



What the Aquarium Needs From Your School

Please have the following items available at least 30 minutes before the first scheduled program:

- ❖ A presentation room on ground level that can be darkened slightly for PowerPoint presentation and accommodates the total number of students for each program
- ❖ Four six-foot long tables for displaying teaching tools
- ❖ An AV cart or small table for the Aquarium's AV equipment
- ❖ A slide screen (if your school's slide screen is larger than 58" X 78")

Our staff will check in at the office when they arrive and will need:

- ❖ Easy access to the presentation area for unloading program materials
- ❖ An orientation of the presentation area from your custodian regarding access to electrical outlets and instructions on how to turn lights on and off

The Aquarium's Education staff will arrive at your facility approximately 30 to 45 minutes before the first scheduled program.





Important Information for Teachers

Because our staff is following a tight schedule and your school time is valuable, please share the following points with your students before the program:

- Students will be asked to sit on the floor during the presentation. Please instruct your students to sit cross-legged and flat on their bottoms so that everyone can see the presentation.
- We suggest that the younger grades sit in the front with the older grades behind them.
- The Aquarium's instructors may be asking for student volunteers during some programs. Instructors will choose students according to listening skills and body size.
- Younger students often confuse the concept of questions and statements. Please review the difference with them. Questions are appropriate both during and after the presentation. (Time constraints may limit the opportunity for questions during the presentation – students may be asked to save their questions until the end of the program.)
- If a student has a question during the Q&A period, a raised hand will help the instructor answer it.
- Please remind students that they should not be talking while another person is talking, whether it is the instructor or another student with a question.
- We will be bringing biofacts (sea urchin teeth, whale bones, mammal fur, etc.) Your students will have a chance to handle and look at these biofacts at the end of their program. **These biofacts are fragile and must be handled with care.**
- The instructor will speak to the whole group for approximately 30-45 minutes, followed by 15 minutes when students will visit the biofacts tables. Only two classes will visit the tables at a time, beginning with the younger grades. While you are waiting, have your students review what they learned during the program and come up with at least one new question to ask the Aquarium staff when they reach the tables.
- Groups who use their best listening skills will have more time at the end of the program to see the biofacts and interact with the program instructors.

We appreciate your help in addressing these issues!



Shark Shenanigans

Grades K-2

Dear teacher:

Here are the instructional objectives for and an outline of the outreach program your school has scheduled for your students. Please use them to help direct your preparation and to review what was learned during the assembly program.

Goal: To understand that sharks are important animals that have special adaptations for survival in the ocean.

Cognitive Objectives:

1. Explain that sharks have adaptations that help them survive in the ocean environment.
2. Name 3 shark body parts and describe how they are helpful to their survival.
3. Understand that most species of sharks are not dangerous to humans.

Affective Objectives:

1. Students will value sharks as worthy of protection and conservation.
2. Students will be inspired to learn more about sharks.

Benchmark Correlations:

- SC.03.LS.01 Recognize characteristics that are similar and different between organisms.
- SC.03.LS.02 Describe the basic needs of living things.
- SC.05.LS.05 Identify how some animals gather and store food, defend themselves, and find shelter.

Time: 45 minutes

Program Outline:

- I. Where sharks live
 - A. Sharks live in the ocean
 - B. Sharks have adaptations to help them live in their environment
 1. Adaptation: a body part or behavior that helps an animal survive in its environment
 2. We have adaptations for living on land (hands, feet, hair, etc.)
- II. Shark adaptations
 - A. Sharks live in a really different place so they have really different adaptations
 - B. Sharks have:
 1. Tiny teeth all over their body that give them rough skin
 2. Skeleton made of cartilage makes them flexible
 3. Many rows of teeth (to replace lost teeth)
 4. Gills help them breathe (most have five gill slits)
 5. Tail fins help them swim



6. Pectoral (or steering) fins help them steer back and forth and up and down
7. Dorsal fins help keep the shark swimming straight and upright

III. Shark adaptations review

- A. Review shark body parts with the “Shark Shimmy” song and dance
- B. Go over shark adaptations with PowerPoint
 1. Horn shark
 2. Leopard shark
 3. Tiger shark
 4. Whale shark
 5. Cookie cutter shark
- C. Review shark fins and talk about shark size with inflatable shark

Sense-ational Sharks

Grades 3-5

Dear teacher:

Here are the instructional objectives for and an outline of the outreach program your school has scheduled for your students. Please use them to help direct your preparation and to review what was learned during the assembly program.

