



Hello students,

You will find many links to other websites and videos to enhance this lesson...I have included [the url web address](#) in case there is any difficulty with the links [in blue](#)...and you will see the final entry in my journal ☺ Many Seashell Blessings to you!

Shelley

INDEPENDENT STUDY: Module 1, Class 2

Please note: The pictures and comments in the transcript and recording below have been gathered over many years and where possible, I attribute them to their original source. If anyone connected with these photographs or comments would like them removed, please notify me and I will be happy to comply.

Class 2 recording is about 38 minutes long and is in your attachments.

There are many more videos and websites to visit in your written transcript. You will also discover that there is one more addition to my color-coding. Text with [yellow highlights](#) refer to a shell card in the Ocean Oracle deck.

Please let me know if you have any questions on this material.

Seashell Blessings!

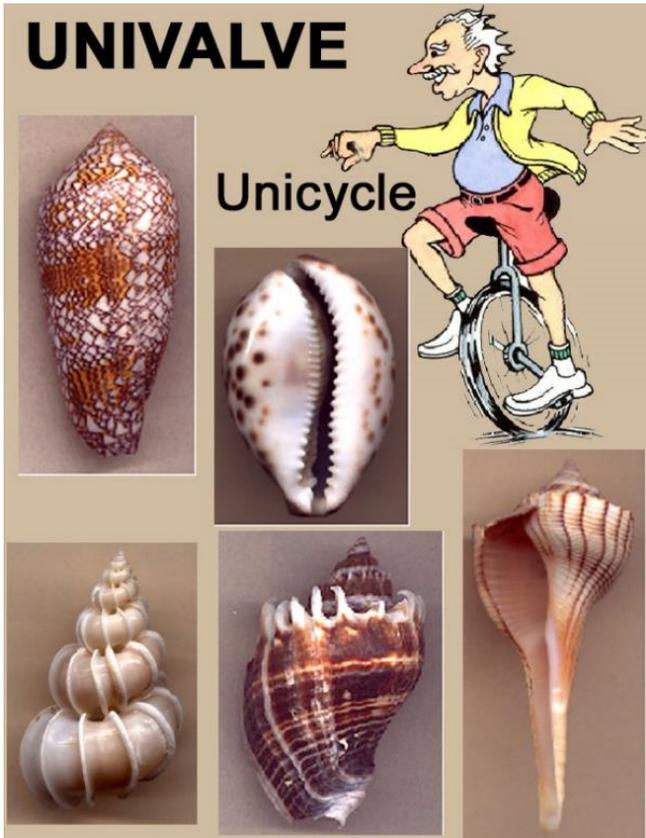
Shelley

Class 2: Shell #: 8,9,72,63,4

If you recall, seashell divination, the language of seashells, is based upon finding a unique quality to assign to each shell. You have already seen that the Chambered Nautilus is the only mollusk that creates chambers as it grows its shell. That serves a purpose we will discuss much later, but it is definitely unique.

The task of finding something unique is not as daunting as it may seem. Believe it or not, in all of my research, I have only found two things all mollusks share.... they all have a mantle (the part of the animal that makes the shell), and they all have a single foot. That is it. No matter what aspect of a mollusk's life you investigate...their anatomy, location, reproduction, feeding habits, methods of defense, or interaction with man... you will find tremendous diversity. You can't even say that all mollusks have gills because there are land snails with lungs. You can't say they all share the same blood because although 99.9% have blue blood with a copper base, there are two species that have red blood. You can't say they all have a heart, because for a while there was an entire class of mollusks believed to have no heart. On the opposite extreme, there is another species that has 3 separate hearts in its body! We will encounter each of these animals and many more as we study seashell divination. You will also learn how shells have interacted with humans in science, medicine, art, religion, and how they have been used as tools, money, and as mentioned in your first class, even as the source of some of our vocabulary words.

In Class 1, we discovered the difference between mollusks and crustaceans regarding shell growth. In Class 2, I want to confine our discussion to mollusks and speak about the 100,000 different species of mollusks. With such a huge number, and with new species being discovered, scientists have divided the mollusks into 5 classes.

