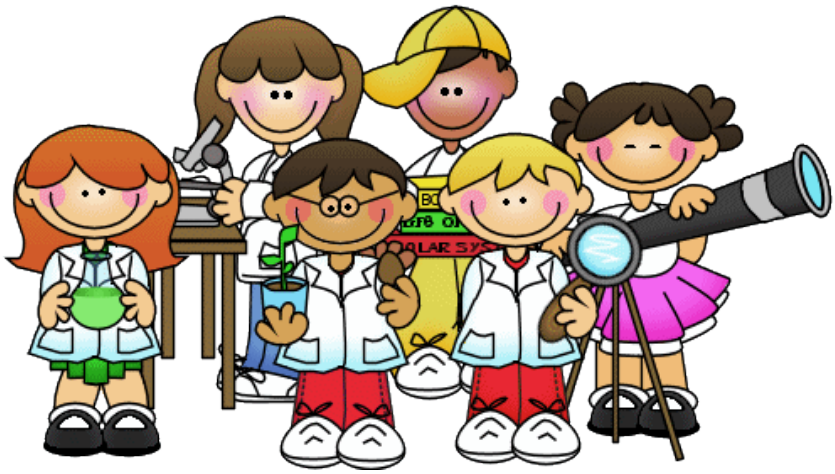
The American School of Douala

SCIENCE



Curriculum Framework

Grades PK–12

Updated April 2018

American School of Douala
Science Curriculum Framework
2017-2018

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SCIENCE PHILOSOPHY

Science Philosophy
The Science curriculum of the American School of Douala seeks to assist and facilitate students in maximizing their strengths and diminishing their weaknesses in the areas of science. The general aim is to promote a student-centered, problem based approach that is developmentally appropriate.

The science program connects concepts to everyday life and situations with the goal of helping students develop higher level thinking skills and processes. We aspire to a curriculum that guides learners through mastering the following skills:

- knowledgeable about the important concepts and theories of the three major branches of scientific study: earth, life, and physical sciences;
- able to think scientifically and use scientific knowledge to make decisions about real–world problems; able to construct new knowledge for themselves through research, reading, and discussion;
- familiar with the natural world, and respectful of its unity, diversity, and fragility; able to make informed judgments on statements and debates claiming to have a scientific basis; and, able to reflect in an informed way on the role of science in human affairs.

Goals of Science Education

1. Students will use inquiry strategies to investigate and understand the natural world.

2. Students will demonstrate an understanding of key concepts and principles central to the life, physical, and earth sciences, and engineering, while recognizing the interrelationship of all the sciences.

3. Students will demonstrate an understanding of the basic laws which govern and explain phenomena observed in the natural world.

4. Students will demonstrate an understanding of, and be able to practice, the basic processes that scientists use to obtain and continually revise knowledge about the natural world.

5. Students will perceive that scientific and technological knowledge is the result of the cumulative efforts of people, past and present, who have attempted to explain the world through an objective, peer-tested, rational approach to understanding natural phenomena and occurrences.

6. Students will display a sense of curiosity and wonder about the natural world, and demonstrate an increasing awareness of the interdependence between all living things and the environment.

7. Students will demonstrate their abilities to identify human needs and concerns and to engage in problem-solving processes to define the problem, research and generate solutions, and develop simulations and prototypes to test their ideas before implementation.

8. Students will be able to apply rational, creative-thinking, and investigative skills and use scientific and technical knowledge in their roles as citizens, workers, family members, and consumers in an increasingly technological society.

9. Students will use oral and written communication, mathematical representation, and physical and conceptual models to describe and explain scientific concepts and ideas, and will be able to apply scientific and technical knowledge.

10. Students will know and employ safe practices and techniques in the laboratory, in fieldwork or any other scientific investigation, and when using scientific or technological materials at home or work.

