will be approved

**Microcredential Stack**

- Science Teaching Methods Microcredential Stack
    - Student Sensemaking
    - Instructional Models
    - Knowledge of Students and the Learning Environment
    - Curriculum Creation, Review, and Adoption
    - Student Discourse, Collaboration, and Consensus
    - Integration with Math, ELA, and other STEM Disciplines
    - Professional Collaboration, Ongoing Learning, and Advocacy

## Requirement Area 7: Science Classroom Lab Safety Knowledge (SC.4.CLS)

*Complete one of the following options to show evidence of competency in this Requirement Area*

***NOTE:*** *CPR/First Aid Training does not meet this requirement. Must be specific to laboratory safety (see competencies for specific expectations)*

**University Courses**

- A 1+ credit course (passed with a grade of C or higher) in Laboratory Safety
    - Course must be specific to laboratory safety and aligned to competencies

**Approved USBE, District, or Organization Course in Lab Safety**

- Utah Science Teachers Association - Safety Certification Course
- Flinn Scientific Lab Safety Online Course
    - Both Flinn's High School and Middle School course options are approved. Educators are invited to choose the one that best fits their needs.
- District or Charter Approved Course
    - Course must be approved by USBE before it will count to meet this requirement. District and charter leaders seeking approval of a Classroom Lab Safety course must show alignment to competencies and receive pre-approval before offering courses.
    - District Safety Certification should be posted in the MIDAS system or provide educators with a certificate of completion

# Requirement Area Competencies

The Secondary Science Core competencies are organized into 4 sections:

1. **Integrated Science Core Ideas** – Utah Secondary Science Courses in Grades 6, 7, and 8 are integrated science courses meaning that they will focus learning in each of the four disciplinary core science content areas:
    - ESS Earth and Space Science (ESS) – Focused in Earth's place in the universe, Earth's systems, and/or human activity
    - LS Life Science (LS) – Focused in life structures and processes, ecosystems, heredity, and/or evolution
    - PS Physical Science (PS) – Focused in matter, forces, energy, and/or waves
    - ETS Engineering (ETS) – focused in engineering design and/or evaluation
2. **Science Pedagogy** – To fulfill this requirement candidates for endorsement must show competency in:
    - SEP Science and Engineering Practices – Engaging students in doing the practices that are done in the field by scientists and engineers helps students understand how scientific knowledge develops and gives them appreciation of the wide range of approaches that are used to investigate, model, and explain the world.
    - CCC Crosscutting Concepts – Engaging students in thinking and reasoning about why or how phenomena occur using the CCCs provide students with a supporting scaffold to build their ability to connect knowledge from various disciplines into a coherent and scientifically based view of the world.
    - PBT Phenomenon-Based Teaching – Engaging students in phenomenon-based teaching provides them with authentic learning as they take the role of the scientist or engineer to work to investigate and explain a phenomenon or solve a problem. Phenomena are observable events that occur in the universe and that we can use our science knowledge to explain or predict. The goal of building knowledge in science is to develop general ideas, based on evidence, that can explain and predict phenomena.
    - STM Science Teaching Methods – Engaging students in effective science teaching and learning requires the ability to identify and implement sound curricula (lessons, activities, and assessments), lead students through productive discourse, provide them with a safe learning environment, and are reflective in their practice.
3. **Science Educator Dispositions** (SED) **–** Developing into an effective science teaching must include a commitment to ensuring the success of all students and as well as one's personal growth. Thus, candidates for endorsement must:

Demonstrate their commitment to equitable and inclusive science instruction. Demonstrate their potential for and commitment to professional growth through evidence-based evaluation of lesson success, reflection, and appropriate modifications.

4. **Classroom and Laboratory Safety** (CLS) - All endorsement candidates must have successfully completed laboratory safety training in order to ensure their ability to maintain a safe classroom environment for student learning.

Each of the requirement area competencies are described below. Quick links to each requirement area options are provided in the parentheses.

## Requirement Area 1 - Earth Science Content Knowledge (Options)

**SC.1.ESS: Core Ideas: Earth and Space Science**

SC.1.ESS.1 Earth's place in the universe.

