Marine Biology/Oceanography

Summit High School
Summit, NJ

Grade Level / Content Area:

11 and 12th Grade
Science

Developed by
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2017

Length of Course: 1 semester

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Course Description:

Marine Biology is a science elective for students who have successfully completed Biology. The first third of the course surveys the fields of oceanography, weather, physical and chemical aspects of the oceans. Part two features a survey of marine organisms and their interactions. The 3rd and final unit covers ecosystems providing the big picture of the workings and health of our marine ecosystems. There is also an introduction to conservation concerns and efforts, with a final focus on the many altruistic opportunities available for marine conservation enthusiasts at the end of the course.

Grades are based on projects, quizzes and class participation.

Course Pacing Guide (18 weeks total)

Weeks	Unit	Key Topics
1-4	1 (Covering chapters 1-4)	Marine Science (technological advancements) -Sonar, radar, scuba, navigation Seafloor mapping / Plate tectonics Climate / ocean currents / weather forecasting Waves / pressure (atmospheric) ● unit 1 project: Hurricane history PPT
5-9	2 (covering chapters 5-9)	Organisms: -Microbes -Primary producers -Invertebrates -Marine Fishes -The "other" Vertebrates ● 2 unit 2 projects: - Invertebrate animal (group) - Fish species (individual)
10-14	3 (covering chapters 10-16)	Marine ecosystems: Intro to ecology (how to research) ● Project on one of 8 marine ecosystems (group) Blue Planet videos on various marine ecosystems
14-18	4 (covering chapters 17-19	Conservation: Investigation of conservation organizations: For example: -Atlantic Salmon Federation -Billfish Foundation -Bonefish and Tarpon Trust ● Final project: Pick a conservation organization to research -Present to class aspects of organization

		- Create proposal to raise funds to donate to organization and act on proposals where appropriate.

**Note: the textbook "Marine Biology" by Castro and Huber, is issued to students as a reference guide.*

Unit 1: Oceanography

Course Objectives for Unit 1 "oceanography": To create a foundation of understanding of our dynamic climate patterns, the physical and chemical properties that influence the oceans, and how these properties can relate to the survival of all of life on Earth.

Big Ideas for Unit 1: Science and Engineering Practices
Planet Earth's dynamic systems are largely defined by the oceans.

Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-ESS2-1)
Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (HS-ESS1-6)
Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HS-ESS1-5)
Analyze data using computational models in order to make valid and reliable scientific claims. (HS-ESS3-5)

Essential Questions	**Enduring Understandings** **Cross cutting concepts** **Patterns**
1. *What factors determine ocean depth?* 2. *How do we know details about the ocean depths?* 3. *What is atmospheric pressure and what is the difference between air and water in terms of pressure?* 4. *Why is seawater salty and how do minerals get into water?* 5. *How does "Plate tectonics" relate to the ocean basins?* 6. *How does the uneven heating of the Earth's surface by the Sun affect wind patterns, ocean currents, and climate?* 7. *How do we predict the weather, and access those predictions?*	● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1) ● Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (HS-PS4-4) ● Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for

8. *How do the Sun and Moon affect the tides in different parts of the world?*	causality in explanations of phenomena. (HS-PS2-4) **Stability and Change** ● Much of Science deals with constructing explanations of how things change and how they remain the same. ● Change and rates can be quantified and modeled over very long or very short periods of times. Some system changes are irreversible. ● When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2)
Areas of Focus: Proficiencies (Cumulative Progress Indicators) **Disciplinary Core Ideas** Students will: ESS2.D: Weather and Climate ● The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-2), (HS-ESS2-4) ● Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (HS-ESS2-6), (HS-ESS2-7) ESS1.B: Earth and the Solar System ● Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (secondary to HS-ESS2-4) ESS2.A: Earth Materials and Systems ● Earth's systems, being dynamic and interacting, cause feedback effects that can	**Examples, Outcomes, Assessments** *(see note below about the content of this section)* Instructional Focus: ● Identify different tidal patterns in different parts of the world and how they are affected by various forces ● Identify how different depth profiles affect seawater characteristics ● Compare different major ocean currents ● Describe how the rotation of the Earth affects ocean currents ● Explore how the concentrations of salt found in the ocean are related to the density of seawater and therefore the "great conveyor". ● Analyze how seafloor features vary depending on tectonic forces ● Research how technology has changed throughout the history of oceanography Sample Assessments: ● Periodic quizzes ● Class discussions and debates ● Short-term in-class projects ● One long-term project

