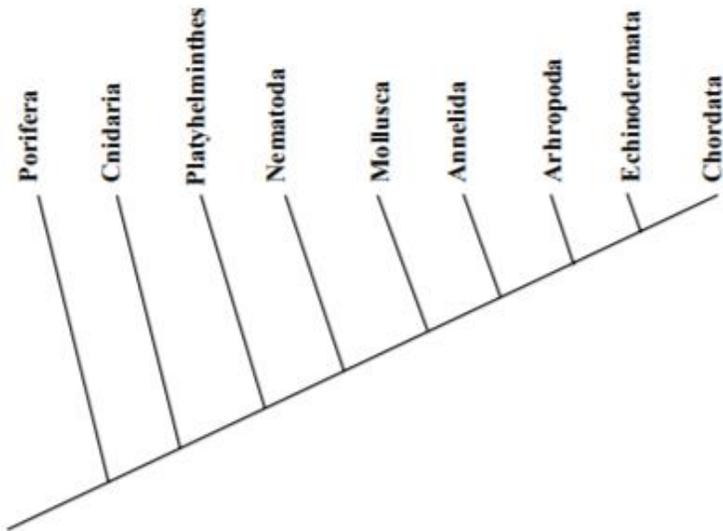


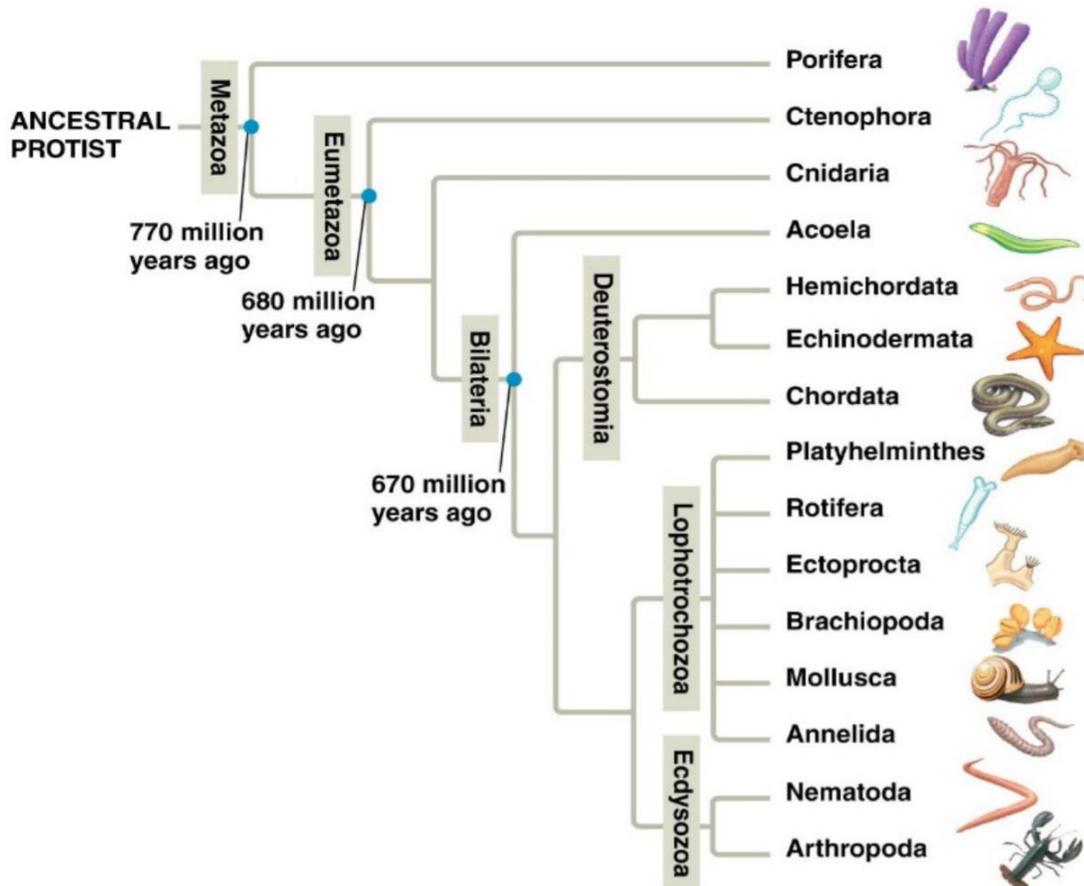
# Analyzing Organismal Traits through Cladograms

