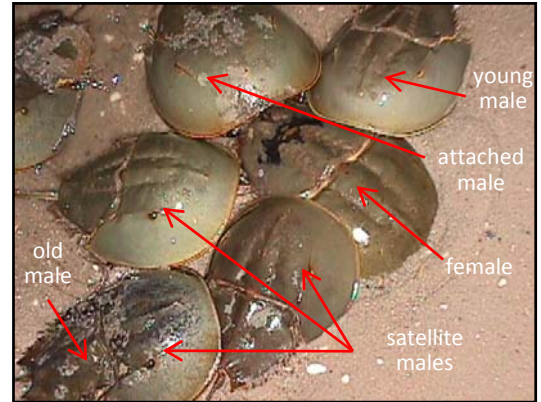


A dozen things to do with students on a horseshoe crab focused field trip

1. **Immerse** yourself in the pure sensory spectacle – the sights, the sounds, the smells, the feel of it all ... Close your eyes and imagine scenes like this going back in time ... to primeval moonlit ocean beaches ... to ancient swamps amongst the dinosaurs ... to native people living along the Bay 1000 years ago ... think of all that horseshoe crabs (HSCs) have seen and endured in their long march through time ...

2. **Observe** spawning HSCs along the shoreline. Identify the cast of characters in a spawning cluster as profiled in the photograph at right. Find the female, attached male and satellite males, and observe how the satellites jockey for position around the female as she digs down in the sand to deposit her eggs. Watch as she pushes forward in the sand after laying her cluster and digs back down to lay another batch of eggs. Distinguish between the young smooth-shelled, greenish-brown crabs and the older, blackened, worn-down, and highly encrusted ones.



3. **Eggs-plore!** Look for the blue-green, tapioca-sized HSC eggs along the shore or wrack line. If spawning gets heavy, female HSCs may inadvertently dig up previously-laid eggs, resulting in them being brought up to the surface where they will be eaten by shorebirds and other bay animals or become dried out and die on the surface of the sand.



Look for signs of HSC nesting – large, shallow depressions in the sand (of HSC size & shape) left along the wrack line from the last high tide – and dig down 4-7 inches in search of egg clusters. Do you notice any signs of other animal activity, such as predators looking to dig up those eggs?

4. **Report** your HSC sightings by downloading the free Wildlab Crab App (available at iTunes) and following the features it offers. Alternatively, report where and when you observed HSCs via the data entry platform provided at www.horseshoecrab.org/crabsightings/



5. **Resight tags** on any HSCs you find along the beach & report the data to the US Fish & Wildlife Service at the link given in the photo at right.



There are a couple types of tags, but the round one shown here is the most common. If you report on line, you'll receive an email that tells you where & when the HSC was tagged and other reported sightings of it.

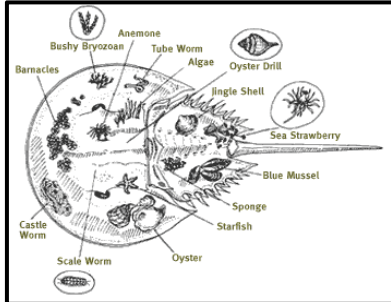
6. **Survey** spawning HSCs at high tide time! Follow the survey protocol used by scientists and volunteers who survey HSCs along Delaware Bay beaches each May and June (<http://horseshoecrabsurvey.com/pdf/instructions.pdf>). **Note:** Due to the need for scientific consistency, teachers are encouraged to do this as a mock survey with students (not as part of scientific data set).



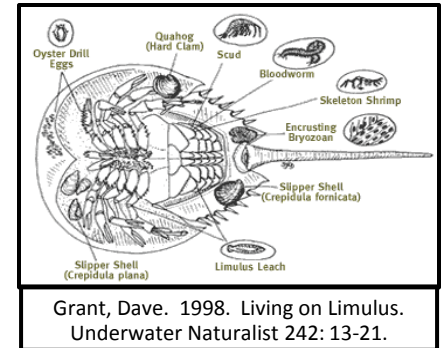
7. **Just flip 'em!**[®] is something you and your students can do to help HSCs left stranded on the beach after spawning to survive and live to spawn again. Learn more at: www.horseshoecrab.org.



When flipping an HSC, never pick it up by the tail as this can damage the tail muscle and seriously injure the animal. The best way to hold an HSC is with your hands on each side of the widest part of the shell.



8. **Identify** the cast of hitchhikers that settle on the shell of HSCs. See how many different kinds of organisms your students can find and ask them to take pictures for identifying and learning about the life forms as an extension project for the classroom.



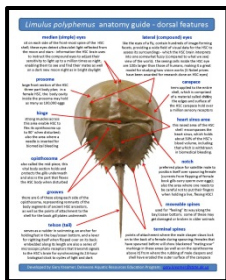
Grant, Dave. 1998. Living on Limulus. Underwater Naturalist 242: 13-21.

9. **Measure** and compile data on the size of HSC attached males, satellite males & females and/or the telson length of stranded vs. non-stranding HSCs to see if there are any clear differences.



Rutecki, D. 2001

Instructions & data reporting forms for undertaking simple student field study projects with HSCs have been provided by Dr. Jane Brockmann as a special addition to module 1 of the Green Eggs & Sand curriculum.



10. **Test** your student's observation powers by tasking them to use HSC anatomy guides (as in attached) to ID key body structures in live HSCs on the beach.

Track the path of HSCs by following the marks left by their movements in the sand. *Can you associate the tracks made with any particular structures?*



www.horseshoecrab.org

11. **Dissect** a dead HSC found on the beach. Look for as freshly dead a specimen as possible - preferably a large female, so that the masses of eggs lining the cavity of the prosoma can be seen.



www.youtube.com/watch?v=-6eHFbROAIs

Use a strong knife to cut along the rim of the HSC shell, so that the top part of the shell can be separated from the bottom. Trace the tube that runs under the mouth to the sac-like crop-gizzard & cut it open to expose the rows of ridges of chitin inside.



12. **Inspire** creative expression in your students by asking them to write, draw, compose or otherwise reflect their thoughts and feelings about this ancient animal through ERDG's *Horseshoe Crabs & the Arts* project. www.horseshoecrab.org/poem/index.html

