



CSS July 1 – August 8, 2019

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 three-week (A session runs from July 1 to July 19, and B session from July 22 to August 8) and six-week sessions (AB runs from July 1 to August 8.) Introduction to Photography, Comparative Habitats, and Black and White Film Photography can be taken as a four-week class (designated A+) or as a six-week class (AB). Classes meet daily Monday through Friday for ninety 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 if they reach the age of 7 years by the time they start Science School, and have finished first grade. Students under 10 are discouraged from enrolling in more than one class per session. A \$35 fee is due at the time of registration. **Tuition for one six-week course is \$450, one four-week course is \$345 (listed as A+), and tuition for each three-week course is \$260.** It is the policy of the Children's School of Science that tuition is non-refundable.

Scholarships: Partial scholarships are available to those truly in need. Please send a written request for financial aid to general@childrenschoolofscience.org.

CSS is run by volunteers. All parents are asked to volunteer whenever possible; however, at a minimum, all parents of enrolled children are required to provide transportation for at least one field trip, or to work at the CSS front desk for two class periods, per three week period enrolled. **Please note that additional children may not accompany you on your volunteer duty.**

2019 Calendar

- July 1** – First day of classes
- July 2** – Back to School Night 6-7pm
- July 4** – No class
- July 17** – Open Board Meeting 7pm
- July 19** – End of session A
- July 22** – Session B begins
- July 23** – Back to School Night 6-7 pm
- July 25** – CSS Picnic Ballpark 5 pm
- August 5** – Annual Meeting 7:30 pm
- August 7** – Open House 5-6:30 pm
- August 8** – End of sessions B and AB



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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 Anonymous Donors, Bristol-Myers Squibb Matching Gifts Program, Church of the Messiah of Woods Hole, Clowes Fund, Esther Simon Charitable Trust, Ethel Metz Fund, The Friendship Fund, Marine Biological Laboratory, Memorial Funds in Honor of Past Presidents and Friends of CSS, NOAA Fisheries Service, Woods Hole Historical Museum, Woods Hole Oceanographic Institution, Woods Hole Public Library, Woods Hole Woman's Club.

Visit childrenschoolofscience.org to learn more about the school.

SCHEDULE OF CLASSES 2019

SESSION AB July 1 – August 8	SESSION A July 1 – July 19	SESSION B July 22 – August 8
<u>8:30 – 10:00</u> Seashore Life (7–8) Marine Biology (9–10) Ichthyology (11–12) B&W Film Photography (13–16)	<u>8:30 – 10:00</u> Ornithology (12-13) Session A+ B & W Film Photography (13-16) ends July 26	<u>8:30 – 10:00</u> Nautical Science (12–13)
<u>10:15 – 11:45</u> Comparative Habitats (8–9) Intro to Film Photography (12-13)	<u>10:15 – 11:45</u> Ecology of the Bike Path (9–10) Physical Oceanography (10–11) Robotics and ROVs (13-15) Session A+ Comparative Habitats (8–9) Intro to Film Photography (12-13) (classes end July 26)	<u>10:15 – 11:45</u> Ecology of the Bike Path (9–10)) Chemical Oceanography (10–11) Robotics and ROVs (13-15)
<u>12:00 – 1:30</u>	<u>12:00 – 1:30</u> Seashore Life (7–8) Animal Behavior (8–9) Marine Biology (9–10) Embryology (12–13) Adv. Marine Biology (14–16)	<u>12:00 – 1:30</u> Seashore Life (7–8) Animal Behavior (8–9) Marine Biology (9–10) Environmental Science (11-13) Biological Illustration (14–16)
<u>1:45 – 3:15</u>	<u>1:45 – 3:15</u> Seashore Life (7–8) Woods, Ponds and Fields (8–9) Botany (10–11) Invertebrates (11–12) Coastal Resilience (14-16)	<u>1:45 – 3:15</u> Seashore Life (7–8) Woods, Ponds and Fields (8–9) Geology (10-11) Entomology (11-12) Monitoring Cape Waters (14-16)

CSS ADMINISTRATIVE OFFICERS 2019

Administrative Director: Doug Jones
Assistant Administrator: Aaron Sloboda
Curriculum Chairs: Karen Dell, Naomi Fraenkel Altschul
Registrar: Crickett Warner
Teaching Assistants Chair: Apple Stephen
Website and Facebook Administrator: Aaron Sloboda

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2019 COURSES

Numbers listed in parentheses indicate ages for each class; letters indicate the session(s).

SEASHORE LIFE (7-8) A, B, AB

Students will explore and study the flora and fauna of the seashore, including dunes, marshes, beaches and shallow water. Activities may include setting up aquaria, experiments, art projects and collections. The six-week version of the course will allow for a more in-depth study of seashore life communities.

COMPARATIVE HABITATS (8-9) AB, A+

This six-week course will explore the salt- and freshwater habitats of Woods Hole by looking closely at fish, birds, insects and crustaceans. Students will learn to identify common species and discuss how they thrive in varied environments including estuaries, salt marshes, ponds and lakes. Students will study the properties of water and the impact of humans on coastal ecosystems. This course can be taken for the first four weeks only.

WOODS, PONDS, AND FIELDS (8-9) A, B

Students will observe the local habitats of terrestrial plants and animals through outdoor activities and classroom tanks. They may make collections of plants, insects and other natural objects. Separate units will introduce students to botany, entomology, herpetology, geology and limnology.