ASD Curriculum Overview

Curriculum

The word curriculum has many different meanings, ranging from the general to the specific. For the purposes of ASD's academic program, curriculum refers to the outline for the standards-based program of study. It outlines the learning standards and outcomes at each grade level, and the content taught in order to achieve those standards. It provides a framework (or guide) for each class, while still providing teachers with the freedom to teach to their professional strengths and include their own creative approaches to classroom activities.

Standards-Based Learning

Standards give guidance to a school as to what should be learned at each grade level. They provide benchmarks for knowledge, skills, and understandings that students should develop as they progress throughout the levels of a school. Standards, however, do not dictate how something should be learned or taught. The American School of Douala's core subject curricula are rooted in the AERO Common Core Plus standards. These standards, which are described below, ensure that our students are equipped with the tools necessary for the choices that they make beyond high school, including university and career.

American Education Reaches Out (AERO)

AERO is a project supported by the United States Department of Education's Office of Overseas Schools, which establishes an implementation framework for international American schools that offer a standards-based U.S. curriculum. The AERO standards are fully aligned with the Next Generation Science Standards (NGSS). **For more, please visit www.projectaero.org.**

Next Generation Science Standards (NGSS)

The Next Generation Science Standards (NGSS) are K–12 science content standards. The standards set the expectations for what students should know and be able to do in science. The NGSS were developed in the United States to improve science education for all students. These standards give educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepare them for college, careers, and citizenship.

Within the NGSS, there are three distinct and equally important dimensions to learning science. These dimensions are combined to form each standard and each dimension works with the other two to help students build a cohesive understanding of science over time. The three dimensions include: Crosscutting Concepts, Science and Engineering Practices, and Disciplinary Core Ideas.

Crosscutting Concepts help students to explore connections across the four domains of science, including Physical Science, Life Science, Earth and Space Science, and Engineering Design. When these concepts, such as "cause and effect", are made explicit for students, they can help students develop a coherent and scientifically-based view of the world around them.

Science and Engineering Practices describe what scientists do to investigate the natural world and what engineers do to design and build systems. The practices better explain and extend what is meant by "inquiry" in science and the range of cognitive, social, and physical practices that it requires. Students engage in practices to build, deepen, and apply their knowledge of core ideas and crosscutting concepts.

Disciplinary Core Ideas are the key ideas in science that have broad importance within or across multiple science or engineering disciplines. These core ideas build on each other as students' progress through grade levels and are grouped into the following four domains: Physical Science, Life Science, Earth and Space Science, and Engineering.

BEST PRACTICES

Understanding by Design

UbD is a results- or standards-based approach to planning curricular units. It was originally published by Grant Wiggins and Jay McTighe in 2005. Based on the concept of "Backward Design," it requires teachers to consider the learning objectives and the related standards for each unit first. From there, teachers are required to determine the performance indicators, or assessments, that will measure how well students have mastered the objectives and standards. Only when these have been determined does the teacher begin to plan the lessons and structure of the unit. This method encourages all lessons and activities to move toward the goal of student mastery of the standards and learning objectives.

Student-Centered Learning

Contemporary pedagogical research overwhelmingly supports the concept of student-centered learning. Although there are many factors to student-centered learning, the general premise is that the teacher minimizes time lecturing at the front of the classroom and more time planning and managing student activities. These student activities can take a variety of forms and be either individual or collaborative. The best student-centered learning activities require students to think deeply about the material they are learning and to use previously learned knowledge and skills in the construction of new ones.

This means that instruction based on teaching isolated skills has been discarded in favor of a more integrated approach to learning. The Science classroom is a workroom where students learn to construct meaning, to

understand the world in new ways, through active participation and engagement in activities. This kind of learning functions best when the teacher takes a "hands off" approach, not responding too quickly to student questions, as students struggle to accomplish a goal on their own. The activity usually ends with an opportunity for students to reflect upon their own learning, either collaboratively or individually.