increase or decrease the original changes. (HSESS2-1), (HS-ESS2-2) ● Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (HS-ESS2-3) ● The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (HS-ESS2-4) ESS2.B: Plate Tectonics and Large-Scale System Interactions ● The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (HS-ESS2-3)	Instructional Strategies: ● Class-discussion ● Teacher-derived Powerpoint presentation (available for student download) ● Class-demonstration ● Cooperative learning ● Independent research projects ● Independent practice and reading ● Video presentations Interdisciplinary Connections ● Physics of water movement ● Analyzing weather data ● Chemistry of seawater ● Geological features Technology Integration ● Use of "Chromebooks" to access web-based resources ● Analysis of Sonar, Radar, Loran, and GPS technology. ● Use of probeware for water quality monitoring. Global Perspectives ● International shipping laws ● Global climate patterns Culturally Responsive Teaching ● Our reliance on the oceans is universal for all walks of human life ● Inuit and Polynesian societies were first to unlock the secrets of the oceans.

Unit 2 Name: Biology of the seas

Big Ideas: Organisms in the oceans are diverse and are not evenly dispersed. Nutrients and light are the essentials for survival in almost every marine ecosystem.
Derived from NGSS:

Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)

Course Objectives for Unit 2 "Marine Biology": To develop a foundation of understanding of how Evolution and Natural Selection have contributed to the array of organisms we see in the oceans today. To gain an understanding of how those organisms can depend on one another to maintain their individual niches.	
Essential Questions ● How can microbes maintain a balance of nutrients in an ecosystem? ● How is energy transferred from the Sun to organisms on Earth? ● How has evolution modified adaptations in marine organisms? ● How do organisms deal with osmotic balance in the marine environment? ● What evolutionary pressures or adaptive advantages may have driven marine mammal ancestors into the water?	**Enduring Understandings** **Cross Cutting Concepts** Cause and Effect ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8), (HS-LS2-5) Energy and Matter ● Energy cannot be created or destroyed— it only moves between one place and another place, between objects and/or fields, or between systems. (HS-LS2-4) ● Energy drives the cycling of matter within and between systems. (HS-LS2-3) Stability and Change ● Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6), (HSLS2-7)
Areas of Focus: Proficiencies (Cumulative Progress Indicators) **Disciplinary Core Ideas** LS4.A : Evidence of Common Ancestry and Diversity ● Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and	**Examples, Outcomes, Assessments** ● Review the fundamentals of biology, including photosynthesis and cellular respiration ● Relate evolution and natural selection to adaptations in a marine environment ● Describe how autotrophs contribute to the survival of all organisms. ● Survey unicellular and multicellular algae as well as marine flowering plants

differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1) LS1.C: Organization for Matter and Energy Flow in Organisms ● The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5) ● The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HS-LS1-6) ● As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HS-LS1-6), (HS-LS1-7) ● As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HS-LS1-7) LS4.B: Natural Selection ● Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance among individuals. (HS-LS4-2),(HS-LS4-3)	● Identify and describe all of the invertebrate phyla and their adaptations. ● ID marine vertebrate phyla ● Describe whale evolution. Sample Assessments: ● Periodic reading quizzes ● Class discussions ● Mini in-class projects on specific marine animals. Instructional Strategies: ● Class discussion ● Teacher-derived Power point presentation (available for student download) ● Class demonstration ● Cooperative learning ● Independent research projects ● Independent practice and reading ● Video presentations ● Animal dissections (shark, squid) Interdisciplinary Connections ● Veternarian/medical Technology Integration ● Use of “Chromebooks” to access web-based resources