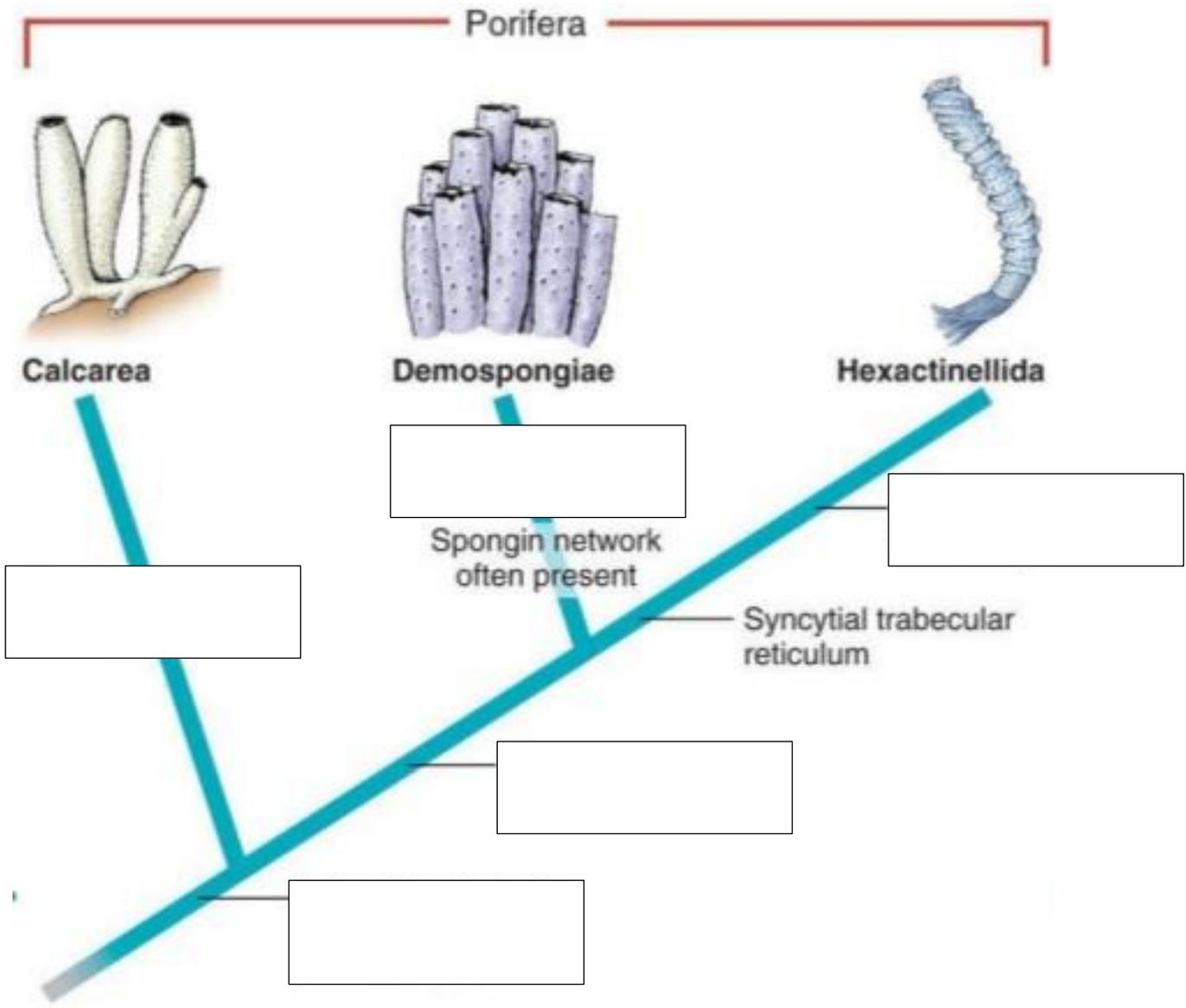


Above you will see a cladogram of marine taxa. Your focus will be only on Phyla Porifera, Cnidaria, and Echinodermata and the cladogram that they show.

Directions: Your task is to fill in the cladograms on the pages to follow, given the list of traits you have been given. The most useful resources will be the PowerPoint presentations that have been posted to the class website on the three Phyla in this activity. You can also use the internet and any of the resources therein.

Search terms can be “tree of life”, “cladogram” and so forth should you search beyond the class PowerPoints.

