Aquatic Science Curriculum
Year-At-A-Glance 2025-2026

Grading Cycle	Number of Instructional Days	Units of Study	Content Focus	Unit Specific TEKS
Fall Semester				
1st Grading Cycle (27 days)	16 Days 8 blocks	Unit 1 Properties of Water	Students will be able to: • describe how the shape and polarity of a water molecule enable it to dissolve a variety of substances, making it the “universal solvent” in aquatic ecosystems. • identify and analyze how adhesion, cohesion, surface tension, heat capacity, and thermal conductivity influence the structure and stability of aquatic ecosystems. • explain how the density changes of water, particularly as it approaches freezing, support the survival of aquatic organisms in cold environments. • connect water’s physical and chemical properties to real-world examples of aquatic ecosystem function and organism adaptation.	AS.5A AS.5B AS.5C
	9 Days 4.5 blocks	Unit 2 Water & Systems **DCA1 Unit 1-2**	Students will be able to: • identify key features and characteristics of atmospheric, geological, hydrological, and biological systems that influence aquatic environments. • describe how atmospheric, geological, hydrological, and biological systems interact within aquatic ecosystems, including examples of positive and negative feedback loops. • evaluate environmental data from multiple technological sources (e.g., maps, satellite imagery, GPS, GIS, weather balloons, buoys) to understand interactions affecting aquatic ecosystems. • model the ways in which Earth system interactions shape aquatic environments, using evidence gathered from authentic datasets.	AS.6A AS.6B AS.6C
2nd Grading Cycle (24 days)	4 days 2 blocks			
	14 Days 7 blocks	Unit 3 Cycle & Aquatic Environment	Students will be able to: • evaluate seasonal changes and organism behavior in local aquatic environments by collecting and interpreting long-term and short-term observational data • collect and analyze baseline and periodic measurements of pH, salinity, temperature, mineral content, nitrogen compounds, dissolved oxygen, and turbidity to assess aquatic ecosystem health. • analyze interrelationships between producers, consumers, and decomposers in aquatic ecosystems using data from field studies. • explain and model how biogeochemical cycles (carbon, nitrogen, water, nutrient), climate patterns (El Niño, La Niña, currents, hurricanes), and tidal cycles influence aquatic ecosystem structure and function.	AS.8A AS.8B AS.8C AS.9A AS.9B AS.9C
	6 Days 3 blocks	Unit 4 Short & Long Term Studies **DCA2 Units 3-4**	Students will be able to: • conduct a number of research projects and lab • participate in field/observational activities	AS.8A AS.8B AS.8C
3rd Grading Cycle (27 days)	6 days 3 blocks			
	18 Days 9 blocks	Unit 5 Human Impact	Students will be able to: • analyze how human population growth and associated activities cumulatively affect aquatic ecosystems over time. • predict the effects of chemical, organic, physical, and thermal changes caused by human activities on both living and nonliving components of aquatic environments. • investigate human roles in unbalanced aquatic systems, including cases involving invasive species, fish farming, cultural eutrophication, and red tides. • evaluate the influence, costs, and benefits of human activities, policies, and restoration efforts—such as fishing, transportation, dams, recreation, environmental laws, and conservation programs—on aquatic environments.	AS.14A AS.14B AS.14C AS.14D AS.14E AS.14F
	3 days	**Semester Final Exams**		
Spring Semester				
4th Grading Cycle (27 days)	16 Days 8 blocks	Unit 6 Type of Aquatic Ecosystems	Students will be able to: • differentiate among freshwater, brackish, and marine ecosystems based on salinity, physical characteristics, and typical organisms. • identify the major properties and components of marine life zones, including their physical and biological features. • identify the major properties and components of freshwater life zones, including their physical and biological features. • compare how environmental factors such as depth, light availability, temperature, and nutrient levels influence the biodiversity of freshwater, brackish, and marine ecosystems.	AS.12A AS.12B
	11 Days 5.5 blocks	Unit 7 Origin & Use of Water **DCA3 Units 7-8**	Students will be able to: • identify sources of water in a watershed, including rainfall, groundwater, and surface water. • explain the factors that influence how water moves through a watershed. • analyze water quantity and quality data from a local watershed or aquifer to assess ecosystem health. • describe how human freshwater use compares and competes with the needs of other organisms in an ecosystem.	AS.10A AS.10B AS.10C AS.10D
5th Grading Cycle (25 days)	3 days 1.5 blocks			
	14 Days 7 blocks	Unit 8 Geological & Fluid Dynamics	Students will be able to: • examine the basic principles of fluid dynamics, including hydrostatic pressure, density influenced by salinity, and buoyancy, and explain their role in aquatic systems. • identify the interrelationships between ocean currents, climate patterns, and geologic features such as continental margins, abyssal plains, island atolls, barrier islands, and hydrothermal vents. • explain how fluid dynamics contributes to processes such as upwelling and lake	AS.11A AS.11B AS.11C AS.11D

