

**South Hadley High School
Accelerated Environmental Issues Curriculum Map**

South Hadley High School learning expectations covered

LE 4: Demonstrate personal, social, and civic responsibility.

LE 5: Acquire, apply, integrate, analyze, and synthesize knowledge.

LE 8: Identify and apply appropriate technologies.

Timeline			
Unit	Title	Number of Weeks	Semester
1	Forestry	10	1
2	Aquatics	9	1
3	Soils	6	2
4	Wildlife	7	2
5	Current Issue	6	2

SUBJECT: Environmental Issues Accelerated

Big Idea/ Essential Question: Identifying tree species, MA: wooded land, various ecosystems, wood products, wood as energy

Estimated Time: 10 weeks total, more in the early year and late school year (fall and spring go outside)

Standard	Skills	Assessments	Content	Notes
<p>Forestry</p>	<p>ID the typical trees (39 trees required by the Envirothon) in MA</p> <p>Use of a dichotomous key (Peterson's Field Guide)</p> <p>Recognize a typical Massachusetts forest habitat</p> <p>Know invasive vs. native species</p> <p>Understand the benefits of using wood as an energy source</p>	<p>Create Tree Folder = test grade</p> <p>Performance assessments outside identifying trees around school and Newton Smith Brook conservation area</p> <p>Group quizzes using twigs and/or photos</p> <p>Ecostation (in class) practice</p> <p>Written tests with tree characteristics</p> <p>Lab- measure the cordwood in one tree</p>	<p>Tree characteristics (bud, leaf, flower, fruit, bark, form)</p> <p>Basic tree characteristics & terminology: e.g. opposite, alternate, simple, compound, serrated, vase shaped, columnar</p> <p>Tree uses</p> <p>Changes in NE forests over time</p> <p>Diseases/insect pests</p> <p>Succession, competition, forest communities, invasive species</p> <p>Trees sites: e.g. trees that like wet sites, trees that are found as understory plants</p> <p>% MA forested land</p> <p>Wood products & MA economy</p> <p>Wood burning stoves</p> <p>Cord wood</p> <p>Oil vs. wood costs</p> <p>Measure trees for wood</p>	<p>Use real trees outside to record tree characteristics</p> <p>Use PowerPoint slides with tree characteristics & facts</p> <p>Use dissecting microscope to draw buds</p> <p>Use Peterson Tree Field Guides</p> <p>No Latin species names, just Latin family names (Envirothon requirements)</p> <p>MADCAPHORSE = opposite leaved plants</p> <p>Use Biltmore stick to measure tree diameter and Hypsometer to measure logs = board feet, convert to cords</p> <p>Use Clineometer to measure tree height</p> <p>Student share wood stove information from home</p>

SUBJECT: Environmental Issues Accelerated

Big Idea/ Essential Question: Stream, pond & lake types in MA, wetlands, groundwater, water supplies, water pollution, aquatic insects

Estimated Time: 9 weeks total

Standard	Skills	Assessments	Content	Notes
<p>Aquatics</p>	<p>Lab: Measure the discharge rate of the Newton Smith Brook</p> <p>Lab: Measure the temp, pH, and oxygen levels of the Newton Smith Brook</p> <p>Lab: Measure the N & P levels of the Newton Smith Brook</p> <p>Collect & ID aquatic insects</p>	<p>Explain why the formula for discharge rate makes sense: Speed x sq feet x .8</p> <p>Written Aquatics/Water test</p> <p>Labs (see skills)</p> <p>Ecostation (in class) practice- insect ID using keys</p>	<p>World water availability Watersheds Stream classification Stream order Discharge rate of streams Riparian zones Lentic vs. lotic flow Turbulent vs. laminar flow Alterations to watersheds: Dams, dredging, erosion, runoff, irrigation, recreation Ex.s of groundwater contamination in our area Stream health: Water temp, pH, oxygen, N, P levels, turbidity Water pollution Lake age, eg. eutrophic Point source vs. non-point source pollution Homeowner vs. factory vs. agriculture & water Remediation of water Conservation of water Lake turnover in NE</p>	<p>Explain discharge formula: Faster water = more water Wider and deeper streams mean more water Correction factor of 20% (x .8) to account for deeper water is slower and the orange we use to measure speed floats towards the top</p> <p>Ch 5 & 13 in Environmental Issues text</p> <p>Research: water article Speeches- conserve water Research South Hadley's water supply: where, how much, quality</p> <p>Hydropower in Holyoke</p> <p>Energy efficient shower heads, toilets, gray water systems</p>

