

Biology Student,

My AMI packet for you consists of science news/research articles with analysis questions. Please read the article for the appropriate AMI day and answer the questions on the space provided or a separate sheet of paper (some articles do not leave much room for answering). Answers need to be complete. Restating is not necessary but answers should be in proper sentence form. Don't forget to put your name on your work. I don't anticipate these assignments to take you more than 20 minutes to complete. Each AMI assignment will be due the day you return from corresponding snow day. Leave the rest of your packet at home. If you need help shoot me an e-mail. I hope you enjoy your snow day (spend some time outside). 😊

Mrs. Donaldson

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AMI Day 1: *How Do Carbon Dioxide Levels in the Atmosphere & Photosynthesis Vary by Season and Latitude?*

AMI Day 2: *Invasive Species Cost the World Billions a Year*

AMI Day 3: *Microplastics are Showing Up in Mount Everest's Snow*

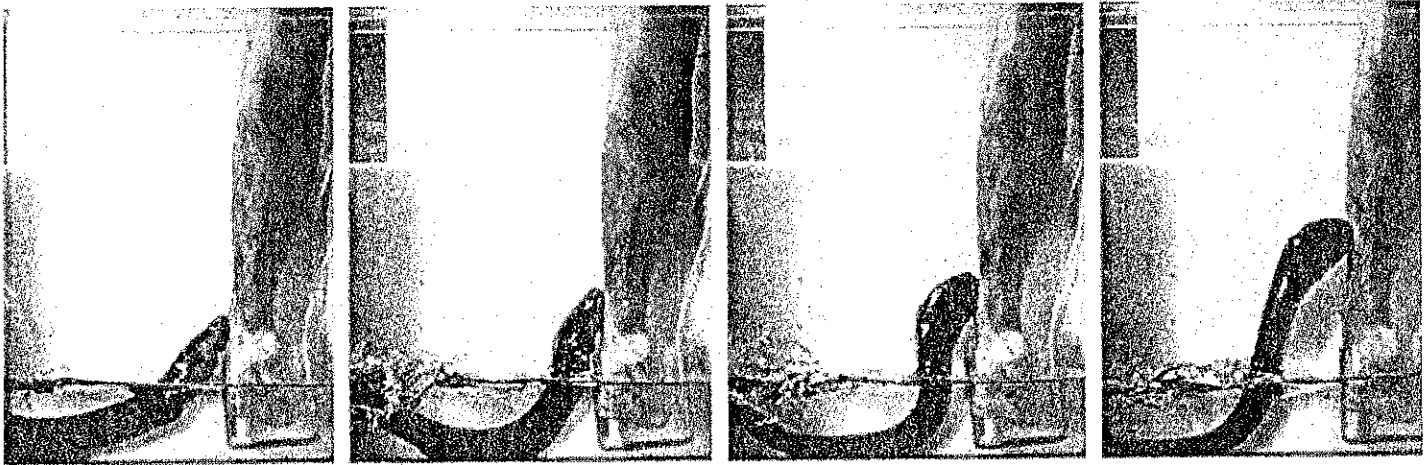
AMI Day 4: *Electric Eels' Zaps Are More Powerful Than a Taser*

AMI Day 5: *The Nutrients from Sewage May Harm Coastal Ecosystems*

ANALYZE THIS! // ANIMALS

Analyze This: Electric eels' zaps are more powerful than a TASER

A scientist measured the strength of the eel's attack by letting himself get zapped



The electric eel that zapped biologist Kenneth Catania was small, but the shock it delivered is similar to one supplied by an electric fence.

