

Unit	Essential Question: As we live on an island in Lake Champlain, what do we need to know about the Lake Champlain Basin in order to live here well, now and in the future?
Introductory Investigations	<p><u>Focus Question:</u> Where does your drinking water come from?</p> <ul style="list-style-type: none"> • Field trip to the Cut with Watershed model demonstration • Water Cycle and Water Table Models
Chemistry 1	<p><u>Focus Question:</u> What are the properties of water?</p> <ul style="list-style-type: none"> • Chemistry Unit – see calendar of activities • Sources: Project Wet, SMILE IIT project lessons, condensed physical and chemical reactions labs <p><u>Formative Assessment:</u> How does one property or function of water connect to the economy, environment, or people of South Hero? Show this connection through a poster, dance, skit or letter home.</p>
Chemistry 2	<p><u>Focus Question:</u> What are the indicators of water quality?</p> <ul style="list-style-type: none"> • Swarming Electrons • pH of Common Liquids Lab • Field Trip – water quality testing, data analysis and report <p><u>Formative Assessment:</u> Choose one indicator of water quality. What does this indicator suggest about water quality around South Hero? How does this impact the economy, environment, or people of South Hero? Show this impact through publishing a news report.</p>
Physics	<p><u>Focus Question:</u> What are fluid dynamics?</p> <ul style="list-style-type: none"> • Starbase Program • KLA Universe Unit -Modeling Earth, Moon, Sun
Chemistry / Physics	<p><u>Focus Question:</u> What are the forces that act on objects in water?</p> <ul style="list-style-type: none"> • STC Floating and Sinking <p><u>Formative Assessment:</u> How do the Lake Champlain Ferries impact the economy, environment, or people of South Hero? Show the forces involved and this impact through a technical drawing, in print or digitally.</p>
Human Body	<p><u>Focus Question:</u> What is the effect of water quality on the human body (you!)?</p> <ul style="list-style-type: none"> • Insights Human Body systems – Lessons 1, 2, 8-14 • Project Wet – “Poison Pump” <p><u>Formative Assessment:</u> Compare and contrast Haiti and South Hero. What do we need to be (or not need to be) concerned about here in terms of quality water supply? How does this impact the economy, environment, or people of South Hero? Display your findings in a wiki designed to encourage donations to the Pennies for Port-Au-Prince campaign.</p>
Ecosystems	<p><u>Focus Question:</u> What is the effect of water quality on living organisms?</p> <ul style="list-style-type: none"> • STC Ecosystems <p><u>Formative Assessment:</u> Choose an aquatic animal or plant species in Lake Champlain that you have learned about. Analyze the factors that contribute to the health of your species in the lake. How does this impact the economy, environment, or people of South Hero?</p>
Watershed Culminating Project	<p><u>Focus Questions:</u> As we live on an island in Lake Champlain, what do we need to know about the Lake Champlain Basin in order to live here well, now and in the future?</p> <ul style="list-style-type: none"> • Local field trips • Identification of project (e.g. field work, field guide, quest) • Project work • Sharing of project

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Level: Middle School (Science)

Vermont State Standards:

Organisms, Evolution, and Interdependence #7.13 Students understand the characteristics of organisms, see patterns of similarity and differences among living organisms, understand the role of evolution, and recognize the interdependence of all systems that support life.

The Human Body #7.14 Students demonstrate understanding of the human body — heredity, body systems, and individual development — and understand the impact of the environment on the human body.

Theories, Systems, and Forces #7.15 Students demonstrate understanding of the earth and its environment, the solar system, and the universe in terms of the systems that characterize them, the forces that affect and shape them over time, and the theories that currently explain their evolution.

Context: I live and teach in South Hero, in the Champlain Islands in Lake Champlain, a unique location in terms of culture, ecology and economy. I teach 5th and 6th grade students math and science in partnership with my teaching colleague, who teaches language arts and social studies. Our school is small; we have 24 students this year on our team. Our small size, unique location, and broader school commitment to place based learning and service learning allows us to be flexible, dynamic, and integrative in our approach to teaching and learning. Our middle school teaching philosophy centers around building self-motivated, empowered learners with the communication (writing and public speaking) and problem solving skills necessary to be successful in high school and beyond in this 21st century world. Although I have been teaching math at Folsom for 5 years, this is my first year teaching both math and science in a specific team.

I first envisioned this unit as a way to help me organize a fairly disparate and chaotic mixture of units presented as our district science curriculum. It has evolved into a whole new way of thinking of my teaching. In its current evolution, the design of the unit provides students the opportunity to study science and social studies standards based content situated in our unique place within the Lake Champlain Basin. Additionally, they have opportunities to engage in service learning throughout the unit and in the culminating activity.

The theme of water anchors units in chemistry, physics, the human body, and ecosystems throughout the year. The year begins with a field trip that includes a watershed demonstration situated near the waterfront where they can look out and see the Adirondacks as well as the Green Mountains and get a feel for the natural bowl that is the “basin” that we will refer to all year. Students then explore the properties and functions of water (chemistry), using a variety of activities designed to differentiate by learning style and learning modality (movement, reading, listening, video, simulations, etc.). In the next unit, student study the indicators of water quality, followed by a unit on fluid dynamics (chemistry and physics). The next unit is anchored on the concept of buoyancy (physics), using the Lake Champlain Ferries as a stage to promote motivation and relevance. A unit on the human body follows, including a lesson that asks students to explore our local water supply system and compare our situation to that of Haiti during a cholera epidemic. In the final unit, students explore the effect of water quality on living organisms as they learn about ecosystems. This includes classic bottle biology activities as well as an investigation of a nearby wetland.

Formative assessment activities are designed into each unit throughout the year. These activities are designed to provide students the materials and background skills they will need for the culminating activity, in which they answer the essential question they design a digital tour of South Hero. The digital tour is designed to promote tourism in the Islands, the main drive of the local economy, and thus provides an avenue for service learning, as well as collaboration with a broader community.

Sample Lesson Plan: Haiti Lesson