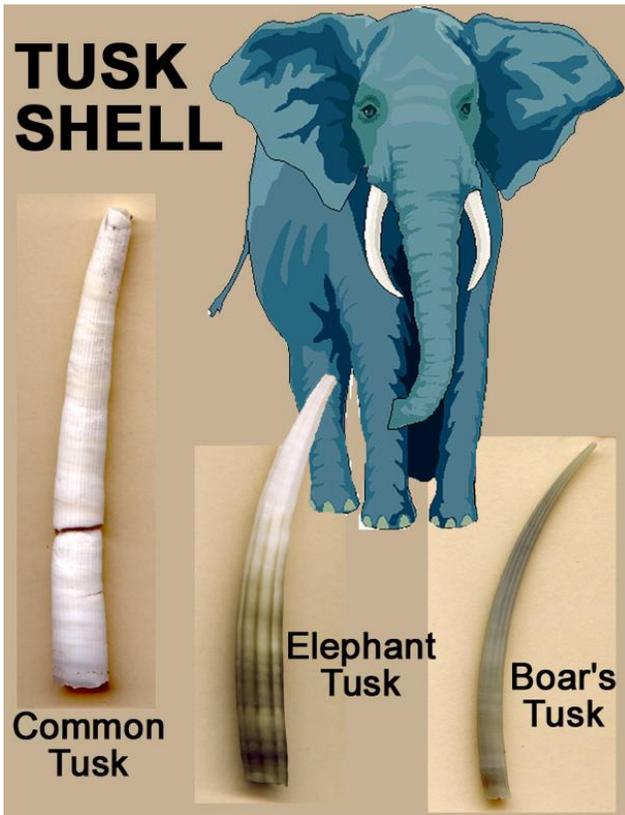


Snails are called Univalves, or single shell...think unicycle....one wheel. In this picture on the left, you will see several types of Univalves.



Clams, Oysters, and Scallops are Bivalves, or two shells....think bicycle...two wheels. The shells in this picture on the left are all bivalves.

Univalves make up about 80% of the seashell kingdom, and Bivalves about another 10%. But, there are 3 other classes of mollusks, all possessing a mantle and a foot, that comprise the final 10%.



One class is called Tusk shells. If you look at these pictures, you will see examples of tusk shells.

All shells have a scientific name, which is in Latin and must refer to the genus and species. However, whoever first discovers a shell can name it anything they want for its non-scientific, common name. The first person to discover Tusk shells thought they resembled elephant's tusks, and you might agree.

Another class of shells is the Chitons. Remember how bivalves all had two shells? Well, Chitons all have 8.



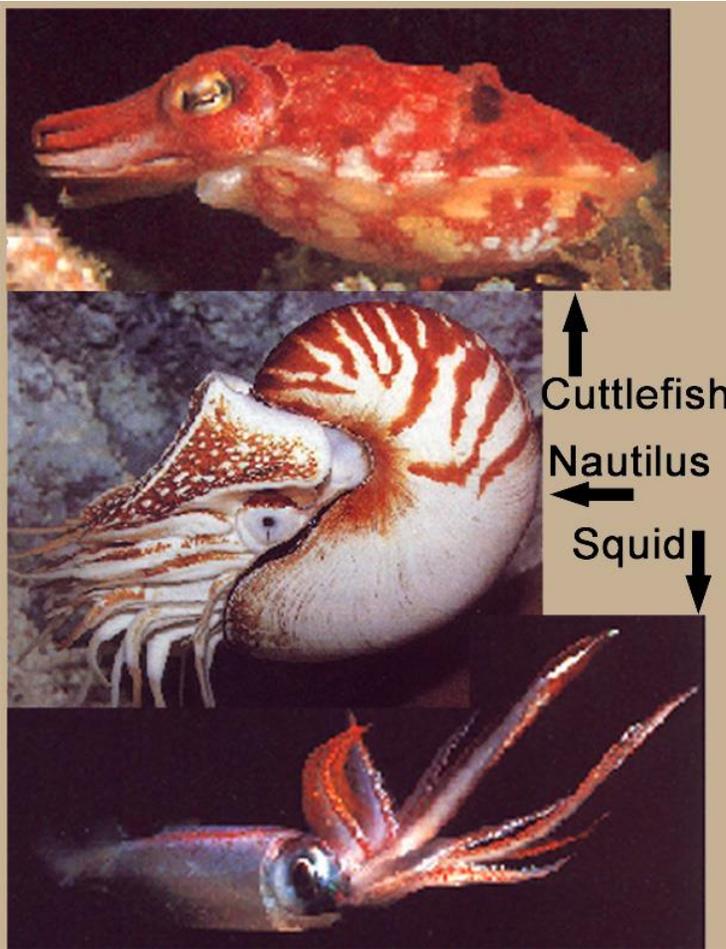
The mollusk does not have a segmented body, but they like to suction onto rocks. With 8 separate shell plates, the Chiton can conform to whatever the contour of the rock might be. They have enough flexibility to curl up into a ball like an armadillo. Chitons are also called coat of mail shells because of their resemblance to the suits of armor worn by knights of old. If you take a good look at these chitons, you will notice they all have 8 plates.

