Chariho Regional School District

Science Curriculum
Grades K-12

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Epistemological Foundations

The Chariho Regional School District believes that students learn best when they are actively engaged in and personally responsible for the learning process. Students need a safe and positive environment in which to talk purposefully about learning, to experience learning, and to observe learning. Learning is enhanced when students have an interest in and choice about what they learn. Students should be engaged in meaningful learning experiences that match their developmental status.

New learning builds on previous knowledge through a process that is challenging and rigorous. That process must encourage students to problem-solve and to think originally, critically, and creatively. Thinking and problem-solving are closely linked to a demanding core of content knowledge. Learning is most quickly assimilated when connected to student goals, when students evaluate their own work and learning habits, and when instruction appeals to a variety of learning modalities and talents.

In an environment of high expectations, sustained and directed student effort and expert teaching practices determine the extent of learning. Our schools and District will organize to encourage and support both.

Introduction

The Chariho Regional School District recognizes the need to reform the science curriculum so that it serves to communicate a clear and unified vision of teaching and learning for educators, students, and the community. This curriculum aligns with the *Next Generation Science Standards (NGSS)* adopted by the state and derived from the *Framework for K-12 Science Education* and reflect current best practice in science teaching.

District Mission

The Chariho Regional School District ensures that all students meet high academic standards and are prepared for lifelong learning and productive global citizenship.

District Vision

With a commitment to continuous improvement, the District's highly-qualified staff engages with students in state-of-the-art facilities to master challenging content, to promote creativity, and to foster critical thinking. The District is recognized by the community as its greatest asset.

District Beliefs

We believe that high academic standards and research informed decision making are critical…

Rigorous academic standards and high expectations, along with a robust and responsive system of supports, are the foundation of the school district.
All professionals operate from a belief that all students can learn at high levels and meet or exceed demanding standards.
All students at every level must be engaged in challenging academic experiences.
Instructional and program decisions must be data-informed and evidence-based.
Learning is a continuous lifelong process.
Schools must prepare students to be creative and critical thinkers, problem solvers, and effective communicators.
The physical, social, and emotional wellness of every child is necessary for optimum learning along with a robust support system.

We believe that the larger community must be fully engaged in the learning process…

Education is a shared responsibility of students, parents, staff, and the community.
Students thrive when supported, nurtured, and engaged by the community.
In an environment that emphasizes school safety, everyone must be treated with kindness, dignity, and respect.
Customer service must be a priority.
Schools must prepare students to be team members and leaders, civic-minded, community contributors, and productive citizens of a global society.

Report on Knowledge Base
for
Science Education

The Next Generation Science Standards (NGSS) provide an important opportunity to improve not only science education but also student achievement. Based on the Framework for K–12 Science Education, the NGSS are intended to reflect a new vision for American science education. By using NGSS, this curriculum strives to use practices, crosscutting concepts and disciplinary core ideas to create a three dimensional science experience for all students. Disciplinary ideas are grouped in four domains: the physical sciences; the life sciences; the earth and space sciences; and engineering, technology and applications of science.

The following conceptual shifts in the NGSS demonstrate what is new and different about the NGSS:

- K-12 science education should reflect the interconnected nature of science as it is practiced and experienced in the real world.
- The Next Generation Science Standards are student performance expectations. Performance expectations clarify the expectations of what students will know and be able to do by the end of the grade or grade band.
- The science concepts in NGSS build coherently from K–12. To develop a thorough understanding of scientific explanations of the world, students need sustained opportunities to work with and develop the underlying ideas and to appreciate those ideas' interconnections over a period of years rather than weeks or months.
- The NGSS focus on deeper understanding of content as well as application of content.
- Science and engineering are integrated in the NGSS, from Grades K–12.
- The NGSS are designed to prepare students for college, career, and citizenship.
- The NGSS and Common Core State Standards (English Language Arts and Mathematics) are aligned.

