THE CHILDREN’S SCHOOL OF SCIENCE

Summer 2023

childrensschoolofscience.org
Woods Hole, Massachusetts
Courses are organized into two three-week sessions, with two courses running for the entire six weeks. Session A runs from July 3 to July 21, and Session B runs from July 24 to August 10. Classes meet daily Monday through Friday for an hour and 45 minutes. Attendance at every class is expected. Courses are organized according to students’ interests and age-appropriate study. Children may enroll in the youngest class (Seashore Life) if they reach the age of 7 years by the time they start Science School, and have finished first grade. An initial registration will begin by early February. During this time, students may sign up for only one class per session (one class for session A and one class for session B, or one session AB class). This will allow more families the opportunity to place a child in a class. Towards the end of February, we will re-open registration and students may enroll in additional classes if space is available. In any case, students under 10 are discouraged from enrolling in more than one class per session. A non-refundable $35 fee is due at the time of registration. Tuition for each three-week course is $340, and six-week classes are $680. Tuition is non-refundable. Scholarships: Partial or full scholarships are available to those in need. Please send a written request for financial aid to scholarship@childrensschoolofscience.org.

The Children’s School of Science encourages and develops in children a love and appreciation of science. Inquiry, direct observation, and understanding of nature guide our instructional philosophy. Frequent field trips and hands-on classroom study give students the opportunity to explore nature, become adept at observation, and discover the rules that govern natural processes. The world-famous scientific community of Woods Hole offers additional opportunities to learn about research in different fields. The unusual complexity of the waters, geology, and biology of the greater Falmouth area provides a uniquely well suited “live” learning environment.
### 2023 COURSE SCHEDULE

#### Session AB
- **July 3 - Aug. 10**

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<tr>
<th>Time</th>
<th>Session AB</th>
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<tr>
<td>8:30 - 10:15</td>
<td>Seashore Life 7-8</td>
<td>Animal Behavior 8-9</td>
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#### 10:30 - 12:15

- Seashore Life 7-8
- Marine Biology 9-10
- Microbiology 11-12
- Neural Systems and Behavior 14-16
- Advanced Marine Biology 14-16

#### 12:30 - 2:15

- Introduction to Film Photography 12-13
- Woods, Ponds, and Fields 8-9
- Art, Science, and Nature 9-10
- Meteorology 11-12
- Biological Illustration 14-16

#### 2:30 - 4:15

- Experimental Ecology 10-11
- Marine Vertebrates 12-13
- Robotics/ROV 13-15
- Climate Change and Biodiversity 14-16
- Botany 10-11
- Nautical Science 12-13
- Robotics/ROV 13-15
- Climate Change and Coastal Resilience 14-16

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**MARK YOUR CALENDARS!**

- Register by visiting the childrensschoolofscience.org website
- kate@childrensschoolofscience.org

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**2023 Calendar**
- **July 3** – Session A Begins
- **July 4** - No School
- **July 5** – Back to School Night 6-7pm
- **July 19** – Open Board Meeting 7 pm
- **July 21** – End of Session A
- **July 24** – Session B Begins
- **July 25** – Back to School Night 6-7 pm
- **August 7** – Annual Meeting 7:30 pm
- **August 10** – End of Session B

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**kate@childrensschoolofscience.org**
### AGES 7-8

**SEASHORE LIFE (A, B, AB)**
Students will explore local beaches and salt marshes to observe and learn about the animals and plants that live there. Activities will include collecting intertidal environments, setting up classroom aquaria, experiments, and art projects. The six-week version of the course will allow for a more in-depth study of seashore communities and invertebrate phyla.

### AGES 8-9

**WOODS, PONDS, AND FIELDS (A, B)**
Students will learn about animals and plants of terrestrial and freshwater environments through outdoor activities and collections and by setting up terraria and aquaria in the classroom. Separate units will introduce students to plants, insects and spiders, reptiles, amphibians, and birds.

**ANIMAL BEHAVIOR (A, B)**
Animals are born with innate behaviors, already knowing how to do lots of things. A fox has the instinct to chase prey, like a rabbit, and that same kind of instinct is seen in a dog when it chases a ball. Animals also have learned behaviors. Herring Gulls learn to drop clams onto the road to crack them open by watching other gulls do it. Students will observe animals to learn about what they do and why they do it. Students will set up some experiments to find out how animals learn.

### AGES 9-10

**ART, SCIENCE, AND NATURE (A)**
This course blends science, nature, and the visual arts. Students will use various materials to create forms of art while learning about ecological relationships between organisms and local natural environments. Each week students will explore different habitats along the seashore, in the woods, in freshwater wetlands, and in suburban backyards of Woods Hole. Through sketches, sculptures, and other projects, students will showcase the connections among animals, plants, and their environments as well as our interactions with them.