The photo at the bottom amazed me. The orange is the animal...the chiton mollusk. If you look closely, you will see 8 tiny shell plates embedded down the length of its body. It is called a gumboot chiton and it has a girdle that is tough like rubber. In fact, the skin is so leathery tough, it does not need to be enclosed inside its shell. The shell plates are buried inside its skin. These animals are sometimes reddish brown in color, and one site made me laugh because it said the people spotting this chiton fondly refer to it as the "wandering meatloaf." I wanted you to see this photo to appreciate the diversity in mollusks.

http://en.wikipedia.org/wiki/Gumboot_chiton Site of "wandering meatloaf" quote above.

<http://simple.wikipedia.org/wiki/Chiton> Chiton website

Let's move on to the final class of mollusks. Here you will meet a mollusk that has no shell at all.



The final class of mollusks is called Cephalopod. This means “head-foot”. This is where our friend the chambered nautilus fits in. Along with the Nautilus, you will find other cephalopods, squid and cuttlefish that have an internal pen-like shell. Some of you may be familiar with the cuttlefish bone that is placed in bird cages as a source of calcium.



Believe it or not, another cephalopod is...the octopus. The octopus used to have an external shell, but it lost it through evolution.

This is a newspaper article from my childhood journal documenting this.

These pictures show a few fossil shells from relatives of the Octopus. However, even though it no longer creates a shell, the octopus still has the mantle, the part that makes the shell...and its 8 arms are a division of a single foot, so it is definitely a mollusk possessing a mantle and a foot, both of the characteristics all mollusks share.



Fossils



Let's pause for a second to review. In the first class we learned the difference between a mollusk and crustacean based upon shell growth.

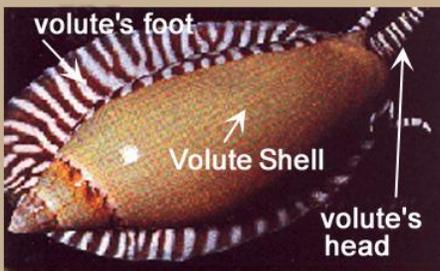
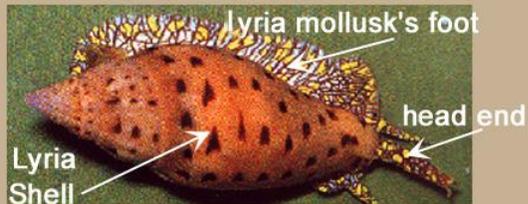
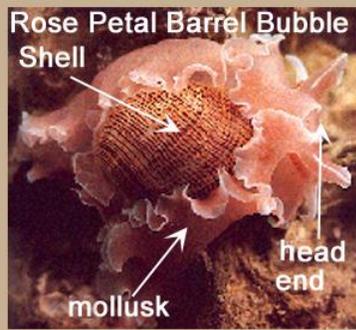
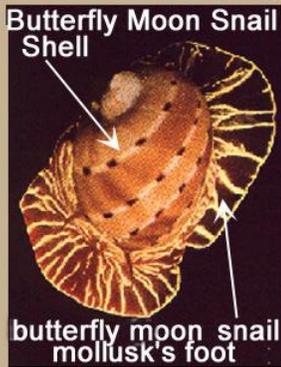
Can you all see that the crab, which has a shell, is a crustacean and IS NOT a relative of the clam or snail?

Now, can you see that the octopus, which has no shell, IS a relative of the clam and snail?

One thing I love about teaching this class on-line is that I have the opportunity to share photos of the animals that I could not include in *Ocean Oracle*. When I say that all mollusks have a foot, a picture says more than 1,000 words. Let me show you some of these mollusk foot photographs. One of my many missions with this class is to teach you about the mollusks and shells as well as divination.

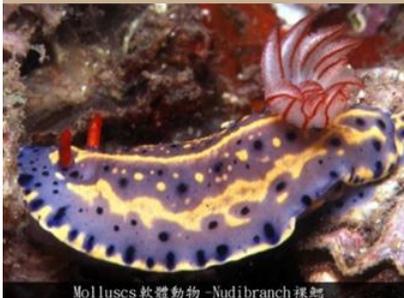
Most people picture snails as slimy and gray. Let me see if I can alter that image for you. Look at these animals.