- SC.1.ESS.1.A The history of the universe, and of the structures and objects within it, can be deciphered using observations of their present condition together with knowledge of physics and chemistry.
- SC.1.ESS.1.B The patterns of motion of the objects in the solar system can be described and predicted on the basis of observations and an understanding of gravity.
- SC.1.ESS.1.C These patterns can be used to explain many Earth phenomena, such as day and night, seasons, tides, and phases of the moon.
- SC.1.ESS.1.D Observations of other solar system objects and of Earth itself can be used to determine Earth's age and the history of large-scale changes in its surface.

SC.1.ESS.2 Earth's systems.

- SC.1.ESS.2.A Earth's surface is a complex and dynamic set of interconnected systems—principally the geosphere, hydrosphere, atmosphere, and biosphere—that interact over a wide range of temporal and spatial scales.
- SC.1.ESS.2.B All of Earth's processes are the result of energy flowing and matter cycling within and among these systems, e.g., rocks and the rock cycle.
- SC.1.ESS.2.C The motion of tectonic plates is part of the cycles of convection in Earth's mantle, driven by outflowing heat and the downward pull of gravity, which result in the formation and changes of many features of Earth's land and undersea surface.
- SC.1.ESS.2.D Weather and climate are shaped by complex interactions involving sunlight, the ocean, the atmosphere, clouds, ice, land, and life forms.
- SC.1.ESS.2.E Earth's biosphere has changed the makeup of the geosphere, hydrosphere, and atmosphere over geological time; conversely, geological events and conditions have influenced the evolution of life on the planet.
- SC.1.ESS.2.F Water is essential to the dynamics of most earth systems, and it plays a significant role in shaping Earth's landscape.

SC.1.ESS.3 Earth and human activity.

- SC.1.ESS.3.A Earth's surface processes affect and are affected by human activities.
- SC.1.ESS.3.B Humans depend on all of the planet's systems for a variety of resources, some of which are renewable or replaceable and some of which are not.
- SC.1.ESS.3.C Natural hazards and other geological events can significantly alter human populations and activities.
- SC.1.ESS.3.D Human activities can contribute to the frequency and intensity of some natural hazards. Humans have become one of the most significant agents of change in Earth's

surface systems.

- SC.1.ESS.3.E Climate change—which could have large consequences for all of Earth's surface systems, including the biosphere—is driven not only by natural effects but also by human activities.
- SC.1.ESS.3.F Sustaining the biosphere will require detailed knowledge and modeling of the factors that affect climate, coupled with the responsible management of natural resources.

## Requirement Area 2 - Life Science Content Knowledge (Options)

**SC.1.LS: Core Ideas: Life Science**

SC.1.LS.1 From Molecules to Organisms: Structures and Processes

- SC.1.LS.1.A All living organisms are made of cells.
- SC.1.LS.1.B Life is the quality that distinguishes living things—composed of living cells—from nonliving objects or those that have died.
- SC.1.LS.1.C While a simple definition of life can be difficult to capture, all living things—that is to say all organisms—can be characterized by common aspects of their structure and functioning.
- SC.1.LS.1.D Organisms are complex, organized, and built on a hierarchical structure, with each level providing the foundation for the next, from the chemical foundation of elements and atoms, to the cells and systems of individual organisms, to species and populations living and interacting in complex ecosystems.
- SC.1.LS.1.E Organisms can be made of a single cell or millions of cells working together and include animals, plants, algae, fungi, bacteria, and all other microorganisms.
- SC.1.LS.1.F Organisms respond to stimuli from their environment and actively maintain their internal environment through homeostasis.
- SC.1.LS.1.G Organisms grow and reproduce, transferring their genetic information to their offspring.
- SC.1.LS.1.H While individual organisms carry the same genetic information over their lifetime, mutation and the transfer from parent to offspring produce new combinations of genes.
- SC.1.LS.1.I Over generations natural selection can lead to changes in a species overall; hence, species evolve over time.
- SC.1.LS.1.J To maintain all of these processes and functions, organisms require materials and energy from their environment; nearly all energy that sustains life ultimately comes from the sun.

SC.1.LS.2 Ecosystems and their interactions, energy, and dynamics.

- 1.LS.2.A Ecosystems are complex, interactive systems that include both biological communities (biotic) and physical (abiotic) components of the environment.
- 1.LS.2.B As with individual organisms, a hierarchical structure exists; groups of the same organisms (species) form populations, different populations interact to form communities, communities live within an ecosystem, and all of the ecosystems on Earth make up the biosphere.
- 1.LS.2.C Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.
- 1.LS.2.D These same interactions can facilitate or restrain growth and enhance or limit the size of populations, maintaining the balance between available resources and those who consume them.

