

Seashell Phylogeny and Evolution Teacher Guide

The seashell phylogeny and evolution activity is an interactive online activity that can be done in class or assigned as homework.

Key Concepts

1. Phylogeny is based on evolutionary relationships
2. A phylogenetic tree can be built by identifying the most dissimilar members in a group
3. A phylogenetic tree can be built by identifying the most similar members in a group
4. Hard remains such as fossils, bones, and shells may not give sufficient clues to group organisms correctly
5. Superficial similarity does not always indicate a close relationship
6. Even experts do not always agree on subtleties of some evolutionary relationships

Pre-Activity Video Clip Suggestions

The shells used in the activity are from marine molluscs of the Philippines. The Indo-Western Pacific region, including the Philippines, is rich in marine biodiversity.

If time allows, you can build excitement for the shell activity by showing a mini-documentary of Philippines biodiversity (12 minutes).

http://www.biointeractive.org/biodiversity/2009_maritime_culture.html

Or, you can show a very brief video segment describing biodiversity in the Philippines (2 minutes).

http://www.biointeractive.org/biodiversity/2009_philippines_biodiversity.html

You can also highlight the feeding behavior of a group of snails included in the activity called cone snails. Cone snails are venomous and carnivorous. Some hunt fish, others hunt snails or worms. A fish-hunting species is shown in this video clip (2 minutes)

http://www.biointeractive.org/biodiversity/2009_conus_catus_strikes_fish.html

There is also an extended video feature on cone snails (13 minutes)

http://www.biointeractive.org/biodiversity/2009_versatile_hunters.html

Other video clips related to cone snails can be found here:

<http://www.biointeractive.org/biodiversity/video.html>

You can download these videos by following the download instructions on their respective pages. You can also find these videos on the DVD “Exploring Biodiversity: The Search for New Medicines,” available free from HHMI.

Pre-Activity Sorting Exercise

Using shell cards, introduce the shells to the students and allow them to sort the shells in a way that makes sense to them. They must create a minimum of 3 groups, and a maximum of 10.

Students can access an online virtual reality shell gallery that allows users to rotate the shells for closer examination. <http://www.biointeractive.org/activities/shells/gallery.html>

Ask students to explain why they sorted the shells the way they did. Discuss problems of sorting according to size, color, or texture, and why those characteristics are not necessarily indicative of evolutionary relationships.

Making the Activity More Hands-On

You can enhance the hands-on nature of the activity by drawing the phylogenetic tree on a piece of paper or a whiteboard as students progress through the exercise, using the shell cards to represent the organisms. Or instead of drawing, you can use masking tape or pieces of string to represent the branches of the tree.

Additional Enrichment Information

Links to relevant videos and animations are scattered throughout the activity.

Shell Index

1. <i>Conus magus</i>	The Magician's Cone
2. <i>Neritina communis</i>	Zigzag Nerite
3. <i>Bursa nobilis</i>	The Noble Frog Shell
4. <i>Conus capitaneus</i>	The Captain's Cone
5. <i>Cypraea annulus</i>	The Ringed Cowrie
6. <i>Conus marmoreus</i>	The Marble Cone
7. <i>Neritina communis*</i>	Zigzag Nerite
8. <i>Distorsio anus</i>	The Distorted Anus
9. <i>Conus omaria</i>	Omaria Cone
10. <i>Cypraea isabella</i>	Queen Isabella's Cowrie
11. <i>Pecten pallium</i>	The Ducal Mantle
12. <i>Cypraea tigris</i>	The Tiger Cowrie
13. <i>Conus ebraeus</i>	The Hebrew Cone
14. <i>Cypraea annulus*</i>	The Ringed Cowrie
15. <i>Conus chaldeus</i>	The Astrologer's cone
16. <i>Neritina communis*</i>	Zigzag Nerite
17. <i>Imbricaria conularis</i>	The Cone-shaped Miter
18. <i>Conus circumcises</i>	Circumcision Cone
19. <i>Cypraea moneta</i>	The Money Cowrie
20. <i>Turris babylonia</i>	Tower of Babel

*Duplicate