The chief visual characteristic of the student-centered classroom is when the teacher is engaged with small groups or individual students, or even moving quietly about the room as the students work.

DIFFERENTIATED INSTRUCTION

As stated above, standards provide a framework for what should be learned at each grade level. However, our philosophy of learning shapes how learning takes place. At ASD, we believe that, although students are grouped by age in each grade level, children develop at different rates, acquire knowledge, skills, and understanding in different ways, and express what they have learned through a variety of means. Furthermore, as an internationally diverse learning community with a transitory population, students join ASD from a variety of schooling systems and a range of English abilities. As a result, we believe that learning must be differentiated based on individual student needs.

Differentiated instruction considers students' individual needs and levels of readiness before designing a lesson plan. Research on the effectiveness of differentiation shows this method benefits a wide range of students, from those with learning disabilities to those who are considered high ability. Furthermore, when students are given more options for how they can learn material, they take on more responsibility for their own learning. Differentiating instruction may mean teaching the same material to all students using a variety of instructional strategies, or it may require the teacher to deliver lessons at varying levels of difficulty based on the ability of each student.

Teachers who practice differentiation in the classroom may:

- Design lessons based on students' learning needs.
- Group students by shared interest, topic, or ability for assignments.
- Assess students' learning using formative assessment.
- Manage the classroom to create a safe and supportive environment.
- Continually assess and adjust lesson content to meet students' needs.

Teachers can differentiate instruction through four ways: Content, Process, Product, and Learning Environment.

Content

Fundamental lesson content should cover the standards of learning set by the school. But some students in a class may be completely unfamiliar with the concepts in a lesson, some students may have partial mastery, and some students may already be familiar with the content before the lesson begins.

Differentiation of content may involve designing activities for groups of students that cover various levels of Bloom's Taxonomy, a classification of levels of intellectual behavior going from lower-order thinking skills to higher-order thinking skills. The six levels are: remembering, understanding, applying, analyzing, evaluating, and creating. Students who are unfamiliar with a lesson could be required to complete tasks on the lower levels, remembering and understanding. Students with some mastery could be asked to apply and analyze the content, and students who have high levels of mastery could be asked to complete tasks in the areas of evaluating and creating.

Examples of differentiating activities:

- Match vocabulary words to definitions.
- Read a passage of text and answer related questions.
- Think of a situation that happened to a character in the story and a different outcome.
- Differentiate fact from opinion in the story.
- Identify an author's position and provide evidence to support this viewpoint.
- Create a PowerPoint presentation summarizing the lesson.

Process

Process addresses the fact that not all students require the same amount of support from the teacher, and students could choose to work in pairs, small groups, or individually. While some students may benefit from one-on-one interaction with the teacher or the classroom aide, others may be able to progress by themselves. Teachers can enhance student learning by offering support based on individual needs.

Examples of differentiating the process:

- Allow students to listen to audio books if they have difficulties reading due to language barriers or physical challenges such as dyslexia.
- Allow some students to use translation devices or have more time to complete tests and assignments
- Allow some students to present information orally rather than in writing.

Product

The product is what the student creates to demonstrate mastery of the content. This can be in the form of tests, projects, reports, or other activities. Students could be assigned or allowed to choose from different types of activities that allow them to demonstrate they have successfully met the standard.

Examples of differentiating the end product to meet a specific standard:

- Write a book report.
- Create a graphic organizer of the story.
- Give an oral report.
- Build a diorama illustrating the story.

Learning environment

The conditions for optimal learning include both physical and psychological elements. A flexible classroom layout that incorporates various types of furniture and arrangements to support both individual and group work is important. Psychologically speaking, teachers should use classroom management techniques that support a safe and supportive learning environment.

Examples of differentiating the environment:

- Break some students into reading groups to discuss the assignment.
- Allow students to read individually if preferred.
- Create quiet spaces where there are no distractions.