Goal: To understand shark adaptations and how they correlate with life in the ocean. Recognize that sharks have a place in the ocean ecosystem and should be protected.

Cognitive Objectives:

1. Explain that adaptations are body parts and behaviors that help sharks live in the ocean.
2. Describe at least three differences between cartilaginous and bony fishes.
3. Name one benefit of having a cartilaginous skeleton
4. Describe how sharks use their senses to locate food.
5. Contrast at least two modes of shark feeding.
6. Explain how humans are more dangerous to sharks than vice versa.

Affective Objectives:

1. Students will appreciate shark diversity in form and function.
2. Students will value sharks as worthy of protection and conservation.
3. Students will be inspired to learn more about sharks.

Benchmark Correlations:

SC.05.LS.01 Group or classify organisms based on a variety of characteristics.

SC.05.LS.03 Describe basic plant and animal structures and their functions.

SC.05.LS.03.01 Associate specific structures with their functions in the survival of the organism.

SC.05.LS.06 Describe how adaptations help a species survive.

SC.05.LS.06.01 Describe changes to the environment that have caused the population of some species to change.

SC.05.LS.06.02 Identify conditions that might cause a species to become endangered or extinct.

SS.05.GE.07 Understand how physical environments are affected by human activities.

SC.05.GE.07.02 Describe how human activity can impact the environment.

Time: 45 minutes

Program Outline:

I. Sharks in general

- A. Member of the Class Chondrichthyes
 1. All members have cartilage skeletons
 2. Skates, rays and ratfish are close relatives.
- B. Sharks are numerous and diverse in species



1. 450+ species
 2. Range in size from 10 inches to 50 feet
- C. Sharks occupy many habitats and niches (including fresh water)
1. Sharks have adaptations that match with their habitat
 2. Adaptation: a body part or behavior that helps an organism survive in its environment

II. Shark vs. bony fish characteristics

Bony fishes	Sharks
Gill cover	Gill slits
Scales	Denticles (skin teeth)
Flexible fins	Stiff fins
Bone skeleton	Cartilage skeleton
Permanent teeth	Replaceable teeth

- A. Cartilage skeletons have three benefits
1. More flexible
 2. Lighter
 3. Heals faster
- B. Sharks skin is covered with tiny teeth called dermal denticles (“skin teeth”)
- C. Most sharks have five gill slits
1. Water flows in through the mouth and over the gills to take oxygen from the water.
 2. Some sharks can pump water over their gills without swimming.
 3. Spiracles help skates and rays breath when buried in the sandy bottom.
- D. Shark body plan
1. Most have two dorsal fins for stabilization
 2. Pectoral fins give lift and control vertical direction
 3. The caudal (or tail) fin makes them go
 4. Pelvic fins can indicate the sex of the shark (males have claspers)
- E. Shark senses
1. Much of a shark’s brain is devoted to smell
 2. Sharks have good low light and some color vision
 3. Sharks sense low frequency sounds and vibrations with ears and lateral line
 4. Sharks have an electrical sense through Ampullae of Lorenzini (tiny gel-filled pits in their snouts.
 5. Some sharks also have barbells (extra sensory organs located on the snout)
- F. Shark teeth
1. Shark teeth are in rows, and lost teeth are replaced throughout their life like a toothy conveyor belt
 2. Sharks may go through as many as 35,000 teeth in lifetime
 3. Tooth shape matches food type (i.e. some are suited for ripping, others for crushing)
 4. Filter feeders have small teeth and large gill rakers that strain plankton
 5. Cookie cutter sharks cut small plugs of flesh from much larger animals

