

WELCOME TO THE CHAPARRAL TO OCEAN SCIENCE SCHOOL

“When we try to pick out anything by itself, we find it hitched to everything in the universe”

John Muir

You and your students are about to embark on a unique program taking you from the Santa Ana Mountains to the Pacific Ocean. During the three days spent at the Chaparral to Ocean Science School you and your students will have the opportunity to explore up to six Southern California ecosystems: chaparral, oak woodland, riparian, intertidal, benthic, and pelagic.

During this program, students hike along Hot Springs Creek and up the Los Piños trail to explore the biotic and abiotic factors that make each ecosystem a “living system.” They identify plants, collect insects, study microhabitats, and determine how each element fits into a working system of living and non-living parts.

The Chaparral to Ocean Science School curriculum is aligned with the Science Content Standards for California Public Schools. Students will develop and exercise the scientific processes, including observing, communicating, inferring, interpreting data, identifying, and classifying.

In order to help you prepare yourself, your class, and your parent chaperones for the upcoming journey, we have provided a teacher materials package. In this package you will find:

- Administrative checklist
- Program description
- Links to California Science Content Standards
- Administrative preparation materials
- Background materials
- Classroom activities
- Teacher Information Packet with forms
- Chaperone Information Packet with forms
- Parent Information Packet with forms

We appreciate all of the time and effort spent in preparing your class and look forward to your arrival!



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TEACHER FORMS

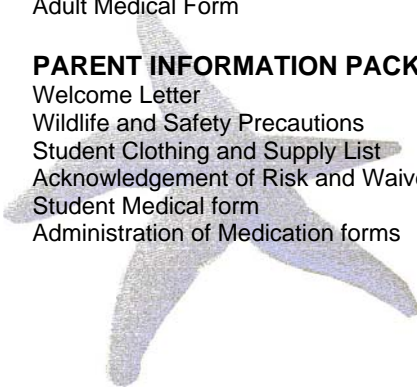
- Adult Clothing and Supply List
- Acknowledgement of Risk and Waiver
- Adult Medical Form
- Activity Group Form
- Cabin Group Form
- Program Information form
- T-shirt Order Form

CHAPERONE INFORMATION PACKET AND FORMS

- Welcome Letter
- Wildlife and Safety Precautions
- Student Guidelines and Discipline Policy
- Frequently Asked Questions
- Adult Clothing and Supply List
- Acknowledgement of Risk and Waiver
- Adult Medical Form

PARENT INFORMATION PACKAGE AND STUDENT FORMS

- Welcome Letter
- Wildlife and Safety Precautions
- Student Clothing and Supply List
- Acknowledgement of Risk and Waiver
- Student Medical form
- Administration of Medication forms



A. ADMINISTRATIVE CHECKLIST FOR CHAPARRAL TO OCEAN SCIENCE SCHOOL

Immediately upon receiving this package...

- Carefully review the Teacher Preparation Package
- Mail an information letter to parents to arrange a parent orientation, and make sure to ask for parent chaperones. We require 1 chaperone for every 9 students
- Arrange your transportation
- Distribute T-shirt information to students and adults

Two months prior to your trip...

- Eighty percent of your funding should be secured
- Recruit your parent chaperones and have a chaperone meeting
- Confirm student and adult numbers with the Ocean Institute
- Distribute Chaperone Information Packets and Parent Information Packets. **KEEP THE MEDICAL FORMS AND THE ACKNOWLEDGEMENT OF RISK FORMS SEPARATE.**
- Fax your T-shirt order 6 weeks before your program to guarantee the requested sizes and a complete order

Six weeks prior to your trip...

- Begin student preparation
- Collect fees
- Select explorations, and complete the Program Information Form. Mail or fax the form to the Ocean Institute
- Contact the Ocean Institute with final number of student and adult participants

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 and medical forms
- Contact parents to remind them to sign and return the Acknowledgement of Risk and Waiver

One week prior to your trip...

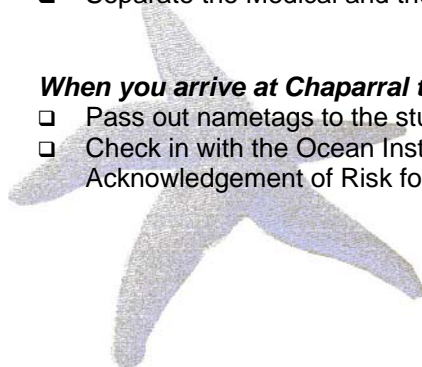
- Review behavioral expectations with students
- Divide students into activity and cabin groups, and complete the activity and cabin group forms
- Contact the Ocean Institute with any last minute questions or changes

24 hours to go!!!...