**MARINE BIOLOGY (A, B)**
This is a diverse field-oriented course in which students will visit rocky, sandy, and marshy ecosystems to collect animals and plants and learn about what they are and how they live. In the classroom, students will keep organisms in aquaria for a closer look and use microscopes for close study.

**ECOLOGY OF THE BIKE PATH (A, B)**
Riding bicycles lets students reach the unique aquatic and upland ecosystems along the Shining Sea Bike Path. During daily rides, students will do ecological studies of the distinct habitats and environments along the bike path. Participants must provide their own bicycles and helmets and be comfortable riding for several miles and in a straight line. A skills test will be administered on the first day of class. (Space limited to 14 students.)

### AGES 10-11

**ORNITHOLOGY (A)**
Did you know that there is no such bird as a “sea gull”? And that the three most common birds in North America are native to Europe? This course is designed to give students a basic understanding of bird biology as well as the ability to identify local birds by field marks, voice, and song. Activities will include field exploration and observation of nest sites, bird flight, life history, comparative morphology and coloration, and behavior. Binoculars will be provided.

**EXPERIMENTAL ECOLOGY (A)**
Students will design and construct simple instruments and experiments to learn about ecological concepts and the ways that human activities interfere with natural processes in ecosystems. We will observe the negative impacts of pollution, litter, and habitat destruction and develop solutions to these problems. Students will take field trips to woods, ponds, seashore, and saltmarsh to observe and collect organisms to set up terraria and aquaria.

**GEOLOGY OF CAPE COD (B)**
Did you know that Cape Cod and the Islands were formed by a huge ice sheet thousands of years ago? Students will be introduced to the geological history of Cape Cod through field work, experiments, and classroom modeling. The class will also cover topics such as fossils, soil, and water.

**SEAWEEDS (B)**
Did you know that we most likely consume some form of seaweed everyday without even knowing it? Come find out why seaweeds are so popular lately. Over the course of three weeks, students will immerse themselves in hands-on activities that cover such topics as: form and function, growth and light, photosynthesis and respiration, eutrophication and pollution, ocean acidification, and aquaculture. Students will learn how to identify local species using identification guides, examine ecological interactions between seaweeds and their surroundings, press seaweeds, eat seaweeds, and design a kelp farm in a fish tank.

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Woods Hole, MA
CHEMICAL OCEANOGRAPHY (B)
Students will learn about the chemical properties of seawater such as salinity, temperature, and pH. Students will investigate how changes to ocean chemistry due to natural processes (such as biological activity or geology) or human activities (such as pollution) may impact both marine and terrestrial life.

BOTANY (B)
Plants provide the foundation for all life on earth. Students collect and identify plant species and learn about their importance in ecosystems. Through experiments, microscopy, dissection, and field work, students gain a hands-on appreciation for botanical concepts and the dynamic role that plants play in the world around us.

MICROBIOLOGY (A)
Students will develop superb microscopy skills while learning about microorganisms such as diatoms, tardigrades ("water bears"), and crab larvae that they collect on field trips to habitats like forests, freshwater ponds, saltwater environments, and under rocks in the backyard.

ENTOMOLOGY (B)
Students learn about the major groups of insects: their habits, growth and development, and the important roles they play in terrestrial and aquatic ecosystems. Many of our activities will involve collecting insects in fields, woods, ponds, and backyards, and rearing them in the classroom. (Did you know that one third of everything we eat is dependent on insect pollinators?)

METEOROLOGY (A)
Weather is easy to study because it’s around us every day and is always changing. But what is weather, what causes it, and how can we predict it? Solar energy input, temperature differences, and pressure variations in the atmosphere drive the weather. Students learn about the components of weather and use and construct instruments that will demonstrate or measure them. Students will become adept at identifying cloud types and recording data and looking for patterns...and maybe even know what tomorrow’s weather will be without consulting the internet!

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Ichthyology (A, B)
Students learn to fish using different baits and lures, as well as by setting traps and using seines. They study the characteristics of species found in local North Atlantic and freshwater habitats, including their diverse forms and survival strategies.

Marine Vertebrates: Cetaceans, Pinnipeds, and Sea Turtles (A)
Students will learn about the whales, dolphins, porpoises, seals and sea turtles that can be seen in waters around Cape Cod. They will learn about the physical and behavioral adaptations that have evolved for a life lived entirely in the ocean or, in the case of pinnipeds, both in the water and out. Animals will be observed from shore, on boats, and at a marine animal rescue and rehab center.

