

# Oceanography B – NGSS Alignment Correlations

## Oceanography (Sem B )

Unit Title	Standards Addressed	Two Essential Question(s)	Unit Summary
<b>Unit 9: Air-Sea Interactions (Ch 10)</b>	<p>HS_ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth's systems.</p> <p>E2.2A Describe the Earth's principal sources of internal and external energy.</p> <p>E2.2C Describe natural processes in which heat transfer in the Earth occur by conduction, convection and radiation.</p> <p>E2.2D Identify the main sources of energy to the climate system.</p> <p>E4.2A Describe the major causes for the ocean's surface and deep water currents, including the prevailing winds, the Coriolis effect, unequal heating of the earth, changes in water temperature and salinity in high latitudes, and basin shape. E4.2B Explain how interactions between the oceans and the atmosphere influence global and</p>	<p>How does the unequal heating of Earth cause seasons and winds?</p> <p>Where do hurricanes form and what types of damage do they cause?</p> <p>-----</p> <p>Why is there a season for hurricanes?</p>	<p>This unit will explain the Sun/Earth/Air/Ocean interaction focusing especially on Unequal heating by the Sun which creates seasonal changes, Earth's rotation which causes the Coriolis effect and winds.</p> <p>9.1: Describe how the Uneven heating from the sun leads to seasonal changes on Earth.</p> <p>9.2: Determine how the Coriolis Effect drives world-wide air circulation.</p> <p>9.3: Track hurricanes and relate the damage caused by this storm.</p>

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	<p>regional climate. Include the major concepts of heat transfer by ocean currents, thermohaline circulation, boundary currents, evaporation, precipitation, climatic zones, and the ocean as a major CO<sub>2</sub> reservoir.</p>		
<p><b>Unit 10: Highways in the Sea (Ch 11)</b></p>	<p>HS_ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth's systems.</p> <p>E4.2A Describe the major causes for the ocean's surface and deep water currents, including the prevailing winds, the Coriolis effect, unequal heating of the earth, changes in water temperature and salinity in high latitudes, and basin shape.</p> <p>E4.2B Explain how interactions between the oceans and the atmosphere influence global and regional climate. Include the major concepts of heat transfer by ocean currents, thermohaline circulation, boundary currents, evaporation, precipitation, climatic zones, and the ocean as a major CO<sub>2</sub> reservoir.</p>	<p>How does the ocean move?</p> <p>How do ocean currents impact global weather patterns?</p>	<p>This unit will model how the oceans circulate and explain what happens when those patterns reverse.</p> <p>10:1 Describe how currents move the ocean surface and deep waters world wide</p> <p>10.2: Predict how upwelling and downwelling affects the fisheries.</p> <p>10:3 Know the world-wide effects of an el Nino.</p>

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<b>Unit 11: Waves and Tides (Ch 12)</b>	<p>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.</p> <p>HS_PS3 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.</p> <p>E3.4C Describe the effects of earthquakes and volcanic eruptions on humans</p>	<p>What is the difference between a wave and a tide?</p> <p>How does a tsunami form and what damage does it produce?</p> <p>What causes a tide to ebb and flow? -----</p> <p>Why is water so powerful?</p> <p>How can we harness the power of water?</p>	<p>This unit will emphasize Waves, Tides, and the destructive properties of Tsunami’s.</p> <p>11.1: Learn the properties of a wave and learn the different types of waves.</p> <p>11.2: View the destructive effects of a tsunami and make recommendations for future city planning in earthquake-prone regions.</p> <p>11.3: Construct a marigram by graphing the tide as it ebbs and flows in a 72 hour time period.</p>
<b>Unit 12: Marine Ecosystems (Ch 16)</b>	<p>B3.2C Draw the flow of energy through an ecosystem. Predict changes in the food web when one or more organisms are removed.</p> <p>NGSS</p> <p>HS_LS2-4 Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</p> <p>HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of</p>	<p>How does energy flow through the marine ecosystem?</p> <p>Compare and contrast the different marine ecosystems.</p> <p>-----</p> <p>What impacts do humans have on marine ecosystems?</p>	<p>This unit will focus on the different marine ecosystems: including the amount of energy, characteristics, of each, and the impact of human activity.</p> <p>12.1: Describe how energy and nutrients flow through the different levels within an ecosystem.</p> <p>12.2: Discuss why it is important to protect the euphotic zone from pollution.</p> <p>12.3: Provide several reasons why the coastal zones are high productive</p>