Hallmarks of Excellence for Science

Desirable Features of the Curriculum

MORE	LESS
• Emphasis on integration of technology. • Developing explanations and designing solutions supported by evidence-based arguments and reasoning. • Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned. • Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance. • Students discussing open-ended questions that focus on the strength of the evidence to generate claims. • Students reading multiple sources, including science-related magazine and journal articles and web-based resources; students developing summaries of information. • Multiple investigations driven by students' questions with a range of possible outcomes that collectively lead to a deep understanding of established core scientific ideas. • Students explain by writing journals, reports, posters, and developing media presentations. • Provision of supports so that all students can engage in sophisticated science and engineering practices.	• Reliance on textbook as sole source. • Isolated topics. • Rote memorization of isolated facts and terminology without connection to broader concepts. • Repetition of specific activities for similar topics across grade levels. • Learning of ideas disconnected from questions about phenomena. • Teachers providing information to the whole class. • Teachers posing questions with only one right answer. • Students reading textbooks and answering questions at the end of the chapter. • Pre-planned outcomes for "cookbook" laboratories or hands-on activities. • Worksheets. • Oversimplification of activities for students who are perceived to be less able to do science and engineering.

Source: National Research Council. (2015). Guide to Implementing the Next Generation Science Standards (pp. 8-9). Washington, DC: National Academies Press. http://www.nap.edu/catalog/18802/guide-to-implementing-the-next-generation-science-standards

Statement of Educational Goals
for
Science

In alignment with Chariho High School's graduation requirements and in order to transform traditional science instruction into meaningful science inquiry, all students will demonstrate the ability to:

- Acquire, analyze, and evaluate information and ideas to effectively solve problems;
- Effectively utilize literacy skills: writing, listening, speaking, reading analysis, and reading interpretation;
- Display technological literacy;
- Be self-directed learners effectively using ideas and information from various disciplines;
- Analyze problems from a global perspective and contribute to society as responsible and skilled citizens;
- Work actively and cooperatively to achieve group goals;
- Display and understanding of scientific content and process as outlined in the national standards;
- Apply their scientific knowledge to real world situations and problems.
- Engage students in observing scientific phenomena using scientific and engineering practices to gain a deeper understanding.
- Encourage students to develop understanding of phenomena based on evidence gleaned from developing and using models, distinguishing patterns in data and identifying cause and effect relationships.
- Promotes critical thinking, problem solving, collaboration, and decision making.
- Prepares pupils for lifelong learning.

Lists of Science Curriculum Documents

Grades K-5 Science Curriculum Documents

(Click on each grade level below to view the Grade Level GEMS-Net curriculum)

"The Guiding Education in Math and Science Network (GEMS-Net) is a partnership among the University of Rhode Island's School of Education, scientists and engineers, and public school districts. The Next Generation Science Standards (NGSS) combine best practices, core ideas, and crosscutting concepts. Crosscutting concepts connect physical science, life science, earth and space science, and engineering design."

The Chariho Regional School District has adopted the NGSS Science Standards in their entirety as the District's K-5 Science Curriculum, in August 2015. The grade level links below connect to a range of resources for educators, administrators, parents, and the general public on the GEMS-Net website. For each grade level's science standards select the grade level from the list below and you will be redirected to the University of Rhodes Island's GEMS-Net page.

Kindergarten Science

Grade 1 Science

Grade 2 Science

Grade 3 Science

Grade 4 Science

Grade 5 Science

Grades 6-8 Science Curriculum Documents

(Click on the title above for the entire Gr. 6-8 Folder, or each grade level below to view the curriculum documents)

Grade 6 Scope and Sequence & Grade 6 Curriculum

Grade 7 Scope and Sequence & Grade 7 Curriculum

Grade 8 Scope and Sequence & Grade 8 Curriculum

Grades 9-12 Science Curriculum Documents

(Click on the title above for the entire Gr. 9-12 Folder, or each course below to view the curriculum documents)

Scope and Sequence		Curriculum	
Astronomy	(0.5 cr)	Astronomy	(0.5 cr)
Biology	(1.0 cr)	Biology	(1.0 cr)
Biotechnology	(1.0 cr)	Biotechnology	(1.0 cr)
Chemistry	(1.0 cr)	Chemistry	(1.0 cr)
Earth and Space Science	(0.5 cr)	Earth and Space Science	(0.5 cr)
Geology	(0.5 cr)	Geology	(0.5 cr)
Human Anatomy and Physiology	(1.0 cr)	Human Anatomy and Physiology	(1.0 cr)
Introduction to Engineering and Design	(1.0 cr)	Introduction to Engineering and Design	(1.0 cr)
Meteorology	(0.5 cr)	Meteorology	(0.5 cr)
Microbiology	(0.5 cr)	Microbiology	(0.5 cr)
Oceanography	(0.5 cr)	Oceanography	(0.5 cr)
Physical Science	(0.5 cr)	Physical Science	(0.5 cr)
Physics	(1.0 cr)	Physics	(1.0 cr)
Principles of Chemistry	(0.5 cr)	Principles of Chemistry	(0.5 cr)

Grades 9-12 Agricultural Science Curriculum Documents

(Click on the title above for the entire Gr. 9-12 Agricultural Science Folder, or each course below to view the curriculum documents)

Scope and Sequence		Curriculum	
Agriculture and Resource Development I	(0.5 cr)	Agriculture and Resource Development I	(0.5 cr)
Agriculture and Resource Development II	(0.5 cr)	Agriculture and Resource Development II	(0.5 cr)
Animal Science	(0.5 cr)	Animal Science	(0.5 cr)
Aquaponics I	(0.5 cr)	Aquaponics I	(0.5 cr)
Aquaponics II	(0.5 cr)	Aquaponics II	(0.5 cr)
Floral Design	(0.5 cr)	Floral Design	(0.5 cr)
Forestry	(0.5 cr)	Forestry	(0.5 cr)
Introduction to Animal and Veterinary Science	(0.5 cr)	Introduction to Animal and Veterinary Science	(0.5 cr)
Landscape Design	(0.5 cr)	Landscape Design	(0.5 cr)
Plant Science	(0.5 cr)	Plant Science	(0.5 cr)
Turf Management	(0.5 cr)	Turf Management	(0.5 cr)
Veterinary Science	(0.5 cr)	Veterinary Science	(0.5 cr)
Wildlife Management	(0.5 cr)	Wildlife Management	(0.5 cr)

References

Committee on Guidance on Implementing the Next Generation Science Standards. "Guide to Implementing the Next Generation Science Standards." *RIDE Rhode Island Department of Education*. National Academy of Sciences, 2015. Web. 18 Oct. 2016. <http://www.ride.ri.gov/LinkClick.aspx?fileticket=ubMckBct3oc%3D&portalid=0>.

"Grades K-5 Gemsnet Science Curriculum." *Gemsnet: Guiding Education in Math and Science Network, University of Rhode Island.* Web. 15 May 2021. <https://web.uri.edu/gemsnet/>.

"Mathematics Standards." *Common Core State Standards Initiative*. National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010. Web. 18 Oct. 2016. <http://www.corestandards.org/Math/>.

"National Core Arts Standards: Dance, Media Arts, Music, Theatre And Visual Arts." National Core Arts Standards, State Education Agency Directors of Arts Education, 2014, www.nationalartsstandards.org/.

"Next Generation Science Standards." *RIDE Rhode Island Department of Education*. Rhode Island Department of Elementary and Secondary Education, 2021. Web. 17 May 2021. <http://www.ride.ri.gov/InstructionAssessment/Science/NextGenerationScienceStandards.aspx>.

NGSS Lead States. "Next Generation Science Standards." *Next Generation Science Standards For States, By States*. N.p., 2013. Web. 18 Oct. 2016. <http://www.nextgenscience.org/>.

"Plant Systems Career Pathways." *National FFA Organization*. The National Council for Agricultural Education, 2015. Web. 18 Oct. 2016. <https://thecouncil.ffa.org/afnr/>.