

OIMB GK12 CURRICULUM

1st Grade

30-45 minutes

Echinoderms (Sand dollar/ sea urchin comparison)

Oregon Science Content Standards:

- 1.1 Structure and Function: Living and non-living things have characteristics and properties
- 1.1L.1 Compare and contrast characteristics among individuals within one plant or animal group.
- 1.2 Interaction and Change: Living and non-living things interact
- 1.2L.1 Describe the basic needs of living things.
- 1.3 Scientific Inquiry: Science explores the natural world using evidence from observations
- 1.3S.1 Identify and use tools to make careful observations and answer questions about the natural world.
- 1.3S.2 Record observations with pictures, numbers, or written statements.

Ocean Literacy Essential Principles:

- 5. The ocean supports a great diversity of life and ecosystems

Goals:

- To introduce scientific classification.
- To introduce students to the group Echinoderms and to learn about two types of Echinoderms

Concepts:

- Scientists put animals into groups based on characteristics that they share.
- Echinoderms are invertebrates that have spiny skin, radial symmetry and tube feet.
- Sea urchins and sand dollars are two types of Echinoderms.

Materials:

- A sea urchin test and a sand dollar test (“test” is the internal skeleton, “shells”)
- Optional: Live sand dollars and sea urchins, tubs and seawater
- Optional: Video clips of urchins and sand dollars (arkive.org)
- Echinoderm PowerPoint
- Venn Diagram of Sea Urchins and Sand Dollars

Lesson Plan:

1. Introduce the students to classification. Ask the class why scientists classify things, that is, put things into groups. Ask for 6 volunteers and put them into two groups based on a characteristic they share (wearing shorts vs. wearing pants) and have the rest of the class guess why you grouped them the way you did. Then tell them that you could close your eyes, pick anyone out of the shorts group, and know that that person is wearing shorts. Repeat this exercise until it is clear that scientists group things based on characteristics they have in common. Emphasize that by putting things into groups, you learn something about those items (e.g. wearing shorts, has curly hair, is wearing sneakers, etc.).

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2. Show the PowerPoint of echinoderms (sea stars, sea cucumbers, brittle stars, sea urchins, sand dollars) and have the students point out everything these animals have in common. Ask them why these animals would all be in the same group. They all have spiny skin, radial symmetry and tube feet. Remind them that echinoderms are a group of invertebrates, so like all invertebrates, have no backbones.
3. Now explain that they are going to look at 2 special kinds of echinoderms: sand dollars and sea urchins. First tell them a little bit about sea urchins. Sea urchins use their 5 teeth to eat seaweeds, and their teeth and spines to dig out depressions in rocks that they can hide in to protect themselves from predators and waves. They live at the rocky seashore. Tell them that they use their spines to catch seaweed. Explain how seagulls, in order to eat a sea urchin, will fly up into the air with it and drop the sea urchin so that it cracks on the rocks below. Show the students a sea urchin skeleton (called a 'test') and explain this is under the tube feet and spines.
4. Now tell the students about sand dollars. Sand dollars use their small spines and tube feet to move food to their mouths. They live in the sand, and when feeding, stick half their body into the sand and the other half out into the water. They wait for the waves to push food (plankton) to them. If a wave is too powerful it can flip them out of the sand and onto their back. If this happens, they cannot turn themselves back on their stomachs. They have to wait for another wave to flip them over. Small sand dollars eat sand to weigh themselves down so that this doesn't happen as often. Fish and birds take bites out of sand dollars, and many tests have scars or pieces missing out of them because of this. Show the student a sand dollar test. Ask the students how the two animals' tests are different and how they are the same.
5. If you have live animals, go over live-animal etiquette. Pass the animals out in small containers of sea water and have the students make observations on the two kinds of echinoderms. Have the students come up with things that are the same and different about them. Pictures or videos from arkive.org can be used instead of live animals.
6. Gather on the carpet and draw a venn diagram, or project the attached venn diagram worksheet to compare sea urchins and sand dollars. Have the students tell you things that are the same and things that are different.

Assessment: Make sure the students point out all of the things that echinoderms have in common (spiny skin, tube feet, symmetry). Differences include color, shape, spine size, where they live, what they feed on, etc.

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Echinoderm comparison

Name _____

Sand Dollar

Sea Urchin