Developing Programs for English Language Learners

One of the key issues in education at The American School of Douala is the academic achievement of English Language Learners (ELL) learners. As teachers, we must provide all students rich and stimulating activities that not only increase their English proficiency but also encourage them to reach proficiency. Many of these strategies are appropriate for all students, not just ELL learners.

- Use pictures, in addition to writing, to help students learn
- Have students conduct surveys, polls, or transcribe interviews about topics that interest them
- Have students write about symbols or gestures significant to their home cultures
- Identify and write about stereotypes or notions regarding their home cultures
- Write a response to art, a movie, or literature, that is part of their home culture
- Teach instructions and vocabulary necessary needed to carry out a task
- Use lead statements that cue listeners about what is going on to start lessons
- Call on student to keep them focused
- Use a variety of questioning strategies
- Use a multi-modal approach to learning, inviting students to move their hands or bodies
- Allow opportunities for hands-on activities in which students interact and collaborate with one another
- Use cooperative learning strategies
- Concentrate on independent student learning

A VARIETY OF ASSESSMENTS

Assessment is the means by which students demonstrate that they have mastered the required standards and learning objectives. Although there is still a time and place for the traditional hard data tests, the focus of assessments should be more holistic and authentic, such as portfolios of work in progress, exhibitions, and performances.

Teachers use rubrics, or scoring guides, to judge students' work. Rubrics make it possible for students to see exactly what it is students are trying to accomplish and to provide specific feedback in assessments. Teachers must be committed to a variety of assessment measures, both formal and informal. For example, a Lower School teacher's assessment tool kit might include:

- Student Reading Journal Entries
- Informal Reading Inventories
- Running Records
- Anecdotal Note Taking (observation of student work)
- Listening Activities
- Selected Response Test (multiple choice, true/false, matching, fill in)
- Performance Assessments and Scoring Guides (skills and products)
- Personal Communication (questions, conferences, interviews)
- Writing Assessment with Specific Traits

COURSE DESCRIPTIONS

FOSS Program

FOSS (Full Option Science System) is a research-based science program for grades K-8 developed at the Lawrence Hall of Science, University of California, Berkeley. FOSS has evolved from a philosophy of teaching and learning that has guided the development of successful active-learning science curricula for more than 40 years. The FOSS Program bridges research and practice by providing tools and strategies to engage students and teachers in enduring experiences that lead to deeper understanding of the natural and designed worlds.

The best way for students to appreciate the scientific initiative, learn important scientific and engineering concepts, and develop the ability to think well is to actively participate in scientific practices through their own investigations and analyses. The FOSS Program was created specifically to provide students and teachers with meaningful experiences through engaging with this active participation in scientific practices. Each year, students actively engage in units of study in three main scientific areas: Physical Science, Earth Science, Life Science, while developing in the areas of scientific reasoning and technology.

Lower School Science Descriptions

PreK 3-4

Science in Prek 3 and 4 introduces learners to understanding themselves as human being before moving forth to learn about their environment and others. We began this process by learning about our five senses and parts of our body. We also learn how to take care of body in our unit Being Healthy. We then learn about animals in different environments, including farm, jungle and polar animals. As kids acquire the above knowledge it facilitates their understanding of the differences between living and nonliving things. In our daily activity of calendar, students learn about the weather as it changes depending on the seasons. The notion of sinking and floating is also introduced, as students experiment with various materials.

K5

Kindergarten science includes three units that students investigate. In Materials and Motion, children observe and compare the properties of various wood, paper, and fabric by performing a number of tests and interactions.

Students use those materials to observe how objects move and solve problems using knowledge of the motion of rolling objects. In Animals Two by Two, students observe and describe the structures of a variety of common animals-fish, birds, snails, and earthworms. In Trees and Weather, students observe and compare trees and tree parts using the senses. They also identify trees as resources that are used in everyday life. Additionally, they observe and describe weather changes from day to day and over seasons and differentiate between living and nonliving things.

