TED Connection

What Sticky Sea Creatures Can Teach Us About Making Glue

Mensa for Kids' TED Connections are short, easy-to-use guides designed to help teachers, parents, and youth use TED talks in a classroom or home setting. Rather than a lesson plan format, they have a list of discussion questions, all at higher levels of thinking.

Scientist Jonathan Wilker explores how some animals can make their own natural glues and cements. He explains how these creatures from the sea could be our keys to creating non-toxic, degradable glues and cements for everyday use.

WATCH THE TED TALK AT

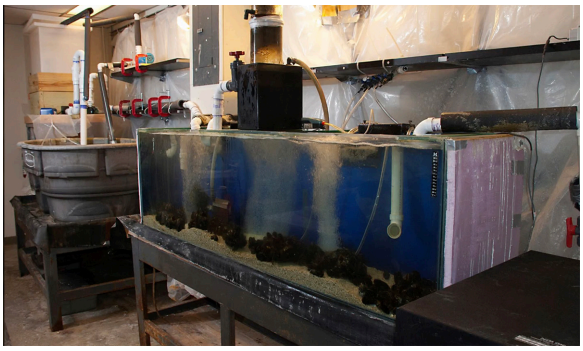
ted.com/talks/jonathan_wilker_what_sticky_sea_creatures_can_teach_us_about_making_glue

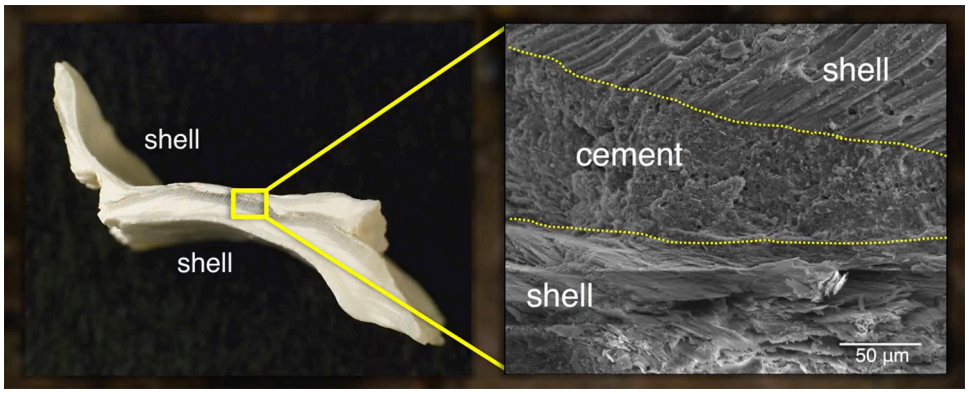
Think About It

1. Working with what you know about the ocean, deduce what would make it a "demanding environment" at the water's edge.

2. Expound on the three advantages that Wilker listed for barnacles that live together. What other things might they have or do as a group that they might not individually?

3. Discuss what some of the benefits might be of the lab making the water turbulent for the mussels. What do you think the purpose is of cycling the lights?





4. Hypothesize why the cement would look so different from the shells.

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5. Outline what type of tests you would use to determine the strength of the adhesive you created.

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6. Explain how these products are able to be produced if we know they are produced with toxic adhesives. Speculate how they got past the Food and Drug Administration, which determines what is safe for the public.

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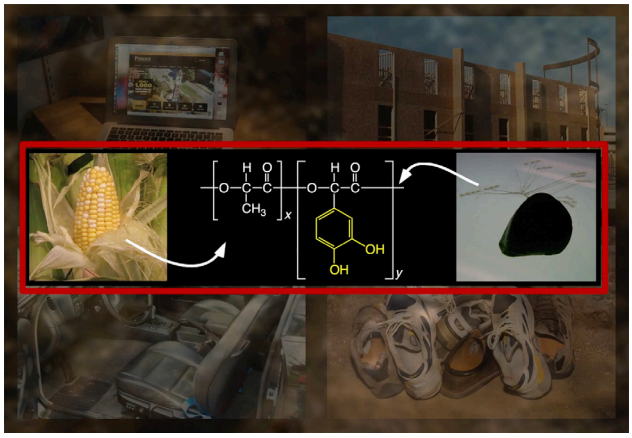
7. Explain the importance of the "surf-and-turf" bio-based polymer.



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8. Assess why the scientist might "whack it with a hammer" when dealing with hard tissues such as bones. Compare and contrast that method with the "cutting it in very precise shapes" testing they do.

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9. Consider other places new adhesives might be used. List five.

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Read About It

- " 'Cooking chemistry' produces new, less toxic glue," Futurity.org (https://www.futurity.org/adhesive-maillard-chemistry-1970642-2)

- "Special Adhesive Helps Oysters Stick Together," *The New York Times* (https://www.nytimes.com/2010/08/31/science/31oboyster.html)

- "Why A Hoosier State Scientist Is Stuck On Oysters," National Public Radio (https://www.npr.org/2013/03/28/175550939/why-a-hoosier-state-scientist-is-stuck-on-oysters)

- "Your guide to the practical uses of hagfish slime, glowworm glue, and other animal goo," *Popular Science* (https://www.popsci.com/animal-goo)

- "Purdue researcher to discuss how nature helps develop biomedical materials," Purdue University (https://www.purdue.edu/newsroom/releases/2012/Q4/purdue-researcher-to-discuss-how-nature-helps-develop-biomedical-materials.html)

- "Speaking Up for Science," ACS Chemical & Engineering News (https://pubs.acs.org/doi/10.1021/cen-09022-acsnews)

- "Chemists Crack Secrets of Nature's Super Glue," National Science Foundation (https://www.nsf.gov/news/news_summ.jsp?cntn_id=100318)

- "Cement, the Glue That Holds Oyster Families Together," National Science Foundation (https://www.nsf.gov/news/news_summ.jsp?cntn_id=117578)

- "Scientists Made the Perfect Underwater Glue By Stealing an Idea From Shellfish," Gizmodo (https://gizmodo.com/scientists-made-the-perfect-underwater-glue-by-stealing-1793230836)

- "High Strength Underwater Bonding with Polymer Mimics of Mussel Adhesive Proteins," ACS Applied Materials & Interfaces (https://pubs.acs.org/doi/10.1021/acsami.7b00270)