

Unit 01: Introduction to Marine Science

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **2 weeks**
Status: **Published**

Summary of Unit

Students will learn the difference between oceanography and marine biology and their relationships to each other. Students will research and learn about early oceanic exploration and early explorers' contributions in the field of marine sciences. Students will learn the characteristics of ocean water and sampling techniques used today.

JULY 2019

Standards

CS.9-12.8.1.12.AP.7	Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.
CS.9-12.8.2.12.EC.1	Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.
LA.RST.9-10	Reading Science and Technical Subjects
LA.RST.9-10.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
LA.RST.9-10.2	Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
LA.RST.9-10.5	Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LA.RST.9-10.6	Determine the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LA.RST.9-10.8	Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
LA.RST.9-10.9	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

LA.RST.9-10.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LA.WHST.9-10	Writing History, Science and Technical Subjects
LA.WHST.9-10.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant sufficient textual and non-textual evidence.
LA.WHST.9-10.1.A	Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
LA.WHST.9-10.1.B	Develop claim(s) and counterclaims using sound reasoning, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
LA.WHST.9-10.1.C	Use transitions (e.g., words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
LA.WHST.9-10.1.D	Establish and maintain a style and tone appropriate to the audience and purpose (e.g., formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
LA.WHST.9-10.1.E	Provide a concluding paragraph or section that supports the argument presented.
LA.WHST.9-10.2.A	Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
LA.WHST.9-10.2.B	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
LA.WHST.9-10.2.C	Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.
LA.WHST.9-10.2.D	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
LA.WHST.9-10.2.E	Establish and maintain a style and tone appropriate to the audience and purpose (e.g., formal and objective for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
LA.WHST.9-10.2.F	Provide a concluding paragraph or section that supports the argument presented.
LA.WHST.9-10.3	(See note; not applicable as a separate requirement)
LA.WHST.9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.WHST.9-10.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
LA.WHST.9-10.6	Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
LA.WHST.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
LA.WHST.9-10.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the

	research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
LA.WHST.9-10.9	Draw evidence from informational texts to support analysis, reflection, and research.
LA.WHST.9-10.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.
PFL.9.1.12.CFR	Civic Financial Responsibility
SCI.HS-ESS2	Earth's Systems
SCI.HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
WRK.9.2.12.CAP	Career Awareness and Planning
9-12.HS-ESS2-1	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
CAEP.9.2.12.C	Career Preparation
CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
CAEP.9.2.12.C.7	Examine the professional, legal, and ethical responsibilities for both employers and

	employees in the global workplace.
CAEP.9.2.12.C.8	Assess the impact of litigation and court decisions on employment laws and practices.
CAEP.9.2.12.C.9	Analyze the correlation between personal and financial behavior and employability.
TECH.9.4.12.CI	Creativity and Innovation
TECH.9.4.12.CT	Critical Thinking and Problem-solving

Essential Questions

What historical achievements of ancient oceanographers helped expand the study of marine science?

How have innovative technologies and discoveries advance the study of marine science?

Why is the study and understanding of the properties of sea water so critical in its effects on marine ecosystems?

How has earth's water budget changed over time?

Objectives

Students will be skilled at defining/describing marine biology, oceanography, water budget, water cycle, solubility, density.

Students will know how to differentiate between oceanography and marine biology.

Students will know the chief characteristics of sea water and sampling techniques used to measure them.

Students will be skilled at analyzing the chief voyages of discovery that led to the developments & discoveries of modern marine science.

Students will know that sea water is unique because of the substances contained in sea water.

Students will be skilled at describing the water budget of our oceans.

Students will be skilled at describing the water cycle.

Students will be skilled at defining the properties of sea water and how it affects ocean currents.

Learning Plan

Meaningful participation in guided question/answer sessions, individual/group discussions, demonstrating an understanding of the purpose of the unit lesson(s), key terms, and concepts.

Preview the essential questions, provide answers, and connect to learning throughout the unit.

Identify and locate the major oceans of the world and some of the seas.

Explore Marine Science Application in the Real World and Careers in the field.

Power Point Presentation - What is Marine Science?

Early Explorers worksheet.

Water Budget Power Point Presentation - Introduction to water and various processes (2 Days).

Water as a buffer activity.

Water Density lab from Naval Meteorology and Oceanography Command Homepage.

Assessment

Summative assessments : evaluation of acquired knowledge and competency in learned topics through quizzes, tests.

Summative assessment: of historical exploratory voyages that led to many discoveries in Marine Science.

Formative assessment : of the density of seawater through experimentation and graphical analysis.

Complete daily classwork and regular homework assignments related to the identification of concepts learned in the natural setting, vocabulary, problem solving, and critical thinking.

Graphical analysis of earth's water budget.

Navigation through PowerPoint presentations to differentiate inherent differences between marine biology and oceanography.

Benchmark assessment to be able to calculate density and analyze density graphs of various types of ocean water using real and/or synthetic samples

Alternative Assessments doing a research project of a decade of choice showing who made discoveries in marine science and what kinds of voyages they led/were a part of that allowed for such discoveries to be made

Materials

Textbook, *Marine Science: Marine Biology and Oceanography*, Amsco, and ancillary materials

Earth Science, Merrill, and ancillary resource materials

Earth Science, Prentice-Hall, and ancillary resource materials

quantitative/qualitative lab equipment for activities, experiments

related oceanography maps, ocean current charts

Informational & interactive Website: noaa.gov

Integrated Accommodation and Modifications

<https://docs.google.com/spreadsheets/d/1k0sr4g3dnbak3t2JgZMhIR6aXvo1NjeSY-JmrS97wRk/edit?usp=sharing>

Additional modifications may be made based on individual needs of students as stated in student IEP (Individualized Education Program) documentation and as observed by the teacher:

Student directed research/presentation (power point, skit, demonstration) - Recent Scientific Contributions.

Design your own lab experiment

modified tests

cooperative learning groups

one-to-one instruction and assistance

additional time on task

alternative outcome options

individualized student assessment

preferential seating

handouts of class materials

guided notes

visual aides

computer web search