Elizabethtown Area School District

Oceanography

Course Number:	353	Length of Course:	18 weeks
Grade Level:	11-12 Elective	Total Clock Hours:	120
Length of Period:	80 minutes	Date Written:	24 October 2012
Periods per Week/Cycle:	5	Written By:	Robert Crick
Credits (if app):	1	Weighting:	1.0

Prerequisite: Earth Science and Biology

Course Description:

Using an inquiry-based approach, this course introduces students to topics in physical, chemical, geological, and biological oceanography. Students will gain an understanding of the dynamic systems and relationships that exist within the ocean environment, as well as the role of the oceans as part of the earth system.

I. Overall Course/Grade Level Standards

Students will KNOW and be able TO DO the following as a result of taking this course.

A) Understand the field of oceanography and its role in understanding Earth as a system.
B) Explain the role of historical oceanographic achievements on human society.
C) Understand and be able to use marine charts in navigation.
D) Understand the role of the world's oceans on the climate of the earth, both currently and in the future.
E) Explain the nature and properties of seawater.
F) Understand the factors that influence seawater chemistry and explain their relationship to one another.
G) Describe the natural patterns of variation in seawater chemistry at the surface and with depth.
H) Explain the role of plate tectonics in the formation of the world's oceans and their bathymetry.
I) Compare and contrast different marine environments within the ocean system.
J) Analyze marine sediments in the context of their importance as an earth resource.
K) Understand the differences between coastal marine provinces.
L) Explain the impacts of humans and coastal stabilization on natural beach processes.
M) Explain the interaction between the world's oceans and earth's atmosphere.
N) Explain how and why water circulates throughout the world's oceans, on the surface and with depth.
O) Describe the formation of ocean waves.
P) Compare and contrast the different kinds of ocean waves.
Q) Explain why tides occur and the impact of different monthly tidal cycles.
R) Understand the classification of marine life.
S) Identify and explain the adaptations of marine organisms as it relates to their survival.
T) Understand the transfer of energy through primary productivity and its impact on marine ecosystems.
U) Know the difference between benthic and pelagic organisms and understand the ecosystems in which they exist.

II. Content

Major Areas of Study

List all units of study below:

Unit	Estimated Time	Materials
1. Oceanography Basics	2 weeks	Textbook, worksheets, notesheets, quizzes, tests, lab supplies, articles, web resources and online data
2. Ocean Chemistry	2 weeks	Textbook, worksheets, notesheets, quizzes, tests, lab supplies, articles, web resources and online data
3. Ocean Geology	4 weeks	Textbook, worksheets, notesheets, quizzes, tests, lab supplies, articles, web resources and online data
4. Ocean Physics	5 weeks	Textbook, worksheets, notesheets, quizzes, tests, lab supplies, articles, web resources and online data
5. Ocean Biology	5 weeks	Textbook, worksheets, notesheets, quizzes, tests, lab supplies, articles, web resources and online data

Name of Unit: Oceanography Basics

Essential Question:

Unit Objectives/Key Question	Priority	Aligned to Course Standard	Aligned to PA Standard
1. What is the role of the ocean within the Earth system?	E	A	3.1.12.C 3.2.12.B 3.5.12.C 3.5.12.D
2. How have historical oceanographic achievements influenced the development of human society?	E	B	3.1.12.B 3.1.12.C 3.1.12.E 3.2.12.A 3.8.12.B 3.8.12.C
3. What are the techniques used to navigate in ocean waters?	E	C	3.1.12.A 3.1.12.E 3.2.12.A 3.7.12.B
4. How do the oceans impact the climate of the earth?	E	D	3.1.12.C 3.5.12.C

Name of Unit: Ocean Chemistry

Essential Question:

Unit Objectives/Key Question	Priority	Aligned to Course Standard	Aligned to PA Standard
1. What are the basic properties and characteristics of seawater?	E	E	3.1.12.D 3.4.12.A 3.5.12.D 3.7.12.B
2. What factors influence variations in seawater chemistry and how do they influence each other?	E	F	3.1.12.D 3.2.12.C 3.4.12.A 3.5.12.D 3.7.12.B
3. What are the natural patterns of variation in seawater chemistry at the surface and with depth?	E	G	3.1.12.D 3.2.12.C 3.4.12.A 3.5.12.D 3.7.12.B

Name of Unit: Ocean Geology

Essential Question:

Unit Objectives/Key Question	Priority	Aligned to Course Standard	Aligned to PA Standard
1. How has plate tectonics molded the oceans and ocean bathymetry?	E	H	3.1.12.C 3.1.12.E 3.2.12.A
2. What are the similarities and differences between the major marine environments?	E	I	3.5.12.A
3. What is the importance of marine sediments as an earth resource?	E	J	3.5.12.A 3.5.12.B
4. How do coastal provinces differ from open ocean provinces?	E	K	3.5.12.A
5. How do humans and modern society impact coastal environments and beach processes with stabilization practices?	E	L	3.1.12.E 3.2.12.B 3.2.12.D 3.6.12.C 3.8.12.C

Name of Unit: Ocean Physics

Essential Question:

Unit Objectives/Key Question	Priority	Aligned to Course Standard	Aligned to PA Standard
1. What is the nature of the interaction between the world's oceans and the earth's atmosphere?	E	M	3.1.12.C 3.4.12.B 3.5.12.C 3.5.12.D
2. How do the world's oceans circulate water at the surface and with depth?	E	N	3.1.12.C 3.4.12.B 3.5.12.C 3.512.D
3. How do waves in the ocean form?	E	O	3.1.12.C 3.4.12.B 3.5.12.A 3.5.12.D
4. What are the similarities and differences between different wave types?	E	P	3.4.12.B 3.5.12.D
5. What causes tides and why do monthly tidal cycles differ from place to place?	E	Q	3.1.12.C 3.4.12.B 3.5.12.D

Name of Unit: Ocean Biology

Essential Question:

Unit Objectives/Key Question	Priority	Aligned to Course Standard	Aligned to PA Standard
1. How is marine life classified?	E	R	3.3.12.A
2. What adaptations to marine organisms use in order to survive?	E	S	3.3.12.A 3.3.12.B 3.3.12.D
3. What is primary productivity and how does it transfer energy through marine ecosystems?	E	T	3.1.12.C 3.3.12.B
4. What is the difference between benthic and pelagic organisms and how do the interact within marine ecosystems?	E	U	3.3.12.B 3.3.12.D 3.5.12.C 3.5.12.D

III. Course Assessments

Check types of assessments to be used in the teaching of the course and provide examples of each type.

X Objective Tests/Quizzes
X Constructed Responses
X Essays
X Reports
X Projects
O Portfolios
X Presentations
X Performance Tasks
O Response Journals
X Logs
X Computer Simulations
O Research Papers
O Class Participation
X Note Taking
X Daily Assignments
X Writing Samples

Provide copies of common assessments that will be utilized for all students taking this course. Overall course/grade level standards will be measured by a common course assessment. Unit objectives will be measured on an ongoing basis as needed by the classroom teacher to assess learning and plan for instruction. List common assessments below and recommend date/tinme frame for administration (at least quarterly).

Name of Common Assessment	When given?
1. Final Exam	End of course
2.	
3.	

IV. Expected levels of achievement

Current grading scale

A	100-92
B	91-83
C	82-74
D	65-73
F	64 and below

PA Proficiency Levels
Advanced Proficient
Basic Below Basic

The following scoring documents have been developed for this course:

Final Exam