● The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (HS-LS4-3) LS4.C: Adaptation ● Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HS-LS4-2) ● Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HS-LS4-3), (HS-LS4-4) ● Adaptation also means that the distribution of traits in a population can change when conditions change. (HS-LS4-3) ● Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (HS-LS4-5),(HS-LS4-6) LS2.B: Cycles of Matter and Energy Transfer in Ecosystems	

● Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HS-LS2-3) ● Plants or algae form the lowest level of the food web. At each link, upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (HS-LS2-4) ● Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. (HS-LS2-5) PS3.D: Energy in Chemical Processes ● The main way that solar energy is captured and stored on Earth is through the complex chemical process known as photosynthesis. (secondary to HS-LS2-5)	

Unit 3: Ecology

Big Ideas:

All ecosystems consist of a complex array of interdependent organisms whose balance is easily disrupted by human activities and exploitation.

Derived from NGSS:

Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ESS3-4) Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (HS-ESS3-2)

Essential Questions ● How do organisms in each marine ecosystem depend on one-another? ● How has co-evolution influenced interactions among organisms in the marine environment? ● How do the physical features of marine environments determine where organisms can be found? ● How are marine communities organized? ● In what ways do we depend on the oceans for our current needs and ways of life? ● How has the human race negatively impacted the marine environment? ● What is the best way for us (humans) to conserve/preserve marine natural resources? ● How should (human) communities along the coast deal with the constant threat of weather and water? ● What is the appropriate role of government in protecting marine environments? ● How can/should individuals influence meaningful change for our Marine ecosystems?	**Enduring Understandings:** **Cross Cutting Concepts** **Patterns** ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1) ● Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (HS-PS4-4) ● Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4) **Stability and Change** ● Much of Science deals with constructing explanations of how things change and how they remain the same.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) **Disciplinary Core Ideas** LS1.C: Organization for Matter and Energy Flow in Organisms ● The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5)	**Examples, Outcomes, Assessments** Instructional Focus: ● ● Summarize and review the various ecosystems found in the Earth's oceans. A. Intertidal (rocky, sandy, muddy) B. Estuaries C. Littoral zone (light penetration) D. Reefs (both tropical and otherwise)

- The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HS-LS1-6)
- As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HS-LS1-6), (HS-LS1-7)
- As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HS-LS1-7)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HS-LS2-3)
- Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and

E. Epipilagic (surface waters)
F. Deep ocean (benthic and Pilagic)

Sample Assessments:

- Periodic reading quizzes
- Class discussions
- Mini in-class projects on specific marine ecosystems.

Interdisciplinary Connections

- Conservation Biology
- International and local politics
- Ecotourism
- Diving / snorkeling

Technology Integration

- Use PowerPoint to present an Ecosystem.
- Use GoogleEarth to track the movements of dolphins, whales, Sharks and Marlin.
- Use of “Chromebooks” to access web-based resources

Global Perspectives

- Each nation and area has it’s own marine environment to take care of and exploit.
- Culturally Responsive Teaching
- Discuss how different cultures rely on certain ecosystems for food (Coral dynamite)

Instructional Strategies:

- Class-discussion
- Teacher-derived Powerpoint presentation (available for student download)
- Class-demonstration
- Cooperative learning
- Group research projects
- Independent practice and reading
- Video presentations

into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (HS-LS2-4) ● Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. (HS-LS2-5) PS3.D: Energy in Chemical Processes ● The main way that solar energy is captured and stored on Earth is through the complex chemical process known as photosynthesis. (secondary to HS-LS2-5) ESS2.E: Biogeology ● The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's surface and the life that exists on it. (HS-ESS2-7)	

Unit 4: Resources and Conservation

Big Ideas:

Through collaboration, cooperation, and hard work, humans can resist the decline of biodiversity at the hands of human development and progress of civilization.