Grade 1

In Science, we study 3 units throughout the year. We start with Air and Weather, students observe the weather for a period of month and notice patterns, using tools that meteorologists use. Students learn why the weather changes based on location in the world. They also study the moon and describe how the moon changes over time. Students then study Sound and Light. Students learn how sound and light work, describing attributes of both elements, including but not limited to: shadows, opaque vs. transparent objects, sound waves, and how both sound and light help us communicate. Finally, students study Plants and Animals. They learn what both living things need to survive and how they have different qualities that allow them to adapt in their environment.

Grade 2

In Grade 2, students learn about Solids and Liquids. They carry out experiments to discover the properties of solid and liquid objects. Students learn how state of matter changes from solid to liquid and vice versa through freezing and melting. They test liquids and solids to find out about reversible and irreversible changes. Students then move to learn about Rocks, Sand, and Silt. They learn about the volcanic rocks and river rocks. They sort rocks by color, shape, and texture. They learn how rocks change and turn to sand through weathering, as well as changes that cause fine sand and clay to be carried by running water and deposited as sediment. Finally, students learn about Plants and Insects. They discover the changes made to some seeds and bugs in order to understand the different stages of their life cycles.

Grade 3

Grade 3's units of study are Motion and Matter (physical science); Structures of Life (life science); and Water and Climate (Earth science). In physical science, students learn about two forces, magnetism and gravity; experiment with different systems and patterns of motion; make mixtures and observe reactions; and conduct a metric field day to deepen their understanding of metric measurement. They also complete engineering design challenges to create carts that meet different criteria. In life science, students learn how physical and behavioral adaptations help plants and animals survive and reproduce in their habitats. In Earth science, students observe the properties of water; build and use thermometers to measure temperature; observe and describe weather and climate; and learn about water in all its states as it's present in the environment. In each of these units, students are challenged to act like scientists: they design and conduct simple experiments; use notebooks as tools to record observations and sharpen their thinking; use data to make and support a claim; and learn more through their reading, their experiments and their communication with other scientists.

Grade 4

In Science we study three units throughout the year: Energy (physical science), Soil, Rocks, and Landforms (Earth science), and Environments (life science). In Energy, students develop an understanding of electricity and magnetism and engage in engineering designs while learning useful applications of electromagnetism in everyday life. Students

understand and explore energy transfer through waves, repeating patterns of motion, that result in sound and motion. In the unit Soil, Rocks and Landforms, students understand that weathering by water, ice, wind, living organisms, and gravity breaks rocks into smaller pieces, and that erosion transports Earth materials. Students conduct controlled experiments by incrementally changing specific environmental conditions. The Environments unit focuses on the understanding that organisms have structures and behaviors, including sensory receptors that serve functions in growth. Throughout all units, students demonstrate grade-appropriate proficiency in planning and carrying out investigations and obtaining, evaluating, and communicating information. Students are expected to demonstrate grade-appropriate proficiency in engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Grade 5

Science is divided into three modules; Mixtures and Solutions, Living Systems, and Earth and Sun. In Mixtures and Solutions students are introduced to fundamental ideas about matter and it interactions. Students experiment with mixtures, solutions of different concentrations, and reactions forming new substances. They also engage in engineering experiences with separation of materials. Students learn about atomic structure and, the periodic table to understand some elements, their symbols and how they are arranged. In Living Systems, students study feeding relationships in ecosystems, nutrient systems of plant and animals, transport systems of plants and animals and, respiratory systems. They are also introduced to cell theory to differentiate between eukaryotic and prokaryotic cells. Through a variety of experiments, students come to understand that plants get the material they need for growth primarily from water and air and that energy in animals' food was once energy from the sun. The Earth and Sun module provides students with experiences to explore the properties of the atmosphere, energy transfer from the Sun to Earth, and the dynamics of weather and water cycling in the Earth's atmosphere. Students use models to understand Earth's place in the solar system, the interactions of the Earth, the Sun and the Moon to reveal predictable patterns.