III. Sharks and humans

- A. The myth of shark attack
 - 1. Chances of being killed by a shark = 1 in 300 million
- B. The reality of shark fisheries
 - 1. 1 attack on a human = 1 million sharks dead by human hands
 - 2. Humans use shark for:
 - a. Meat (steaks, fish and chips)
 - b. Fertilizer and fish meal
 - c. Leather
 - d. Corneas (used in human transplants)
 - e. Liver oil (cosmetics and medicines)
 - f. Teeth and jaws (as curios)
 - g. Shark fins (for shark fin soup)
 - h. Shark cartilage (as a possible, but dubious, cure for cancers)
- C. Scientists find studying sharks difficult
 - 1. Some are large and toothy
 - 2. The ocean is huge, and they can be hard to find
 - 3. Sharks don't stay in one place
 - 4. The boats, scuba gear, and electronic equipment used to study sharks in the ocean are expensive
 - 5. Many sharks are difficult to keep in captivity.
- D. Aquariums study sharks and educate the public

Oregon Coast Aquarium Outreach Program Feedback

Shark Shenanigans & Sense-ational Sharks

Please help us improve our outreach programs. Each teacher in attendance should complete this sheet and return it to the Aquarium. Your comments are important to us. Thank you!

School: _____

Teacher Name: _____ Grade: _____

Please evaluate the outreach program in which your students participated:

1. **Information level:** ✧ too basic ✧ too technical ✧ just right

Please explain: _____

2. **Instructor presentation:** ✧ too basic ✧ too technical ✧ just right

Please explain: _____

3. **Overall impression:** ✧ too basic ✧ too technical ✧ just right

Please explain: _____

Please indicate which of the provided program materials you used to help prepare your students for their outreach visit:

_____ Pre and post visit suggestions	_____ Measuring Sharks
_____ Shark Background Information	_____ Shark Resources
_____ Fish Vocabulary	_____ English/Spanish Translation
_____ Leopard Shark Fact & Coloring Sheet	_____ Certificate
_____ Whale Shark Fact & Coloring Sheet	_____ None of the above
_____ Shark Flash Cards	

What types of materials would you have liked us to include?

What part of the program did your students enjoy the most?

How did this program fit into your curriculum? Did it help you address common curriculum goals and benchmarks?

What could we do to make this program a better learning experience for your students?

Additional comments:

**Public Programs Department
Oregon Coast Aquarium
2820 SE Ferry Slip Road
Newport, Oregon 97365**



Marine Vocabulary

English/Spanish Translation

English	Spanish
A	
Abalone	Abalone
Adaptation	Adaptación
Ampullae of Lorenzini	Ampollas de Lorenzini
Anchovy	Anchoa, Boquerón
Anemone (sea)	Anémone del mar
Aggregating anemone	Anémone agregada
Green anemone	Anémone verde
Pink tipped anemone	Anémone punta de rosa
B	
Baleen	Ballena
Baleen whale	Misticetos
Barnacle	Percebe
Acorn barnacle	Percebe de bellota
Giant barnacle	Percebe gigante
Gooseneck barnacle	Percebe de cuello de ganso
Blubber	Grasa de mamífero marino
Bony fish	Pez óseo
Breach	Saltar del agua
Bryozoans	Bryozoos
C	
Cartilaginous fish	Pez cartilaginoso
Caudal	Caudal
Cetacean	Cetáceo
Clam	Almeja
Coralline algae	Alga coralina
Crab	Cangrejo de mar, cambara, caneta, jaiba
Hermit crab	Cangrejo hermitaño



Kelp crab	Cangrejo de alga
D	
Denticles	Dentículos
Dolphin	Delfín
Dorsal	Dorsal
E	
Echolocation	Localización por eco
F	
Feather boa kelp	Alga de pluma
Fin	Aleta
Fish	Pez (pl.: peces)
Flipper	Aleta pectoral
Fluke	Aleta anal, cola
G	
Giant kelp	Alga gigante
Gill	Agalla
H	
Hydrodynamic	Hydrodinámico
I	
Intertidal zone	Zone inundada por la marea
Invertebrate	Invertebrado
J	
Jellyfish	Medusa
K	
Keratin	Queratina
Krill	Krill
L	
Lateral line	Linea lateral
Limpet	Lapa
Lobster	Langosta
M	
Marine mammal	Mamífero marino
Mussel	Mejillón



