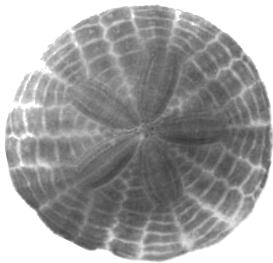


A Little About Sand Dollars

[Click here to go to Contents](#)



by Cheryl Anne ©2012

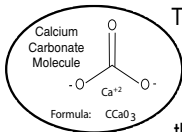
Contents

- Click on topic to go there -

What Are Sand Dollars?	1
Where Do Sand Dollars Live?	2
What Do Sand Dollars Eat?	3
How Do They Eat?	3
How Do Sand Dollars Breathe?	4
What Are They Related To?	4
How Do Sand Dollars Move?	5
Do Sand Dollars Have Enemies?	5
How Do Sand Dollars Multiply?	6
What Do Sand Dollars Do?	7
How Do You Find Sand Dollars?	7
Is It Still Alive?	8
How Do You Clean Sand Dollars?	8
What Do You Do With Them?	9
Glossary	10

What Are Sand Dollars?

Sand dollars are creatures that belong to the class Echinoidea. They are bilaterally symmetrical so they are known as 'irregular echinoids'. That means that they have a front end that always faces the direction they are traveling. Sand dollars are *Echinoderms* because echinoderm means 'spiny skin', and the 'fur' of a sand dollar is composed of tiny spines. Sand dollars are a deep chocolatey maroon color, and the spines have a coarse velvety feel.

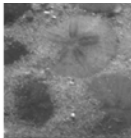


The skeleton of a sand dollar is made of *calcium carbonate* plates. Sand dollars are often uprooted and killed by storms. Usually, by the time they are found on the beach, sand and waves have rubbed the spines off; the remaining shell is called a *test*.

The oldest sand dollar fossil, named *Arkarua*, lived in the oceans off Australia about 560 million years ago during the Earth's *Pre-Cambrian Age*.

Where Do Sand Dollars Live?

Sand dollars live and travel in the sand in the *intertidal* and *subtidal* zones of Earth's oceans. They live in both temperate and tropical waters where the water is shallow. Most species live in water up to about 40 feet deep, but some can be found as deep as a mile. Living in large gatherings, they like sheltered areas with soft sandy floors and gentle tides.



They travel just beneath the surface of the sand. During storms, they lie flat and burrow a little deeper, but when the water is calm, they like to stand on end, waving lazily to and fro with the ocean's currents.

The most common species living along the west coast from Alaska to California is called *Dendraster Excentricus*.

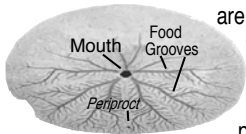


What Do Sand Dollars Eat?

Sand dollars eat *plankton*, *copepods*, and tiny plants called *diatoms*. These live in the ocean's currents or cling to grains of sand. When the sea bed is calm, sand dollars stand on end with their *oral* surfaces facing the current, letting the ocean bring food right into their mouths. When water is rougher, they stay beneath the sand's surface and ingest sand and water from the ocean floor. This is called 'bulk-processing'.

How Do They Eat?

Sand dollars eat with their feet! As they move through the sand, food is trapped among the spines. Covering the spines



are fine hairs called cilia, and these transport food to specialized tube feet called podia that line the creature's food grooves. These podia transport food along the food

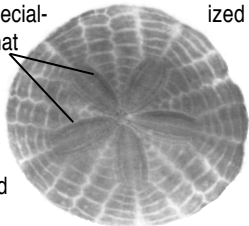
grooves to its mouth, called its peristome, where food and sand are crushed between strong teeth by muscles called Aristotle's Lantern.



Aristotle's Lantern

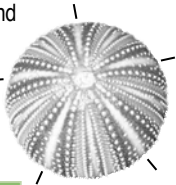
How Do Sand Dollars Breathe?

Sand dollars breathe through their feet, of course! Not the same feet though! These specialized tube feet grow out of the holes that create the petaloids on the creature's top, *aboral*, surface. Tube feet pull water into its water vascular system where carbon dioxide is exchanged for oxygen and circulated throughout its body.



What Are They Related To?

Sand dollars, like sea stars, sea urchins, and sea cucumbers, are a member of the *phylum* echinodermata. These creatures are characterized by having 'spiny skin' and being *pentamerous* - the sand dollar's five petals, the five arms of the star fish, and the five rays of the sea urchin.



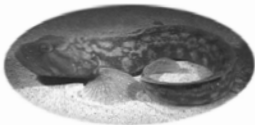
Sea Urchin test

How Do Sand Dollars Move?

Not with its feet! Mostly, a sand dollar uses its thousands of spines to propel itself. Spines grow out of muscles that are attached to its test. The spines swivel like the ball joint in your shoulder, and this gives the creature its mobility.

The spines are hollow and help keep sand dollars buoyant, but when they want to counter this effect, they swallow sand grains whole, and this makes them heavier. They like traveling just beneath the sand's surface; however, during storms they bury themselves safely under several inches of sand.

Do Sand Dollars Have Enemies?



The Ocean Pout, an eel-like bottom fish, hunts and eats sand dollars. Ocean Pout can grow to be over three feet long and weigh 12 pounds. Other dangers include water pollution and increasing ocean temperatures.

How Do Sand Dollars Multiply?

Sand dollars reproduce using a system called broadcast spawning. Whenever ocean conditions are right, the adult male and female sand dollars simultaneously each release hundreds of *gametes*.

