# Doral Academy of Nevada
# Science Curriculum Overview

## *K-5: FOSS*

**Publisher:** Delta Education/Copyright: 2016

**Overview:** The FOSS (Full Option Science System) Program has evolved from a philosophy of teaching and learning at the Lawrence Hall of Science that has guided the development of successful active-learning science curricula for more than 40 years. This 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 world. The features that distinguish the FOSS program include: research-based and nationally field-tested; classroom-tested; students learn science by doing science; integrated reading, writing, and mathematics; comprehensive assessment system; interactive technology; and taking FOSS outdoors.

**Standards/Scope and Sequence:** Each FOSS module was developed based on *A Framework for K-12 Science Education* (2012) and the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The modules address the topics below with engineering design opportunities embedded throughout all modules:

| Grade | Physical Science | Earth Science | Life Science |
|---|---|---|---|
| **K** | Materials and Motion | Trees and Weather | Animals Two by Two |
| **1** | Sound and Light | Air and Weather | Plants and Animals |
| **2** | Solids and Liquids | Pebbles, Sand, and Silt | Insects and Plants |
| **3** | Motion and Matter | Water and Climate | Structures of Life |
| **4** | Energy | Soil, Rocks, and Landforms | Environments |
| **5** | Mixtures and Solutions | Earth and Sun | Living Systems |

**English Learners:** The FOSS program provides a rich laboratory for language development using a variety of techniques to make science concepts clear and concrete, including modeling, visuals, and active investigations in small groups. Science vocabulary and language structures are introduced in authentic contexts while students engage in hands-on learning and collaborative discussion. Instruction is guided and scaffolded through carefully designed lessons with specific suggestions to integrate English Language development approaches during the investigation.

**Technology:** FOSSweb gives students the opportunity to interact with simulations, virtual investigations, tutorials, images, and text to enhance understanding of the disciplinary core ideas in science. It also provides support for teachers, administrators, and families who are actively involved in implementing FOSS.

# *6-8: IQWST*

**Publisher:** Activate Learning/Copyright: 2017

**Overview:** IQWST (Investigating and Questioning Our World through Science and Technology) is a carefully sequenced, 12-unit middle school science curriculum developed with support from the National Science Foundation. As designed, each academic year includes four units, one in each discipline: Physics, Chemistry, Life Science, and Earth Science. IQWST's foundation is the latest research on how students learn and how they learn science in particular. At its core, IQWST engages students in scientific practices as they experience, investigate, and explain phenomena while learning core ideas. Rather than memorizing facts, students build understanding by connecting ideas across disciplines and across the middle school grades. The following are core tenets of IQWST, important whether following NGSS, the Framework, or individual state standards: phenomena, coherence, core ideas, scientific practices, crosscutting concepts, learning performances, and science for all.

**Standards/Scope and Sequence:** Each IQWST unit was developed based on *A Framework for K-12 Science Education* (2012) and the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The units address the topics below:

| Grade | Physical Science | Chemistry | Earth Science | Life Science |
|---|---|---|---|---|
| **6** | Can I Believe My Eyes? *Light Waves, Role in Sight, and Interaction with Matter* | How Can I Smell Things from a Distance? *Particle Nature of Matter, Phase Changes* | How Does Water Shape Our World? *Water and Rock Cycles* | Where Have All the Creatures Gone? *Organisms and Ecosystems* |
| **7** | Why Do Some Things Stop While Others Keep Going? *Transformation and Conservation of Energy* | How Can I Make New Stuff from Old Stuff? *Chemical Reactions, Conservation of Matter* | What Makes the Weather Change? *Atmospheric Processes in Weather and Climate* | What is Going on Inside Me? *Body Systems and Cellular Processes* |
| **8** | How Will It Move? *Force and Motion* | How Does Food Provide My Body with Energy? *Chemical Reactions in Living Things* | How Is the Earth Changing? *Geological Processes, Plate Tectonics* | Why Do Organisms Look the Way They Do? *Heredity and Natural Selection* |

**English Learners:** Strategies built into IQWST lessons acknowledge students' differing capabilities, expectations, experiences, preferred learning styles, language proficiency, reading strategy use, and science background knowledge, among others. Materials address diverse needs by connecting classroom science to students' everyday, real-world interests and experiences. Each activity provides opportunities for teacher guidance, for independent work as well as small-group and whole-group interaction, for investigation, for discussion, and for reading, writing, and talking science. Opportunities for differentiation abound in each of these areas and in each lesson, so all students can work at their appropriate level of challenge.

**Technology:** The Interactive Digital Edition extends what the print version can do enabling students and their teachers to engage with science as it incorporates audio, video, graphic simulations, and writing and drawing tools into the IQWST curriculum.

