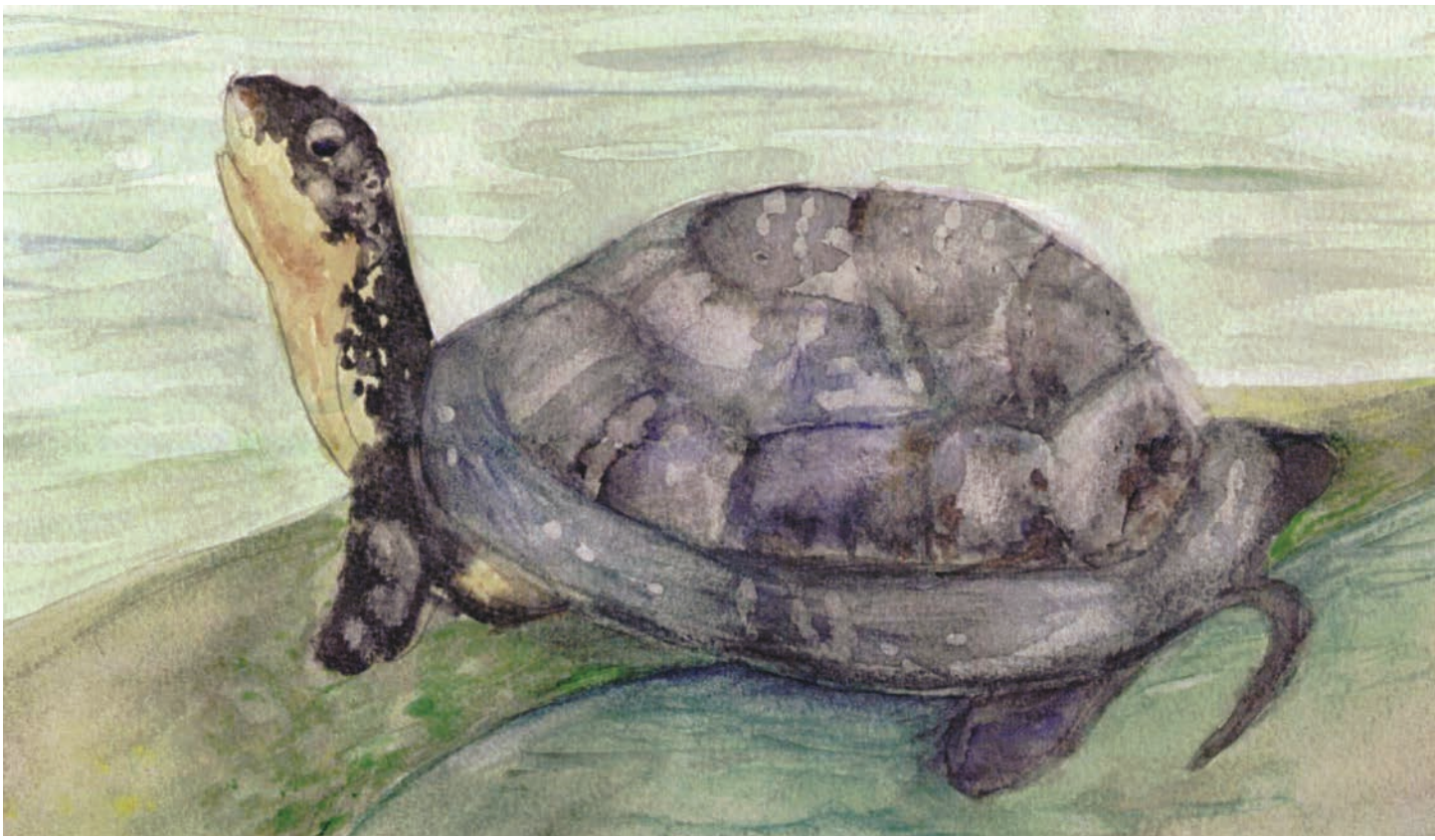
EL Education

Model Expedition: Grade 7

Four Rivers Charter Public School
Greenfield, MA

Life in a Vernal Pool



This learning expedition combined original scientific research and writing, creative writing, artwork, political advocacy, and community service. It culminated in a real-world achievement.

Guiding Questions:

What is a vernal pool?

How can we gain state certification and protection for our local vernal pool?

How can scientific facts and research be used to create informative, accurate, and engaging field-guide writing?

How can stories be used to create curiosity about the natural world?

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SUMMARY: The Life in a Vernal Pool learning expedition brought students outside of the school to conduct intensive scientific research at a local vernal pool. This vernal pool served as a case study for addressing state standards on ecology and taxonomy and included extensive skill building in species identification, nonfiction reading, scientific writing, and measurement. The students' first major project was an application to the state of Massachusetts for official vernal pool certification. Further book research and instruction in watercolor technique and expository and creative writing gave students the tools they needed to complete the second major project of the expedition – the *Life in a Vernal Pool* field guide. Designed for young children, the field guide includes paintings, descriptions, and original folktales about animals that live in and around vernal pools. The book was donated to the local public library. Thanks to these seventh graders' thorough research and advocacy, they achieved real change in their community.