N	
Nematocyst	Nematocisto, célula que pica
Narwhal	Narval
O	
Octopus	Pulpo
Orca	Orca
P	
Pectoral	Pectoral
Pelvic	Ventral, pélvico
Pinnipeds	Pinnípedos
“Wing-footed”	“Pie-aleta”
Plankton	Plankton
Pod	Manada
Porpoise	Marsopa
Predator	Animal predador, cazador
Prey	Presa
R	
Ratfish	Quimera
Rays	Rayas
S	
Scallop	Venera
School (of fish)	Banco de peces
Sea cucumber	Pepino de mar
Sea grass	Hierba de mar
Sea lemon	Limón de mar
Sea lettuce	Lechuga de mar
Sea lion	León marino
Sea otter	Lataz, nutria, lutra
Sea slug	Babosa de mar
Sea star (starfish)	Estrella de mar
Bat star	Estrella murciélago
Brittle star	Estrella delicada
Ochre star	Estrella ocre
Pink star	Estrella solar



Sea urchin	Erizo de mar
Purple urchin	Erizo morado
Red urchin	Erizo rojo
Seal	Foca
Seaweed	Alga marino
Shark	Escualo, tiburón
Thresher shark	Pez zorro
Tiger shark	Escualo tigre
Blue shark	Escualo azul
Great white shark	El gran blanco
Hammerhead	Pez martillo
Whale shark	Tiburón ballena
Shrimp	Gamba, camarón
Skate	Raya
Snail	Caracol
Spanish shawl	Bailarin español
Sponge	Esponja de mar
Squid	Calamar magano
T	
Toothed whale	Odontoceto
Tube feet	Pies en forma de tubo
Turkish towel seaweed	Alga toalla turca
V	
Vertebrate	Vertebrado
W	
Walrus	Morsa
Whale	Ballena
Humpback whale	Ballena nudosa (yubarta)
Bowhead whale	Ballena polar
Grey whale	Ballena gris
Killer whale	Orca
Pilot whale	Calderón
Sperm whale	Cachalote
Blue whale	Ballena azule



Beaked whale	Ballena de hocico de botella
Beluga whale	Beluga
Dall's porpoise	Marsopa de Dall
Bottlenose dolphin	Delfin mular
Worm	Gusano
Flat worm	Gusano liso
Ribbon worm	Gusano cinta

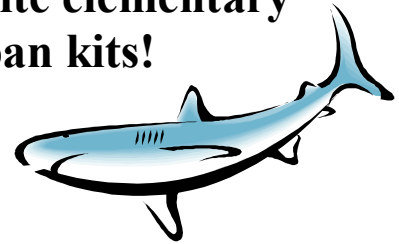


Educational Kits

The Aquarium would like to invite elementary school teachers to use our new loan kits!



What's inside?



Each kit contains videos, books, plush animal models, flashcards, prepared specimens or models of shells, teeth, or bones and information and activities developed by our education staff.

Is there a fee?

There is no fee for schools registered for outreach assemblies. The education staff will drop the kit off at your school when they come to give your program. You will be responsible for mailing or delivering the kit back to the Aquarium no later than two weeks after you receive your kit. Teachers from non-outreach schools may also acquire kits for a fee of \$35.00 and round-trip shipping. A refundable deposit of \$100 is required from both outreach and non-outreach schools.



What topics are offered?

- ◆ Sharks
- ◆ Whales
- ◆ Rocky Shore Invertebrates
- ◆ Seals, Sea Lions and Sea Otters

OREGON COAST
AQUARIUM



How do we get one?

Call the Aquarium at (541) 867-3474, ext. 5222 to request a kit. Completed kit applications must be received at least two weeks prior to requested arrival date. Visit our website to download an application:

<http://www.aquarium.org/edTeacherResources.asp?sid=4>



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