- 1.LS.2.E These interactions can also change both biotic and abiotic characteristics of the environment.
- 1.LS.2.F Similar to individual organisms, ecosystems are sustained by the continuous flow of energy, originating primarily from the sun, and the recycling of matter and nutrients within the system.
- 1.LS.2.G Ecosystems are dynamic, experiencing shifts in population composition and abundance and changes in the physical environment over time, which ultimately affects the stability and resilience of the entire system.

SC.1.LS.3 Heredity, inheritance, and variation of traits.

- SC.1.LS.3.A Heredity explains why offspring resemble, but are not identical to, their parents and is a unifying biological principle. Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes.
- SC.1.LS.3.B Genes encode the information for making specific proteins, which are responsible for the specific traits of an individual.
- SC.1.LS.3.C Each gene can have several variants, called alleles, which code for different variants of the trait in question.
- SC.1.LS.3.D Genes reside in a cell's chromosomes, each of which contains many genes.
- SC.1.LS.3.E Every cell of any individual organism contains the identical set of chromosomes.
- SC.1.LS.3.F When organisms reproduce, genetic information is transferred to their offspring.
- SC.1.LS.3.G In species that reproduce sexually, each cell contains two variants of each chromosome, one inherited from each parent. Thus sexual reproduction gives rise to a new combination of chromosome pairs with variations between parent and offspring.
- SC.1.LS.3.H Very rarely, mutations also cause variations, which may be harmful, neutral, or occasionally advantageous for an individual.
- SC.1.LS.3.I Environmental as well as genetic variation and the relative dominance of each of the genes in a pair play an important role in how traits develop within an individual.
- SC.1.LS.3.J Complex relationships between genes and interactions of genes with the environment determine how an organism will develop and function.

SC.1.LS.4 Biological evolution, unity, and diversity.

- SC.1.LS.4.A Explains both the unity and the diversity of species and provides a unifying principle for the history and diversity of life on Earth.
- SC.1.LS.4.B Is supported by extensive scientific evidence ranging from the fossil record to genetic relationships among species.
- SC.1.LS.4.C Researchers continue to use new and different techniques, including DNA and protein sequence analyses, to test and further their understanding of evolutionary relationships.
- SC.1.LS.4.D Is continuous and ongoing, occurs when natural selection acts on the genetic variation in a population and changes the distribution of traits in that population gradually over multiple generations.
- SC.1.LS.4.E Natural selection can act more rapidly after sudden changes in conditions, which can lead to the extinction of species.
- SC.1.LS.4.F Through natural selection, traits that provide an individual with an advantage to best meet environmental challenges and reproduce are the ones most likely to be passed on to the next generation.
- SC.1.LS.4.G Over multiple generations, this process can lead to the emergence of new species.
- SC.1.LS.4.H Explains both the similarities of genetic material across all species and the

multitude of species existing in diverse conditions on Earth, its biodiversity—which humans depend on for natural resources and other benefits to sustain themselves.

## Requirement Area 3 - Chemistry Content Knowledge (Options)

**SC.1.PS: Core Ideas: Physical Science**

SC.1.PS.1 Matter and its interactions.

- SC.1.PS.1.A The existence of atoms, now supported by evidence from modern instruments, was first postulated as a model that could explain both qualitative and quantitative observations about matter (e.g., Brownian motion, ratios of reactants and products in chemical reactions).
- SC.1.PS.1.B Matter can be understood in terms of the types of atoms present and the interactions both between and within them. The states (i.e., solid, liquid, gas, or plasma), properties (e.g., hardness, conductivity), and reactions (both physical and chemical) of matter can be described and predicted based on the types, interactions, and motions of the atoms within it.
- SC.1.PS.1.C Chemical reactions, which underlie so many observed phenomena in living and nonliving systems alike, conserve the number of atoms of each type but change their arrangement into molecules.
- SC.1.PS.1.D Nuclear reactions involve changes in the types of atomic nuclei present and are key to the energy release from the sun and the balance of isotopes in matter.

## Requirement Area 4 - Physics Content Knowledge (Options)

**SC.1.PS: Core Ideas: Physical Science**

SC.1.PS.2 Motion and stability.

- SC.1.PS.2.A Interactions between any two objects can cause changes in one or both of them.
- SC.1.PS.2.B The forces between objects is important for describing how their motions change, as well as for predicting stability or instability in systems at any scale.
- SC.1.PS.2.C All forces between objects arise from a few types of interactions: gravity, electromagnetism, and the strong and weak nuclear interactions.