Derived from NGSS:
Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ESS3-4)
Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (HS-ESS3-2)

Essential Questions: In what ways do we depend on the oceans for our current needs and ways of life? How has the human race negatively impacted the marine environment? In what ways do we (humans) attempt to conserve marine natural resources? How do governments deal with necessary legislation of conservation requirements? What non-profit options are there for concerned members of the community at large?	**Enduring Understandings:** **Cross Cutting Concepts** Cause and Effect ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8), (HS-LS2-5) **Patterns** ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1) ● Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (HS-PS4-4) ● Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4) **Stability and Change** ● Much of Science deals with constructing explanations of how things change and how they remain the same.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) **Disciplinary Core Ideas** ESS3.A : Natural Resources ● Resource availability has guided the development of human society. (HS-ESS3-1) ● All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2)	**Examples, Outcomes, Assessments:** Instructional Focus: ● Summarize which resources we obtain from the ocean. ● Describe offshore drilling for oil ● Describe various types of commercial fishing practices. ● Summarize environmental disasters (oil spills, whaling, tuna depletion) ● Examine the coastal effects of “superstorm Sandy”. ● Research government legislation of topics that the students are interested in IE: fisheries management, mineral

ESS3.B: Natural Hazards ● Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (HS-ESS3-1) ESS3.C: Human Impacts on Earth Systems ● The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (HS-ESS3-3) ● Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (HS-ESS3-4) ESS3.D: Global Climate Change ● Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5) ● Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (HS-ESS3-6) ETS1.B: Developing Possible Solutions ● When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (secondary to HS-ESS3-2), (secondary HS-ESS3-4) ETS1.B: Developing Possible Solutions ● When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (secondary to HS-ESS3-2), (secondary HS-ESS3-4)	deposit exploitation, beach replenishment.. Sample Assessments: ● Periodic reading quizzes ● Teacher-derived Powerpoint presentation (available for student download) ● Class discussions ● Mini in-class projects on specific issues ● Substantial group research project and presentation on government / conservation / legislation. Interdisciplinary Connections ● Humanities, History, Law, Environmental science, Geology Technology Integration ● Use of “Chromebooks” to access web-based resources Global Perspectives ● Global Perspective is self-evident. Culturally Responsive Teaching ● Likewise, this unit is intimately related to the culture of our global community.

Curricular Addendum

Career-Ready Practices **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**:. Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Interdisciplinary Connections** ● Close Reading of works of art, music lyrics, videos, and advertisements ● Use Standards for Mathematical Practice and Cross-Cutting Concepts in science to support debate/inquiry across thinking processes **Technology Integration** Ongoing: ● Listen to books on CDs, Playaways, videos, or podcasts if available. ● Use document camera or overhead projector for shared reading of texts. Other: ● Use Microsoft Word, Inspiration, or SmartBoard Notebook software to write the words from their word sorts. ● Use available technology to create concept maps of unit learning.

Instructional Strategies:
Supports for English Language Learners:

Sensory Supports	Graphic Supports	Interactive Supports
Real-life objects (realia)	Charts	In pairs or partners
Manipulatives	Graphic organizers	In triads or small groups
Pictures & photographs	Tables	In a whole group
Illustrations, diagrams, & drawings	Graphs	Using cooperative group
Magazines & newspapers	Timelines	structures
Physical activities	Number lines	With the Internet (websites) or software programs
Videos & films		In the home language
Broadcasts		With mentors
Models & figures		

from https://wida.wisc.edu

Media Literacy Integration

- Use multiple forms of print media (including books, illustrations/photographs/artwork, video clips, commercials, podcasts, audiobooks, Playaways, newspapers, magazines) to practice reading and comprehension skills.

Global Perspectives

- The Global Learning Resource Library

Differentiation Strategies:

Accommodations	Interventions	Modifications
Allow for verbal responses	Multi-sensory techniques	Modified tasks/ expectations
Repeat/confirm directions	Increase task structure (e.g., directions, checks for understanding, feedback)	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding (e.g., writing, reading aloud, answering questions in class)	Individualized assessment tools based on student need
Audio Books	Utilize prereading strategies and activities: previews, anticipatory guides, and semantic mapping	Modified assessment grading