

WELCOME TO THE ADVANCED LIVING SYSTEMS LAB AND/OR CRUISE PROGRAM

We are pleased that you will be joining us for an Advanced Living Systems program! Your students will be embarking on a fun and fascinating exploration of living systems and the biotic and abiotic components that define them. The Advanced Living Systems Laboratory is typically combined with the Advanced Living Systems Cruise to create a more extensive program but either program can be done separately. If your program includes the boat make sure to read the sections about the boat and have a manifest completed.

In order to better address your needs, we have designed our Advanced Living Systems program to help seventh grade to High School teachers meet California Science Content Standards. We built our At-Sea Learning Center and re-outfitted the *R/V Sea Explorer* to create many new ways for students to experience and investigate a variety of living systems. We are proud to be able to offer your students this one-of-a-kind learning experience, and are pleased that you will be joining us.

Please take a few moments to familiarize yourself with the materials we have included, and share them with other teachers and chaperones who will be joining you. These materials contain important information to prepare you, your chaperones, and your students for your visit. Make sure to link to the 'Required Forms' found just under this 'Prep Pack' link on the web site to find the required Acknowledgement of Risk and Waiver form.

We are excited to present to you our Advanced Living Systems program and are pleased that you'll be joining us. If you have any questions before your program, please do not hesitate to contact our program director, Linda Blanchard at (949) 496-2274, extension 314 for lab questions or Tim Sullivan at (949) 496-2274, extension 315 for boat questions. If you have questions on scheduling, please contact Alexis Honens at (949) 496-2274, extension 610.

Sincerely,
Rick Baker
Vice President of Education

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A. ADMINISTRATIVE CHECKLIST FOR PROGRAM

This preparation package contains information for the *Advanced Living Systems Lab* program that takes place in the At Sea Learning Center. Please review the package carefully to ensure that you will be prepared for your program.

Immediately upon receiving your program agreement...

- Carefully review the Teacher Preparation Package
- Arrange your transportation
- Return your signed program agreement and deposit to the Ocean Institute in order to confirm your reservation.

Two months before your trip...

- Confirm student and adult numbers with the Ocean Institute
- Arrange for parent chaperones—please limit the number to 2 adults for every 12 students

One month before your trip...

- Begin student preparation
- Copy and distribute Acknowledgement of Risk and Waiver to each student and adult participant

Two weeks prior to the trip...

- Mail program payment to the Ocean Institute—full payment must be received a minimum of 10 days before your program
- Contact parents to remind them to sign and return the Acknowledgement of Risk and Waiver
- Collect Acknowledgement of Risk and Waiver from each participant
- Contact the Ocean Institute with any changes in the number of participants. We cannot guarantee our ability to accommodate changes in numbers of students or adults within two weeks of your program date.

One week prior to the trip...

- Review behavioral expectations with students
- Distribute Student Clothing and Supply List
- Contact the Ocean Institute with any last minute questions or changes

24 hours to go!!!...

- Prepare nametags for students and adults
- If inclement weather is expected, contact the Ocean Institute for status of the program.
- Complete ship manifest listing ALL students and adults if you are participating in the Living Systems Cruise.

When you arrive for the Advanced Living Systems Laboratory program...

- Unload the bus in front of the Ocean Institute
- Check in at the Student Services building with a final head count and all Risk and Waiver forms.
- If necessary, students may use the restroom facilities that are located within the teaching complex. Please do so quietly so as not to disturb other programs. Then return to the front of the Student Services building to wait for our staff.

OR

When you arrive for the Advanced Living Systems Boat Program...

- Unload the bus in front of the Ocean Institute
- Check in at the Student Services building with a final head count
- If necessary, students may use the restroom facilities—please limit use to 7 girls and 7 boys at a time
- Have your Manifest filled out with the full name of each passenger (including chaperones) for the *R/V Sea Explorer* Floating Lab Specialist who will greet you before the program
- Seasickness remedies should be taken at least 60 minutes before departure

B. DESCRIPTION OF PROGRAM

Advanced Living Systems Lab / Cruise Combination Program

The Advanced Living Systems Laboratory is typically combined with the Advanced Living Systems Cruise to create a more extensive program but they can be done separately. If you choose to combine them, your students should be divided into 2 equal sized groups before you arrive at the Ocean Institute. One group will start with the cruise and the other will start with the lab.

Advanced Living Systems Laboratory

If you are doing a laboratory program:

The Advanced Living Systems Lab will study the interactions between biotic and abiotic components that affect different types of systems. Students will explore the external and internal systems of a fish, test some of the abiotic factors of water, study the taxonomy system by classifying invertebrates, and make a hypothesis on the effects of increased jelly populations on an ecosystem. The students will receive a brief group introduction and then will be divided into smaller groups to rotate through the following four lab stations.

- **Fish Dissection**

Students will observe form and function of the external anatomy and, with this information, make a hypothesis on the habitat of a mackerel. Using this information, they will generate a hypothesis about mackerel diet. Then they will dissect the mackerel to examine the digestive system linking all parts and test their hypothesis. The dissection will continue with the eye to observe the lens and its adaptation to a water environment. It continues with the respiratory system and any others as time permits. With a high school program, the dissection will continue and they will hypothesize and observe any effects of bioaccumulation of pollution on this type of fish.

- **Water Quality**

Students will test the nonliving (abiotic) factors including pH, temperature, salinity, and dissolved oxygen of the water of an aquarium and holding tank to determine if an organism can be moved from the aquarium system water to the holding tank. Students will discuss how the water affects the animals and how the animals in the tanks may affect the water quality.

- **Invertebrate Biodiversity/ Classification**

Students will learn the characteristics of marine invertebrate phylum's that are represented in our tank farm. In this activity, students will use a field guide to locate four assigned invertebrate animals. Using their observation skills, they will list some of the general characteristics found in these animals. The students will then be supplied with a general classification sheet listing common characteristics for each represented invertebrate phylum. Using this information, they will identify what phylum their assigned animals are in and why.

- **Jellies Biology and Ocean Imbalance**

Jellies often occur in large swarms that can cause damage to an ecosystem. Some scientists feel these swarms are increasing in number and size and are a sign of environmental degradation. At this station, we will look at the jellies and make a hypothesis on what makes it possible for jellies to appear from 'out of nowhere' and to produce great population blooms. We will start by gathering information about the jellies in order to make an informed hypothesis.

Advanced Living Systems Cruise

The two-hour cruise aboard the *R/V Sea Explorer* examines local coastal marine populations, introducing students to a variety of scientific equipment used in the collection and study of marine species. The students focus on the examination of offshore ecosystems and organisms, beginning with an observation of marine birds along the jetty wall as the vessel prepares to leave the harbor. Once upon the open ocean, the vessel scouts out sea lions as students discuss marine mammal adaptations, and the staff prepares for deployment of the ship's scientific equipment. If cetaceans (dolphin or whales) are sighted in the area, there are about 20-30 minutes to locate and observe these marine mammals before returning to the harbor for the final three teaching stations. These teaching stations give the students the opportunity to examine the organisms collected during the cruise. Students learn about the bottom-dwelling fish and invertebrates caught in the otter trawl net at the fish ecology station. In the wet lab, they use video-microscopes to observe a plankton sample. The students sort through the benthic grab mud sample and examine the invertebrates that live in the seafloor sediment habitat.

- **The Benthic Grab**

Students observe the deployment of the Benthic Grab to collect a sample of mud from the sea floor. Once retrieved, students sort through the sample to identify organisms that live in the mud.

- **The Otter Trawl Net**

Students help set the Otter Trawl Net to collect a sample of the organisms that live on the sea floor. Once retrieved, students sort through the sample and identify benthic fish and invertebrates and their adaptations for life on the sea floor.

- **The Plankton Net**

Students help set the Plankton Net to collect a sample of the organisms that drift close to the sea surface. Once retrieved, students observe a sample under a microscope and identify different types of phytoplankton and zooplankton.

Some of the Advanced Living Systems Cruises will have trained adult volunteers onboard to help collect and process samples for collaborative research projects. These projects include a fluorometric analysis of phytoplankton productivity for Scripps Institution of Oceanography, Geographic Information System study of benthic fish populations by Saddleback College, and biotoxin analysis of phytoplankton by the California Department of Public Health.

C. LINKS TO CALIFORNIA CONTENT STANDARDS

Science Standards Addressed during the Advanced Living Systems Laboratory/Cruise

Grade Seven

Life Sciences

2.a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.