A gamete is a reproductive cell, an egg or sperm in most animals, that, in sand dollars, is released from the five holes that creates the star shape in the center of the five petals on the aboral surface of the sand dollar .

The gametes mix together, and the resulting fertilized larvae go on an adventure as they are swept along by the ocean's currents. They can be carried many miles in the month or so that it takes them to *metamorphose* into proper baby sand dollars. Once they have their first test, they drift to the bottom and find new homes.

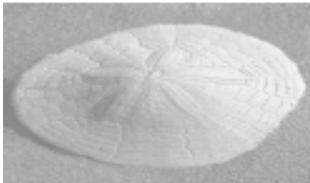
Sand dollars can live to be about 50 years old.

What Do Sand Dollars Do?

Sand dollars are part of Earth's housekeeping crew. In an aquarium, you clean the sand in the bottom by dumping it all out and washing it free of all that green sludge. In the ocean, sand dollars keep the sand clean. By processing billions of tiny bits of organic matter that drift to the ocean's floors, they prevent it from decomposing and fouling the ecosystem.



How Do You Find Sand Dollars?



Sand dollars can be found as the tide goes out on sandy beaches around the world; however, after a storm is the best time to find them. Storms stir up sand dollar beds and wash their tests onto the beach.

Is It Still Alive?

Occasionally, you might find a sand dollar that still has its fur. If it's still wet and you see a little trail of effort where it tried to bury itself in the sand after being accidentally beached, you should throw it back into the water.

How Do You Clean Sand Dollars?

Most tests found on the beach are already nearly bleached white from sand and sun and water. To clean sand dollars, soak them in fresh water and rinse them thoroughly.

After they are rinsed, soak them in a solution of about half bleach and half water. Let them soak for several minutes until they turn white. Rinse them again and let them dry. For very dirty sand dollars, use a little more bleach, let them soak a little longer, or repeat the process.

What Do You Do With Them?

Sand dollars can be decorated and used for a variety of crafts. To seal them for indoor use, either brush or spray on a coat of acrylic varnish, or coat them with a mixture of equal parts water and white glue.

Sand dollars can be sealed either before and/or after they are painted or otherwise decorated. Experiment with spray paints, acrylics, and watercolor. Glue on decorations.

Sand dollars can be turned into Christmas ornaments, night lights, jewelry, mobiles, game pieces, paper weights, or whatever your imagination can think of.

For outdoor use, coat sand dollars with exterior sealer. For garden markers, paint (or write with permanent marker) the name of the plant on the sand dollar, and then give it a second coat of exterior varnish or sealer to protect it from the elements. Bring markers inside over winter.

Glossary

Aboral: The top side of a sand dollar; has petal pattern.

Arkarua: The oldest known fossil of an echinoderm. Arkarua lived off the coast of Australia about 560 million years ago, during the Vendian period of the Pre-Cambrian Age.

Calcium Carbonate: CaCO_3 . A common nonsiliceous mineral. It is a white chemical compound made of crystals in either (hexagonal) calcite form or in (rhombohedral) aragonite form.

Copepods: Tiny shrimp-like crustaceans usually only about a millimeter long. Copepods are a variety of zooplankton that eat single celled organisms like bacteria and diatoms.

Diatom: A unicellular algae that is special because instead of using green chloroplast to conduct photosynthesis, it uses yellow-brown chloroplast.



Echinoderm: Spiny skinned animals that have an exoskeleton made of interlocking calcium carbonate plates.

Gamete: a germ cell produced through the process of meiosis. A gamete contains a copy of a chromosome set and is essential in the process of fertilization.

Intertidal: The part of the beach that falls within the high and low water tide marks.

Metamorphose: The magical process employed by butterflies emerging from their cocoons; transformation of appearance and character.

Oral: The bottom, flat side of a sand dollar. This is the side that has the mouth opening in the center; the creature's anal opening is the little hole near the edge.

Pentameral: Having five-part radial symmetry. Having arms or rays in multiples of five. Sand dollars have five petaloid segments arranged in a flower pattern on their top surface.

Periproct: The anal opening.

Phylum: A broad category used to classify plants and animals that are in the same genetic family.

Plankton: Planktos: ‘wanderer’ in Greek. The link between sunlight and life. Phytoplankton are microscopic plants that use the magic of photosynthesis to transform sunlight into carbohydrates. Zooplankton are microscopic animals that eat them. Together, they live within the ocean’s currents, forging the first link in the dance of life, and together, they are eaten by everything from sand dollars to baleen whales.

Pre-Cambrian Age: Once upon a time about 600 million years ago, life only existed in the Earth’s oceans. All the lands were frozen solid in the grips of an ice age, and this period of time came to be called the Pre-Cambrian Age.

Subtidal: The part of the beach that is always underwater, just beyond low tide, the transitional stretch where the beach becomes the ocean floor.

Test: the ‘shell’ of the sand dollar.



A grayscale microscopic image of sea urchin spines, showing their characteristic circular cross-sections with radial internal structures.

Kingdom: Animalia
Phylum: Echinodermata
Class: Echinoidea
Order: Clypeasteroidea
Family: Echinarachnidae
Genus: Echinarachnius
Species: Dendraster Excentricus

[Click here to return to Contents](#)

[Click here to return to Contents](#)



A Little About Sand Dollars

by Cheryl Anne

©2012 www.cheryl-anne.com