Univalve foot



On the upper left is the Butterfly Moon snail, with the foot of the mollusk exposed beneath the shell. The pink frilly animal you see to its right is the Barrel Bubble snail. Beneath them is the Lyria whose pattern is completely different from the one on its shell. And look at the Volute on the bottom. The shell is practically bare, yet the mollusk looks like a zebra. These are all Univalves (snails) at home in their shells. In fact, let me go you one better. For sheer beauty, you should see the Nudibranchs. These are mollusks that have no shell...again, they are snails, sometimes referred to as sea slugs.

Nudibranchs



Every animal here is a Nudibranch. Look at this array of colors and designs! The name Spanish Dancer really captures the grace of these animals as they dance through the water. Please keep these new images in mind when you think of the word snail next time ☺.

<http://youtu.be/2uUk9K9TQhg> Here is a [video from Bali featuring many nudibranchs](#). This video is several minutes long, but the nudibranchs appear at the following times.... 1:14, 1:26, 1:53-2:18, 3:17-3:50

<https://www.nationalgeographic.com/animals/invertebrates/group/nudibranchs/> Another nudibranch site

After viewing these amazing beauties, I think you will appreciate why I love the following [comment from Dr Hans Bertsch](#) from the California academy of sciences: http://slugsite.us/bow/nudi_han.htm

I personally think nudibranchs are a happy bunch, even though they have only a few brain cells. They all look like they're dressed up going to a party. They look like they are where they want to be. And that is the fundamental success of evolutionary adaptations.

To continue with mollusks ‘foot...back to the mollusks with shells. Now that we have covered Univalves, let’s look at the other four classes.



In this series, **Bivalve** is a cockle, with its foot sticking out. The cockle has such a powerful foot, that they can jump. **Chiton** shows the underside of the chiton revealing the foot that suctions onto rocks. **Tusk** is a drawing of the tusk shell with the foot extended, and the **Cephalopod** shows the octopus. As we mentioned, its 8 arms are a division of a single foot.

Let me stop here to demonstrate how seashell divination works.

I mentioned that the cockle has a foot powerful enough to allow it to jump. Here you can see the animal in action 😊

<http://www.youtube.com/watch?v=pcUAdc3NI4c> 0:44
[Jumping cockle video](#)

<http://www.youtube.com/watch?v=xraKDDIrgUg> 0:59
[Jumping away from starfish](#)

That is not the case for many mollusks. This knowledge led me to meanings connected to jumping themes. If you have your Ocean Oracle books, you will notice on page 32-33 the **Vanhyning’s cockle shell #8** means “*Great happiness*” because this equates to Jumping for joy. Continuing on page 33, **shell #9** is another cockle, the **Giant Pacific Cockle**, and it means “*Demanding obedience*” as in someone jumping through hoops, following orders. (Note: If you have the first printing of Ocean Oracle, you will find this information on page 35.) All of my cockles have jumping themes. We will be working with the 200 shells in Ocean Oracle, but as I mentioned, I have 500 shells. One cockle not in Ocean Oracle means great sadness, because it reflects someone so sad they desire to jump off a bridge.

See how much you can learn just from the foot 😊.

If I had to say which mollusk has the most important foot, I would choose the tusk. The reason is because all of my knowledge regarding shells and mollusks came from books, and as I was growing up, all of my books said that the tusk mollusk had no heart. I didn’t think an animal could exist without a heart, but tusks live a very sedentary lifestyle. It was believed that the blood was circulated by pumping its foot muscle. Hence, my reason for saying they have the most important foot. But more important, remember that I was looking for unique characteristics with each shell/mollusk to discover its contribution to this seashell language. As I mentioned earlier, there is really very little that all mollusks share. For the tusk to have no heart...that definitely qualifies as a unique characteristic. Immediately, I realized that the **Tusk shell** reflects someone who is heartless. In recent years, some scientists believe they found a very rudimentary heart in the tusk after all. The divination meaning for **shell #63** is now, “*Perceiving someone as heartless*” because you really have to dig to find their heart.

Regarding the issue of whether the tusk contains a heart, here is a sampling of what can be found online:

http://www.manandmollusc.net/beginners_intro/scaphopoda.html

We draw water in through the small tip of our shell that sticks out of the sand or mud where we live. This water flows into our mantle cavity (remember, the mantle is the organ that builds our shells) where oxygen is just absorbed directly into our blood. We do not have gills for breathing, nor do we have a heart or blood vessels to carry and pump our blood. We are what scientists call "a very primitive and simple organism".