# *High School Biology: Glencoe Biology*

**Publisher:** McGraw Hill/Copyright: 2017

**Overview:** *Glencoe Biology* is organized around major themes, big ideas, and main ideas of biology, and has a strong support for reading comprehension. The program's comprehensive content is made relevant to students through engaging real-world contexts. A vast array of lab experience builds strong inquiry skills and abundance of differentiated instructional strategies helps teachers reach all learners.

**Standards/Scope and Sequence:** *Glencoe Biology* has correlations and alignments to the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The program addresses the topics below:

| **Topic** | **Unit 1: Ecology** | **Unit 2: The Cell** | **Unit 3: Genetics** | **Unit 4: History of Biological Diversity** | **Unit 5: Bacteria, Viruses, Protists, and Fungi** | **Unit 6: Plants** | **Unit 7: Inver-tebrates** | **Unit 8: Ver tebrates** | **Unit 9: The Human Body** |
|---|---|---|---|---|---|---|---|---|---|
| Structure and Function | | x | x | | | x | x | x | x |
| Matter and Energy in Organisms and Ecosystems | x | x | | | | x | | | x |
| Inter-dependent Relationships in Ecosystems | x | | | | | | x | x | |
| Inheritance and Variation of Traits | | x | x | | | | x | | x |
| Natural Selection and Evolution | x | | | x | | | | | |

**English Learners:** The *Blueprints for Success* book allows teachers to differentiate for English-language learners. The hands-on approach to science through *Glencoe Biology* requires that students learn to perform scientific processes and know how to communicate scientific theories, results, and predictions in a variety of written and oral forms. To be successful, ELs have to acquire and use customized specific learning strategies that fit the particular task from a menu of specific strategies before they immerse themselves in a science task. A suggested format for teaching and choosing the appropriate strategies is outlined in this chapter.

**Technology:** The interactive connected edition extends what the print version can do enabling students and their teachers to engage with science as it incorporates audio, video, virtual lab simulations, online quizzes and tests, tutorials, vocabulary e-games, and readings.

# *High School Chemistry: Active Chemistry*

**Publisher:** Activate Learning/Copyright: 2016

**Overview:** *Active Chemistry* has been funded by the National Science Foundation and exemplifies the goals and objectives to improve science, mathematics, and technology education for all students. It was designed and developed to provide teachers with instructional strategies that guide and facilitate learning, engage in ongoing assessment of their teaching and student learning, design and manage learning environments that provide students with time, space and resources needed for learning science, develop communities of science learners that reflect the intellectual rigor of scientific attitudes and social values conducive to science learning, and authentic use of assessment. Each *Active Chemistry* chapter emphasizes the transfer of learning and the importance of eliciting prior understanding through a 7E model: elicit, engage, explore, explain, elaborate, evaluate, and extend.

**Standards/Scope and Sequence:** *Active Chemistry* was developed based on *National Science Education Standards* and updated to meet the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The program addresses the topics below:

| **Topic** | **Ch. 1 Movie Special Effects** | **Ch. 2 Fun with the Periodic Table** | **Ch. 3 Artist as Chemist** | **Ch. 4 Chemical Dominoes** | **Ch. 5 Ideal Toy** | **Ch. 6 Cool Chemistry Show** | **Ch. 7 Cookin' Chem** | **Ch. 8 CSI Chemistry** |
|---|---|---|---|---|---|---|---|---|
| Structure and Properties of Matter | x | x | x | | x | x | | x |
| Chemical Reactions | x | x | x | x | x | x | x | x |
| Energy | x | x | x | x | | x | x | x |

**English Learners:** The *Strategies for Students with Limited English Language Proficiency* augmentations allow teachers to differentiate for English-language learners. The augmentations (broken down to the section level) offer suggestions and also indicate potential interference points which could disrupt the students' engagement in the activities. By focusing on words and their derivations, which may not be in the student's receptive or expressive vocabulary, teachers can help students meet the linguistic challenges of the particular subject. Also, the use of discussion as a means of bridging the oral language development to the content development can add to a richer experience for the students and facilitate the teacher's instruction. As teachers plan their instruction, they can consult the augmentations to determine at which points to best incorporate these considerations.

**Technology:** The print edition is available digitally for both teachers and students. Students are required to utilize technology for their chapter challenge and mini-challenge projects.