			turnover, and analyze their ecological impacts. ● describe how erosion and deposition in river systems create and modify geologic features over time.	
	8 Days 4 blocks	**Unit 9** **Organism Adaptations**	Students will be able to: ● explain how energy flows and matter cycles through freshwater and marine ecosystems, using food webs, chains, and pyramids to illustrate relationships. ● identify the biological, chemical, geological, and physical components of aquatic life zones and relate these to the organisms that inhabit them, including factors affecting gas solubility and population cycles. ● compare traits and adaptations of aquatic organisms, including freshwater and marine species, using classification tools such as dichotomous keys. ● analyze how specific adaptations enable organisms to survive, reproduce, and maintain interdependence within various aquatic environments.	AS.7A AS.7B AS.7C AS.7D AS.7E AS.13A AS.13B AS.13C
6th Grading Cycle (27 days)	6 days 3 blocks			
	18 Days 9 blocks	**Unit 10** **Interdependence & Interactions** **DCA4 Units 9-10**	Students will be able to: ● analyze the relationships between energy flow, matter cycling, and organism interdependence in specific freshwater, brackish, and marine ecosystems. ● identify the biological, chemical, geological, and physical components of aquatic life zones and explain how these factors shape the distribution and diversity of organisms. ● differentiate among freshwater, brackish, and marine ecosystems and describe the major properties and components of their respective life zones. ● evaluate how environmental variables—such as gas solubility, lunar cycles, temperature, daylight hours, and predator-prey dynamics—influence aquatic population stability and ecosystem health.	AS.7A AS.7B AS.7C AS.7D AS.7E AS.12A AS.12B
	4 days	**Final Exams**		

Aquatic Science Process Standards
(These skills will be spiraled into each unit)

(1) Aquatic Science. In Aquatic Science, students study the interactions of biotic and abiotic components in aquatic environments, including natural and human impacts on aquatic systems. Investigations and field work in this course may emphasize freshwater or marine aspects of aquatic science depending primarily upon the natural resources available for study near the school. Student who successfully complete Aquatic Science acquire knowledge about how the properties of water and fluid dynamics affect aquatic ecosystems and acquire knowledge about a variety of aquatic systems. Students who successfully complete Aquatic Science conduct investigations and observations of aquatic environments, work collaboratively with peers, and develop critical-thinking and problem-solving skills. "
(2) Nature of science. Science, as defined by the National Academy of Sciences, is the ""use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."" This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable."
(3) Scientific hypotheses and theories. Students are expected to know that:
- (3)(A) hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and
- (3)(B) scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed."

(4) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices.Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.
- (4)(A) Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.
- (4)(B) Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models."

(5) Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information)."
(6) Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide tools for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment."
(7) Statements containing the word ""including"" reference content that must be mastered, while those containing the phrase ""such as"" are intended as possible illustrative examples."

Scientific and Engineering Practices

(1) Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to explain phenomena or design solutions using appropriate tools and models. The student is expected to:
- AQUA.1A
- ask questions and define problems based on observations or information from text, phenomena, models, or investigations;"
- AQUA.1B
- apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problem
- AQUA.1C
- use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency approved safety standards;"
- AQUA.1D
- use appropriate tools such as Global Positioning System (GPS), Geographic Information System (GIS), weather balloons, buoys, water testing kits, meter sticks, metric rulers, pipettes, graduated cylinders, standard laboratory glassware, balances, timing devices, pH meters or probes, various data collecting probes, thermometers, calculators, computers, internet access, turbidity testing devices, hand magnifiers, work and disposable gloves, compasses, first aid kits, field guides, water quality test kits or probes, 30-meter tape measures, tarps, ripple tanks, trowels, screens, buckets, sediment samples equipment, cameras, flow meters, cast nets, kick nets, seines, computer models, spectrophotometers, stereo microscopes, compound microscopes, clinometers, and field journals, various prepared slides, hand lenses, hot plates, Petri dishes, sampling nets, waders, leveling grade rods (Jason sticks), protractors, inclination and height distance calculators, samples of biological specimens or structures, core sampling equipment, fish tanks and associated supplies, and hydrometers;"
- AQUA.1E
- collect quantitative data using the International System of Units (SI) and qualitative data as evidence;"
- AQUA.1F
- organize quantitative and qualitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper,
- computers, or cell phone applications;"
- AQUA.1G
- develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and"
- AQUA.1H
- distinguish between scientific hypotheses, theories, and laws."

(2) Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:

- AQUA.2A
- identify advantages and limitations of models such as their size, scale, properties, and materials;"
- AQUA.2B
- analyze data by identifying significant statistical features, patterns, sources of error, and limitations;"
- AQUA.2C
- use mathematical calculations to assess quantitative relationships in data; and"
- AQUA.2D
- evaluate experimental and engineering designs."

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

- AQUA.3A
- develop explanations and propose solutions supported by data and models consistent with scientific ideas, principles, and theories;"
- AQUA.3B
- communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and"
- AQUA.3C
- engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence."

(4) Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:

AQUA.4A

analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;"

- AQUA.4B
- relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists as related to the content; and"
- AQUA.4C
- research and explore resources such as museums, planetariums, observatories, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers."