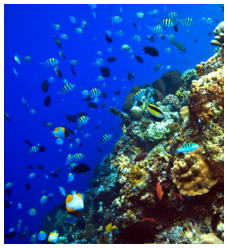
HOME SCIENCE TOOLS
THE GATEWAY TO DISCOVERY

Young Science Explorers
Science fun for 4 to 9-year-olds!



June 2009 – Ocean Animals

There are many creatures living in the waters of the oceans. Some are quite funny looking, some have strange habits and weird abilities, some are tiny, and some are huge. Check out the projects in this issue to find out more!

Ocean Science Projects

Project 1 – Can the Ocean Freeze?

What You Will Need:

- two plastic cups or small containers
- water
- salt
- a tablespoon
- a freezer

What To Do:

1. Fill each cup 3/4 full of water from the tap.
2. Add 1 tablespoon of salt to the water in one container and stir it until the salt dissolves. Do not add anything to the other container.
3. Carefully move each container to the freezer. Check on them in a few hours.
4. Once they have both started to freeze, you can take them out and taste some of the chunks of ice. Can you tell which one had salt added to it just by tasting?
5. Put the containers back in the freezer and check on them every hour. Did it take longer for one to freeze completely solid?
6. Which one do you think will thaw the fastest? Set both cups on the counter and check them every few minutes to find out!

What's Happening?

The water in the container that you added salt to probably took longer to freeze than the plain water. Water freezes at a certain temperature - 32 degrees Fahrenheit. This temperature is called the freezing point of water, because pure water will always begin to freeze when it gets to 32 degrees. Salt is a mineral that lowers the freezing point of water. That means that when you added salt to the water, it lowered the freezing point of the water in the containers, so it did not start to freeze until it got really really cold from being in the freezer for a long time. The plain water started to freeze just as soon as it reached 32 degrees, but the salt water didn't

start to freeze until it got much colder. The salt water was probably sort of slushy still by the time the plain water was frozen solid.

The ice from the cup without salt took much longer to thaw completely back into water than the cup with salt in it for the same reason. The freezing point of the salt water is still colder and now that it is out in the warmer air of the room, it is much farther from being as cold as it needs to be to continue to freeze into ice. It also thawed sooner than the plain water because there was less ice to melt since the salt water did not freeze all the way through.

The ocean can never freeze because there is so much salt in the water that the freezing point is very low. It just doesn't get cold enough. Any time a part of the ocean gets cold enough to start forming ice crystals, the salt around the ice will start to melt it by lowering the freezing point again so that it has to get colder to keep freezing. This is very important because many ocean animals would not survive if the water were to freeze!

For a fun and tasty experiment to see what happens when you mix ice and salt, try making ice cream in a plastic bag!

Project 2 – Ocean Animal for a Day

If you could be an ocean animal for a day, what would you want to be? Pick one you like or want to learn more about, then draw a picture of it. You can pretend to be that animal while you answer these questions:

- What part of the ocean do you live in (near the surface, near the bottom, in a coral reef)?
- What are your favorite things to eat (plants or animals)?
- What animals are your predators (animals that might want to eat you)?
- Are any animals your prey (what do you like to eat)?
- What kind of shelter or protection do you like to have?
- Do you use camouflage to protect yourself?
- How do you move around?
- What do you look like?
- Do you have arms, fins, or tentacles? How many?
- What kind of covering do you have on your body (scales, fur, skin)?

If you don't know the answers to some of the questions, ask a parent or older sibling to help you learn more about the animal from books or the internet. Here is one website to try (click on "Ocean").

Fun Facts

- Did you know that oceans contain 99% of earth's living space? If you look at a globe, notice how much of it is blue (which represents water); there's more water than land, plus animals can live much deeper in the ocean than they can in the ground.
- Blue fin Tuna can weigh up to 1,500 lbs and can swim as fast as 55 mph - one of the fastest fish in the ocean.