Upper School Science Descriptions

The Science program is designed to provide all ASD students with the skills and knowledge they will need to be successful in university and their professional careers. All high school students are required to take three Science credits.

Grade 6

The curriculum for this class covers scientific disciplines and focuses on the biggest ideas in each in order to prepare students for success in future science courses. With this preparation in mind, emphasis is also on student development of organizational, communication and study skills to help them conceptualize what it means to "do science."

Grades 7 and 8

Grades 7 and 8 follow a two-year rotating schedule in which both grades study life science one year and earth science the next.

In 7th/8th grade middle school life science, students begin to investigate big ideas in life science. Emphasis will be on topics such as organization, heredity and evolution. This course should prepare students with the critical thinking skills and background conceptual knowledge necessary for success in future biology courses.

In 7th/8th grade middle school earth science, students begin to investigate big ideas in earth science including gravity, the celestial movements of space objects, plate tectonics, changing surfaces of Earth and weather. This course should prepare students with relevant background conceptual knowledge that they can apply in future physics, chemistry, life science and environmental courses.

Grade 9 Physical Science

In 9th grade physical science, students begin investigating big ideas of physics and chemistry that will be expanded upon in later high school courses. The course emphasizes topics in physical science such as energy, forces and matter. In each unit of study, students explain real-world phenomena by constructing scientific models based on knowledge and understandings gathered from investigations, readings, and class discussions.

Grade 10 Biology

In 10th grade biology, students will deeply investigate life on subcellular, organismal and ecosystem levels. In each of the 8 units of study, students will construct scientific models in order to explain a range of real-world phenomena. The course is designed to foster in students an appreciation for life's complexity while they build the skills necessary to critically think about, investigate and communicate relevant life science concepts.

Grade 11 Chemistry

In 11th grade chemistry, students will build on previous physical science topics to deeply investigate matter and energy on molecular, atomic and sub-atomic scales. In each of the 7 units of study, students will construct scientific models in order to explain a range of real-world phenomena. The course is designed to provide students with both strong conceptual understandings and the mastery of the requisite skills that current research suggests best prepare students for success in future university-level chemistry courses.

Grade 11/12 Advanced Placement Biology

The AP Biology Course is designed to be the equivalent of a College-level introductory Biology Course. The intent of the course is to expose students to higher level biological principles, concepts and skills to allow them the opportunity to apply their knowledge to real-life applications.

Students are expected to learn not by memorization of facts but through content and concept application via AP Biology Science Practices.

Core Concepts called *enduring understandings* and their application via the science practices are the basis of AP Biology Curriculum. These concepts are organized around biological principles called *big ideas* that permeate the entire course and focus on the following topics:

- Evolution
- Biological systems using energy to maintain homeostasis for survival.

- Genetics-Passing heritable information to provide continuity of life.
- Ecology-The interaction of biological systems with biotic and abiotic factors.

Grade 11/12 Advanced Placement Physics 1

The AP Physics 1 course focuses on big ideas typically included in the first and second semesters of an algebra-based, introductory college-level physics sequence and provides students with enduring understandings to support future advanced course work in the sciences. Through inquiry-based learning, students will develop critical thinking and reasoning skills, as defined by the AP Science Practices.

Students will cultivate their understanding of physics and science practices as they explore the following topics: Kinematics, Dynamics (Newton's Laws), Circular Motion and Universal Law of Gravitation, Simple Harmonic Motion, Collisions (Impulse, Linear Momentum, and Conservation of Linear Momentum), Work, Energy, and conservation of Energy, Rotational Motion (Rotational Dynamics and Conservation of Angular momentum), Electrostatics (Electric Charge and Electric Force), DC Circuits (Resistors only), Mechanical Waves and Sound.