SC.1.PS.3 Energy.

- SC.1.PS.3.A Interactions of objects can be explained and predicted using the concept of transfer of energy from one object or system of objects to another.
- SC.1.PS.3.B The total energy within a defined system changes only by the transfer of energy into or out of the system.

SC.1.PS.4 Waves and their applications in technology for information transfer.

- SC.1.PS.4.A Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. Light and sound are wavelike phenomena.
- SC.1.PS.4.B Wave properties and the interactions of electromagnetic radiation with matter, scientists and engineers can design systems for transferring information across long distances, storing information, and investigating nature on many scales— some of them far beyond direct human perception.

## Requirement Area 5 - Three-Dimensional Science and Engineering Pedagogical Knowledge (Options)

**SC.1.ETS: Core Ideas: Engineering, Technology, and Applications of Science**

SC.1.ETS.1 Engineering Design

- SC.1.ETS.1.A The design process, engineers' basic approach to problem solving, involves many different practices including problem definition, model development and use, investigation, analysis and interpretation of data, application of mathematics and computational thinking, and determination of solutions.
- SC.1.ETS.1.B Engineering practices incorporate specialized knowledge about criteria and constraints, modeling and analysis, and optimization and trade-offs.

SC.1.ETS.2 Links among engineering, technology, science, and society.

- SC.1.ETS.2.A New insights from science often catalyze the emergence of new technologies and their applications, which are developed using engineering design.
- SC.1.ETS.2.B New technologies open opportunities for new scientific investigations.
- SC.1.ETS.2.C Advances in science, engineering, and technology can have profound effects on human society, in such areas as agriculture, energy and energy use, transportation, health care, and communication, and on the natural environment.
- SC.1.ETS.2.D Systems can change significantly when new technologies are introduced, with both desired effects and unexpected outcomes.

**SC.2 Science Pedagogy**

SC.2.SEP Science and Engineering Practices

- SC.2.SEP.1 Conceptualize science as a systematic way of knowing which relies on specific practices that must be mirrored in the classroom.
- SC.2.SEP.2 Understand and apply Science and Engineering Practices in SEEd.
  - SC.2.SEP.2.A Ask questions (for science) and define problems (for engineering)
  - SC.2.SEP.2.B Develop and use models
  - SC.2.SEP.2.C Plan and carry out investigations
  - SC.2.SEP.2.D Analyze and interpret data
  - SC.2.SEP.2.E Use mathematics and computational thinking
  - SC.2.SEP.2.F Construct explanations (for science) and design solutions (for engineering)
  - SC.2.SEP.2.G Engage in argument from evidence
  - SC.2.SEP.2.H Obtain, evaluate, and communicate information
- SC.2.SEP.3 Have experience with and model the practices by which scientists and engineers develop and refine ideas.
- SC.2.SEP.4 Understand and apply the progressions described in SEEd Core Guides.
- SC.2.SEP.5 Integrates assessments into curriculum that specifically target student development of SEPs in both formative and summative ways.

SC.2.CCC Crosscutting Concepts

- SC.2.CCC.1 Understands and can explain how the Crosscutting Concepts bridge disciplinary boundaries, uniting core ideas throughout the fields of science and engineering as described in SEEd.
  - SC.2.CCC.1.A Patterns
  - SC.2.CCC.1.A Cause and effect
  - SC.2.CCC.1.A Scale, proportion, and quantities
  - SC.2.CCC.1.A Systems and systems models
  - SC.2.CCC.1.A Energy and matter; flows, cycles, and conservation
  - SC.2.CCC.1.A Structure and function
  - SC.2.CCC.1.A Stability and change
- SC.2.CCC.2 Have experience with and model the application of Crosscutting Concepts by which scientists and engineers engage in sensemaking and refine ideas.
- SC.2.CCC.3 Understand and apply the progressions described in SEEd Core Guides.

- SC.2.CCC.4 Integrates assessment into curriculum that specifically target student knowledge of CCCs in both formative and summative ways.

