



CSS July 2 – August 9, 2018

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 2 to July 20, and B session from July 2 to August 9 and six-week sessions (AB) run from July 2 to August 9.) Advanced Marine Biology and Black and White 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. Early registration will run from mid-February to March 15th. During this time, students may only sign up for one AB class or one A and one B class as our goal is to place as many students as possible in a course. After March 15th students may enroll in additional classes if space is available. 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.**

2018 Calendar

- July 2** – First day of classes
- July 3** – Back to School Night 6-7pm
- July 18** – Open Board Meeting 7 pm
- July 20** – End of session A
- July 23** – Session B begins
- July 24** – Back to School Night 6-7 pm
- July 26** – CSS Picnic Ballpark 5 pm
- August 6** – Annual Meeting 7:30 pm
- August 8** – Open House 5-6:30 pm
- August 9** – 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.

SCHEDULE OF CLASSES 2018

SESSION AB July 2 – August 9	SESSION A July 2 – July 20	SESSION B July 23 – August 9
<u>8:30 – 10:00</u> Seashore Life (7–8) Marine Biology (9–10) Ichthyology (11–12) Film Photography (13–16)	<u>8:30 – 10:00</u> Nautical Science (12–13) Film Photo A+ (13-16) ends July 27	<u>8:30 – 10:00</u> Environmental Science (12-13)
<u>10:15 – 11:45</u> Comparative Habitats (8–9) Invertebrates (11–12) Advanced Marine Biology (14–16)	<u>10:15 – 11:45</u> Ecology of the Bike Path (9–10) Invertebrates (11–12) Intro to Film Photography (12-13) Adv Marine Bio A+ (14–16) ends July 27	<u>10:15 – 11:45</u> Ecology of the Bike Path (9–10) Embryology (12–13)
<u>12:00 - 1:30</u>	<u>12:00 – 1:30</u> Seashore Life (7–8) Animal Behavior (8–9) Marine Biology (9–10) Chemical Oceanography (10–11) Experiments in Woods Hole (14-16)	<u>12:00 – 1:30</u> Seashore Life (7–8) Animal Behavior (8–9) Marine Biology (9–10) Physical Oceanography (10–11) Microbial Life (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) Entomology (11-12) Robotics and ROVs (13-15)	<u>1:45 – 3:15</u> Seashore Life (7–8) Woods, Ponds and Fields (8–9) Geology (10-11) Advanced Oceanography (12–13) Biological Illustration (14–16)

CSS ADMINISTRATIVE OFFICERS 2018

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

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2018 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

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.

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.

CHEMICAL OCEANOGRAPHY (10-11) A

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.

PHYSICAL OCEANOGRAPHY (10-11) B

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.

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, AB

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) A

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 (11-12) 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) 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. Materials Fee: \$30

NAUTICAL SCIENCE (12-13) A

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) 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 OCEANOGRAPHY (12-13) B

Students in this course will have an opportunity to explore research currently and historically done at the scientific institutions in Woods Hole. Multiple boat trips, visits to labs, presentations by local scientists, and hands-on experiments will enhance the experience of the young oceanographers.

ROBOTICS/ROVs (13-15) A

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.

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. Materials Fee: \$60.

ADVANCED MARINE BIOLOGY (14-16) A+, AB

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.

EXPERIMENTS IN WOODS HOLE (14-16) A

For more than a century, Woods Hole has been an international center for research, education and training in biology and ocean sciences. This class will introduce students to the diversity of research done in Woods Hole through trips to working labs and classroom visits from research scientists. Students will also have an opportunity to design and conduct their own experiments.

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.

MICROBIAL LIFE (14-16) B

Microbes profoundly impact our external environment as well as our personal biome. Learn about the strange and fascinating world of bacteria, protists and fungi through microscopic observation and experimentation both in the classroom and in various Woods Hole ecosystems.