- When a blue whale breathes air out through its blowhole, it can spray water almost 30 feet into the air!

Silly Science

- What are the strongest ocean creatures? (Answer: *Mussels*.)
- Why was the fish so smart? (Answer: *It lived in a school*.)
- What do you get from a bad-tempered shark? (Answer: *As far away as possible*!)
- What has no beginning, end, or middle, and touches every continent? (Answer: *The Ocean*.)

Way Cool Websites

- Listen to the calls of different species of marine mammals and watch videos to learn more about them! (Requires Flash.)
- Sort the animals into their correct categories in this game.
- Here are some more ocean animal games and puzzles. (Requires *Java*).
- Watch live video of a kelp forest at the aquarium in Monterey, California. If you watch at certain times during the day, you can see divers feed the sharks and other animals! (Check out the website to find out what time to watch.)

Teacher Tidbits

Ocean Life

Oceans cover more than two thirds of the earth's surface, and they are very deep! Fish and other animals make their homes in all different parts of the ocean, even on the bottom, or sea floor. The ocean is also filled with lots of plants, which provide food, homes, and protection for ocean animals. A person who studies ocean life is called a *marine biologist*.

Microscopic plants and animals called *plankton* are very important in the ocean because they become food for a lot of animals. They drift along with the currents in the water and are eaten by fish, scallops, anemones, and others. Krill are small creatures that look like shrimp. They eat plankton and are eaten by larger animals, such as whales and birds.

Some creatures that live in the ocean use a special chemical reaction inside their bodies to create a glowing light. The light is called *bioluminescence* and happens when certain chemicals mix together, along with some oxygen from the water, in a particular part of the animal's body.

Because many bioluminescent animals live far down in the oceans where it is very dark (since sunlight cannot travel down that far through the water), the lights they make work sort of like a night light and help them see where they are going and to find food as well as other creatures to mate with. The anglerfish is an example of a deep sea creature that uses bioluminescence to find food. It has a glowing "lure" that extends from its head and dangles above its mouth. Other fish think the lure is food, but when they try to eat it, the anglerfish eats them instead! Here is a picture of an anglerfish: http://www.pbs.org/wgbh/nova/abyss/life/w57.html.

Fish

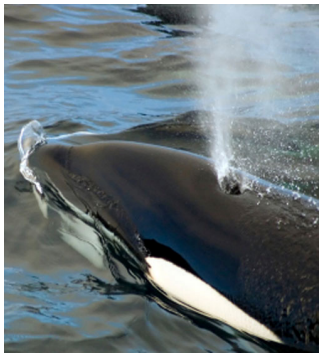
Fish have bones and are cold-blooded. (Cold-blooded means that their body temperature depends on the temperature of the water around them, unlike humans, who have a normal body temperature that stays at 98.6 degrees.) They breathe oxygen from the water through gills on the sides of their bodies. They cannot breathe air or live outside of water. Most fish are covered with small scales instead of skin. Fish use fins and a tail to swim around. Baby fish hatch from eggs. A person who studies fish is called an *ichthyologist* (say: ICK-THEE-ALL-O-JIST).

Most fish have a special part inside their bodies called a swim bladder. Air inside the swim bladder helps the fish float through the water. The fish can adjust how much air is in its swim bladder. If it wants to swim deeper, it lets some air out and if it wants to swim up towards the surface, it will let more air into its swim bladder.

Some animals that have the word "fish" in their names are not really fish. Some examples are cuttlefish (they are mollusks, see below), jellyfish (they are actually plankton), and starfish (they belong to a group called "echinoderms"). Can you think of any other animals that are called fish but do not have the things it takes to be a real fish?

