

Science: Environmental Science
Unit 4: Aquatics

<p>Essential Understandings</p>	<ul style="list-style-type: none"> ▪ Water is a renewable resource essential for all life on earth. ▪ Water’s chemical structures and physical properties make it the most unique substance on earth. ▪ Water’s ability to retain heat modifies local climatic conditions in areas near large bodies of water. ▪ Although water covers nearly 70% of the earth’s surface, over 97% is saltwater. ▪ Water is naturally cleaned and recycled through a process known as the hydrologic cycle. ▪ The four human uses of water are domestic, agricultural, in-stream, and industrial. ▪ Reduced water quality can seriously threaten land use and in-place water use. ▪ We must keep our local freshwater supply clean and uncontaminated in order to survive on planet earth.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ▪ What are the chemical and physical properties of water and why is it so unique? ▪ How does the hydrologic cycle purify water and replenish the watershed? ▪ What are the four human uses of water and why is it so important? ▪ What lives in freshwater besides fish? ▪ What is a BMI? ▪ How do we protect and manage our water resources? ▪ What are some common threats to our water resources? ▪ Name some benefits of a wetland and describe the changes that could be expected with the destruction of a wetland?
<p>Essential Knowledge</p>	<ul style="list-style-type: none"> ▪ A watershed is a drainage area or basin in which all land and water areas drain or flow toward a central collector river, pond, lake, ocean or lower elevation. ▪ All water systems: groundwater, wetlands, streams, rivers, lakes, ponds, estuaries, marine intertidal zones, and open ocean are all part of a watershed (a large area that transports water) ▪ The chemical and physical properties of surface water will vary continuously and allow for many species of living organisms. ▪ Forested wetlands, bogs, and marshes are the three types of wetlands found in Maine. ▪ The hydrologic cycle cleanses and recycles our water supply naturally. We cannot survive without a clean freshwater supply.
<p>Vocabulary</p>	<ul style="list-style-type: none"> ▪ <u>Terms</u>: watershed, wetland, runoff, groundwater, aquifer, transpiration, dam, reservoir, evaporation, precipitation, freshwater ecosystem, lakes, ponds, streams, rivers, emergent plants,

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	<p>submerged plants, littoral zone, limnetic zone, oligotrophic lakes, eutrophic lakes, biochemical oxygen demand, periphyton, swamps, marshes, potable water, hydrologic cycle, evapotranspiration, unconfined aquifer, water table, vadose zone, confined aquifer, aquiclude, aquitard, artesian well, porosity, domestic water, irrigation, industrial water uses, in-stream water use, eutrophication, pollution: point source/nonpoint source, fecal coliform bacteria, thermal pollution, storm-water runoff, water diversion, primary sewage treatment, secondary sewage treatment, trickling filter system, sewage sludge, activated-sludge sewage treatment, chlorination, tertiary sewage treatment, salinization, and groundwater mining.</p> <p style="text-align: center;">○</p>
<p>Essential Skills</p>	<ul style="list-style-type: none"> ▪ Draw and label the BHS water cycle using the terms and definitions correctly from The Water Cycle and Water Resources activity worksheet. ▪ Review and answer practice assessment questions for textbook chapters 6 and 16 by matching terms and definitions, determining true or false statements, identifying correct multiple choice responses, or writing complete sentences to answer challenging questions before answering them on a unit test. ▪ Answer and then review the previous regional Maine Envirothon test question answers regarding the Aquatics unit before doing them correctly on a test. ▪ Identify common benthic macro-invertebrates in both the BHS ponds and boundary stream to complete the lab activity and worksheets. ▪ Complete the How to Read a Topographic Map and Delineate a Watershed activity and then perform each skill on a test.
<p>Related Maine Learning Results</p>	<p>E1 Biodiversity E2 Ecosystems</p>
<p>Sample Lessons And Activities</p>	<p>Draw and label the BHS Water Cycle using the Water Cycle and Water Resources activity worksheet.</p> <ul style="list-style-type: none"> ▪ Read Chapters 6 and 16 and answer the assigned end of chapter review questions and practice test questions for each. ▪ Read and complete the Defining A Watershed activity. ▪ Individual students will be asked to take a written true/false question pre-test regarding the properties of water. ▪ Students will watch the “Water’s Physical Properties” and “Water’s Structure” videos and complete the accompanying worksheets before answering written post-test questions. ▪ All students will be given chapter 6 and 16 notes on the properties of water prior to witnessing a power-point presentation and then

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	<p>given follow-up questions to be completed.</p> <ul style="list-style-type: none"> ▪ Identify “Major River Divides” of Maine by completing an assigned worksheet. ▪ Read and “Give Me Ten” facts on the basic BMI morphology packet. ▪ Identify common benthic macro-invertebrates in the BHS pond and stream using a lab sheet and dichotomous key. ▪ Groups of two students will read and learn “How To Read A Topographic Map And Delineate A Watershed” by doing the activity packet. ▪ Select and research one Maine freshwater fish and complete the project worksheet, poster, and presentation to their class. ▪ Read and then answer Limnology packet questions before reviewing answers in class. ▪ If time allows...students will be asked to complete a local positive impact project on a topic of their choice by doing a hands on activity and a two-page typed report.
<p align="center">Sample Classroom Assessment Methods</p>	<ul style="list-style-type: none"> ▪ Answer post-test questions from observing the physical and chemical structures demonstrations and water videos. ▪ Textbook Chapters 6 and 16 Quizzes and Tests. ▪ Previous Maine Envirothon Test Questions on Aquatics. ▪ Benthic macro-invertebrates lab quiz. ▪ Aquatics Unit Test.
<p align="center">Sample Resources</p>	<ul style="list-style-type: none"> ▪ <u>Publications: Environmental Science: A Study of Interrelationships Eighth Edition by Enger/Smith</u> ▪ <u>Maine Envirothon Aquatics Station packet</u> ▪ <u>Peterson Field Guides Freshwater Fishes by Lawrence M. Page and Brooks M. Burr , 1991</u> ▪ <u>Pond Life edited by Zim, Golden Nature Series</u> ▪ <u>“Water on the Web” www.watersontheweb.org/index.html</u> ▪ <u>Textbook of Limnology by Gerald Cole</u> ▪ <u>Videos: Merrymeeting Bay: The Rising Tide of Stewardship</u> ▪ <u>Water’s Structure</u> ▪ <u>Water’s Physical Properties</u> ▪ <u>Freshwater Ecosystems</u>
<p align="center">Technology Link</p>	<ul style="list-style-type: none"> ▪ http://www.brunswick.k12.me.us/curriculum