<http://en.wikipedia.org/wiki/Scaphopod>

The scaphopod vascular system is rudimentary, lacking both heart and blood vessels; the blood is held in sinuses throughout the body cavity, and is pumped through the body by the rhythmic action of the foot.

<http://www.molluscs.at/scaphopoda/index.html> Info on tusk mollusks, (called scaphopods) The quote below came from the website above:

"...heart is reduced to such an extent, that it is not even shown in the schematic illustration on the right side. The blood circulation is completely free, blood not being pumped by heart action, but by foot contractions." (Note: With the statement that the *heart is reduced*, it does suggest that the heart exists.)

If we stick with hearts for a moment, let's look at the diversity with this one organ. The tusk has a very rudimentary heart that took decades to discover. Now let's talk about the Octopus.



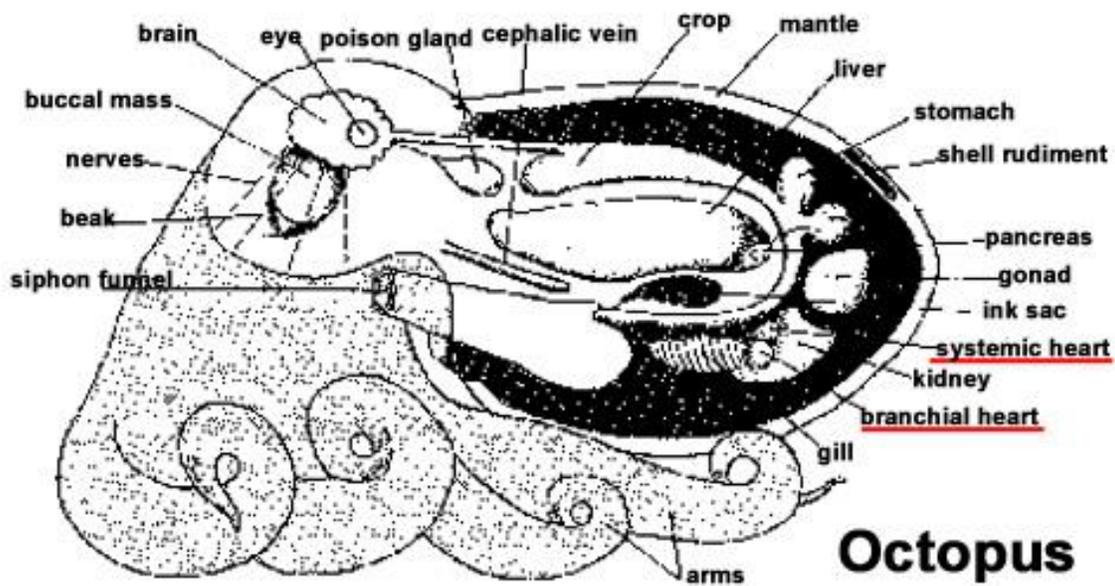
Cephalopod "head-foot" is really a misnomer because people think the round top of the octopus is its head, and the arms extend from the head.... hence head-foot. This Octopus cartoon is from a children's book taking that viewpoint. This anatomy is completely incorrect. The eyes should be down low where the arms meet.



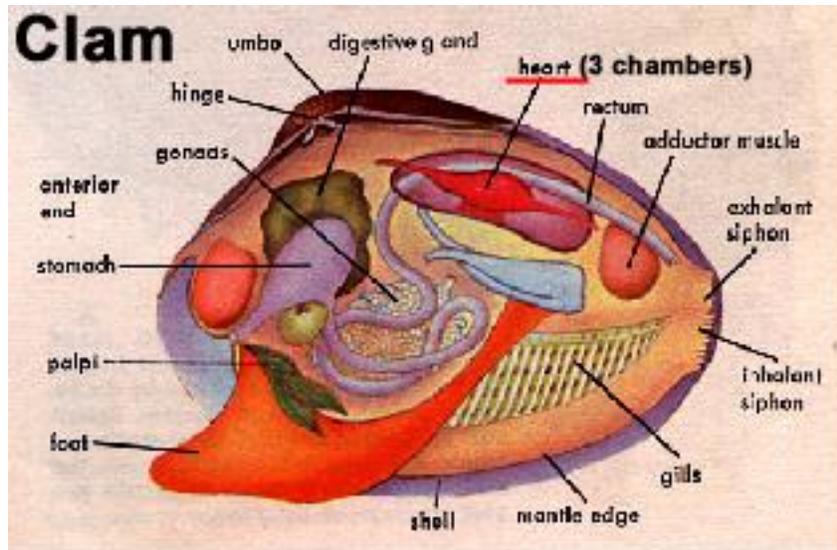
Here is another cartoon from a different children's book, where the anatomy is correct.

