

WELCOME TO THE WATERSHED SCIENCE DAY PROGRAM

We are pleased that you will be joining us for the Watershed Lab/Cruise program! We are proud and excited to provide your students with this exciting program series. We have built our At Sea and Surfscience Learning Centers, outfitted *RV Sea Explorer*, and developed this program to assist fourth and fifth grade teachers with meeting the California Content Standards for Science. This integrated-discipline program is designed to bring students in communities throughout Southern California to the Ocean Institute to explore the science of watersheds. Students learn about internal systems, water quality, hydrologic cycle, Earth's water supply, nutrient cycles, biological assessments, ecological integrity, and research techniques. Join us for an exploration into watershed science in our labs and out at sea!

Please take a few moments to familiarize yourself with the materials we have included, and share them with other teachers and chaperones that will be joining you. These materials contain important information to prepare you, your chaperones, and your students for your visit. You will also find important forms that must be returned to the Ocean Institute.

If you have any questions about your visit to the Ocean Institute, please do not hesitate to contact our Director of Environmental Programs, Jonathan Witt at 949-496-2274, extension 330. Again, welcome to the Watershed Science series of programs! We're looking forward to your visit.

Sincerely,

Rick Baker
Vice President of Education



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A. ADMINISTRATIVE CHECKLIST FOR DAY PROGRAMS

This preparation package contains information for the Watershed Lab/Cruise program. Please review the package carefully to ensure that you will be prepared for your program.

Immediately upon receiving this package...

- Carefully review the Teacher Preparation Package
- Arrange your transportation

Two months prior to your trip...

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

One month prior to your trip...

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

Two weeks prior to your trip...

- Mail program payment to the Ocean Institute—full payment must be received a minimum of 10 days before your program
- Collect Acknowledgement of Risk and Waiver from each student
- Contact parents to remind them to sign and return the Acknowledgement of Risk and Waiver
- Call the Ocean Institute with any changes in the number of participants. We cannot guarantee that changes in numbers of students or adults can be accommodated if requested within 2 weeks of your program date

One week prior to your trip...

- Review behavioral expectations with students
- Contact the Ocean Institute with any last minute questions or concerns

24 hours to go!!!...

- If inclement weather is expected, contact the Ocean Institute for status of the program
- Prepare nametags for students and adults
- Complete ship manifest listing ALL students and adults participating in the program

When you arrive for the 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 30 minutes before departure



B. DESCRIPTION OF LAB/CRUISE PROGRAM

Watershed Laboratory

Students enter into the At Sea and Surfscience Learning Centers to conduct their research. These experiments are designed to compliment the research completed onboard the *RV Sea Explorer*. Each research team will rotate through all 4 activity stations.

Effects of Pollution on the Internal Anatomy of a Living System (Life Sciences)

Students visually examine the external anatomy and dissect a fish to explore the internal anatomy, paying special attention to the digestive process. They also look for evidence of pollution uptake and disease on the fish.

Water Chemistry/Quality (Physical Sciences)

Students test a water sample from the Dana Point Harbor and measure temperature, pH, salinity, dissolved oxygen, nitrates, nitrites, and phosphates. They results are used to determine the chemical integrity of the water.

Pollutants in a Watershed (Watershed Science)

Students use a watershed model to study the movement and origins of water and pollution within a watershed. Students will use this visual representation to hypothesize the possible effects on the environment, strategies of prevention, and ways to monitor watersheds.

Water Distribution (Earth Sciences)

Students will examine how earth's water supply is distributed i.e. in oceans, icecaps, lakes, rivers, etc. Then, they will discover how little is suitable for human use, and how their watershed and community receives its supply of freshwater.

Watershed Cruise

Students board the *R/V Sea Explorer* as junior scientists for an investigation of the coastal waters off Dana Point. The students are separated into research teams, with each team focusing on specific tests. The program explores current environmental issues through research, analytical thinking, and discussion. As well as, demonstrates how individuals, regardless of where they live, make choices that affect coastal water quality.

Offshore Nutrient Levels (Physical Sciences)

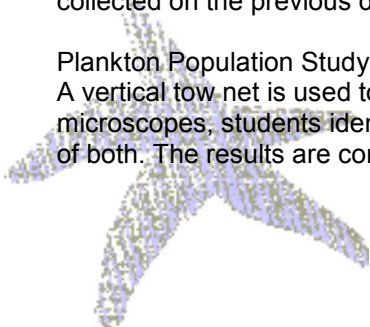
A water sampling bottle is used to collect a sample of water from a designated sampling site. The students then analyze the nitrate, nitrite, and phosphate levels. The results are compared with data collected on the previous day.

Benthic Habitat Assessment (Life Sciences)

The Ocean Institute staff deploy a benthic sampler to retrieve a mud from the ocean floor. The students remove and identify invertebrate organisms living in the sediment. The results are compared with data collected on the previous day.

Plankton Population Study (Life Sciences)

A vertical tow net is used to collect a sample of ocean plankton from a designated sampling site. Using microscopes, students identify both phytoplankton and zooplankton as well as estimate the population sizes of both. The results are compared with data collected on the previous day.



C. LINKS TO CALIFORNIA SCIENCE STANDARDS

Grade Four

Life Sciences

- 2.a. Students know plants are the primary source of matter and energy entering most food chains.
- 2.b. Students know producers and consumers (herbivores, carnivores, omnivores, decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
- 2.c. Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.
- 3.a. Students know ecosystems can be characterized by their living and nonliving components.
- 3.b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- 3.d. Students know that most microorganisms do not cause disease and that many are beneficial.

Investigation and Experimentation

- 6.a. Students will differentiate observation from inference (interpretation) and know scientist's explanations come partly from what they observe and partly from how they interpret their observations.
- 6.c. Students will formulate and justify predictions based on cause-and-effect relationships.
- 6.d. Students will conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and result.
- 6.e. Students will construct and interpret graphs for measurements.
- 6.f. Students will follow a set of written instructions for a scientific investigation.

Grade Five

Physical Sciences

- 1.a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.
- 1.f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.

Life Sciences

- 2.a. Students know many multicellular organisms have specialized structures to support the transport of materials.
- 2.c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small/large intestine, and colon in the function of the digestive system.
- 2.f. Students know plants use carbon dioxide and energy from sunlight to build molecules of sugar and release oxygen.
- 2.g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide and water.

Earth Sciences

- 3.a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.
- 3.d. Students know that the amount of fresh water located in rivers, lakes, and underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing water use.
- 3.e. Students know the origin of the water used by their local communities.

Investigation and Experimentation

- 6.a. Students will classify objects in accordance with appropriate criteria.
- 6.d. Student will identify the dependent and controlled variables in an investigation.
- 6.e. Students will identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.
- 6.f. Students will select appropriate tools and make quantitative observations.
- 6.g. Students will record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make a specific conclusion.
- 6.h. Students will draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

D. ADMINISTRATIVE PREPARATION FOR DAY PROGRAM

ADMINISTRATIVE CONTACT

For scheduling information, please contact:

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

For program information, please contact:

Jonathan, Director of Environmental Programs
Telephone Number: (949) 496-2274, extension 330
E-mail: jwitt@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 telephone numbers—please call us at any time with any questions you may have about your field trip.

TEACHER INFORMATION: BEFORE YOUR 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. Complete the pre-trip activity with your students, 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.
- Have a completed Manifest for the *R/V Sea Explorer*.
- 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.

TEACHER INFORMATION: DURING YOUR PROGRAM

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

- Work cooperatively with Ocean Institute instructors and parent chaperones to manage students during the program.
- Work cooperatively with Ocean Institute instructors and parent chaperones to solve student and chaperone management problems.
- Report any problems to the Ocean Institute staff as soon as possible.

TO START THE PROGRAM

Ocean Institute instructors will greet your students and lead them to the appropriate starting point for your program. They will receive an introduction and then be divided into groups for the duration of the program.

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 two 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.
- Work cooperatively with Ocean Institute instructors and classroom teacher to keep students on task at the stations.
- Guide students 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 the check 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 Program Agreement 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 2 weeks of your program date.**

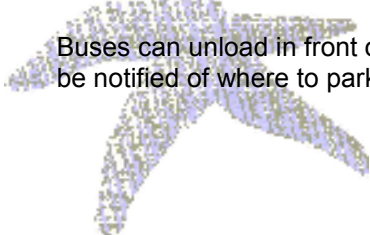
STUDENT AID

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.



FORMS

The following forms can be found in the Appendix. Please make sure to have all the completed forms with you upon arrival for your program.

Acknowledgement of Risk and Waiver Each student must have this form signed by a parent or guardian to participate in the Watershed Lab/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.

Manifest for the *R/V Sea Explorer*

A Manifest for the *R/V Sea Explorer* must be completed before you arrive for the program. 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 must 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 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. We have included a pre program activity packet and answer sheet to introduce important concepts to your students before they arrive for their program.

STUDENT BEHAVIORAL EXPECTATIONS

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

STUDENT SAFETY RULES FOR THE *R/V SEA EXPLORER*

The Watershed Science Cruise program takes place on the *R/V Sea Explorer*. When you arrive at the Ocean Institute, you will be met by an Ocean Institute Floating Laboratory Specialist who will review the following safety rules with you and your students.

- Walk at all times while onboard the *R/V Sea Explorer*—running and horseplay are not permitted.
- Keep both feet on the deck at all times, and remember to stay off the rails.
- Keep off the upper deck and access ladder unless permitted by Ocean Institute instructors.
- Keep hands off the equipment until instructed to do otherwise.

STUDENT CLOTHING AND SUPPLY LIST FOR THE *R/V SEA EXPLORER*

For safety reasons, students participating in the program need to have and/or wear the following clothing.

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

Optional Items:

- Camera with film
- Money for the gift and book store
- Seasickness medication

AVOIDING SEASICKNESS ON THE R/V SEA EXPLORER

There are several things that you and your students can do to avoid seasickness:

- Eat a good breakfast or lunch before the cruise—make sure that you avoid sweets and greasy foods!
- Take anti-motion medication at least 30 minutes before boarding the vessel

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.

Please remind your students that sales tax will be added to their items.

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