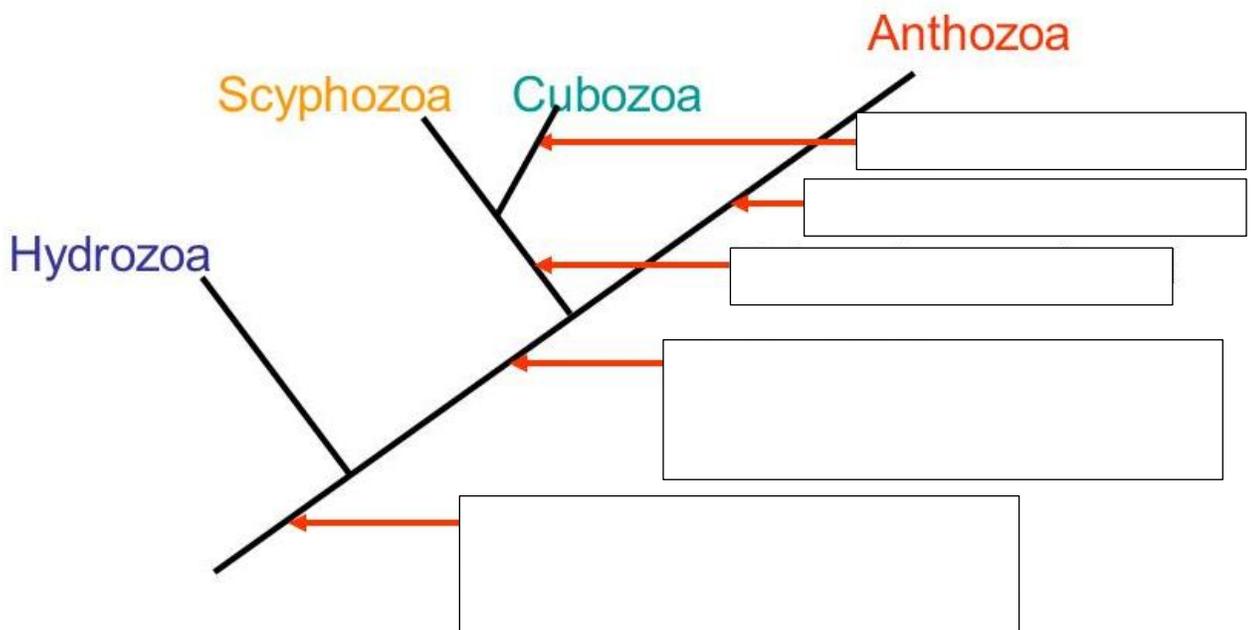
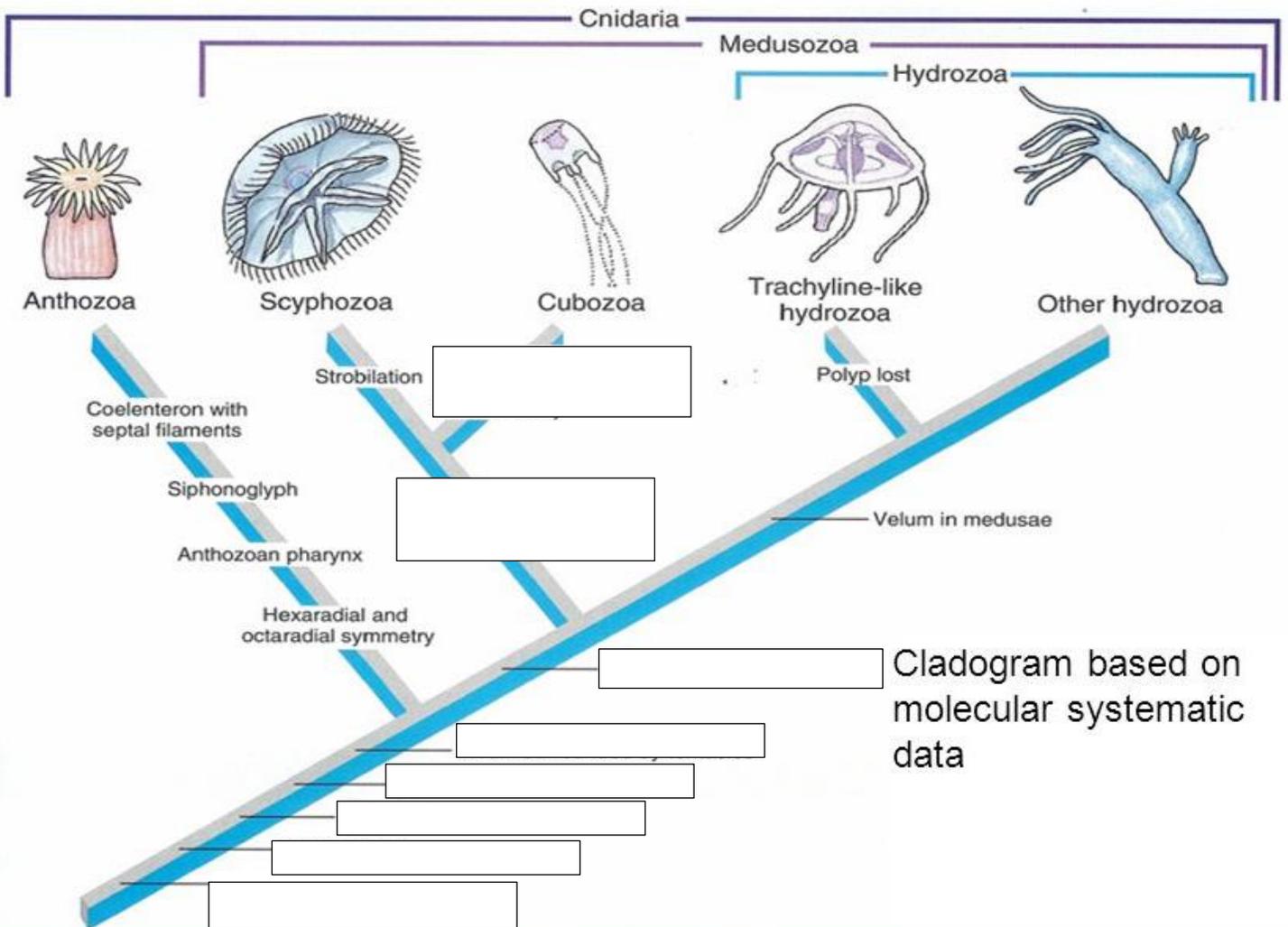