ANIMAL BEHAVIOR (8-9) A, B

Have you ever wondered why certain animals live where they do, or behave in particular ways? Through collection, observation and experimentation, this course will study the habits and habitats of local animals.

MARINE BIOLOGY (9-10) A, B, AB

This is a diverse field-oriented course in which students will visit rocky, sandy and marshy ecosystems to study and collect the major groups of animals and plants of the ocean. In the classroom, students will observe marine organisms with dissecting microscopes and will make a shell collection. The six-week version will study these areas in greater depth.

ECOLOGY OF THE BIKE PATH (9-10) A, B

Bicyclists will study the ecology and geology of the unique aquatic and upland ecosystems along the Shining Sea Bike Path. There will be daily rides with weekly driving field trips to visit more distant destinations. Participants must provide their own bicycles and helmets and be comfortable riding for several miles and in a straight line on the bike path. A skills test will be administered on the first day of class.

BOTANY (10-11) A

Plants provide the foundation for all life on Earth. In botany, we collect and identify local plant species, and learn about their importance in our ecosystem. 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.

GEOLOGY OF CAPE COD (10-11) B

Students will be introduced to the geological history of Cape Cod. The course will focus on such topics as Cape Cod's rock record and history, fossils, soil and water. Laboratory modeling and fieldwork will help students examine the changes in the environment over past geological periods.

PHYSICAL OCEANOGRAPHY (10-11) A

This class will focus on the physical processes within the ocean such as wave formation, tides, gyres and global ocean circulation. Students may investigate the impact of these processes on beach profiles, coastal erosion and phenomena such as the "Pacific plastic garbage patch". They will learn about the ocean-atmosphere relationship and its importance to weather and climate across the globe.

CHEMICAL OCEANOGRAPHY (10-11) B

Students in this class will learn about the chemical properties of sea water such as salinity, temperature and pH. They may 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.

ICHTHYOLOGY (11-12) AB

In this class, students will learn to fish using different baits and lures, as well as by setting traps and using seines. They will study the characteristics of species found in local North Atlantic and freshwater habitats, including their diverse forms and survival strategies.

INVERTEBRATES (11-12) A

Invertebrates dominate the animal world. They 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 and feeding through observation of live specimens, dissection and field trips to local ecosystems. We will also investigate aspects of their behavior through detailed observation and design of experiments in the classroom.

ENTOMOLOGY (11-12) B

Did you know that there are 900,000 known species of insects in the world and probably as many not yet known? Why are they so successful? We will investigate the curious and beautiful world of insects through the collection and classification of living specimens. We will study their morphology, habitats and learn about their important role in human survival.

ENVIRONMENTAL SCIENCE (11-13) B

This course will focus on ecosystems around Woods Hole and human impacts on those systems. We will explore physical, chemical and biological aspects of both aquatic and terrestrial habitats. By collecting samples and taking measurements, we will see how humans are impacting local ecosystems and discuss how these impacts could be lessened.

INTRODUCTION TO FILM PHOTOGRAPHY

(12-13) AB, A+

Welcome to photography! In this class, we will learn how to use a film camera and understand the science behind photography. We will explore how to artistically capture nature through our lens and be introduced to film development and photo printing in the darkroom. Students must provide their own, *tested and working*, SLR film camera; space is limited to 10 students. This course may be taken for just the first four weeks. Materials Fee: \$30

ORNITHOLOGY (12-13) A

Our focus will be on learning how to identify birds in the field by size, shape, sound, color, behavior and field marks. We will investigate the diversity of birds; anatomy, form, and function; flight and the adaptive functions of feathers. We will learn about breeding behaviors, and by dissecting nests, we'll learn to identify the birds that made them.

NAUTICAL SCIENCE (12-13) 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.

EMBRYOLOGY (12-13) A

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.

ROBOTICS/ROVs (13-15) A, B

Students will 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 will explore principles such as buoyancy, propulsion and energy. Students will build a functional remotely operated vehicle (ROV). Materials Fee: \$40.

B & W FILM PHOTOGRAPHY (13-16) A+, AB

Discover the science behind the unique, creative qualities of black and white film photography. In this intensive 4-6 week class, students will review the basic principles of photography including the balance of light and time, composition, and darkroom procedures for developing and printing film. Students must provide their own *tested and working* SLR film camera; space is limited to 12 students. This course may be taken for just the first four weeks. Materials Fee: \$60.

ADVANCED MARINE BIOLOGY (14-16) A

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.

COASTAL RESILIENCE (14-16) A

Climate change and rising sea levels will have big impacts on coastal communities, including Woods Hole. This course examines those impacts and explains the concept of resilience. Students will inventory resources at risk, perform experiments aimed at understanding the meaning of sustainable recovery, and examine the types of actions being taken to minimize and adapt to the consequences of coastal flooding and other storm effects.

Note: The course will involve several extended field trips past the normal 3:15 ending time.

MONITORING CAPE COD WATERS (14-16) B

Water is an essential and precious resource on the Cape, but relatively little attention is paid to rivers and freshwater sources. In this course, we will investigate the biology and chemistry of Cape waters, tracing the pathways from the bogs and rivers out into the marine environment. Students will learn how these waters are monitored and studied, and they will have the opportunity to participate in research projects using modern techniques.

Note: The course will involve several extended field trips past the normal 3:15 ending time.

BIOLOGICAL ILLUSTRATION (14-16) B

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.