

Name: _____

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Introduction to Cephalopods

Adapted from: The Cephalopod Page (www.thecephalopodpage.org)

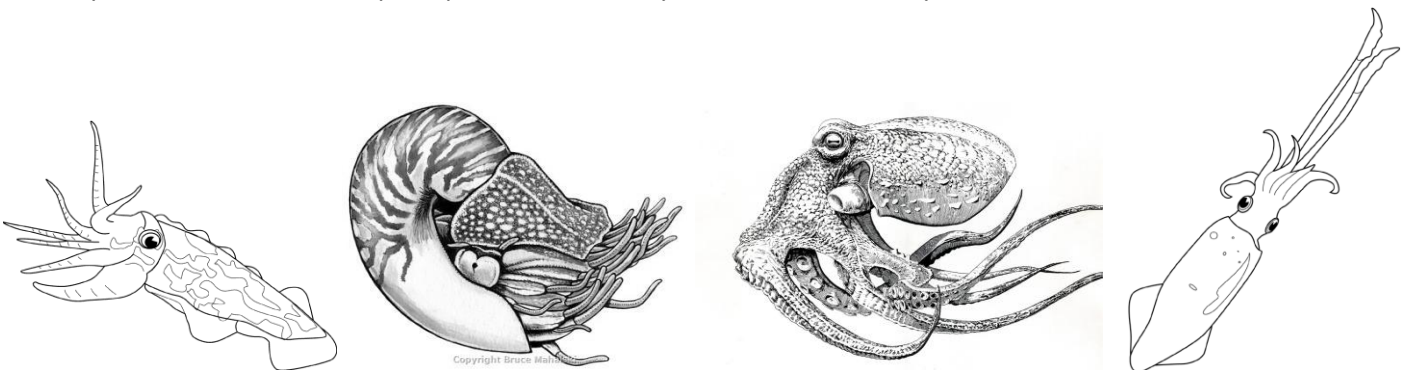
Cephalopoda, the class of mollusks in which scientists classify **octopuses, squid, cuttlefish and nautilus**, can change color faster than a chameleon. They can also change texture and body shape, and, and if those camouflage techniques don't work, they can still "disappear" in a cloud of **ink**, which they use as a smoke-screen or decoy. Cephalopods are also fascinating because they have **three hearts** that pump **blue blood**, they're **jet powered**, and they're **found in all oceans of the world**, from the tropics to the poles, the intertidal to the abyss. Cephalopods have inspired legends and stories throughout history and are thought to be the most intelligent of invertebrates. Some can squeeze through the tiniest of cracks. They have eyes and other senses that rival those of humans.

The class **Cephalopoda**, which means "head foot", are mollusks and therefore related to bivalves (scallops, oysters, clams), gastropods (snails and slugs), scaphopoda (tusk shells), and polyplacophorans (chitons). Some mollusks, such as bivalves, don't even have a head, much less something large enough to be called a brain! Yet cephalopods have **well-developed senses and large brains**. Most mollusks are protected by a **hard external shell** and many of them are not very mobile. Although **nautilus** has an external shell, the trend in cephalopods is to **internalize and reduce the shell**. The shell in **cuttlefish**, is internal and is called the **cuttlebone**, which is sold in many pet shops to supply calcium to birds. **Squid** also have a reduced internal shell called a **pen**. **Octopuses** lack a shell altogether (some may have some vestigial shells; they have no use).

Cephalopods are found in all of the world's oceans, from the warm water of the tropics to the near freezing water at the poles. They are found from the wave swept intertidal region to the dark, cold abyss. All species are marine, and with a few exceptions, they do not tolerate **brackish** (mix of salt and fresh) water.

Cephalopods were once one of the dominant life forms in the world's ocean. Today there are only about **800 living species** of cephalopods (compare that with 30,000 living species of bony fish). However, in terms of productivity, some scientists believe that cephalopods are still giving fish a run for their money.

Many species of cephalopods to **grow very fast, reproduce over a short period of time**, and then die. Scientists classify this weed-like life history as "**r-selection**" - the r refers to **exponential growth**. If you were to clear cut an oak forest, the first plants to grow would not be more oak trees - it would be weeds. In life history terms, cephalopods are the weeds of the seas. With over-fishing and climate change, there may be more biomass of cephalopods now than any time in recent history.



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Answer the questions below using the reading on the front of this page.

1. What class do octopus, squid, nautilus and cuttlefish belong to?
2. How many hearts do cephalopods have? What color is their blood?
3. What does the term "cephalopod" mean? Why are these species placed in this class?
4. Members of the Mollusca phylum have shells (internal or external), list the different classes and how shells are represented by their members.
5. How do cephalopods move?
6. Where are cephalopods found? How many species are in this class?
7. Explain what "r-selection" is and how this applies to cephalopods.

Top 12 Weird Facts About Octopus (<http://www.nmfs.noaa.gov>)

1. A 50-pound octopus can squeeze through a hole only 2 inches in diameter. If their beak fits, they can get through.
2. Octopuses are about 90 percent muscle.
3. You can tell a male octopus from a female octopus by looking at the tip of its third arm on the right (starting between the eyes and going clockwise). Males have a special tip on this arm that has no suckers on the last few inches. This specialized tip is visible even in immature octopus. To mate, the male inserts this special arm into the female's body cavity. A captured male will try to protect this arm.
4. Female octopuses can wait until months after mating to fertilize the eggs.
5. An average female giant Pacific octopus in Alaska can lay 90,000 eggs.
6. Fishermen like to cut off the tip of an octopus' arm and use it for halibut bait because it continues to wiggle even after being cut off.
7. Octopuses frequently lose an arm to predators, but they grow back.
8. Giant Pacific octopuses are cannibals. They will happily kill and eat smaller octopuses.
9. All species of octopus have venom. The venom of the Giant Pacific octopus is not dangerous to humans, but Australia's blue-ringed octopus is known as one of the most poisonous marine animals—its venom is deadly to humans.
10. Octopuses actually have shells similar to clams and snails. There is a pair of small, spike-shaped structures called stylets inside the octopus' body that are a vestigial shell—meaning it really has no function.
11. It is tempting to use "octopi" as the plural of "octopus", but DON'T DO IT. "Octopi" would be a proper Latin plural, but the word "octopus" has a Greek, rather than a Latin, root. The correct use is to use the word "octopus" to refer to one or several individuals of a single species; use the plural "octopuses" only when talking about multiple species.
12. An octopus has three hearts, nine brains, and blue blood. Two hearts pump blood to the gills, while a third circulates it to the rest of the body. The nervous system includes a central brain and a large ganglion at the base of each arm which controls movement. Octopus blood contains the copper-rich protein hemocyanin, which is more efficient than hemoglobin for oxygen transport at very low temperatures and low oxygen concentrations.