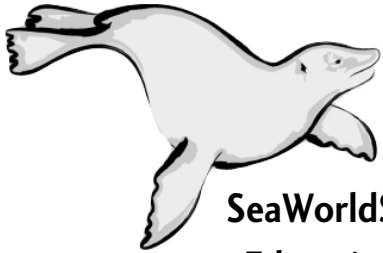


WHEN SCHOOL IS OUT, CAMP IS IN SESSION

SeaWorld Camp brings campers incredibly close to their favorite ocean animals. Join us this summer for a safe, fun, and educational camp experience at SeaWorld San Diego.

- ◆ Resident Camp
- ◆ Day Camp
- ◆ Sleepovers

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Educational Programs
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SEAWORLD EDUCATION PROGRAMS

SPLASH OF MATH

FIELD TRIP GUIDE



JUST FOR TEACHERS

Did you know that SeaWorld has a website just for educators? Visit SeaWorld.com/Teachers to find free activities and other classroom resources.

Shamu TV

Bring SeaWorld, Busch Gardens, and Discovery Coves' award-winning environmental education series, **Shamu TV**, right into your classroom. Find the Shamu TV broadcast schedule, show descriptions, satellite links, and more by clicking on *Shamu TV: Saving a Species* from the Classroom Resources web page.

Group Camp

This multi-night resident camp for grades 4-12 includes lodging, meals, activities and supplies. For details call (800) 257-4268, x4 or explore Educational Programs online at SeaWorldSanDiego.com

Sleepovers

A nocturnal field trip for grades 2-8. Spend the night with sharks, sea turtles, whales, and more. For details call (800) 257-4268, x4 or explore Educational Programs online at SeaWorldSanDiego.com

Thank you

for participating in your SeaWorld
instructional field trip today.

Splash of Math: Answer Page

Note to Teachers: Many of the questions are designed so that students can explore mathematics and find a variety of answers.

Page 2: Beluga whales are known to live near the edge of the ice pack as well as at river mouths. They can tolerate water temperatures from 32°F to 64°F.

Page 3: A polar bear's paw can be 12 inches in diameter. That is about twice the size of an adult human hand. Shoe sizes vary: a man's size 6 = women's size 8 and is about 10 inches long. A polar bear would take shoes as wide as they are long.

Page 4: $20'' \times 5'' = 100$ square inches $\times 70$ feathers per square inch = 7,000 feathers

Page 5: Answers will vary.

Page 6: a). $1,500$ sea turtles / $20,000$ animals = 7.5%
b). answers will vary

Page 7: One line of symmetry.

Page 8: Answers will vary. Some answers may include "difficulty identifying animals in the water," and "moving animals are hard to see." Characteristics for "seals": small front flippers, visible claws on front flippers, ear holes, quiet, spots. Characteristics for "sea lions": ear flaps, loud, long flippers, walk on land. Shared characteristics: whiskers, fur, four flippers.

Page 9: Since flamingos have two legs, tucking one under their wing protects 50% or one-half of their leg surface area from heat loss.

Page 10: If you shuffle your feet in the sand and wear water shoes you can decrease your probability of being injured by a bat ray. To find out the chances of injury at the beach, you need to know the number of people injured and the total number of people at the beach for one year.

Page 11: sea cucumber (animal, radial); human (animal, bilateral); sea star (animal, radial); sea urchin (animal, radial); opaleye fish (animal, bilateral); turban snail (animal, neither); kelp (plant, neither); sea anemone (animal, radial).

Page 12: a). $9,200$ pounds $\times 0.03 = 276$ pounds
b). $5,400$ pounds $\times 0.03 = 162$ pounds

Page 13: Answers will vary. Some answers may be "A dolphin can jump twice its length" or "Dolphins can jump 200 percent of their length" or "Multiply the length of a dolphin by 2 to find out how high it might be able to jump."

