What is an echinoderm?

- **Echinoderms move** by means of hundreds of hydraulic, suction-cup-tipped appendages and have skin covered with tiny, jawlike pincers.

- **Echinoderms are found in all the oceans of the world.**
Echinoderms have endoskeletons

- SKIN: all have a hard, spiny, or bumpy endoskeleton covered by a thin epidermis.

- Endoskeleton of all echinoderms is made primarily of calcium carbonate, the compound that makes up limestone.
Some spines have become modified into pincerlike appendages called pedicellariae (PEH dih sih LAHR ee ay).

An echinoderm uses its jawlike pedicellariae for protection and for cleaning the surface of its body.
Echinoderms have radial symmetry

- Radial symmetry is an advantage to animals that are stationary or move slowly.

- Radial symmetry enables these animals to sense potential food, predators, and other aspects of their environment from all directions.
The water vascular system

- The **water vascular system** is a **hydraulic system** that operates under **water pressure**.

- Water enters and leaves the water vascular system of a sea star through the **madreporite** (mah druh POHR ite), a sievelike, disk-shaped opening on the **upper surface** of the echinoderm’s body.
The water vascular system

- The *underside* of a sea star has *tube feet* that run along a groove on the underside of each ray.
The water vascular system

- Tube feet are hollow, thin-walled tubes that end in a suction cup.
- The round, muscular structure called the ampulla (AM pew lah) works something like the bulb of a dropper.
- Each tube foot works independently of the others, and the animal moves along slowly by alternately pushing out and pulling in its tube feet.
The water vascular system

- Tube feet also function in gas exchange and excretion.
Echinoderms have varied nutrition

- All echinoderms have a mouth, stomach, and intestines, but their methods of obtaining food vary.

- Sea stars are carnivorous and prey on worms or on mollusks such as clams.
Echinoderms have varied nutrition

- Most sea urchins are herbivores and graze on algae.

- Brittle stars, sea lilies, and sea cucumbers feed on dead and decaying matter that drifts down to the ocean floor.
Echinoderms have a simple nervous system

- Echinoderms have no head or brain, but they do have a central nerve ring that surrounds the mouth.
Echinoderms have a simple nervous system

- Nerves extend from the nerve ring down each ray.

- Echinoderms have cells that detect light and touch, but most do not have sensory organs.

- A sensory organ known as an eyespot and consisting of a cluster of light-detecting cells is located at the tip of each arm, on the underside.
Echinoderms have a simple nervous system

- **Eyespots** enable sea stars to detect the **intensity** of light.

- Sea stars also have **chemical receptors** on their **tube feet**.
Echinoderms are deuterostomes; a broad classification of triploblastic animals that tend to share certain embryological traits.

This pattern of development indicates a close relationship to chordates, which are also deuterostomes.
Approximately 6000 species of echinoderms exist today.

About one-fourth of these species are in the class Asteroidea (AS tuh ROY dee uh), to which the sea stars belong.
1.) **Ophiuroidea** (OH fee uh ROY dee uh), the **brittle stars**

2.) **Echinoidea** (eh kihn OY dee uh), the **sea urchins & sand dollars**.
Diversity of Echinoderms

3.) Holothuroidea (HOH loh thuh ROY dee uh), the sea cucumbers

4.) Crinoidea (cry NOY dee uh), the sea lilies & feather stars

5. Concentricycloidea (kon sen tri sy CLOY dee uh), the sea daisies.