3.d. Students know how to construct a simple branching diagram to classify living groups or organism by shared derived characteristics and how to expand the diagrams to include fossil organisms.

5.a. Students know plants and animals have levels or organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.

5.b. Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.

5.g. students know how to relate the structures of the eye and ear to their functions.

7.c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from scientific evidence.

Grade Nine through Twelve

Ecology

6.a. Students know biodiversity is the sum total of different kinds or organism and is affected by alterations of habitats.

6.b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in populations size.

6.c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.

6.d. Students know how water, carbon, and nitrogen cycles between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.

D. ADMINISTRATIVE PREPARATION FOR PROGRAM

ADMINISTRATIVE CONTACT

For questions regarding the Advanced Living Systems Lab program, please contact:

Linda Blanchard, Director of Lab Programs and Volunteers
Telephone Number: (949) 496-2274, extension 314
E-mail: lblanchard@ocean-institute.org

For questions regarding the Advanced Living Systems Cruise, please contact:

Tim Sullivan, At Sea Coordinator
Telephone Number: (949) 496-2274, extension 315
E-mail: tsullivan@ocean-institute.org

For questions regarding scheduling, please contact :

Alexis Honens, Program Reservation Coordinator
Telephone Number : (949) 496-2274, extension 610
E-mail: ahonens@ocean-institute.org

INTRODUCTION

Thank you for choosing the Ocean Institute as your field trip destination. We appreciate the time and effort it takes to prepare your students for their program, and we will do everything we can to make their experience as rewarding as possible.

Please make sure that all of the participating teachers have a copy of these teacher materials. The information contained here can help you find answers to your questions, develop your preparation timeline, and prepare both your students and chaperones. This packet also contains directions to the Ocean Institute as well as contact phone numbers—please call us at any time with any questions you may have about your field trip.

TEACHER INFORMATION: BEFORE THE PROGRAM

You can do several things before you arrive to help make your program run as smoothly as possible:

- Review the program goals, station activities, and expected student behaviors with the students before you arrive. Have them complete the classroom activities, and make sure they have a clear understanding of the educational concepts they will explore during the program.
- Spend some time choosing and preparing your parent chaperones. Review the program goals, station activities, and expected student behaviors with them before you arrive. Make sure that they have a clear understanding of their role as a chaperone.
- Have a signed Acknowledgement of Risk and Waiver for each student and chaperone before boarding the bus.
- Notify the Ocean Institute staff of students with any special health or behavioral considerations.
- Send program payment to the Ocean Institute at least 10 days before the scheduled date of your field trip.
- Have a completed Manifest for the *R/V Sea Explorer* if on the boat program

TEACHER INFORMATION: DURING YOUR PROGRAM

Ocean Institute instructors are all well trained to work with students of different ages and abilities. Both you and the adult chaperones can help the instructors monitor student behavior and safety. There are several things that you can do to help facilitate the smooth running of your educational program:

- Work cooperatively with Ocean Institute instructors and your parent chaperones to manage students during the program.

- Report any problems (including facilities and management) to the Ocean Institute staff as soon as possible.

CHAPERONE INTRODUCTION AND INFORMATION

Adult chaperones play a significant role in safety and the educational quality of the program. We request that you bring no more than 2 adults per 12 students. We ask your chaperones to help us in the following ways:

- Work cooperatively with Ocean Institute instructors and classroom teacher to enforce all safety rules and help keep students on task at the teaching stations.
- Guide students efficiently to different stations throughout the program.
- Act as a positive role model for the students by exhibiting enthusiasm for learning without answering questions directed at students.

PAYMENT

Payment must be received 10 days before your program date. Please mail a **single check** for the total amount of the program minus the deposit you have already paid. Please make checks payable to **Ocean Institute**.

FINAL COUNT

Call the Ocean Institute two days before your program if the number of students or adults changes. When you arrive at the Ocean Institute for your program, you must have an accurate count of total students and adults participating in the program. If the number of participants listed on your Confirmation Form is not accurate, call the Ocean Institute immediately. **We cannot guarantee that changes in numbers of students or adults can be accommodated if requested within two weeks of your program date.**

STUDENT AID

The Ocean Institute maintains a student aid fund for students who are unable to obtain sufficient funding to attend the program. Please call (949) 496-2274, extension 0 for more information and to receive the necessary forms for student aid.

