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**Lab Requirement:**

40% of Science Instructional Time

**TEKS/SEs:**

(4) Science concepts. Students know that aquatic environments are the product of Earth systems interactions. The student is expected to:

(A) identify key features and characteristics of atmospheric, geological, hydrological, and biological systems as they relate to aquatic environments;

(C) collect and evaluate global environmental data using technology such as maps, visualizations, satellite data, Global Positioning System (GPS), Geographic Information System (GIS), weather balloons, buoys, etc.

(6) Science concepts. The student knows the role of cycles in an aquatic environment. The student is expected to:

(A) identify the role of carbon, nitrogen, water, and nutrient cycles in an aquatic environment, including upwellings and turnovers; and

(7) Science concepts. The student knows the origin and use of water in a watershed. The student is expected to:

(A) classify different aquatic organisms using tools such as dichotomous keys;

(B) compare and describe how adaptations allow an organism to exist

(10) Science concepts. The student knows environmental adaptations of aquatic organisms. The student is expected to:

(A) classify different aquatic organisms using tools such as dichotomous keys;

(B) compare and describe how adaptations allow an organism to exist

(11) Science concepts. The student knows environmental adaptations of aquatic organisms. The student is expected to:

(C) analyze interrelationships among producers, consumers, and decomposers in a local aquatic ecosystem; and

(D) identify the interdependence of organisms in an aquatic environment such as in a pond, river, lake, ocean,
expected to:

(A) identify sources and determine the amounts of water in a watershed, including rainfall, groundwater, and surface water;

(B) identify factors that contribute to how water flows through a watershed; and

(C) identify water quantity and quality in a local watershed.

(C) compare differences in adaptations of aquatic organisms to fresh water and marine environments.

(11) Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments. The student is expected to:

(A) identify how energy flows and matter cycles through both fresh water and salt water aquatic systems, including food webs, chains, and pyramids; and

(6) Science concepts. The student knows the role of cycles in an aquatic environment. The student is expected to:

(A) identify the role of carbon, nitrogen, water, and nutrient cycles in an aquatic environment, including upwellings and turnovers; and

(C) describe and explain fluid dynamics in an upwelling and lake turnover.

(8) Science concepts. The student knows that geological phenomena and fluid dynamics affect aquatic systems. The student is expected to:

(A) identify the role of carbon, nitrogen, water, and nutrient cycles in an aquatic environment, including upwellings and turnovers; and

(C) describe and explain fluid dynamics in an upwelling and lake turnover.

(9) Science concepts. The student knows the types and components of aquatic ecosystems. The student is expected to:

(A) differentiate among freshwater, brackish, and saltwater ecosystems;

(B) identify the major properties and components of different marine and freshwater life zones; and

(C) identify biological, chemical, geological, and physical components of an aquatic life zone as they relate to the organisms in it.

(11) Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments. The student is expected to:

(A) identify how energy flows and matter cycles through both fresh water and salt water aquatic systems, including food webs, chains, and
Science concepts. The student understands how human activities impact aquatic environments. The student is expected to:

(A) predict effects of chemical, organic, physical, and thermal changes from humans on the living and nonliving components of an aquatic ecosystem;

(B) analyze the cumulative impact of human population growth on an aquatic system;

(C) investigate the role of humans in unbalanced systems such as invasive species, fish farming, cultural eutrophication, or red tides;

(D) analyze and discuss how human activities such as fishing, transportation, dams, and recreation influence aquatic environments; and

(E) understand the impact of various laws and policies such as The Endangered Species Act, right of capture laws, or Clean Water Act on aquatic systems.
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<tr>
<th>Units: Introduction to Oceanography</th>
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**Lab Requirement:** 40% of Science Instructional Time

**TEKS/SEs:**

1. Science concepts. Students know that aquatic environments are the product of Earth systems interactions. The student is expected to:
   - (A) identify key features and characteristics of atmospheric, geological, hydrological, and biological systems as they relate to aquatic environments;
   - (C) collect and evaluate global environmental data using technology such as maps, visualizations, satellite data, Global Positioning System (GPS), Geographic Information System (GIS), weather balloons, buoys, etc.

2. Science concepts. The student knows the role of cycles in an aquatic environment. The student is expected to:
   - (B) examine the interrelationships between aquatic systems and climate and weather, including El Niño and La Niña, currents, and hurricanes.

3. Science concepts. The student knows that geological phenomena and fluid dynamics affect aquatic systems. The student is expected to:
   - (A) demonstrate basic principles of fluid dynamics, including hydrostatic

4. Science concepts. The student knows the types and components of aquatic ecosystems. The student is expected to:
   - (A) differentiate among freshwater, brackish, and saltwater ecosystems;
   - (B) identify the major properties and components of different marine and freshwater life zones; and

5. Science concepts. The student knows environmental adaptations of aquatic organisms. The student is expected to:
   - (A) classify different aquatic organisms using tools such as dichotomous keys;
   - (B) compare and describe how adaptations allow an organism to exist within an aquatic environment; and
   - (C) compare differences in adaptations of aquatic organisms to fresh water and marine environments.

6. Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments. The student is expected to:
   - (A) identify how energy flows and matter cycles through both fresh water

7. Science concepts. The student understands how human activities impact aquatic environments. The student is expected to:
   - (A) analyze and discuss how human activities such as fishing, transportation, dams, and recreation influence aquatic environments; and

8. Science concepts. The student knows that aquatic environments are the product of Earth systems interactions. The student is expected to:
   - (A) identify key features and characteristics of atmospheric, geological, hydrological, and biological systems as they relate to aquatic environments;
   - (C) collect and evaluate global environmental data using technology such as maps, visualizations, satellite data, Global Positioning System (GPS), Geographic Information System (GIS), weather balloons, buoys, etc.

9. Science concepts. The student knows the role of cycles in an aquatic environment. The student is expected to:
   - (B) examine the interrelationships between aquatic systems and climate and weather, including El Niño and La Niña, currents, and hurricanes.

10. Science concepts. The student knows that geological phenomena and fluid dynamics affect aquatic systems. The student is expected to:
    - (A) demonstrate basic principles of fluid dynamics, including hydrostatic

11. Science concepts. The student knows the types and components of aquatic ecosystems. The student is expected to:
    - (A) differentiate among freshwater, brackish, and saltwater ecosystems;
    - (B) identify the major properties and components of different marine and freshwater life zones; and

12. Science concepts. The student knows environmental adaptations of aquatic organisms. The student is expected to:
    - (A) classify different aquatic organisms using tools such as dichotomous keys;
    - (B) compare and describe how adaptations allow an organism to exist within an aquatic environment; and

13. Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments. The student is expected to:
    - (A) identify how energy flows and matter cycles through both fresh water

14. Science concepts. The student understands how human activities impact aquatic environments. The student is expected to:
    - (A) analyze and discuss how human activities such as fishing, transportation, dams, and recreation influence aquatic environments; and

15. Science concepts. The student knows that aquatic environments are the product of Earth systems interactions. The student is expected to:
    - (A) identify key features and characteristics of atmospheric, geological, hydrological, and biological systems as they relate to aquatic environments;
    - (C) collect and evaluate global environmental data using technology such as maps, visualizations, satellite data, Global Positioning System (GPS), Geographic Information System (GIS), weather balloons, buoys, etc.
pressure, density, salinity, and buoyancy;

(B) identify interrelationships between ocean currents, climates, and geologic features; and

and salt water aquatic systems, including food webs, chains, and pyramids; and

(E) understand the impact of various laws and policies such as The Endangered Species Act, right of capture laws, or Clean Water Act on aquatic systems

Ongoing TEKS

(a) General requirements. Students shall be awarded one credit for successful completion of this course. Required prerequisite: one unit of high school Biology. Suggested prerequisite: Chemistry or concurrent enrollment in Chemistry. This course is recommended for students in Grades 10, 11, or 12.

(b) Introduction.

(1) Aquatic Science. In Aquatic Science, students study the interactions of biotic and abiotic components in aquatic environments, including impacts on aquatic systems. Investigations and field work in this course may emphasize fresh water or marine aspects of aquatic science depending primarily upon the natural resources available for study near the school. Students who successfully complete Aquatic Science will acquire knowledge about a variety of aquatic systems, 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 scientifically testable.

(3) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation can be experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods and ethical and social decisions that involve the application of scientific information.

(5) Scientific systems. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in terms of 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. 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.

(c) Knowledge and skills.

(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during laboratory and field investigations, including chemical, electrical, and fire safety, and safe handling of live and
preserved organisms; and

(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:

(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;

(B) know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;

(C) know that 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;

(D) distinguish between scientific hypotheses and scientific theories;

(E) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting, handling, and maintaining appropriate equipment and technology;

(F) collect data individually or collaboratively, make measurements with precision and accuracy, record values using appropriate units, and calculate statistically relevant quantities to describe data, including mean, median, and range;

(G) demonstrate the use of course apparatuses, equipment, techniques, and procedures;

(H) organize, analyze, evaluate, build models, make inferences, and predict trends from data;

(I) perform calculations using dimensional analysis, significant digits, and scientific notation; and

(J) communicate valid conclusions using essential vocabulary and multiple modes of expression such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;

(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;
(C) draw inferences based on data related to promotional materials for products and services;

(D) evaluate the impact of research and technology on scientific thought, society, and the environment;

(E) describe the connection between aquatic science and future careers; and

(F) research and describe the history of aquatic science and contributions of scientists.