- If inclement weather is expected, contact the Ocean Institute for status of the program
- Prepare nametags for students and adults, and gather boxes for sack lunches
- Complete ship manifest listing ALL students and adults
- Separate the Medical and the Acknowledgement of Risk forms

When you arrive at Chaparral to Ocean Science School...

- Pass out nametags to the students and adults
- Check in with the Ocean Institute instructors to give them a final count of students and adults as well as the Acknowledgement of Risk forms



B. PROGRAM DESCRIPTION OF CHAPARRAL TO OCEAN SCIENCE SCHOOL

Students spend three days in a wilderness setting exploring six different ecosystems. They examine the relationship between the biotic (living) and abiotic (nonliving) factors that define different ecosystems. Activities include: measuring the abiotic characteristics of different ecosystems, identifying and mapping biotic components of different ecosystems, investigating the interactions between abiotic and biotic components (i.e., organism adaptations), exploring the relationships between biotic components (i.e., food webs, symbiosis), and participating in a number of student investigations designed to explore different aspects of systems biology.

EXPLORATIONS

At Science School, your students complete four "Ecosystem Explorations." Please read the descriptions and select the four explorations best suited for your group. Once you have made your selections, enter your four explorations on the Program Information Form in the Teacher Information Packet, and return the form to the Ocean Institute

Chaparral

Students examine the adaptations of the plants and animals living in the chaparral ecosystem, define the abiotic factors of the chaparral using a Physical Factor Test Kit, search for evidence of animals, identify plant and animal species, discover interactions between organisms, and study the impact of humans on the chaparral ecosystem.

Riparian

Students identify and examine the adaptations of plants and animals living in the riparian ecosystem, collect and identify insects living in the stream microhabitats, test the water quality using scientific equipment, define the abiotic factors of the riparian ecosystem using a Physical Factors Test Kit, discover interactions between organisms, and study the impact of humans on the riparian ecosystem.

Oak Woodland

Students examine the adaptations of the plants and animals living in the oak woodland ecosystem, identify plants using a dichotomous key, identify animals in our Nature Center using field guides, define abiotic factors of the oak woodland using a Physical Factors Test Kit, discover interactions between organisms, and study the impact of humans on the oak woodland ecosystem.

Riparian / Oak Woodland

Students combine the riparian and the oak woodland explorations described above, including stream collection and a visit to the Nature Center.

Earth Science

Students search for evidence of tectonic activity while examining the geologic history and makeup of the Santa Ana Mountains. Students will rotate through activities designed to illustrate how plate tectonics have shaped the Santa Ana Mountains in the distant past, and how erosional forces continue to shape the landscape in present day.



Sample Schedule

Day One

10:30 AM	Students arrive at Lazy W Ranch
10:30 AM – 11:30 AM	Student and Chaperone Introduction
11:30 AM – 12:30 PM	Lunch, Cabins, Hike Preparation
12:30 PM – 2:30 PM	<i>Ecosystem Investigation #1</i>
2:30 PM – 4:30 PM	<i>Ecosystem Investigation #2</i>
4:30 PM – 5:30 PM	Recreation / Showers
5:30 PM – 6:30 PM	Dinner
6:30 PM – 7:30 PM	Showers / Recreation
7:30 PM – 9:00 PM	Nocturnal Investigation
9:00 PM – 9:30 PM	Settling Down
9:30 PM	Lights Out

Day Two

7:00 AM	Awaken
7:30 AM – 8:15 AM	Breakfast
8:15 AM – 9:00 AM	Hike Preparation / Recreation
9:00 AM – 11:00 AM	<i>Ecosystem Investigation #3</i>
11:00 AM – 11:30 AM	Field Notebook
11:30 AM – 12:15 PM	Lunch
12:15 PM – 1:00 PM	Rest and Relaxation
1:00 PM – 2:30 PM	<i>Field Investigation #1</i>
2:30 PM – 4:00 PM	<i>Field Investigation #2</i>
4:00 PM – 4:30 PM	Field Notebook
4:30 PM – 5:30 PM	Recreation / Showers
5:30 PM – 6:30 PM	Dinner
6:30 PM – 7:30 PM	Showers / Recreation
7:30 PM – 9:00 PM	Camp Fire Program
9:00 PM – 9:30 PM	Settling Down
9:30 PM	Lights Out

Day Three

6:45 AM	Awaken
7:00 AM – 7:30 AM	Clean Cabins and Pack
7:30 AM – 8:15 AM	Breakfast
8:15 AM – 9:00 AM	Clean Camp and Load Buses
9:00 AM – 9:45 AM	Transport to Ocean Institute
9:45 AM – 11:15 AM	<i>Ecosystem investigation #4: Intertidal Ecosystem</i>
11:15 AM – 12:00 PM	Lunch
12:00 PM – 4:00 PM	<i>Ecosystem Investigation #5: Living Systems Lab / Cruise</i>
4:00 PM	Load Bus and Head Home

Please note that this is a **Sample Schedule**. Please check your **PROGRAM AGREEMENT** for your departure time.



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, and 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 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.c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

Investigation and Experimentation

- 6.a. Students will differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
- 6.b. Students will measure and estimate the weight, length, or volume of objects.
- 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 results.
- 6.e. Students will construct and interpret graphs from measurements.
- 6.f. Students will follow a set of written instructions for a scientific investigation.

Grade Five

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 intestine, large intestine, and colon in the function of the digestive system.
- 2.e. Students know how sugar, water, and minerals are transported in a vascular plant.
- 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 (CO₂) and water (respiration).

Earth Sciences

- 3.a. Students know most of Earth's water is present as salt water in the oceans, which cover most of the Earth's surface.
- 3.b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.
- 3.c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.
- 3.d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
- 4.a. Students know uneven heating of Earth causes air movements.
- 4.c. Students know the causes and effects of different types of severe weather.
- 4.d. Students know how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.

Investigation and Experimentation

- 6.a. Students will classify objects in accordance with appropriate criteria.
- 6.b. Students will develop a testable question.
- 6.c. Students will plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
- 6.f. Students will select appropriate tools and make quantitative observations.

- 6.g. Students will record data by using appropriate graphic representations and make inferences based on those data.
- 6.h. Students will draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

Grade Six

Plate Tectonics and Earth's Structure

- 1.a. Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; the distribution of fossils, rock types, and ancient climate zones.
- 1.c. Students know lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.
- 1.d. Students know that earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are locations where magma reaches the surface.
- 1.e. Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.
- 1.f. Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.

Shaping Earth's Surface

- 2.a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.
- 2.b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
- 2.c. Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.
- 2.d. Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

Ecology (Life Sciences)

- 5.a. Student know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
- 5.b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- 5.c. Students know populations of organisms can be characterized by the functions they serve in an ecosystem.
- 5.d. Students know different kinds of organisms may play similar ecological roles in similar biomes.
- 5.e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Investigation and Experimentation

- 7.a. Students will develop a hypothesis.
- 7.b. Students will select and use appropriate tools and technology to perform tests, collect data, and display data.
- 7.c. Students will construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
- 7.e. Students will recognize whether evidence is consistent with a proposed explanation.
- 7.f. Students will read a topographic map and a geologic map for evidence provided on maps and construct and interpret a simple scale map.
- 7.g. Students will interpret events by sequence and time from natural phenomena.
- 7.h. Students will identify changes in natural phenomena over time without manipulating the phenomena.

D. ADMINISTRATIVE PREPARATION FOR CHAPARRAL TO OCEAN SCIENCE SCHOOL

ADMINISTRATIVE CONTACT

For questions regarding the Chaparral to Ocean Science School, please contact:

Greg Hermann, Director of Outdoor Education Programs
Telephone Number: (949) 496-2274, extension 344
Fax Number: (949) 496-4296
E-mail: ghermann@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 package also contains directions to the Ocean Institute and the Lazy W Ranch 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:

- Complete the Program Information Form and return it to the Director of Outdoor Education Programs six weeks before your program date. Notify the Ocean Institute staff of students with any special health or behavior considerations
- Send program payment to the Ocean Institute at least 10 days before the scheduled date of your field trip
- Review the program goals, station activities, and expected student behaviors with the students before you arrive. Complete the classroom activities with your students, and make sure they have a clear understanding of the educational concepts they will explore during the program
- Provide each student with a copy of the Parent Information Packet. This packet includes a Welcome Letter, Wildlife and Safety Precautions, Student Clothing and Supply List, Acknowledgement of Risk and Waiver, and Student Medical forms.
- 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. Please provide each chaperone with a copy of the Chaperone Information Packet. This packet includes the Acknowledgement of Risk and Waiver and Adult Medical Form.
- Have a signed Acknowledgement of Risk and Waiver and medical forms for each student and chaperone before boarding the bus
- Use the Activity Group Form to divide your students into hiking groups, and use the Cabin Group Form to divide your students into cabin groups.

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
- Work cooperatively with Ocean Institute instructors and your parent chaperones to solve student and chaperone management problems
- Report any problems (including facilities and management) to the Ocean Institute staff as soon as possible

PARENT CHAPERONE RECRUITMENT

Your recruitment of chaperones is very important. Their support and enthusiasm are vital to a successful adventure. We require one adult chaperone for every nine students. Chaperones may be teachers, parents, grandparents, college students, or older brothers or sisters of students. They must be at least 18 years old, in good physical condition, and supportive of the Science School goals. Please meet with your chaperones before your trip to make sure they have a complete understanding of their responsibilities, and distribute the Chaperone Information Packet. The onsite director will meet with all of the chaperones at the beginning of the program to address any questions or concerns.

Please remember that the Chaparral to Ocean Science School experience is designed for the students and that, while parent participation is important, too many parent chaperones can shift the focus of the information away from the 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 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.

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 344 for more information and to receive the necessary forms for student aid.

TRANSPORTATION

Student transportation should be arranged well in advance. Please make sure that your bus can drive over the 1½-mile dirt road to the Lazy W Ranch. If your bus cannot do this, call the Ocean Institute as soon as possible to make arrangements for luggage transport. The students must walk the 1½ miles into camp.

Transportation Schedule for Chaparral to Ocean Science School:

Day 1: Arrive at the Lazy W Ranch at 10:30 AM

Day 3: Pick up at the Ocean Institute at 2:00 PM (without boat program or with an early morning boat program),

OR

Pick up at the Ocean Institute at 4:00 PM (with boat program)

Please check your PROGRAM AGREEMENT for your scheduled departure time.

CAMPER'S INSURANCE

All campers visiting the Lazy W Ranch are covered by a special camper's day insurance policy through the United Methodist Conference Camps. The policy covers campers from the time they leave school on the bus to the time they leave the Lazy W Ranch. It covers accidents up to \$5,000. The first \$250 is primary to any existing policies and the remaining \$4,750 is secondary. Accidents occurring at the Ocean Institute, after leaving the Lazy W Ranch, are covered only through the Ocean Institute's general liability policy.

INFORMATION PACKETS

We have included separate packets for the teachers, chaperones, and parents. They contain copies of information and forms that must be completed before arriving at the Science School. **IT IS IMPORTANT THAT YOU ARE FAMILIAR WITH ALL THE INFORMATION AND FORMS FOUND IN EACH PACKET.** These packets are ready to be copied and distributed to the appropriate participants. Information on each of the forms is in the next section.

Please make sure that you provide chaperones with both the Chaperone Information Packet and the Parent Information Packet.

FORMS

The following forms are included in the information packets found at the back of this booklet. Please make sure that all of the forms are completed before you arrive for the Chaparral to Ocean Science School. Make sure that you use the forms from this packet—they are the most updated forms.

Medical Forms

You will find **medical forms** in the packets. You must have a completed and signed medical form for each student and adult participating in the Science School program. In order for a child to receive any prescription or non-prescription medication during the Science School program, the Administration of Medication form(s) must be completed and signed by the parent or guardian and the child's physician.

Acknowledgement of Risk and Waiver

Each student must have this form signed by a parent or guardian to participate in the Chaparral to Ocean Science School. Please make sure that you have one signed form for each student and adult chaperone when you check in with the Ocean Institute staff.

Activity and Cabin Group Forms

Once you have a final roster of participating students, divide them into activity and cabin groups. At Science School, each activity group will be assigned to an Ocean Institute instructor who will guide them through their instructional activities. An activity group consists of 12 – 14 students (mixed sexes, please) and one or two adult chaperones. Choose an identifying name for each of the activity groups (for example: coyotes or dragonflies). A cabin group consists of nine students of the same sex and one adult chaperone. Please be prepared to present the Science School director with a copy of the Activity and Cabin Group lists upon arrival.

Program Information Form

The Program Information Form should be completed and mailed to the Ocean Institute at least six weeks before your before your program date. This information will help us prepare for your program. Use this form to request your explorations and inform us of any special needs.

MEDICAL ISSUES

The medical forms included in this package must be completely filled out and signed for every student and adult participant. Please carefully review the completed forms to ensure that they have been properly filled out and signed. The teacher-in-charge will keep all medical forms and store and distribute student medications (both prescription and non-prescription). Please notify the Science School director in advance of any participant with special dietary or other needs. We do not have a medical doctor or nurse on site, and we do not have housing for sick students. Parents of ill or injured students will be notified immediately and arrangements made for transportation to the hospital or home.

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 background information and classroom activities 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 for your program. During the program, we expect your students to follow the same behavioral rules you have in your classroom.

WILDLIFE AND SAFETY PRECAUTIONS

All teachers, chaperones, parents, and students must understand these safety rules before the start of the program. The Lazy W Ranch is located in the Cleveland National Forest, which is a designated wilderness area. Animal residents of the area that make precautions necessary include mountain lions, bobcats, coyotes, rattlesnakes, scorpions, and bees. While encounters with these animals are rare, both adults and students must be aware of camp policies and procedures. Close supervision of students by the accompanying adults is essential, and strict adherence to the camp rules is necessary.

All teachers, chaperones, and students attending the Chaparral to Ocean Science School program must read and understand the following wildlife and safety rules prior to their visit.

- All students must remain in close proximity of an instructor or chaperone. Close proximity shall be strictly defined as “visual contact.”
- Students will be advised of the “visual contact” rule and the seriousness of compliance.
- Two adults will accompany each activity group. A Science School instructor will lead the group and a designated chaperone will follow.
- At least one chaperone will oversee the recreation area during the recreation periods. At least one chaperone will oversee the cabin and shower areas before and after dinner.
- Students are never to go anywhere alone.
- Food (including gum and candy) is not allowed in the cabins or on the trails.
- Shoes must be worn at all times. Students will be required to wear long pants on trails.
- Littering is not tolerated.
- Students and chaperones must stay with their instructor on established trails. On winding and narrow trails the instructor will stop regularly to allow students to catch up. The distance between the instructor and the adult at the end shall not exceed 30 yards.
- Students should not touch any of the camp animals or pets, including the cats and dogs.
- The stream area is off limits unless accompanied by an instructor during an organized activity.
- Students must remain in their cabins from “lights out” until 7:00 AM, except for bathroom visits. Chaperones must accompany students on night bathroom visits.
- Instructors will carry walking sticks, whistles, and emergency first aid kits on hiking trails.
- Cabin raiding is not allowed.

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

The boat portion of the Chaparral to Ocean Science School takes place on the *R/V Sea Explorer*. 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.

CHAMBERS GALLERY GIFT AND BOOK STORE

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

You and your class are encouraged to visit the store. 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 as well as a three-minute time limit for each student. This is to ensure that all of your students will have time to shop. Please have two or three chaperones in the store to help supervise your students. One chaperone should stand at the door to monitor the students waiting in line. The other two adults should supervise the shoppers and remind them that they must make their selections quickly. Please ask the students to leave food, drinks, and backpacks outside with a friend while they are shopping.

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



DIRECTIONS TO SCIENCE SCHOOL SITES**DIRECTIONS TO THE LAZY W RANCH**

Directions from Los Angeles/North Orange County:

- Travel south on Interstate 5
- Exit on the Ortega Highway (74)
- Travel east approximately 12.2 miles
- Turn left on Hot Springs Canyon Road (just before the San Juan Fire Station)
- Travel 1.5 miles northeast to the Lazy W Ranch on the dirt road
- Once at the Ranch, parking is on the left

The street address of the Lazy W Ranch:

25832 Hot Springs Canyon Road
San Juan Capistrano, CA 92623

LAZY W RANCH TELEPHONE NUMBERS

Lazy W Ranch telephone number: (949) 728-0141 (to be used for emergencies only)

Chaparral to Ocean Science School telephone number: (949) 728-0758

Note: You may contact the Outdoor Education Programs Director at this number or at the Ocean Institute. Please give this number to your office and parents as an emergency number to use during the program.

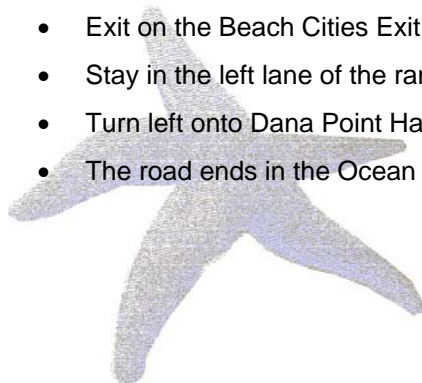
DIRECTIONS TO THE OCEAN INSTITUTE

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



E. RESOURCE MATERIALS FOR THE CHAPARRAL TO OCEAN SCIENCE SCHOOL

The Chaparral Ecosystem

The plants and animals of the chaparral ecosystem thrive in the hot dry climate of Southern California. This ecosystem is found on the sunny side of mountains and hills. The soil is rocky and lacks abundant nutrients. The plants in the chaparral remain small, requiring less water than larger plants. Many plants, like chamise, have small leaves to reduce water loss. The leaves of white sage are light colored and reflect strong sunlight. The shrub called toyon has hard waxy leaves that seal in precious water.

Animals that live in the chaparral, like coyotes, mountain lions, and woodrats, survive the hot climate by hunting at night. Some small mammals can get the water they need from their food, rather than drinking. The large ears of rabbits have evolved to dissipate heat (rather than to increase hearing abilities.)

Common Animals

scrub jay
woodrat
red-tailed hawk
wrentit
yucca moth
anna's hummingbird
western rattlesnake

Common Plants

scrub oak
toyon
yucca
chamise
laurel sumac
white sage
dodder

The Riparian Ecosystem

Large trees, moist cool air, and sandy soil characterize the riparian (streamside) ecosystem. These trees, such as the white alder and western sycamore, require a great deal of water to survive. The sycamore has deep roots and can drink 400 gallons of water a day! The roots of the white alder must always be in contact with water for the tree to survive. Many riparian plants, such as blackberry and arroyo willow, have large leaves to help collect sunlight in this shady environment. Mule deer and rabbits will not eat plants like wild rose because of the thorns on the stems.

Animals depend on the stream for many reasons. Raccoons, opossums, and garter snakes are among the animals that search for food and water along the stream. Birds, like the black phoebe and hummingbirds, feed on the plentiful flying insects found around the stream. The young of many of these insects (like dragonflies and caddisflies) develop in the stream and spend their adult lives on land. Other insects, such as the giant water bug and the diving beetle, spend their entire lives in the stream.

Common Animals

pacific tree frog
California newt
black phoebe
raccoon
dragonfly
diving beetle
giant water bug

Common Plants

white alder
blackberry
wild mint
western sycamore
arroyo willow
mule fat
fern

The Oak Woodland Ecosystem

The oak woodland ecosystem is found on the shady side of mountains and hills. The most outstanding feature of this environment is the large coast live oak trees. These enormous trees shade the ground below with a wide canopy of branches. Many of the plants in the oak woodland have adapted to living in the shade of the oak trees. These plants usually have larger leaves than chaparral plants. The large leaves are an adaptation to the lower amounts of sunlight.

Many animals make their home in the oak woodland. A common reptile is the fence lizard. The sandy color and blotchy pattern help this lizard blend into its environment and avoid predators, like the gopher snake. Red-shouldered hawks hunt for ground squirrels and other small mammals. A ground squirrel can warn other squirrels of a hawk's presence by sending out a high-pitched single note call. Skunks defend themselves by spraying predators with bad smelling oil. Great horned owls, however, can swoop noiselessly down to catch a skunk without being sprayed.

Common Animals

western fence lizard
red-tailed hawk
ground squirrel
raccoon
great horned owl
gall wasp
acorn woodpecker

Common Plants

coast live oak
lichen
poison oak
coffeeberry
milkmaids
horehound
alder

The Intertidal Ecosystem

The intertidal ecosystem is found along the seashore between the highest and lowest of tides. Plants and animals living in this region must survive the force of waves, exposure to air and heat during low tides, and competition for space to live.

Plants of the intertidal are different from terrestrial plants. Most intertidal plants (for example, sea palms, feather boa kelp, and codium) have a rubbery texture well suited to moving with the waves. Plants in the intertidal have no roots. Instead, nutrients are absorbed throughout the entire plant. Many plants in this ecosystem remain extremely small and may appear as "fur" on the rocks.

Animals, like barnacles and mussels actually glue themselves to rocks to survive the force of large waves. These animals, while attached, filter the seawater for microscopic organisms. Crabs are scavengers and eat anything they can find. They avoid waves by hiding in the cracks in rocks. Many clams burrow deep into the sand to avoid being washed away. Like plants, most intertidal animals remain small.

Common Animals

limpet
sea urchin
bat star
chiton
mussel
striped shore crab

Common Plants

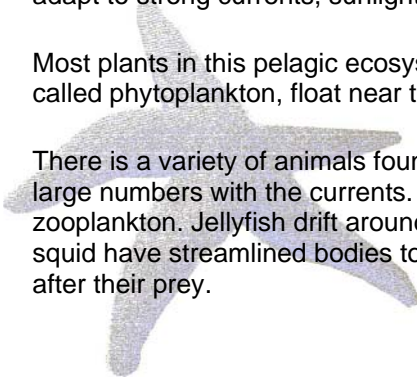
feather boa kelp
codium
sea palm
rock weed
coralline algae
sea grass

The Pelagic Ecosystem

The pelagic ecosystem describes the plants and animals that live in the open ocean. The most outstanding physical feature of this environment is the water itself. Plants and animals that live in this environment must adapt to strong currents, sunlight penetration of less than 300 meters, and vast amounts of space.

Most plants in this pelagic ecosystem are microscopic and drift freely with the ocean currents. These plants, called phytoplankton, float near the surface of the water where sunlight is plentiful.

There is a variety of animals found in the pelagic ecosystem. Microscopic animals called zooplankton float in large numbers with the currents. Some animals, like crabs, and barnacles, spend a part of their lives as zooplankton. Jellyfish drift around the ocean capturing small fish in their tentacles. Whales, sea lions, fish, and squid have streamlined bodies to swim against the ocean currents. Sea lions and mackerel can swim swiftly after their prey.



Common Animals

copepod
jellies
mackerel
common dolphin
sea lion
squid

Common Plants

diatoms
dinoflagellates



F. CLASSROOM ACTIVITIES FOR THE CHAPARRAL TO OCEAN SCIENCE SCHOOL

Rules to Live By

INTRODUCTION

So that we can all have a fun and safe experience at Chaparral to Ocean Science School, you must follow these safety guidelines.

THE CHALLENGE

See if you can come up with three reasons why these rules are important to follow.

1. Always remain within visual contact of an adult whenever outside of a building.
2. Never go anywhere alone...always take a buddy and remain in visual contact.
3. Please do not enter any cabins other than your own.
4. Food is not allowed in the cabins.
5. Shoes must be worn at all times.
6. Please make sure all litter is placed in trashcans (even if it is not yours!).
7. Always walk on the trails, follow the instructor closely, and remain in front of the chaperones.
8. Please do not pick leaves or flowers from any plants.
9. Please do not touch or pick up any animals, unless asked by an instructor to do so.
10. Long pants must be worn while on the trails.
11. Always stay on the trails.
12. Please remember to walk, rather than run, both in camp and on the trails.
13. The stream area is off limits unless accompanied by an instructor during an organized activity.
14. Please do not pick up or throw sticks or rocks.
15. Please remain in the cabins from "Lights Out" until 7:00 AM, except for bathroom visits (and then accompanied by an adult).
16. Cabin raids and practical jokes are not allowed at any time.
17. Students are asked to follow established classroom guidelines.
18. Always be respectful of other students and adults, as well as their possessions.
19. Please report any illness or injury to an adult immediately.

Life in the Chaparral

INTRODUCTION

What is life in the Chaparral ecosystem like? Read the abiotic (non-living) factors listed below, and circle the words that describe the Chaparral ecosystem.

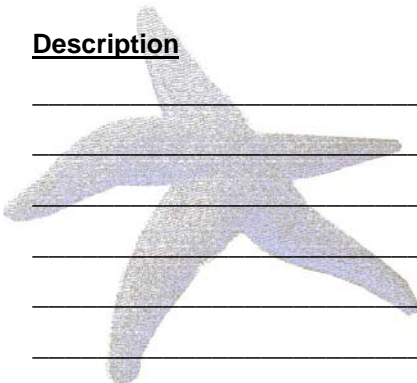
- | | | | | |
|----------|-------|------------|-------|-----------------|
| Hot air | Dry | Rocky soil | Sunny | Strong currents |
| Cool air | Moist | Sandy soil | Shady | Waves |

THE CHALLENGE

Design an imaginary plant that is adapted to survive in the Chaparral ecosystem. Use the abiotic factors you circled to help you. Create adaptations for the following features of the plant: leaf size, leaf shape, color, texture, overall size, and root system. When you have finished drawing and labeling your plant, write a description.

Drawing

Description



A Breath of Fresh Air?

INTRODUCTION

Transpiration is the evaporative water loss from stems and leaves. During this investigation, you will explore the processes of photosynthesis and transpiration.

THE CHALLENGE

Materials

- 4 plastic bags
- 4 twist-ties or rubber bands
- Petroleum jelly
- Clock or watch

Procedure

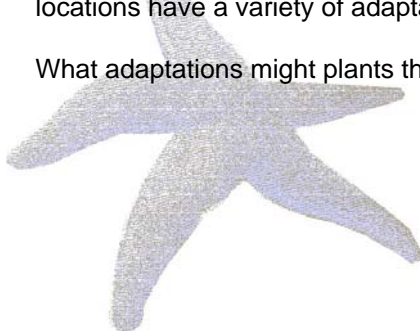
1. Gather the plastic bags, petroleum jelly, and twist-ties or rubber bands.
2. Go outside and choose an area as your “study area”. Spend a few minutes observing plants in the study area. Choose one plant as your “study specimen.”
3. Locate four leaves of approximately the same size on the plant, and place one plastic bag around a leaf and secure it to the stem with a rubber band or twist tie.
4. Coat the top of another leaf with a heavy layer of petroleum jelly and then secure a plastic bag over the leaf.
5. Coat the bottom of a third leaf with petroleum jelly and secure a plastic bag over it.
6. Coat both sides of a fourth leaf with petroleum jelly and secure a plastic bag over it.
7. Leave the bags in place for two hours. Check the leaves and bags after two hours.
8. Predict what will happen inside each of the plastic bags if they are left on the plants? Which leaf will produce the most water?