# *High School Geoscience: Earth Comm*

**Publisher:** Activate Learning/Copyright: 2018

**Overview:** *Earth Comm* has been funded by the National Science Foundation to provide a comprehensive secondary-level educational program in the Earth and space sciences that builds proficiency in Science by requiring students to use evidence-based arguments to construct and evaluate explanations for phenomena and relate those explanations to each other in the context of Earth systems. The evidence used can come from several sources, including experiments, investigations, written sources, and others, and it can be connected across concepts and even across disciplines. Through the use of evidence and the building of connections, students begin to develop evidence-based models that help them make sense of their world. While these models are largely internal mental models, they may also be expressed by students in various ways—conceptually, mathematically, and/or physically. As students become more proficient in science, they gain skill at evaluating the merits of their understandings, models, and approaches to gathering evidence and constructing arguments, among other things. That is, they gain abilities as independent science learners. Each *Earth Comm* chapter emphasizes the transfer of learning and the importance of eliciting prior understanding through a 7E model: elicit, engage, explore, explain, elaborate, evaluate, and extend.

**Standards/Scope and Sequence:** *Earth Comm* was developed based on *A Framework for K-12 Science Education* (2012) and the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The program addresses the topics below:

| **Topic** | **Ch. 1 Plate Tectonics** | **Ch. 2 Minerals, Rocks, and Structures** | **Ch. 3 Surface Processes** | **Ch. 4 Winds, Oceans, Weather, and Climate** | **Ch. 5 Global Climate Change** | **Ch. 6 Earth's Natural Resources** | **Ch. 7 Earth System Evolution** | **Ch. 8 Astronomy** |
|---|---|---|---|---|---|---|---|---|
| Space Systems | | | | | | | | x |
| History of Earth | x | x | | | | | | |
| Earth's Systems | x | x | x | x | x | x | x | |
| Weather and Climate | | | | x | x | | | |
| Human Sustain-ability | | | | | x | x | | |

**English Learners:** The *Strategies for Students with Limited English Language Proficiency* augmentations allow teachers to differentiate for English-language learners. Language-learning skills that actively engage students in learning new science concepts are provided for each section. These skills are called augmentations because they augment existing frameworks of teaching and learning. To develop proficiency in understanding and using new words, students are given the opportunity to explore words in context. Teachers are provided with language building strategies that focus on unfamiliar words and help students meet the linguistic challenges of a particular topic. Also, the use of discussion as a means of broadening oral language experiences and bridging content development adds a richer dimension of learning for students and facilitates instruction.

**Technology:** The print edition is available digitally for both teachers and students. Students are required to utilize technology for their chapter challenge and mini-challenge projects.

# *High School Physics: Active Physics*

**Publisher:** Activate Learning/Copyright: 2016

**Overview:** *Active Physics* has been funded by the National Science Foundation and exemplifies the goals and objectives to improve science, mathematics, and technology education for all students. It was designed and developed to provide teachers with instructional strategies that guide and facilitate learning, engage in ongoing assessment of their teaching and student learning, design and manage learning environments that provide students with time, space and resources needed for learning science, develop communities of science learners that reflect the intellectual rigor of scientific attitudes and social values conducive to science learning, and authentic use of assessment. Each *Active Physics* chapter emphasizes the transfer of learning and the importance of eliciting prior understanding through a 7E model: elicit, engage, explore, explain, elaborate, evaluate, and extend.

**Standards/Scope and Sequence:** *Active Physics* was developed based on *A Framework for K-12 Science Education* (2012) and the *Next Generation Science Standards* (2013), which aligns to the *Nevada Academic Content Standards for Science*. The program addresses the topics below:

| **Topic** | **Ch. 1 Driving the Roads** | **Ch. 2 Physics in Action** | **Ch. 3 Safety** | **Ch. 4 Thrills and Chills** | **Ch. 5 Let Us Entertain You** | **Ch. 6 Electricity for Everyone** | **Ch. 7 Toys for Under-standing** | **Ch. 8 Atoms on Display** | **Ch. 9 Sports on the Moon** |
|---|---|---|---|---|---|---|---|---|---|
| Structure and Properties of Matter | | | | | | | | x | |
| Forces and Interactions | | x | x | x | | | x | x | x |
| Energy | | x | x | x | | x | x | x | x |
| Waves and Electro-magnetic Radiation | | | | | x | | x | x | |

**English Learners:** The *Strategies for Students with Limited English Language Proficiency* augmentations allow teachers to differentiate for English-language learners. Language-learning skills that actively engage students in learning new science concepts are provided for each section. These skills are called augmentations because they augment existing frameworks of teaching and learning. To develop proficiency in understanding and using new words, students are given the opportunity to explore words in context. Teachers are provided with language building strategies that focus on unfamiliar words and help students meet the linguistic challenges of a particular topic. Also, the use of discussion as a means of broadening oral language experiences and bridging content development adds a richer dimension of learning for students and facilitates instruction.

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