Invertebrates (B)
Invertebrates dominate the animal world. Invertebrates include organisms such as sponges, cnidarians, worms, echinodermata, mollusks, and arthropods. This hands-on class will survey the diversity of invertebrate phyla and explore the evolutionary relationships between these groups. Students will study internal and external anatomy, reproduction, feeding, and behavior through observation of live specimens, dissection, classroom experiments, and field trips to local ecosystems.

Nautil Science (B)
Explore boat design and build a seaworthy model boat, learn to navigate by chart and compass, experiment with the principles of buoyancy and displacement, and delve into nautical terminology and practical seamanship. Classes will take trips to the working waterfront and through Woods Hole Passage.

Introduction to Film Photography (AB)
Students will learn how to use a film camera and understand the science behind photography, composition, and printing photos in the dark room. This class will introduce the balance of light and time, developing film and printing photos. Students will explore how to artistically capture nature through a lens. CSS will provide each student with an SLR film camera for the class. Materials Fee: $40.

Robotics/ROVs (13-15) A, B
Students focus on the technical, economic, and environmental aspects of real-world marine engineering and electronics. Through frequent field trips to Woods Hole labs, project design, and data analysis, students explore principles such as buoyancy, propulsion, and energy. Students build a functional remotely operated vehicle (ROV). Materials Fee: $40.

Neural Systems and Behavior (A)
In NSB, students will learn how the brain & nervous systems of different kinds of animals works to control behavior and cognition. Vertebrates and invertebrates use different neural strategies to navigate and survive in their world, which will be explored in this course. Students will be exposed to the neural systems of mammals, fish, insects, and humans and taught how to think critically when developing scientific experiments.
Kate Schafer's lifelong love of the oceans and marine life was sparked in Woods Hole as a student in Bettina Dudley's Advanced Marine Biology at CSS. A few years later she attended Stanford University, where she graduated with a Bachelor of Science in Biology. While living in Jamaica after graduation, she became fascinated with the incredible diversity of life on coral reefs, so she returned to California to earn her Ph.D. in integrative biology at UC Berkeley. Her dissertation research was largely spent in Belize, studying mantis shrimp and pygmy octopuses. While in Belize, she witnessed a coral bleaching event at her study sites. This experience and others have led to her commitment to doing everything she can to stave off the climate crisis's worst impacts and advocate for sustainability at every level. Kate has taught high school biology and environmental science for 16 years, and is now the chair of the science department at Sequoiah School in Pasadena. Her summers bring her to Woods Hole, for many years as a CSS instructor, and now as the school's Director, where she is excited to pass her love of science and nature onto a new generation of students.

Jessica Rencher joins the CSS team every summer from the Rocky Mountains. She instructs teaching candidates at Colorado State University. Her Early Childhood Education courses focus on K-3 literacy, science, and math. Previously, Jessica dedicated her talent as a first-grade teacher in Fort Collins, Colorado, a zip-line guide in the coastal Redwoods in Santa Cruz, California, and an advisor to international students at The American School in Switzerland in Lugano, Switzerland. However, of all these adventures, teaching science in Woods Hole remains her all-time favorite experience. CSS gave Jessica her first official teaching job in 2010; the rest is history. She's a passionate educator, an avid science enthusiast, and committed to being a lifelong learner. Jessica graduated with a B.S. in Biology with an emphasis in teaching from California Polytechnic State University and earned an M.Ed. from Colorado State University. Currently, she's a Human Resources and Education doctoral candidate at CSU. Jessica enjoys spending time with family and friends, playing the violin, traveling, reading, skiing, and hiking with her Siberian Husky.

Becky Lash is often endearingly referred to as the 'keeper of the school.' She has been involved with the Children's School of Science almost every summer since 1963, when she was just a wee lass in Seashore Life. She is passionate about science education and creating engaging experiments! Becky's teaching career started at CSS in 1977, with some summers off here and there. Among her favorite classes to teach are Entomology and Ornithology. Before her extensive teaching career, Becky went to Penn and Cornell, where she earned her degrees. Recently, the CSS Board convinced her to join the leadership team. She plays an instrumental role in developing innovative courses while honoring the long-standing traditional CSS classes. Becky considers teaching in Falmouth Public Schools, being an aquarist at the Woods Hole Science Aquarium, and being a landscaper/gardener three of her most enjoyable jobs. She is currently obsessed with being part of the New England Aquarium's sea turtle rescue and rehab team. Take some time this summer to chat with Becky about her work with the sea turtles!
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