Explanation

Transpiration is the evaporative water loss from stems and leaves. Plants have stomata, or small openings on the leaves and stems, that allow carbon dioxide to enter the plant. At the same time, water can exit the plant through the stomata. Most of the stomata are located on the underside of the leaves.

Some plants can lose a great deal of water through transpiration. The western sycamore tree is said to lose as much as five hundred gallons of water per day! On the other hand, plants that live in extremely dry environments face the threat of dehydration through this water loss. This means that plants living in these locations have a variety of adaptations to prevent excess water loss.

What adaptations might plants that live in dry environments have to prevent excess water loss?



Seeing is Feeling

INTRODUCTION

Observation is a probably the most fundamental skill of any scientist. The scientist builds his or her knowledge based on observations made over time. Communication is the skill that scientists use to convey observations. Communication may be in written or verbal forms. Great scientists need to be not only great observers, but great communicators as well.

THE CHALLENGE

In this activity, you will record observations that you make while you are in the field. Find a quiet location outdoors, and quietly observe the area for five minutes. Carefully record your observations. When you return to the classroom, write a poem based on your observations. Read the following section on the *Haiku* for additional information of one type of poem.

Haiku

The Japanese have concentrated on the power that a single image can produce. The *haiku* often contain a single, simple event that suggests to the reader a variety of feelings and associations. Although poets can place many restrictions on themselves, the *haiku* generally has some distinct features. It usually contains a seasonal reference and is about seventeen syllables long (commonly with a first line of five syllables, a second of seven, and a third of five).

Examples of Haiku

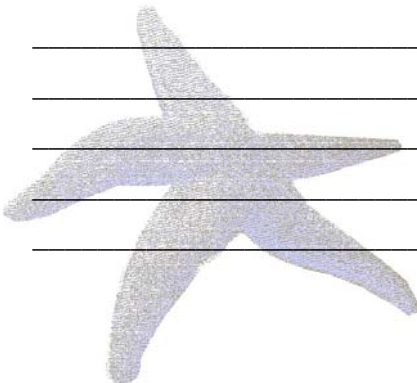
To the sun's path
The hollyhocks lean
in the May rains.
-Matsuo Basho (1644-1694)

Note: Since this poem is a translation, the usual syllabic criteria have not been closely met.

For the child who won't
stop crying, she lights a lamp
in the autumn dusk.
-Kawahigashi Kekigodo (1873-1937)

A thousand years hence
The tick of time erodes naught
As styrofoam rules.

Your Poem



Test Your Senses!

INTRODUCTION

Each day we are showered with a variety of sights, sounds, smells, and textures. Some of these we pay close attention to, while others we all but ignore. When we look at something, how much do we really see? Are we paying attention to the fine details...or just the big picture?

Close your eyes for a moment. Think about one of your friends in the classroom and answer the following questions (without looking at the person!): What color of eyes does the person have? How tall is the person? What is the person wearing? Check your answers... How accurate were you? How closely are you really looking at things?

At Science School, you will have an opportunity to discover many new and interesting things as we explore the different ecosystems. You'll hear the songs of tree frogs and the rustle of leaves, see the fence lizard as it tries to camouflage itself on a rock, smell the scent of the wild mint, feel the texture of a snake's scales. So... you'll have to practice using your senses so that you won't miss anything!

THE CHALLENGE

Now test out your powers of observation! This time not just with your vision, but with your other senses as well. Go on a scavenger hunt inside and outside your classroom and find the following items:

- something soft*
- something rough*
- 3 shades of brown inside the classroom*
- 3 shades of green outside the classroom*
- 3 natural sounds*
- 1 pleasant human-made sound*
- 1 unpleasant human-made sound*
- something that smells sweet*
- something that smells unpleasant*

How successful were you in your "hunt?" How many of these items did you notice before you went hunting for them?

Next...

Make a touch map of your classroom. Explore your classroom using your fingers. Find non-living items that feel soft, bumpy, slick and so on. Make a map of your discoveries to share with a friend. Be sure to make it detailed enough so that your friend can locate all of the "touches."