SUBJECT: Environmental Issues Accelerated

Big Idea/ Essential Question:

Estimated Time: 6 weeks total

Standard	Skills	Assessments	Content	Notes
<p>Soils</p>	<p>ID soil type using the soils key: form a ball, ribbon, grittiness</p> <p>Use the Munsell Soil Color Charts to identify soil type</p> <p>Use a soil pit to : recognize soil profile and horizon layer depths</p> <p>Predict soil type from land use (current and historically)</p>	<p>Written Soils test</p> <p>Lab skills (see Skills)</p> <p>Ecostation (in class) practice</p>	<p>Recognize the importance of preserving soils for food production</p> <p>Types of soil erosion and formation- wind, water, glaciers, gravity</p> <p>Soil formation, parent material, organic matter</p> <p>Decomposition of organic matter</p> <p>3 basic soil type particles: sand, silt, clay</p>	<p>Students describe their own soil at home (color, texture, permeability, organic matter, dry, wet), as well as what will grow there</p> <p>Students bring in soil sample (use Munsell color charts) and line up samples in clear jars according to gradation in color- darkest to lightest to see variety in South Hadley</p> <p>Use Soil Surveys for area Look at soil maps and topography</p>

SUBJECT: Environmental Issues Accelerated

Big Idea/ Essential Question:

Estimated Time: 7 weeks total

Standard	Skills	Assessments	Content	Notes
<p>Wildlife (animals)</p>	<p>Track Identification</p> <p>Know the species of game and non-game wildlife in Massachusetts</p> <p>Pelt, skull & scat ID</p> <p>Be aware of Massachusetts Fish & Wildlife Laws (hunting seasons, game species)</p> <p>Amphibian ID: frogs, toads, salamanders, eggs of each</p>	<p>Amphibian test</p> <p>Student webpages of a particular wildlife species</p> <p>Ecostation (in class) practice</p>	<p>Typical wildlife found in MA- familiarity and identification</p> <p>Distribution</p> <p>Range</p> <p>Animals & people</p> <p>Diseases spread by animals to people</p> <p>Feeding signs</p> <p>Habitat</p> <p>Behavior</p> <p>Scat</p> <p>Bones/skulls</p> <p>Food webs</p> <p>Predator/prey</p> <p>Endangered species</p> <p>Protection laws</p> <p>Adaptation</p> <p>Survival</p> <p>Carrying capacity</p>	<p>Bring in preserved animals from UMASS to ID</p> <p>Student research an animal of choice- create an online webpage for their animal</p> <p>Students then have to answer questions on all animals by using these student-created websites</p>

SUBJECT: Environmental Issues Accelerated

Big Idea/ Essential Question:

Estimated Time: 6 weeks total, mostly at the end of the year, right before the Envirothon competition in early May

Standard	Skills	Assessments	Content	Notes
<p>Current Issues: MA Envirothon Current Issue (varies)</p> <p>Sustainable development Root causes of unsustainable development Resource use Renewable energy</p> <p>Population</p> <p>Climate Change Extreme weather & effects</p> <p>Pollution Ozone depletion Acid rain</p>	<p>Public speaking Voice, body language, eye contact, credibility, facts, convincing examples, memorization</p> <p>Research current data and history of South Hadley</p> <p>Interviews of South Hadley citizens and public officials</p> <p>Team work</p> <p>Community organizing</p> <p>Map and poster creation, professional presentations</p>	<p>Top 5 students plus 1 alternate go to the Envirothon state competition</p> <p>Several speeches given throughout the year, use rubric to grade</p> <p>Quiz on global warming, vs. ozone, vs. acid rain</p> <p>Papers written based on research of South Hadley</p> <p>Posters for Envirothon presentation including facts about South Hadley & our community project</p>	<p>Use Al Gore's movie, "An Inconvenient Truth" Research facts given in movie to either confirm, deny, or update those facts</p> <p>Research coal, oil, nuclear power</p> <p>Research South Hadley: energy use, population</p> <p>Research renewable energy sources: solar, wind, geothermal, biomass, hydropower</p> <p>Student choice of project to benefit South Hadley</p>	<p>Community Research Award available through the Envirothon (must fill out contact info page)</p> <p>Community Project award available through the Envirothon</p> <p>Speeches: start short, start reciting something already written Get longer as time goes on Have specific goals: e.g. convincing speech, use learned facts, tell story, use emotion Use local papers to research South Hadley</p>