Marine Mammals

Whales, dolphins, porpoises, walruses, manatees, dugongs, seals, and sea otters are all mammals that live in the ocean. Some, like seals and sea otters, can also live on land, but they spend most of their time underwater. These animals have lungs, are warm-blooded, give birth to live babies (they don't lay eggs) and nurse their babies, but they live in salt water instead of on dry land like most mammals. Since they have lungs, they need to breathe air instead of just getting oxygen from the water like fish and other ocean animals can. Instead of breathing air through their mouth or nose like we do though, a whale or dolphin uses a special hole on the back of its head called a blow hole to get air from above the surface of the water. Then it dives back down into the water and swims around for a few minutes before it needs to come up to breathe again. When it does, it breathes out the air through the blow hole and then breathes in more air so it can go back under the water again. When the air goes out of the blow hole, there is usually some water that squirts out with it, making a little spray at the surface (like the killer whale in the picture). Marine mammals also have some fur or hair, but sometimes it falls out by they time they become adults.



Most kinds of whales live in groups called pods. The pods are kind of like families. The older whales take care of the younger whales, which are called calves. Whales stay together in their pods for most of their life. Most kinds of whales live somewhere in the middle of the ocean so that they can quickly get to the surface since they need to go up for air a lot. There are two different types of whales - baleen whales and toothed whales:

- Baleen whales include humpbacks, blue whales, gray whales. They are among the largest animals on earth and are bigger than most toothed whales. In fact, the blue whale is the largest animal in the world! Baleen whales have comb-like plates that hang from their upper jaw. These plates are called baleen and whales use them to filter small

pieces of food from the water. Because they only eat small fish, krill, and other things that can fit through their baleen plates, baleen whales don't need teeth! Baleen whales have two blowholes.

- Toothed whales include sperm whales, orcas, belugas. They use *echolocation* by creating noises and listening for the echoes of their noises to bounce off of an object and get back to them. They can tell how far away they are from the object by how the echoes sound! This helps them find their way around and find food. Toothed whales eat fish, squid and other animals, using their teeth to bite off and chew food. Orcas are also called Killer Whales because they are very active hunters. They eat large animals such as fish and marine mammals like seals or even other kinds of whales! Sperm whales are among the few animals large enough to catch and eat giant squid.

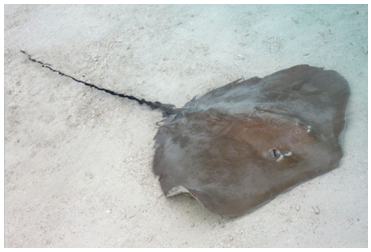
Many marine mammals live in very cold water. They have *blubber* to insulate their bodies and keep them warm in the cold ocean waters. Blubber is a really thick layer of fat between the animal's skin and inside organs. It is very effective at keeping an animal warm. The gray whale's layer of blubber is about 10 inches thick! Do this experiment to find out how well blubber works.

Sharks

Sharks look a lot like marine mammals, but they are actually fish! Unlike most fish though, sharks do not have bones. Their skeletons are made up of cartilage instead of bones. Cartilage is the same stuff that makes your ears and the tip of your nose have their shape and be a little bit flexible. Even though they don't have bones, sharks do have lots of other similarities to bony fish. They are cold-blooded and breathe through gills instead of through lungs. Sharks have gills on each side of their heads. As they swim, water passes over the gills and oxygen flows in from the water.

Sharks have several rows of sharp pointed teeth and powerful jaws to tear off big pieces of food, which they swallow whole. They don't even need to chew their food! Sometimes sharks lose teeth, but when they do, new ones grow in their place. Sharks have several rows of teeth. They eat bony fish, squid, marine mammals, and even sea turtles. They have an excellent sense of smell, which helps them find food. Many sharks eat near the surface of the water, but will also dive down deeper in search of food.

Not all sharks are large. Some only grow up to 7 inches long. However, most kinds of sharks grow to about 5-7 feet long, which is about the same height as an average adult. Not all sharks are dangerous to humans, either. There are over 350 kinds of sharks, but only about 25 of those have ever been known to attack humans. When sharks do attack people, it is probably because they mistake people for seals or other large ocean animals that they would like to eat. It is hard for them to tell what's what from below the surface of the water.