Grade 12 Advanced Placement Physics 2

The AP Physics 2 course focuses on big ideas typically included in the first and second semester of an algebra-based, introductory college-level physics sequence and provides students with enduring understandings to support future advanced course work in the sciences. Through inquiry-based learning, students will develop critical thinking and reasoning skills, as defined by the AP Science Practices.

Students will cultivate their understanding of physics and science practices as they explore the following topics: Thermodynamics, Fluid Statics and Dynamics, Electrostatics, DC Circuits and RC Circuits, Magnetism and Electromagnetic Induction, Geometric and Physical Optics, and Quantum Physics.

Science: Common Core

Mission Statement

The Common Core State Standards provides an understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With students fully prepared for the future, ASD will be best positioned to compete successfully in the global economy.

Standards Defined

The following is quoted from the standards documents at www.projectaero.org.

Learning Progressions

The idea of building an understanding overtime is referred to as a **learning progression**. The development of understanding over time is a foundation for all three dimensions of the NGSS, **disciplinary core ideas**, **science and engineering practices**, and **crosscutting concepts**.

A learning progression represents both the logical progression of a science concept and how students' ideas progress to the more complete understanding of the concept (Furtak & Heredia, 2014). There are two anchor points in a learning progression, the initial ideas about a topic students have when they enter school and the level of understanding about the topic desired upon completion of school (NRC, 2007). The learning progression is then created from those two points to illustrate how conceptual understanding of the scientific phenomena develops over time. The progression is not about just adding more content pieces to an idea. The focus of the progression is students developing a more coherent, complete, accurate, and complex understanding.

Standards based on learning progressions offer an opportunity to support the improvement in science teaching and learning. It is important to note that the Framework and the subsequent NGSS, focuses on a few core set of science idea (disciplinary core ideas) throughout the KR12 education. This is important for the successful implementation of learning progressions theory and the goal of creating scientifically literate students because students need focused, sustained, and coherent learning opportunities to develop a conceptual understanding of a scientific phenomenon or concept. We cannot facilitate this if the set of science ideas that are required each year is large and wide spread. "It is highly unlikely that brief periods of uncoordinated instruction are going to achieve the goal of helping students generate a scientifically informed epistemology, a deep and well-structured knowledge base, and a firm understanding of the purposes and methods of science" (NRC, 2007).

The focus on the learning progression of select science concepts will improve the understanding of science students are able to develop throughout their K12 education. Learning progressions are used to plan coherent units of instruction as they are focus on connected concepts related to a big science phenomena or idea. The learning progressions in the NGSS provide us with a road map of how a science concept builds KR12. This helps with planning as the learning progressions illustrate the development of student understanding. Thus, if students are struggling to develop an understanding of a concept we can trace the concept back in the standards to identify parts of the concept that students may need further learning opportunities to understand.

Course Mapping

The K–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

The Next Generation Science Standards differ conceptually in significant ways from previous science standards. They focus more on:

- deeper student learning of fewer core ideas in each discipline instead of on excessive memorization of isolated facts;
- understanding seven cross cutting concepts that can be found in more than one of the science disciplines;
- student activities in eight different "practices" or behaviors that scientists engage in as they investigate the natural world and that engineers use as they design and build models and systems.

The Next Generation Science Standards (NGSS) provide grade level guidance for course development in grades K@5, but allow for flexible mapping of the middle school and high school grade band standards. Appendix K provides curriculum models to ensure a smooth transition from K-5 to grades 6-8.

In designing the instructional model, the mapping provides consistent alignment across each grade and within each grade with Common Core Math and English Language Arts.

The Next Generation Science Standards Documents

The NGSS documents can be found at Project AERO:

AERO/NGSS Science Standards K-8

http://www.projectaero.org/aero_standards/science-standards/2016-Science/CourseMapping.pdf

Secondary Standards

http://www.projectaero.org/aero_standards/science-standards/2016-Science/CourseMapping.pdf