TRANSPORTATION

Student transportation should be arranged well in advance. **It is important that you arrive on time.** Please schedule yourself to arrive at least 15 minutes before your scheduled program start time. If you arrive late, your program time will be shortened.

Buses can unload in front of the Student Services building. After the students have unloaded, the drivers will be notified of where to park the buses and must obtain an Ocean Institute Bus Parking Permit.

STUDENT BEHAVIORAL EXPECTATIONS

Please take time to discuss the academic nature of their field experience with your students before arriving at the Ocean Institute. While at the Ocean Institute, we expect your students to follow the same behavioral rules you have in your classroom.

STUDENT PREPARATION

We have found that the more familiar the students are with program concepts and content before they arrive, the more they will benefit from and enjoy their experience.

FORMS FOR THE ADVANCED LIVING SYSTEMS LAB or CRUISE PROGRAM

Please make sure to have all the completed forms with you upon arrival for your program. These forms are available under 'Required Forms' on the program web page.

Acknowledgement of Risk and Waiver

Each participant must have this form signed by a parent or guardian to participate in the Living Systems Lab or Cruise program. Please make sure that you have one signed form for each student and adult chaperone when you check in with the Ocean Institute staff in the Student Services Building.

Manifest for the R/V Sea Explorer

A Manifest for the *R/V Sea Explorer* must be completed if you have scheduled the Advanced Living Systems Cruise. The Coast Guard requires us to have a completed Manifest in order to account for all passengers before we leave the dock. Please have it completed before you arrive at the Ocean Institute—we will lose valuable instructional time if the Manifest needs to be completed when you arrive. It is important that the Manifest is accurate and includes the first and last names of ALL students, teachers, and chaperones. Your Ocean Institute Floating Laboratory Specialist will take a head count before boarding the vessel and the number of this count must match the number on the Manifest.

STUDENT CLOTHING AND SUPPLY LIST

For safety reasons, students participating in any Living Systems Series program need to have and/or wear the following clothing. The weather is often cooler at the Ocean Institute than it is inland, so make sure your students are prepared.

- Jacket
- Long pants
- Rubber-soled, closed-toe shoes
- Hat
- Sunscreen

Optional Items:

- Camera with film
- Money for the gift and book store
- Sunglasses
- Seasickness remedies for a cruise program

LAURENA G. CHAMBERS GALLERY BOOK AND GIFT STORE

Chambers Gallery Book and Gift Store is a fun and unique non-profit museum store open daily from 9:00 AM to 5:00 PM and definitely worth the visit. The revenue is directed toward lowering tuition for schools that participate in Ocean Institute programs.

To help accommodate all of the schools that would like to shop each day, please have one teacher from your school check-in with a store staff member before your students begin shopping.

There will be a limit on the number of students allowed to shop at one time and we encourage you to organize them so that they all have time to enjoy the shop. Please have one or two adults in the store to help supervise your students. We ask that all food, drink, and backpacks be left outside while they are shopping. Teachers receive a 15% discount in the shop if members of the Teachers Club and 10% normally.

In order to ensure a positive experience, we recommend the following:

1. Plan sufficient time before or after your program to shop.
2. All purchases should be stowed safely away and out of sight for the program.
3. Please allow only 10-12 students in *Chambers Gallery* Book and Gift Store at a time. Remaining students should remain outside in a manner that does not interfere with traffic in and out of the building.

DIRECTIONS TO THE OCEAN INSTITUTE**The address of Ocean Institute:**

24200 Dana Point Harbor Drive
Dana Point, CA 92629
(949) 496-2274

Directions from Los Angeles:

- Travel south on Interstate 5
- Exit on the Pacific Coast Highway Exit
- Stay in the right lane of the exit ramp and go north on P.C.H.
- Turn left onto Dana Point Harbor Drive
- The road ends in the Ocean Institute parking lot

Directions from San Diego:

- Travel north on Interstate 5
- Exit on the Beach Cities Exit
- Stay in the left lane of the ramp and go north on P.C.H.
- Turn left onto Dana Point Harbor Drive
- The road ends in the Ocean Institute parking lot