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	ecosystems at different scales.		<p>marine environments.</p> <p>12.4: Identify several challenges to organisms living in the tidal zones.</p> <p>12.5: Compare the amount of productivity in the polar zones to that of the coastal zones.</p> <p>12.6: Describe the conditions found in the deep sea and identify two ways organisms have adapted to the environment.</p>
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<p><b>Unit 13: Marine Resources A (Ch 17A)</b></p>	<p>B3.4C Examine the negative impact of human activities.</p> <p>NGSS</p> <p>HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*</p> <p>HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. [</p>	<p>How do humans benefit from marine resources?</p> <p>How are humans harming the ocean ecosystem?</p>	<p>This unit will challenge students to classify resources in marine ecosystems, and to analyze how humans interact with each resource.</p> <p>13.1 Define nonrenewable resources and list several examples.</p> <p>13.2 List several renewable resources and explain why each one is considered renewable.</p> <p>13.3 Discuss the threats to submerged cultures and explain why they need to be protected.</p>
<p><b>Unit 14: Marine Resources B (Ch 17B)</b></p>	<p>NGSS</p> <p>HS-LS2-2 Use mathematical representation to support and revise explanations based on evidence about factors affecting biodiversity and population in ecosystems of different scales.</p> <p>HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of</p>	<p>What is the status of the oceans fishery?</p> <p>How can biodiversity be used to determine the healthiness of an ecosystem?</p> <p>Can fish farms meet world demands and protect the ecosystems at the same time?</p>	<p>This unit will focus on the interaction between humans and the biological resources of the marine ecosystems.</p> <p>13.4 Explain the impact and the limitations of the IWC on Biological Resources.</p> <p>13.5 List several way that humans are using biological resources.</p> <p>13.6 Describe and support with</p>

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	ecosystems at different scales.		<p>reasoning the current condition of the World's Fisheries.</p> <p>13.7 Identify the challenges of commercial fishing .</p> <p>13.8 Explain how the world has developed a means to governing the seas.</p> <p>13.9 Explain the importance of biodiversity.</p>
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<p><b>Unit 15: Pollution and the Health of the Ocean (Ch 18)</b></p>	<p>E2.4B Explain how the impact of human activities on the environment (e.g., deforestation, air pollution, coral reef destruction) can be understood through the analysis of interactions between the four Earth systems.</p> <p>E5.4C Analyze the empirical relationship between the emissions of carbon dioxide, atmospheric carbon dioxide levels, and the average global temperature over the past 150 years.</p> <p>E5.4D Based on evidence of observable changes in recent history and climate change models, explain the consequences of warmer oceans (including the results of increased evaporation, shoreline and estuarine impacts, oceanic algae growth, and coral bleaching) and changing climatic zones (including the adaptive capacity of the biosphere).</p>	<p>What is global warming and how will it affect the oceans?</p> <p>What are the threats to the oceans? -----</p> <p>How can we protect the oceans?</p>	<p>This unit will focus on the direct and indirect ways that humans have negatively impacted the marine ecosystem and steps that are being taken to correct this.</p> <p>15.1 Examine the causes and effects of global warming.</p> <p>15.2 Discuss the impact humans are having on sensitive marine habitat. 15.3 List the different types of toxic pollutants.</p> <p>15.4 Compose a letter to a newspaper editor or government official explaining the effects of eutrophication and hypoxia on marine life in the form of dead zones.</p> <p>15.5 List ways humans can eliminate or reduce energy and refuse pollution.</p> <p>15.6 Compare and contrast two efforts to protect the seas.</p>
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	<p>NGSS</p> <p>HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity</p>		
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<p><b>Unit 16: Future of an Ocean Planet (Ch 19)</b></p>	<p>NGSS</p> <p>HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p>	<p>What are the difficulties of regulating and protecting the oceans?</p> <p>Why is it important to protect the oceans?</p>	<p>This unit will focus on the importance of the ocean, current research that is happening and careers that exist in the study of oceanography.</p> <p>16.1 Explain the relationship between “tragedy of the commons” and the oceans.</p> <p>16.2 Describe ecosystems based management.</p> <p>16.3 Identify the connection between the ocean and the research associated with global climate change.</p> <p>16.4 Create an argument or plan for protecting the oceans.</p>
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