Page 14: 44 pounds $\times 25\% = 11$ pounds of food per day. A 100 pound student $\times 25\% = 25$ pounds of food per day. Discuss with students how heavy a quarter-pound hamburger is. Quarter-pound is the weight of just the meat, before it is cooked.

Page 15: Answers will vary.

SPLASH OF MATH

EXHIBIT BOOKLET

WELCOME TO SEAWORLD!

Our education program is designed to introduce you to marine life and the many applications of mathematics in the marine sciences. To ensure a successful learning experience visit as many SeaWorld animal habitats as you can.

This booklet will help you learn about the animals at SeaWorld while exploring mathematics. As you visit each exhibit, solve the problems and answer the questions in this booklet.

Problems labeled "DEEPER DEPTHS" are for you to investigate back at school.

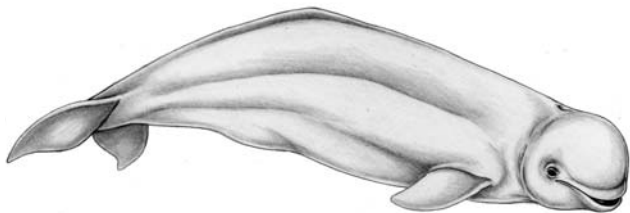
We hope you enjoy your SeaWorld education program.

WILD ARCTIC®

BELUGA WHALES

Beluga whales live in cold arctic oceans. The temperature of their habitat at SeaWorld is 52°F. Have you ever been to the beach in the winter? Was the water cold or warm?

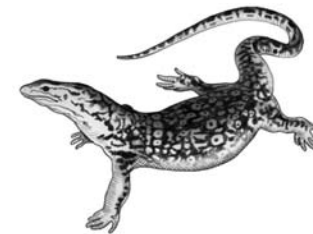
During the winter in Southern California, the coastal ocean water temperature is about 62°F. The freezing point of fresh water is 32°F, but ocean (salt) water can reach nearly 28°F before it freezes. Draw a thermometer and label these water temperatures. Shade in the range of water temperatures you think a beluga whale would be able to live in.



ANIMAL CONNECTIONS

Animal Connections is home to many different kinds of animal ambassadors.

Count the number of each type of animal you see on your visit and create a bar graph with the numbers on the y-axis and the following five animal categories on the x-axis: invertebrates (animals without backbones), reptiles, amphibians, birds, and mammals. Which animal type is most common at Animal Connections?



OTTER OUTLOOK

Sea otters have big appetites. They can eat 25% of their body weight in food per day. Figure out how much food a 44-pound sea otter might eat in one day.



How many quarter-pound hamburgers would a 100-pound student eat in one day if that student had the appetite of a sea otter?



WILD ARCTIC®

POLAR BEAR DEN

How big is a polar bear paw? Find a paw print in the polar bear den. Compare the size of your hand to a polar bear's paw. How many times larger is a polar bear's paw than your hand?



What is your shoe size? Try using multiplication to estimate the size "shoe" a polar bear would wear.



PENGUIN ENCOUNTER®

PENGUINS

Penguins are covered with feathers. Feathers and fat insulate penguins from the cold. Penguins from the Antarctic have an average of 70 feathers per square inch. An Adélie penguin can be 20 inches tall.

Draw a rectangle and label it 20 inches tall and 5 inches wide. Calculate the number of feathers in this area.



DEEPER DEPTHS

Each year penguins molt (shed their feathers). Bird keepers at SeaWorld remove piles of discarded feathers when cleaning the penguins' habitat during the molting season. How would you determine the number of penguins that could produce one million feathers in a year? What information would you need to know? What mathematical equations could you use?



DOLPHIN POINT

BOTTLENOSE DOLPHINS

Some dolphins can jump very high out of the water. An 8-foot long dolphin may jump 16 feet out of the water. Write at least three ways to describe this information using mathematical terms.