Academic Skills and Standards

SCIENCE AND TECHNOLOGY

- Taxonomy and species identification
- Ecology
- Geology, topography, and hydrology

ENGLISH

- Writing – expository, scientific, and creative

MATH

- Proportional thinking and mathematical similarity
- Ratios and proportions
- Units of measure

VISUAL AND PERFORMING ARTS

- Watercolor
- Grid drawing
- Photography

HEALTH AND WELLNESS

- Fieldwork safety

PERFORMANCE AND RELATIONAL CHARACTER

- Group collaboration
- Critique and revision

BELOW *Data collection by Four Rivers seventh graders led to official vernal pool certification by the state of Massachusetts. The area will now be protected by law.*

CASE STUDY: THE HIGHLAND PARK VERNAL POOL

In preparation for applying to the state for official vernal pool certification, students conducted a case study of their local vernal pool, using the Natural Heritage & Endangered Species Program's *Guidelines for the Certification of Vernal Pool Habitat* as a resource for data collection. The certification process required students to describe the location and distinctive features of the pool in detail, and to measure and map the pool throughout a season. They identified and documented vernal pool species, observed their lifecycles and reproductive activities, and classified them as obligate or facultative vernal pool organisms. Students coordinated as a group to avoid counting the same organism twice as they worked to identify the egg masses, larvae, and juveniles of several amphibian species. They used scoop nets to look for fairy shrimp, aquatic insect larvae and nymphs, leeches, fingernail clams, and snails. Each find was documented with dates, counts, and photographs.

PROJECT ONE: GAINING STATE VERNAL POOL CERTIFICATION

Each student recorded data on an enlarged copy of the *Vernal Pool Field Observation Form* that they would eventually submit to the Natural Heritage & Endangered Species Program at the Massachusetts Division of Fisheries & Wildlife. After carefully compiling their data, students completed the application and sent it to the state. Nearly nine months later they received word that their hard work had paid off—their vernal pool was officially certified and will be protected by the state of Massachusetts.

PROJECT TWO: CREATING THE LIFE IN A VERNAL POOL FIELD GUIDE

This field guide was a major publication with six significant components and extension options.

Watercolor Painting and Scientific Illustration

Students created an accurate scientific illustration of their assigned animal in its habitat. Art and science teachers worked together to introduce students to the work of John James Audubon and the ways naturalists have used art to document new species of animals. Art and math teachers also worked together to help students use mathematical similarity and proportional thinking to create scaled-up drawings of their animals from photographs and grids. The art teacher provided mini-lessons on watercolors and students created final illustrations that were both beautiful and accurate.

Diet and Feeding Habits

Students created a food web diagram centered on their assigned animal, with accompanying captions in bullet point form. After a gallery of first drafts, students created a rubric defining what makes a clear and understandable food web and how bullet points should enhance, explain, or give more detail about the diagram.

Physical Description

Students described the movement, sound, color, shape, size, and measurements of their vernal pool animal accurately and vividly so that young readers could picture the animal. This section of the field guide, along with writer's workshops, helped students explore descriptive writing and the writing traits of *ideas* and *voice*. The more scientific challenge was for students to help a reader understand how the animal uses its internal and external physical features as adaptations to meet its needs and survive in its particular habitat. In writing this section of the field guide, students were able to put to use their careful observations of color and texture from their watercolor projects.

Habitat

This written section challenged students to give their readers a clear description of the climate and physical features of the animal's required habitat and range: Where and when should a reader go to observe the animal in the wild? How and when is the animal connected to a vernal pool? What particular part or season of the vernal pool does the animal use? Students worked on supporting their statements with details and examples.

ABOVE *Students learned to control the medium of watercolor to create washes and textures that give two-dimensional compositions the illusion of three dimensions.*

Natural History, Taxonomy, and Lifecycle

In order to write a clear and understandable description of their animal's life history, students worked to understand the differences between several orders in the animal kingdom. An earlier classification poster project introduced students to the concepts of classification and taxonomy, but their detailed descriptions of the lifecycles of their animals helped deepen their understanding of the differences between incubation and gestation or between gradual and complete metamorphosis. The research and writing process gave students more time to make connections between the new words and the animal they'd come to know so well throughout the expedition.

Folktale

After an extensive period of researching and reporting facts, students were asked to think creatively about their animal. Writing for a younger audience meant having to provide the reader with a sense of wonder about the natural world along with the rich information of the field guide. The genre of folktales provided the perfect place for both fact and fiction to work together to entertain. Animals had to be characterized enough to foster a connection between them and the reader, but not contain so many points of departure from reality that the story was outlandishly unbelievable. The folktales had to be entertaining and creative while also bringing to life the facts about the animal and its connection to vernal pools.

Extension Options

Students inevitably moved at different paces through the process of writing and revising (and often revising again) based on peer and teacher feedback. Students who needed writing support had time to confer with both peers and adults, while other students became editors and production-team members if they completed their work early in the process. Designing the cover, writing about the authors, creating a taxonomy topic page, or organizing the glossary or table of contents allowed students to learn new skills or put their particular talents to use toward the common goal of publishing a high-quality field guide.

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Connections to the Community and Larger World

Fieldwork
- Great Falls Discovery Center
- Greenfield Library
- Five visits to the vernal pool in Highland Park

Experts
- Local public library librarian
- Staff at Department of Fish and Wildlife
- Educator at Great Falls Discovery Center

Service Learning
- Certifying the Vernal pool
- Presenting a copy of the field guide to the local library as a thank you for the help they gave with the research

Exhibitions
- School wide Expo night featuring original watercolor paintings and complete field guide

Final Product
- Complete application for official vernal pool certification
- Field Guide titled *Life in a Vernal Pool: Field Guide and Folktales*

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Inspired by the Fading Footprints learning expedition, King Middle School, Portland, ME

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