Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Science
Course ID	CASC80432	Grade Level	9-12
Course Name	Marine Science B	# of Credits	0.5
SCED Code	03005G0.5022	Curriculum Type	Connections Academy

COURSE DESCRIPTION

Have you ever wondered about the secrets of the deep, and how the creatures below the ocean's surface live and thrive? It is truly a new frontier of discovery, and in Marine Science, you will begin to understand a great deal more about the aquatic cycles, structures, and processes that generate and sustain life in the sea. Through the use of scientific inquiry, research, measurement, and problem solving, you will conduct various scientific procedures that will lead to an increased level of knowledge about Marine Science. You will also have the opportunity to use technology and laboratory instruments in an academic setting. By recognizing the inherent ethics and safety procedures necessary in advanced experiments, you will become progressively more confident in your abilities as a capable marine scientist.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex biotic and abiotic interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a modified ecosystem.
HS-LS2-7	Evaluate and assess impacts on the environment and biodiversity in order to refine or design a solution for detrimental impacts or enhancement for positive impacts.
HS-LS2-8	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
HS-LS4-4	Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
HS-LS4-5	Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OBJECTIVES
Unit 1: The Ocean and Its Populations The sun, winds, tides, and all the other elements of the ocean do more than just move water around. They also shape the environment to keep a wide variety of organisms alive. The ocean contains different layers, and each layer hosts organisms that have adapted to survive in the specific conditions of that region. Creatures in the deepest layers of the oceans are adapted to live in those depths. The populations there are just a small percentage of the ocean's residents. Identifying and documenting the species that live in the world's oceans is one of marine science's most daunting tasks.	HS-LS2-8, HS-LS4-4	• Identify the layers of the ocean and their characteristics. • Discuss the importance of adaptation for survival. • Analyze the role of natural selection in evolution. • Describe the characteristics of a population. • Articulate the methods used to identify and monitor marine populations.
Unit 2: Populations that Thrive Populations work together within ecosystems. An increase or decrease in one population will directly impact the neighboring organisms. If there is a decline in the seal population, it is likely to cause a decline in the killer whale population because these whales feed on the seals. This is just one way in which every species has a specific function which keeps the ecosystem in balance. These populations are also in competition with each other for the resources within the ecosystem. In many cases, populations have mutually beneficial relationships, and in others, they endanger each other. Populations also increase and decrease in natural cycles, some of which take years. These variations in population are in addition to the many natural factors that can limit or bolster population growth. All of these factors make it hard to say how many fish there are in the sea at any given moment.	HS-LS2-6, HS-LS4-5	• Identify the role of a species within a food pyramid. • Compare and contrast the relationship among organisms. • Describe the trophic levels. • Discuss the interactions and interdependence that occur in aquatic environments. • Evaluate the factors impacting aquatic population cycles.

Unit 3: Human Interaction and the Environment There are many factors that impact the environment, and man is one of them. One of man's biggest threats to stable and healthy aquatic systems is pollution. From industrial accidents to algae overpopulation, many causes of water pollution come from the land. Once pollutants enter the environment, they can impact all levels of the ecosystem. Therefore, if we are working towards a clean environment, we can't just focus on the problems we see in the water; our focus must be broader. Fortunately, there are a lot of regulations designed to keep clean water as a top priority.	HS-LS2-7	• Identify the large-scale environmental impact of human activity on marine systems. • Evaluate how the environment and personal health are related. • Investigate the role of humans in unbalanced ecosystems. • Analyze the role of human activities that influence marine environments. • Recognize the value of non-renewable resources.
Unit 4: The Past and Future of Marine Science It is hard to say where marine science began, but the ocean has been the subject of study for thousands of years, as trade records for the Mediterranean Sea indicate. In the nineteenth century, the creatures that lived in the ocean became the subjects of scientific study, allowing marine science to emerge as its own discipline. Since then, marine scientists have explored the arctic regions and brought the ocean into our living rooms through documentaries and films. These efforts have raised international awareness of the issues threatening the ocean. These issues require global collaboration for ethical solutions if we want marine science and the ocean to have a positive future.		• Describe the history of marine science. • Identify the contributions of individuals to marine science. • Articulate the ethical expectations in marine science. • Recognize that scientific questions and conclusions may be influenced by social and cultural concerns. • Distinguish between scientific and ethical questions
Unit 5: Careers in Marine Science Careers in marine science are found everywhere, from the ocean depths to the moon. One of marine science's most important jobs is to unlock the mysteries of the ocean and then pass this information along so that it can inform policies and practices here on the surface. Without understanding how the ocean works, we will never be able to save its valuable resources. Fortunately, great minds all over the globe are using the scientific method to study our waterways and helping all of us live well on Earth.		• Describe career options in marine science. • Identify the function of systems thinking in aquatic environments. • Discuss the role of technology in marine science. • Explain how science factors into human decision making. • Recognize that marine science requires a variety of approaches and contributions.
Unit 6: Marine Science B Final Exam In this unit, you will review the information you learned throughout this course and take an exam to demonstrate your newly acquired knowledge.		• Review information acquired and mastered from this course. • Take a course exam based on material from this course.