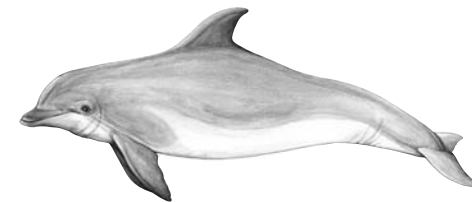


How high can you jump? Jump in place to see. How can you measure this?



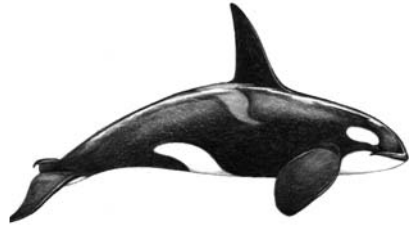
DEEPER DEPTHS

Find out the world records for Olympic jumping events.



SHAMU CLOSE-UP®

A adult killer whale requires about 3% of its body weight in food each day to maintain a healthy weight. SeaWorld's killer whales are trained to slide out onto a scale so that their trainers can get a weight and see how much fish and squid the animal needs. Calculate the daily amount of food each of the following killer whales would require.



a). An adult male that weighs 9,200 pounds.



b). An adult female with a weight of 5,400 pounds.



PENGUIN ENCOUNTER®

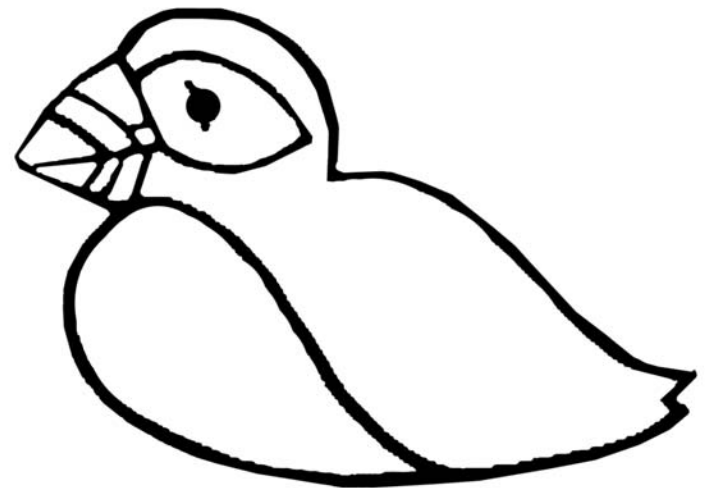
PUFFINS AND MURRES

Puffins and murres are birds that look like penguins, but live in the Northern Hemisphere and can fly.

Using the puffin drawing below, see how many basic geometric shapes (circles, ovals, squares, rectangles, and triangles) you can use to fill in the drawing as completely as possible. How many shapes did you use?

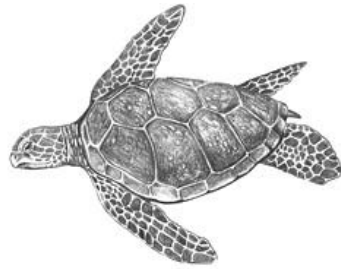


Compare with your number of shapes with the rest of the class. What was the lowest number of shapes used to fill in the puffin drawing?



TURTLE REEF®

Since 1965, SeaWorld parks have cared for more than 20,000 rescued sea turtles, seals and sea lions, whales and dolphins, sea birds, manatees, and sea otters. Of these 1,500 were sea turtles. Whenever possible, rescued animals are returned to the wild when they can survive on their own.



a). What percentage of the total of rescued animals were sea turtles?



b). List three reasons sea turtles may need to be rescued? (Check the *Race for the Beach* game, *Turtle Link*, or with the Educator at *Turtle Reef* to find out threats to sea turtles.)



CALIFORNIA TIDE POOL

Some of the invertebrate animals in the California Tide Pool habitat have radial (round) symmetry. Others, like fishes, have bilateral symmetry.