SC.2.PBT Phenomenon-Based Teaching

- SC.2.PBT.1 Understands and can explain how phenomena are best used to promote engagement in science learning across all three dimensions (SEPs, CCCs, and DCIs)
  - SC.2.PBT.1.A Identify phenomena as observable events that occur in the universe that teachers use to help students use science knowledge to explain/model - more than just a hook
  - SC.2.PBT.1.B Phenomena must be culturally relevant and accessible so that every student can engage in investigation and are most effective when they have a direct connection to students' lives and experience
  - SC.2.PBT.1.C Phenomena are presented as statements (not as questions) that lead to student questioning and investigation and can be presented in the form of a picture, video, description, graph/data table, or other visual that build interest and purpose for their investigation and explanation
- SC.2.PBT.2 Understands and distinguishes that phenomena are used when teaching science standards and that design problems are used when teaching engineering standards
- SC.2.PBT.3 Understands the differences between Anchoring, Investigative, and Analogous Phenomena and how they are used in instruction

## Requirement Area 6 - Science Education Teaching and Dispositions Knowledge (Options)

**SC.2 Science Pedagogy**

SC.2.STM Science Teaching Methods

- SC.2.STM.1 Incorporate instructional materials and teaching strategies to create a community of diverse student learners who can construct meaning from scientific experiences and possess a disposition for further inquiry and learning
- SC.2.STM.2 Anticipate learner ideas in the planning of instruction, identify students' specific prior knowledge and skills on which instruction can be built, monitor the development of student understanding, interpret student needs, develop responsive actions to meet these needs, and provide multiple opportunities for students to practice their learning.
- SC.2.STM.3 Integrate the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas to immerse students in the manner in which scientific and engineering ideas are developed and refined.
  - SC.2.STM.3.A Implement the Disciplinary Core Ideas of physical, life, earth and space science, and engineering progressions as found in the SEEd Core Guides
  - SC.2.STM.3.B Implement the Science and Engineering Practices as described in the SEEd Core Guides
  - SC.2.STM.3.C Implement the progressions of the Crosscutting Concepts across the grades in order to help students deepen their understanding of the Disciplinary Core Ideas and develop coherent and scientifically-based view of the world as described in the SEEd Core Guides
- SC.2.STM.4 Demonstrate an understanding of the Utah Secondary Mathematics Standards and align instruction in science with instruction that students receive in mathematics.
- SC.2.STM.5 Demonstrate an understanding of the Utah Secondary English Language Arts Standards Literacy in Science and Technical Subjects and align instruction in science with instruction that students receive in English Language Arts.

- SC.2.STM.6 Develop an understanding of how science, technology, engineering, and mathematics (STEM) disciplines are interrelated to each other, society, the workplace, and the environment; and how they promote equitable learning opportunities for all students.
- SC.2.STM.7 Know and understand the interactions between culture and science, and the contributions of diverse individuals to the development of science and technology, and how science and technology have affected individuals, cultures, and societies throughout human history e.g., analysis of local, regional, national, and/or global environmental and resource issues.
- SC.2.STM.8 Implement intentional learning strategies and opportunities to scaffold practice for the adolescent learner as science content moves from concrete to abstract.
- SC.2.STM.9 Leverage and/or develop a variety of both informal and formal assessments that require higher-order thinking, concept application, and problem solving in alignment with both 3D science and assessment best practices.

**SC.3 Science Educator Dispositions**

SC.3.SED Science Educator Dispositions

- SC.3.SED.1 Contribute to projects and organizations focused on improving science teaching and learning.
- SC.3.SED.2 Understand how to be a reflective practitioner who reviews their instruction and seeks for constant improvement.
- SC.3.SED.3 Identify and participate in ongoing professional learning opportunities to improve classroom instruction practices
- SC.3.SED.4 Use and advocate for effective and equitable science instruction

## Requirement Area 7 - Science Classroom Lab Safety Knowledge (Options)

**SC.4 Classroom and Laboratory Safety**

SC.4.CLS Classroom and Laboratory Safety

- SC.4.CLS.1 Understand and be able to appropriately respond to potential safety hazards in different learning environments, e.g., laboratory, classroom, or field. Model sound classroom safety procedures.
  - SC.4.CLS.1.A Establish and enforce laboratory safety (including storage and disposal of hazardous waste) in the science laboratory.
  - SC.4.CLS.1.B Demonstrate responsible use and disposal of live organisms
- SC.4.CLS.2 Understand an educator's rights and responsibilities as described in OSHA guidelines.
- SC.4.CLS.3 Understand an educator's legal responsibilities to provide a safe classroom.
- SC.4.CLS.4 Create and implement a Student Safety Contract.