



# THE CHILDREN'S SCHOOL OF SCIENCE

.....  
Summer 2023  
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[childrensschoolofscience.org](http://childrensschoolofscience.org)  
Woods Hole, Massachusetts





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.

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](mailto:scholarship@childrensschoolofscience.org).

**The Children's School of Science is made possible through the cooperation and collective generosity of dedicated parents, teachers and benefactors.**

CSS gratefully acknowledges all contributions from its many friends and families. CSS also gives thanks to Church of the Messiah of Woods Hole, Clowes Fund, Elaine Noe Memorial Fund, Esther Simon Charitable Trust, The Friendship Fund, Marine Biological Laboratory, Memorial Funds in Honor of Past Presidents and Friends of CSS, NOAA Fisheries Service, Woods Hole Foundation, Penikese Island School, Woods Hole Historical Museum, Woods Hole Oceanographic Institution, Woods Hole Public Library, and Woods Hole Woman's Club. CSS also thanks Teaching Assistants Chair Josh Olins, Ways and Means Committee Chairs Emily Yang and Gail Diamond, and the Recording Secretary David Epstein.



# MARK YOUR CALENDARS!

 Register by visiting the [childrensschoolofscience.org](https://childrensschoolofscience.org) website

 [kate@childrensschoolofscience.org](mailto:kate@childrensschoolofscience.org)

## 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

## 2023 COURSE SCHEDULE

Session AB July 3 – Aug. 10	Session A July 3 – July 21	Session B July 24 – Aug. 10
8:30 – 10:15		
	Seashore Life (7-8) Animal Behavior (8-9) Ecology of the Bike Path (9-10) Ornithology (10-11) Ichthyology (12-13)	Seashore Life (7-8) Animal Behavior (8-9) Ecology of the Bike Path (9-10) Seaweeds (10-11) Ichthyology (12-13)
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)	Marine Biology (9-10) Geology (10-11) Embryology (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)	Woods, Ponds, and Fields (8-9) Chemical Oceanography (10-11) Entomology (11-12) Invertebrates (12-13)
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)



# 2023 COURSE DESCRIPTIONS

LETTERS INDICATE THE SESSION(S)

## 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.

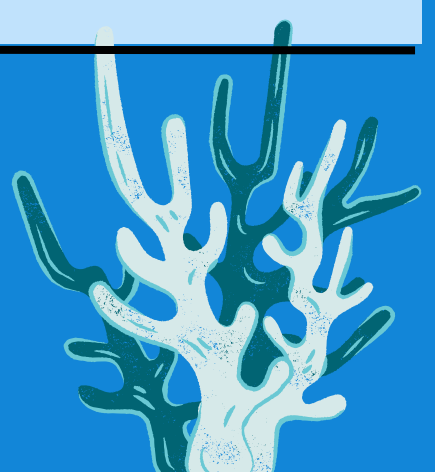
### GEOLOGY OF CAPE COD (B)

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.

Register now at  
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Woods Hole, MA



# 2023 COURSE DESCRIPTIONS

## AGES 10-11 CONTINUED...

### 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.

## AGES 11 - 12

### 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!

## AGES 12-13

### 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, echinoderms, 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.

### NAUTICAL 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; space is limited to 10 students. Materials Fee: \$40

## AGES 13 - 15

### 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.

## AGES 14 - 16

### 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.



# 2023 COURSE DESCRIPTIONS

AGES 14 - 16 CONTINUED...

## BIOLOGICAL ILLUSTRATION (A)

Illustration can be a useful and beautiful method of recording information. In this class we will become familiar with basic techniques of biological illustration, while examining the structure, anatomy and function of local organisms. This course will also compare historically important methods of illustration with modern techniques such as photomicrographs and data-based animations.

## CLIMATE CHANGE AND BIODIVERSITY (A)

Climate change is altering ecosystems around the globe, and Cape Cod is being affected in profound ways. In this course we will develop a scientific understanding of how and why the climate is changing and then explore the impact that these changes are having on the biodiversity of ecosystems on the Cape and beyond. We will learn from experts who are conducting research on these topics and use a systems approach to learning how climate change is impacting both natural and human systems.

## CLIMATE CHANGE AND COASTAL RESILIENCY (B)

Coastal resilience is the ability of a system to "bounce back" after hazards such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts. During this class, we will consider the ways our coastal environment has adapted to changes in past climates (e.g., glacier retreat, isostasy) to illuminate what we expect our shoreline and surrounding ecosystems to be in response to our current and future climate conditions. Climate change is causing sea level rise, altering the intensity, path, and frequency of extreme storms, changing the distribution of sea-ice, and even altering the chemistry of seawater. Many of these changes are influencing the way our coast responds to erosion, deposition, and estuarine processes. Additionally, human interventions such as beach nourishments, jetties, and seawalls modify the natural equilibrium of the coastal system. We will work with historical data and future predictions to learn about many of these changes and ways in which our future decisions with regard to coastal hazards can encourage resilience. We will go on field trips to observe and understand records of climate effects on our coastal and estuarine systems.

## EMBRYOLOGY (B)

During development, a single cell will divide and produce many different cell types with different shapes and jobs. How does this happen? How long does it take? This course will introduce and explore the changes and stages of embryonic development in organisms through collection and microscopic research.

## ADVANCED MARINE BIOLOGY (A, B)

Through hands-on exposure, students will delve into the biology and ecology of marine vertebrates and invertebrates, their evolution and classification, anatomy and physiology, and behaviors and habitats. This course will include snorkeling field trips to different ecosystems around Woods Hole. Students must provide their own mask, snorkel and fins. A swim test will be administered requiring students to swim 50 ft and tread water for 2 minutes. (Space limited to 14 students.)

## CSS ADMINISTRATIVE TEAM

### MEET KATE



### DIRECTOR

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 her to commit 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 Sequoyah 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.

### MEET JESSICA



### ASSISTANT DIRECTOR

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 life-long 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.

### MEET BECKY



### CURRICULUM CHAIR

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!





# CHILDREN'S SCHOOL OF SCIENCE BOARD MEMBERS

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