**Phylum Porifera Cladogram Questions:**

1. Which of the three Classes above are made up of silica/glass? \_\_\_\_\_
2. Which of the Classes above are composed mostly of calcium carbonate? \_\_\_\_\_
3. The Class that we refer to as the “glass sponges” with spicules of 6 rays? \_\_\_\_\_
4. Looking back to the marine cladogram on the first page of this packet, what reasons justify placing Phylum Porifera where it’s shown on the diagram?

# Phylogeny of Cnidaria



**Phylum Cnidaria Cladogram Questions:**

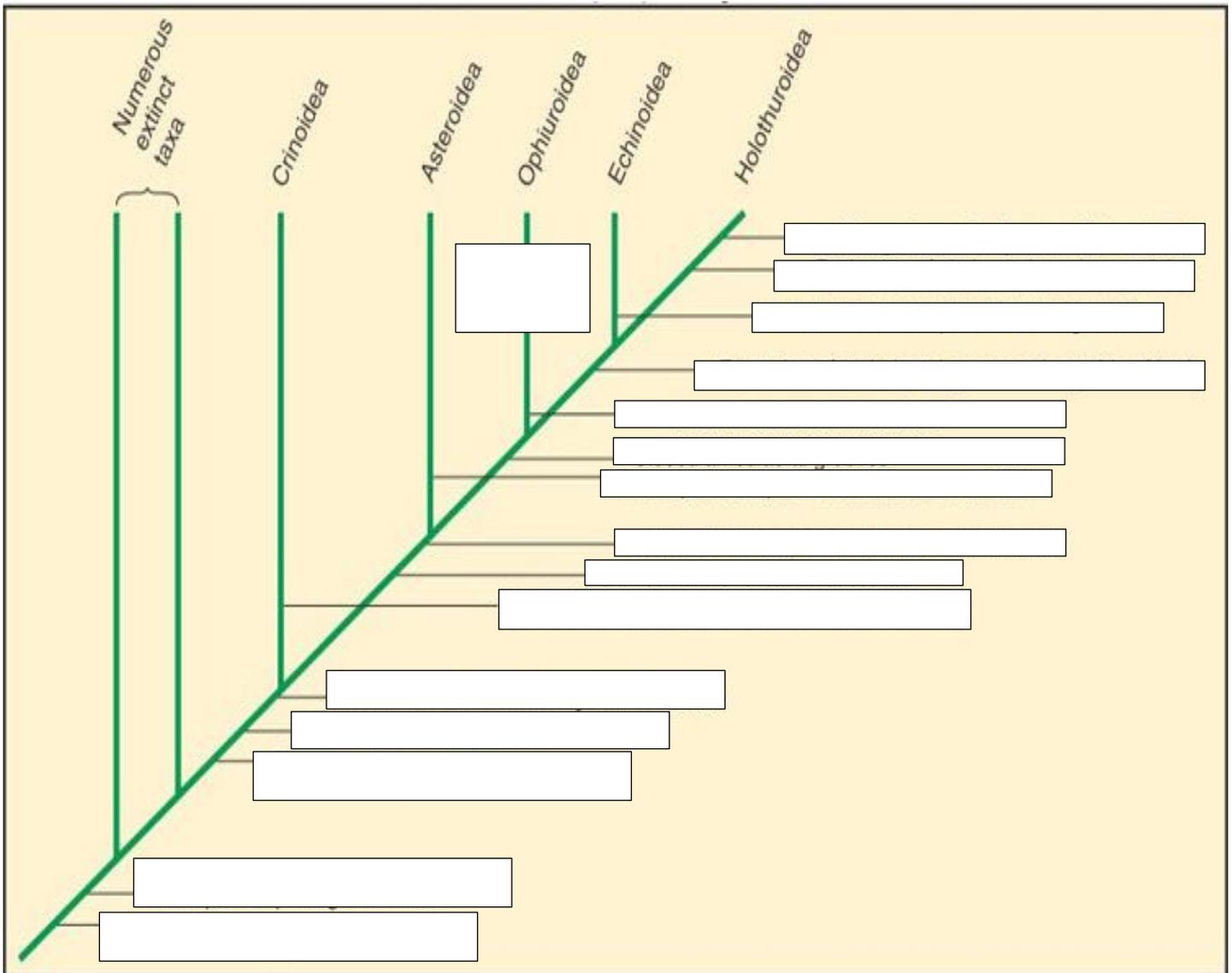
5. The box jelly fish is known to have the most deadly of the toxins in this phylum, even though we didn't cover this Class, given the name, box jelly fish, which Class is it in? \_\_\_\_\_