Look at the names of the organisms listed in the chart below. First determine whether each organism is a plant or an animal. Next determine whether the organism has radial or bilateral symmetry. Put checks in the appropriate boxes. Ask the California Tide Pool Educator if you need help.


PLANT	ANIMAL	ORGANISM	RADIAL	BILATERAL
		SEA CUCUMBER		
		HUMAN		
		SEA STAR		
		SEA URCHIN		
		OPALEYE FISH		
		TURBAN SNAIL		
		KELP		
		SEA ANEMONE		




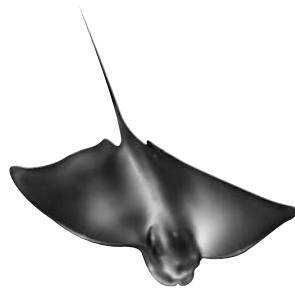
MANTA®

First, visit the attraction and read the graphics. Bat rays are a type of stingray. Stingrays can injure people, but injuries are rare and can be prevented. If you are careful, you have a low probability (chance) of being hurt.

Write several sentences on these topics:

 How to **decrease** your probability of being injured by a bat ray.

 If you wanted to know the probability of being hurt by a marine animal at the beach, what information would you need? (*Clue: You'd need two numbers.*)



SHARK ENCOUNTER®

Do you think sharks are symmetrical? Look down on the swimming sharks. How many lines of symmetry can you find on a shark? Draw a shark and the line(s) of symmetry.



Look at the caudal (tail) fin of a shark from a side view. Draw the caudal fin of one type of shark you see.



PACIFIC POINT

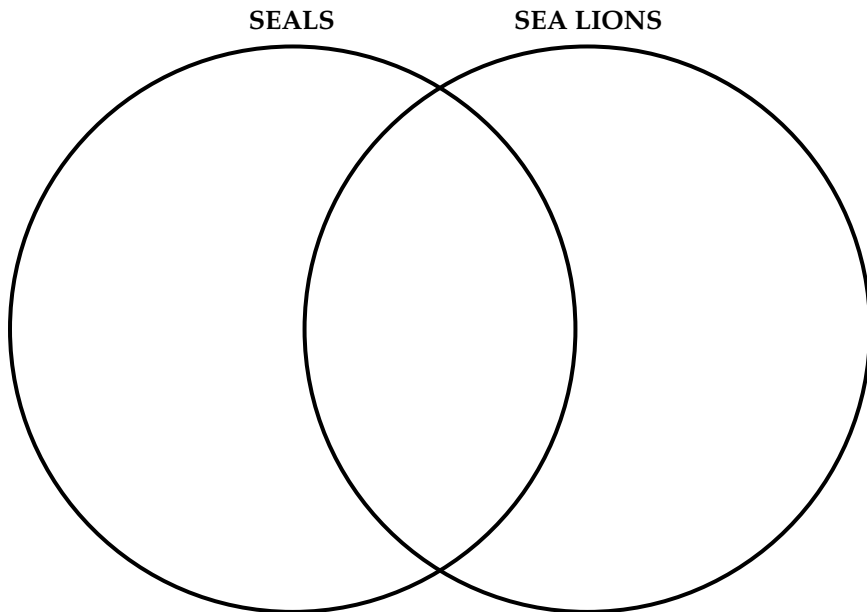
Estimate the number of animals in the sea lion habitat.
Compare your estimate with a friend's.



What types of problems would you encounter as a marine scientist counting active animals that live in the water?



Use this Venn diagram to compare and contrast seals and sea lions. Shared characteristics go in the overlapping area.



FLAMINGO COVE

Flamingos have long legs and long, curved necks to help them feed in shallow-water lagoons. Flamingos can walk, swim, and fly.

Draw a flamingo in the space below.

Estimate what part (one-half, one-third, etc.) or percentage (20%, 30%, 50%, etc.) of a flamingo's height is leg, its body, and its neck/head.



If a flamingo stands on one leg and tucks the other under its wing, what part (or percentage) of its leg surface area is protected from heat loss?