The mouth is underneath in the center of the arms. And that round top is not the head, but the Octopus' body containing all of the internal organs: the stomach, gills, intestines...and hearts. Yes, that word is plural because the octopus has 3 hearts. They are simple single-chambered hearts. The two branchial hearts go to the gills for oxygen, and the third, systemic heart, circulates the oxygenated blood to the rest of the body.

This diagram shows the internal structure of an octopus.



Now you can see quite a range.... we have a mollusk believed to have no heart, and one with 3 separate hearts. But there is still another heart to discuss. That belongs to the quahog clam. The animal may have no head, but it has a 3-chambered heart with a pacemaker. Here is a diagram of the internal anatomy of a clam.



Humans have a 4-chambered heart with a pacemaker. This means that scientists can study the effect of drugs, nicotine, etc. on the clams' hearts and extrapolate how these chemicals would affect us because our hearts are that similar. In your books, you will see on page 58-59/60 that in shell divination, the **Quahog Clam #72** reflects "Heart health, blood pressure, doctors and hospitals." If you don't have your Ocean Oracle, this shell is in the picture of Bivalves under the bicycle on the bottom right.

Can you all see that just exploring one organ, the heart, we have found diversity to allow the Tusk shell to refer to someone who is heartless, and the Quahog Clam shell to reflect heart health and blood pressure?

Let's move on to take a closer look at their blood. When it comes to blood, almost all mollusks have blue, copper-based blood called hemocyanin. However, the **Bittersweet Clam, shell #4** that you see below, has iron carrying red hemoglobin, just like we do.



Iron is a much more efficient transporter of oxygen than copper. The Bittersweet Clam lives in areas with very low oxygen content. In these depleted environments, with its more efficient hemoglobin, the clam can utilize every drop of oxygen it finds. So, here is something unique for divination.

If someone is attracted to the Bittersweet Clam, it would mean that person is "*Concerned with efficiency and accomplishment; disliking waste*" Just as this clam does not waste a single drop of oxygen, the person drawn to the shell would not want to waste energy, time, money, etc.

Now you know my method. In simple terms, I realized that if the animal does this, the shell means that. You all saw how supportive my family was of my eagerness to study anything connected to seashells. My aunt even donated her shower curtain to this cause. Well, there was one episode where I met a complete roadblock. When I discovered there were 5 classes of mollusks, I took it upon myself to undergo a mission to obtain a representative of each class. As I continued my studies, I found a deepening connection to the octopus. In fact, in hindsight, half of my childhood journal has information about this amazing animal. I somehow overlooked the Chambered Nautilus, and decided I wanted a pet octopus as my cephalopod. When we study mollusk reproduction, I will more fully explain my reasons, but since the octopus no longer has a shell, it is not in *Ocean Oracle*. While we are studying the cephalopod class, I am thrilled to share the magic of the octopus with you. These are photographs I could not include in *Ocean Oracle*.

When I show you their capacity for camouflage, I think you will see why I thought a pet octopus would be magical. However, my request for an octopus was met with instant disapproval from my parents. I began a campaign trying to convince them. One day, I returned from school, and my mother greeted me with a fishbowl covered with a towel. I thought she got me my octopus! With great flourish, she removed the towel to reveal...pet clams. No offense to clams, but to me at that age, they were a step above a pet rock. I pictured the kaleidoscope of colors as an octopus transformed itself, and its graceful motion. In comparison, these clams were a big disappointment. I imagine my parents figured that a mollusk is a mollusk. But, all clams do is stick out their siphons (their breathing tubes) that resemble necks. Some of you may have heard the term "big neck, or little neck" clams. Other than watching the neck change positions, there is no activity at all.

I can't explain the soul connection I felt with the octopus. My family would visit an aquarium, and I would station myself in front of the octopus tank. Because the octopus likes to hide, I seldom saw anything. However, on the slight chance that it would come out to visit, I would not budge from that position. There were many times that my family would take in the entire aquarium and come back to get me. Usually, the octopus remained concealed, or if I were lucky, it would dangle one arm from its cave, and then it was time to go home.

My admiration for the octopus extends beyond its physical beauty. I want to give you some understanding of their capacity for intelligence, and I think these next pictures will go a long way toward accomplishing that. As you have seen, even something as basic as blood is not the same for all mollusks. Most have blue blood, and the octopus is one that has this blue, copper-based blood. It is not a very efficient transporter of oxygen, and the octopus can't rely on escaping from a predator by swimming away.