6. List three traits that are shared by all Cnidarians. \_\_\_\_\_, \_\_\_\_\_, & \_\_\_\_\_.

7. Between the evolution of Classes \_\_\_\_\_ & \_\_\_\_\_, the medusa body form evolved.

8. The ancestral (oldest) line of evolution always maintained the formation of the polyp stage as the dominant stage, what trait and in which Classes lost this feature? \_\_\_\_\_ & \_\_\_\_\_

9. There are two different theories on how this Phylum evolved. Look at the two cladograms ( A & B) and in three or more sentences, make your claim and describe why you think one is more likely. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Phylum Echinodermata Cladogram Questions:**

11. What traits are common to all Classes in Phylum Echinodermata? \_\_\_\_\_ & \_\_\_\_\_.

12. We briefly touched on Class Crinoidea. The common name of this group is the \_\_\_\_\_. This group attached to the substrate (hard bottom surface) by a \_\_\_\_\_.

13. What is meant by the term “pentaradial” in terms of this Class’ symmetry? \_\_\_\_\_

14. Class Ophiuroidea (brittle star) lost the presence of suckers (tube feet) on their arms. From the Shape of Life video when you saw these organisms, for what reason do you think this happened? \_\_\_\_\_

15. At what point in the evolution of Phylum Echinodermata did the ambulacral grooves close and start to evolve a larger, more circular, body plan (shape)? \_\_\_\_\_

Do you think this gave an advantage in the Classes that evolved after this trait’s first appearance? \_\_\_\_\_

**Connections to the Dissection:**

16. In the list of traits you were given for this activity, list those that were easily, and not so easily, seen in the dissection of the sea star we recently conducted. \_\_\_\_\_

17. Of all the traits you saw in the sea star, which THREE do you feel are most vital to its mode of living? Explain why you make this claim. \_\_\_\_\_

## Trait bank to use in cladograms:

- Nematocysts
- Planula larvae
- Water vascular system
- Calcium carbonate spicules
- Internal system of pores/canals for water flow
- Siliceous spicules
- Spicules not with 6 rays
- Spicules with 6 rays
- Radial symmetry
- Mouth surrounded by tentacles
- Box-like medusa body form
- Medusoid body form
- Cnidocytes
- Gastrovascular cavity
- Polyp stage reduced
- Loss of medusa
- Madreporite opening near mouth

- Pentaradial symmetry
- Extension of ambulacral grooves from oral to aboral pole
- Elongation of oral-aboral axis
- Madreporite internal
- Reduction of ossicles
- Open ambulacral grooves
- Attachment to substrate by aboral surface
- Arms with ciliated grooves for suspension feeding
- Oral surface oriented to substrate
- Tube feet with suckers and used in locomotion
- 5 rays broadly connected to a central disc
- Closed ambulacral grooves
- Loss of suckers on tube feet
- Extension of ambulacral grooves alongside of body
- Fusion of skeletal plates into a rigid covering
- Arms have highly articulated "vertebrae" for movement

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