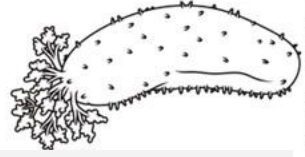




# SHAPE OF LIFE: ECHINODERMATA

1. What are some familiar echinoderms that you see recognized in the first minute of the video?

**Sea stars, sea cucumbers, sea urchins, feather stars, brittle stars**



2. What type of symmetry do sea stars and other echinoderms have?

**Echinoderms display 5-part symmetry.**

3. If you curl the 5 arms of a sea star up, which sphere-like echinoderm does it resemble?

**A sea star with the arms meeting at the tips resembles a sea urchin.**

4. If you turn an urchin on its side and stretch it out, which tube-like echinoderm results?

**A sea urchin flipped and stretched resembles a sea cucumber.**

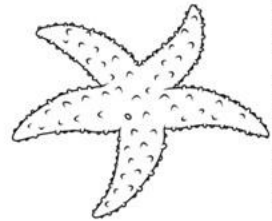
5. How many bony platelets make up the endoskeleton of a sea star? **Thousands**

6. What joins the bone platelets together, allowing the arms to extend and flex, as well as to lock in place for hours if necessary?

**Tiny muscles hold the bone platelets together.**

7. Describe the nervous system of an echinoderm.

**Echinoderms lack a brain; however, they do have a nerve ring around their mouth and nerves that radiate down each arm.**

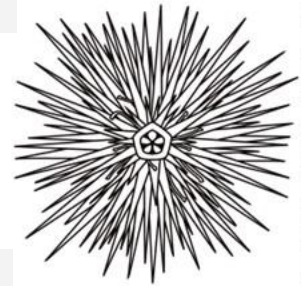


8. What do sea urchins eat?

**Sea urchins eat plants and algae, such as giant kelp.**

9. How do urchins know where they are going in the water?

**Sea urchins lack eyes and a sense of sight; however, they can taste food and the water with their sensory tube feet.**



10. Describe how the sea urchin eats kelp.

**Sea urchins have a mouth with 5 tiny teeth that bite and chew the kelp, drawing it into their mouth.**

11. True or False: Sea cucumbers are sessile, unable to move along the sea floor. **False**

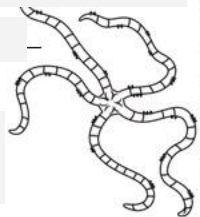
12. How do sea cucumbers eat?

**Sea cucumbers use their tube feet to push sand into their mouth. They keep the organic food matter and eliminate the extra sand and waste from their anus.**

13. Which echinoderms form a fuzzy carpet along the sea floor? **Brittle stars**

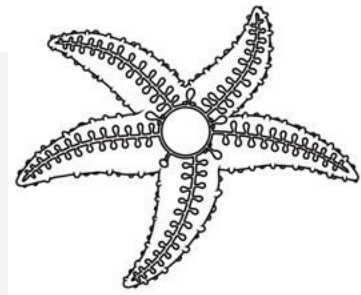
14. How do brittle stars eat?

**Brittle stars have feathery arms, which they use to capture plankton in the water.**



15. How do the tube feet extend to walk the sea star along the ocean floor?

Water enters through a sieve plate (also called a madreporite) and flows through a series of radial canals down each arm of the sea star. The tube feet are attached to these canals. At the top of each tube foot is a muscular bulb that contracts and forces water out of the tube foot, extending it in a certain direction to move.



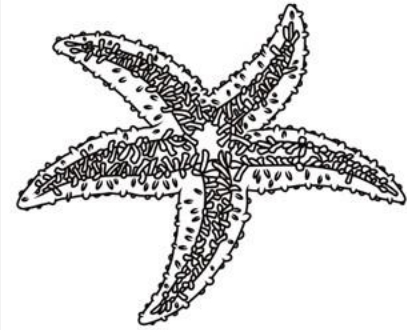
16. What do the sensory tube feet at the tip of each arm sense? **taste**

17. What additional sensory organ is located at the tip of each arm? What can it sense?

On the tip of each arm, sea stars have a light-sensing organ (often called an eyespot) that can differentiate between light and dark.

18. How do sea stars eat? Describe the process in detail, explaining how different structures of the echinoderm play a role in the process.

Sea stars are predators! They hunt mussels by crawling towards their prey. Once they find a bed of mussels, they use their tube feet to feel the mussels, find a mussel that is slightly cracked open, and pry the mussel open. The sea star's stomach everts from its mouth and pushes inside the mussel's shell, releasing enzymes that dissolve the mussel alive. Once the mussel's body forms a rich soup, the sea star absorbs the nutrients and draws its stomach back in through its mouth.

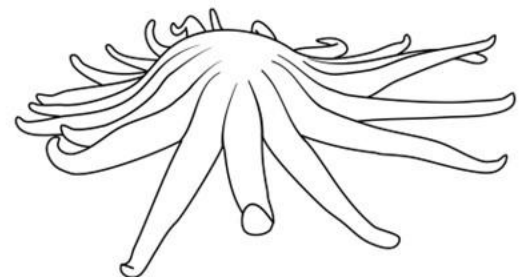


19. How many arms can Pycnopodia have? **Over 20**

20. Which prey does Pycnopodia hunt? **Snails**

21. In their marine habitats, are echinoderms successful or unsuccessful animals?

**Echinoderms are successful animals in a marine habitat!**



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# LOOKING FOR MORE ZOOLOGY RESOURCES?

### Myth or Fact Challenge Phylum Echinodermata

**ECHINODERMATA MYTH OR FACT #1**  
• Starfish are a type of fish.  
**Myth**

**ECHINODERMATA MYTH OR FACT #2**  
• The prey of a sea star is too large to fit in their mouth, so they shoot their stomach out to digest the food externally.  
**Fact**

**ECHINODERMATA MYTH OR FACT #3**  
• Echinoderms have an exoskeleton.  
**Myth**

**ECHINODERMATA MYTH OR FACT #4**  
• Sea urchins have teeth.  
**Fact**

**ECHINODERMATA MYTH OR FACT #5**  
• Echinoderms can regenerate a missing or ray.  
**Fact**

**ECHINODERMATA MYTH OR FACT #6**  
• Sea urchin and sea cucumber meat is toxic to humans.  
**Myth**

**ECHINODERMATA MYTH OR FACT #20**  
• Echinoderms can regenerate a missing or ray.  
**Fact**

**Versatile & Low Prep**

### Sea Star Anatomy Coloring Activity

**ANATOMY OF A SEA STAR**

**Sea Star, External Anatomy**

**Sea Star, Internal Anatomy**

**Miller, Muscles, Lignites**

**No prior learning needed!**

### Zoology Curriculum Map

**ZOOLOGY PACING GUIDE & LEARNING OBJECTIVES**

**Unit 1: Biology Basics**

**Unit 2: Diversity & Classification**

**Unit 3: Phylum Protista**

**Unit 4: Phylum Fungi**

**Unit 5: Phylum Plantae**

**Unit 6: Phylum Animalia**

**Unit 7: Phylum Mollusca**

**Unit 8: Phylum Arthropoda**

**Unit 9: Phylum Chordata**

**Unit 10: Phylum Vertebrata**

**& Learning Objectives**

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