However, when the octopus is in danger, the first thing it does is shoot out a cloud of ink. Here is an octopus doing just that.

There are theories regarding the purpose of the ink. Some books say it provides a smoke screen to hide behind, I have also read that there is something in the ink that dulls the sense of smell so the predator can't see or smell the octopus. Other sources say the ink takes the form of a phantom for the predator to chase. All of these scenarios buy the octopus time...not to flee, but this allows the octopus to take advantage of the situation and hide in plain sight by camouflage.

Octopus Camouflage



They are masters at this.... changing color and texture to blend in with their surroundings. In this picture, you see a white octopus on the left that has changed color and texture in the picture to the right, and below is one that is practically invisible!



Blue Ring Octopus



Attempting camouflage



Female with eggs

In the interest of your education, I would be remiss if I did not mention one octopus that is not very good at camouflage. It is called the blue ring octopus, and it is recognized as one of the world's most venomous creatures. They are found in Australia. It does not have to be good at camouflage because no creature would survive approaching close enough to eat it. Although they are small, a blue ring's venom is potent enough to kill adult humans in minutes. The octopus is not deadly, but it carries bacteria in its saliva that is. In the middle picture, a blue ring is attempting camouflage, but you can clearly still see the blue rings.



Photo Copyright Denise Nielsen Tackett

The Mimic Octopus



Photo Copyright Denise Nielsen Tackett



Photo Copyright Denise Nielsen Tackett

Now for the octopus that takes camouflage to the next level. It rearranges its body to look like other animals...it is a shapeshifter! It is called a mimic octopus. In the picture below, the crab, snake, and flounder you see are the same octopus changing from one animal into another. To be the snake it buries itself in the ground and extends two arms with the pattern of a sea snake. To be the flounder, it sends all of its arms in one direction and swims in an undulating motion. The little sac you see above the arms is its entire body organs. Since they are mollusks, octopuses have no internal skeleton and can flatten down to nothing. You can see the intelligence that this requires to mimic other animals.

<http://www.youtube.com/watch?v=t-LTWFnGmeg> 1:48 [video of mimic octopus](#)

I once read of an experiment in which two octopuses were in tanks positioned beside each other. The first was given a clear glass jar containing a crab. The jar was sealed with a cork. Octopuses dine on crabs, so this octopus swam over to the jar and tried to figure out how to get to the enticing crab. It took a while, but it finally realized that it could wrap its arms around the cork and pull up to draw the cork out of the jar. Then it was able to capture the crab. The neighboring octopus was then given a corked glass jar containing a crab. Without hesitation, it swam right over to the jar, wrapped its arms around the cork and pulled it out to eat the crab. It learned by watching the first octopus. That is another sign of how intelligent these animals are.

Another example: An aquarium staff was baffled when each day they would arrive at the aquarium and discover dead crabs in their tank. The staff could not figure out what was killing the crabs since they were perfectly healthy at the time the aquarium closed each night. To solve this mystery, they stationed someone in the aquarium to keep watch overnight. What he witnessed was the octopus. Since they can flatten their bodies down to nothing, even though there was a cover on the tank, the octopus managed to slide through a miniscule opening and over the top of the tank. It then slid across the floor, (they are able to breathe for a short time out of water) and up to the tank containing the crabs. It flattened its body to enter the crab tank, and helped itself to a few choice dinners. Then, it slid out of the crab tank and back across the aquarium to its own tank so the humans would be none the wiser!

http://www.youtube.com/watch?v=WhVel-1_rmA :39 seconds, [Octopus escape video](#)

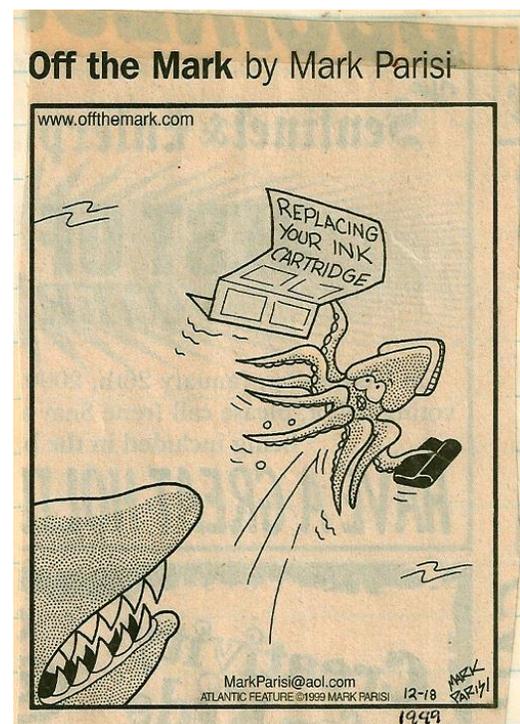
<http://www.youtube.com/watch?v=VLLQOK1gZE4&feature=related> :18 seconds, [A clever octopus](#)

