Georgia Science

Oceanography

Adopted 2019

Obtain, evaluate, and communicate information about how and why humans explore our ocean. S01	**a.** Obtain, evaluate, and communicate information that compares historical and modern motivations for ocean exploration and methods of exploration. S01.A
	b. Define problems and challenges associated with oceanographic research and exploration. S01.B
Obtain, evaluate, and communicate information about the characteristics, physical features, and boundaries of the oceans. S02	**a.** Analyze and interpret geologic data to describe how the Earth's ocean basins, ocean and atmosphere were formed. S02.A
	b. Construct an argument from evidence to support the role of plate tectonics in shaping the physical features of the ocean and continents. S02.B
	c. Analyze and interpret data to understand how the dynamic events at plate boundaries influence the physical features of oceans and continents. S02.C
	d. Develop and use models to investigate geological features from the continental margins to the deep ocean basins. S02.D
	e. Ask questions to classify the sources of different types of marine sediments. S02.E
Obtain, evaluate, and communicate information to model the flow of energy in the ocean. S03	**a.** Construct an explanation to support the claim that some of the earliest life forms originated in the ocean. S03.A
	b. Ask questions to compare and contrast the relative role of photosynthesis and chemosynthesis in oceanic biologic productivity and describe the oceanic realms in which each mode of primary production occurs. S03.B
	c. Develop and use models to analyze the flow of energy and cycling of matter in marine ecosystems. S03.C
	d. Ask questions to investigate relationships between biotic and abiotic factors in marine ecosystems including estuaries, coral reefs, kelp forests, the open ocean, and the deep ocean. S03.D
Obtain, evaluate, and communicate information that describes the complex	**a.** Develop a model to explain the effects of tilt of the earth, solar energy inputs, and heat capacity of land and oceans on the resulting patterns of weather and climate. S04.A

relationships between weather, climate and the oceans. S04	b. Ask questions to investigate and provide explanations about the influence of the Coriolis Effect on winds, ocean currents, and climate. S04.B
	c. Analyze and interpret data to develop models for global patterns of atmospheric and oceanic circulation. S04.C
	d. Construct an explanation for variations in global weather patterns such as El Nino, hurricanes, and monsoons and design solutions to minimize the impact of these systems on human populations. S04.D
	e. Use mathematics and computational thinking to explain how climate change influences the ocean. S04.E
Obtain, evaluate, and communicate information on how waves and tides are created and their influence on coastal processes. S05	a. Develop and use models to demonstrate how ocean waves are generated. S05.A
	b. Use mathematics and computational thinking to analyze the properties of ocean waves and how they change as they interact with the seafloor. S05.B
	c. Construct an argument based on evidence from tide tables and lunar calendars to explain the role of the moon and sun in the formation of tides and tidal patterns. S05.C
	d. Construct an explanation for the effects of waves and tides on coastlines, including how they interact with sandy shorelines to transport sediments, influence barrier islands, and affect the marine organisms that live there. S05.D
Obtain, evaluate, and communicate information on the physical and chemical properties of seawater and how they influence the structure of the ocean. S06	a. Develop and use a model to demonstrate how the ocean and land are connected by the hydrologic and other biogeochemical cycles. S06.A
	b. Plan and carry out an investigation to discover the unique properties of seawater when compared to fresh water. S06.B
	c. Ask questions to investigate how the water column is structured based upon the physical properties of seawater (temperature, salinity, density). S06.C
	d. Develop an argument based on evidence to support the claim that the physical properties of sea water influence the evolution, adaptations and distributions of marine organisms. S06.D
Obtain, evaluate, and communicate information about how humans use the ocean as a resource and the need for responsible stewardship. S07	a. Construct an argument based on evidence about the impact that extraction of physical, geological, chemical, and biological resources from the oceans has on marine ecosystems. S07.A
	b. Design, evaluate, and refine solutions on how to use the ocean as a source of alternative energy. S07.B
	c. Construct an explanation based on evidence on how recreation and transportation impact marine ecosystems. S07.C

d. **Analyze and interpret data to investigate the causes of ocean acidification, biomagnification of pollutants, ocean deoxygenation, and eutrophication.** S07.D

e. **Construct an argument based on evidence to examine policies and laws related to responsible stewardship of the oceans.** S07.E

f. **Design and evaluate a sustainability plan that includes conservation efforts to reduce human impact on the ocean.** S07.F