Baby sharks are called pups. Some pups grow inside their mothers like human babies do, but most hatch from eggs.

Rays are related to sharks and are also fish. They also have cartilage instead of bones. They look like flattened fish with eyes on top of their heads, gills underneath their bodies, and a long tail. Some rays like to live alone, but most of them live in large groups

with other rays. Some kinds of rays have spines on their tails that have poison, which they use to stun or kill their prey. Some rays eat sort of like baleen whales - they filter small pieces of food out of the water. Like most ocean animals, their size can vary a lot. Some kinds of rays are tiny and some are really big. The largest rays are manta rays and can grow to be over 20 feet wide!

Mollusks

Mollusks are marine animals with soft bodies and no backbone. Animals like mollusks that do not have a backbone are called *invertebrates*. Animals that do have a backbone are called vertebrates. There is a lot of variety in the mollusk family. Some of them have a hard shell to cover and protect their soft bodies, but many do not. Did you know that clams and squids are related? They are both mollusks! Mollusks with shells, like clams, like to live in tide pools near the coast and larger ones with soft bodies, such as squid, live in the deep parts of the ocean. Here are some interesting things to know about several different mollusks:

Scallop - a small animal that lives between two identical shaped shells. Scallops, along with clams and oysters, are called bivalves. Scallops live on the ocean floor and move by quickly opening and closing their two shells with a thick muscle that works like a hinge to hold the shells together and allow them to open and close. When the shells come together, some water squirts out and the animal is propelled a little ways through the water. Most bivalves eat plankton and other tiny living things, like algae. Starfish and crabs often eat the soft bodies of scallops.

Conch (say: KONK) - this mollusk is called a gastropod and has a spiral-shaped shell and a soft foot. A conch looks similar to a snail and has tentacles to help it smell and feel. Its eyes protrude out from its head on two larger tentacles. It also has a claw-like foot it digs into the sand to propel itself forward and a very rough tongue for eating things that float in the water. Conch shells are used for many things, including musical instruments (sort of like a horn), decoration (they are very pretty), and even building materials!

Cuttlefish - these strange creatures have the amazing ability to instantly change the colors and patterns of their skin to blend in with their surroundings (they are related to the octopus, which can do this too!). Cuttlefish, along with octopi and squid, are called cephalopods. They are very fast swimmers and have multiple tentacles or arms that they use to catch and eat their food. These animals are meat-eaters and many of them use poison to kill their prey. Cuttlefish, octopi, and squid all have eight long arms. To learn more about cuttlefish, check out this website and click on "Launch Interactive" to find out about a cuttlefish's anatomy and how it works inside: http://www.pbs.org/wgbh/nova/camo/anatomy.html. Here are some videos of cuttlefish as well: http://www.arkive.org/common-cuttlefish/sepia-officinalis/video-10.html.

Giant Squid - some squid are small, but the giant squid, as its name tells us, is not a small one. This large creature can reach over 40 feet long and weigh about 1 ton (2,000 pounds), making it one of the largest ocean dwellers! Its main predator (an animal that hunts and eats it) is the sperm whale. A sperm whale might have to fight hard if it wants a giant squid for a meal though, because they are generally not much longer than the giant squid! Like other squid, the giant squid has eight arms and two very long tentacles with sharp barbs at the ends, which it uses to capture food. It likes to eat smaller squid and fish. Giant squid live very far down in the ocean and have big eyes to help them see.

Printable Worksheet

Print this two-page coloring sheet and help kids cut and paste each animal onto the ocean page at the depth where it is most commonly found in the ocean. Talk about why each animal lives in that particular area. Encourage them to draw animals and plants to fill their ocean picture.

What To Do:

1. Color the animals.
2. Carefully cut each one out.
3. Glue each one into the ocean on the next page.
4. Draw and color other animals to fill your ocean scene.

Remember that some animals live near the bottom of the ocean, some live in the middle, and some live near the surface. Put each animal where you think it likes to live.