<http://www.youtube.com/watch?v=cOmBUct0fWg> 1:24 [Recent discovery of octopus using coconut shells for shelter](#)...discussing their use of tools.

Scientists have discovered an Octopus in the Indian Ocean that uses tools...specifically coconuts to build shelter. "Octopuses often use foreign objects as shelter. But the scientists found the veined octopus going a step further by preparing the shells, carrying them long distances and reassembling them as shelter elsewhere. That's an example of tool use, which has never been recorded in invertebrates before..."What makes it different from a hermit crab is this octopus collects shells for later use, so when it's transporting it, it's not getting any protection from it," "It's that collecting it to use it later that is unusual."

<http://youtu.be/biuoagnGCFQ> 1:43 [Video of coconut octopus](#) using them for transportation.

In Class 1, I shared the first page of my childhood journal with you. It is a thick journal, but allow me to conclude this class with the final entry from 1999. When I was young, there was no such thing as a home computer. We have come a long way, and I could not resist adding this cartoon to my journal. You have the information to appreciate this little octopus now. With the intelligence demonstrated above, I can just picture this octopus actually reading and comprehending the instructions ☺.



To complete this lesson on the octopus, there is one more chapter in the saga of my childhood campaign with my parents. Except for this battle over the octopus, my mother was incredibly supportive. When I began doing shell readings in earnest, and writing articles and books, my parents were taking yearly vacations to Sanibel Island, Florida...a seashell collector's paradise. My mother would carry a list of my seashell inventory with her. She took great pleasure in asking the shell store proprietors what they had that was not on her daughter's list. Every year, she would return with a few new shells and that is how my collection grew. About 10 years after I started shell reading, my mother returned with a gift box I did not recognize. It was not from one of the shell stores. As I opened the box, I could not believe it. You can see for yourselves. The box was from a jewelry store, and inside was a necklace made of fine gold chain supporting the most beautiful delicate octopus. As I took in this sight, my mother smiled and said, "I finally got you your octopus."



I want to thank you for indulging me in teaching you about the octopus. Throughout this course, there will be other examples of the intelligence, and compassion demonstrated by mollusks, but since the octopus no longer has a shell, I did not want to neglect its contribution to the development of the language of the seashells.

Here is an added treat. You will see Cuttlefish turning tentacles into algae. There are also amazing scenes of the squid dividing its body into two patterns simultaneously displaying separate emotions to the male and female squid surrounding him. And the octopus at the end of the video demonstrates what true magicians they are.

<http://www.ted.com/index.php/talks/view/id/206> [Ted Talk--Cephalopods](#) start at the 2 minute mark

<http://www.youtube.com/watch?v=JSq8nghQZqA> 1:32 [This may look familiar now](#) 😊

One final note:

Shortly after I finished creating this course, my mother read the transcripts.. When she finished the transcript for this class, she sent me this message after watching these videos:

“These guys have to be the brainiest of all. They are such amazing creatures and now instead of thinking them ugly, I have to admire their beauty and ingenuity. No wonder you were drawn to them all those years ago.”

For those interested, here are more cephalopod links:

<http://www.youtube.com/watch?v=q5ZQH2Uzpew> 4:29 [Video of vampire squid](#)

Here is more information on the type of bacteria found in the blue ring...it is a neurotoxin.

<http://www.thecephalopodpage.org/bluering2.php> [Information on the bacteria in the blue ring octopus](#)

<http://www.pbs.org/wgbh/nova/camo/> [Kings of Camouflage](#) (all about cuttlefish)

<http://www.pbs.org/wgbh/nova/nature/cephalopod-intelligence.html> 9:58 [How smart is an octopus?](#) Wonderful video covering much of what you have seen above, and linking all aspects in consideration of the intelligence of cephalopods.

<http://www.brandoncole.com/IFPro/scripts/imageFolio.pl?search=cephalopod&img=0&cat=all&bool=and> [Still photos of cephalopods from all species](#)