K. CATANIA/CURRENT BIOLOGY 2017

By Allie Wilkinson

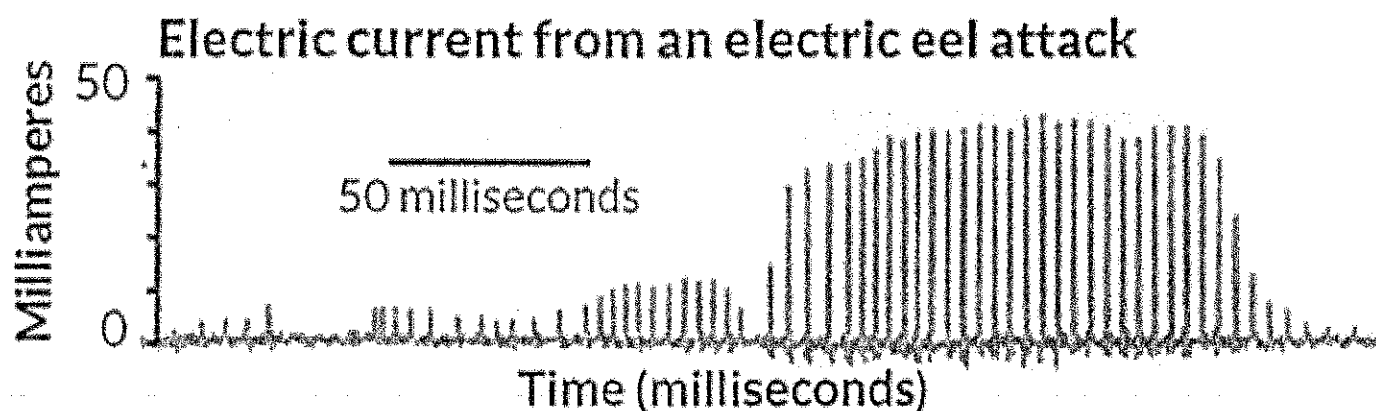
January 24, 2018 at 6:30 am

Electric eels have captured the attention of scientists — and the public — for centuries. These aquatic animals can deliver a jolt of electricity to track and tucker out their prey. They also can use that shock as a defense mechanism. When an eel feels threatened, it leaps out of the water and zaps a perceived predator. Now a scientist has deliberately subjected himself to such an attack. His goal: to get a better picture of the fish's shocking prowess.

Kenneth Catania is a biologist at Vanderbilt University in Nashville, Tenn. He wanted to know how strong of a shock an electric eel could deliver. So he stuck his arm in a tank and let a small

eel zap him. At its strongest, the fish delivered a 40- to 50-milliamperere current into his arm. It takes only 5 to 10 milliampere of electricity for humans to lose control of their muscles and let go of the object that is shocking them. So it's no wonder Catania involuntarily pulled his arm away with each electrical jolt this eel delivered. He presented his findings September 14 in *Current Biology*.

His test subject was just 40 centimeters (16 inches) long. Based on his tests with this fish, Catania has now estimated how much electricity someone might receive from a run in with an eel 1.8 meters (5 feet 10 inches) long. That's the average length of an adult one of these eels living in the Amazon of South America. A human could receive a zap of 0.25 ampere, or 63 watts, he now calculates. That's some 8.5 times more than a police-issued TASER gun. Enough to make a heart beat uncontrollably, this could kill a human.



The current an electric eel sent into the arm of a researcher got stronger as the animal reached out of the water to attack.

K. CATANIA/CURRENT BIOLOGY 2017

Data Dive:

1. Roughly how many milliseconds worth of data are displayed on the x-axis in this graph?
2. According to the graph, what is the approximate electric current measured at 125 milliseconds into the recording? Be sure to use appropriate units in your response.
3. How many milliamperes are in one ampere? How many centiamperes are in one ampere? Convert your answer from question 2 to amperes, centiamperes and kiloamperes (write your answer in scientific notation).

4. If you had to change the units used on the y-axis to either centiamperes or kiloamperes, which would you choose and why?
5. Critique the graph. What would you do differently? What information do you feel could be added to the graph to make it more useful or easier to understand?

Analyze This! explores science through data, graphs, visualizations and more. Have a comment or a suggestion for a future post? Send an email to sns@sciencenews.org.

CITATIONS

Journal: K.C. Catania. Power Transfer to a Human during an Electric Eel's Shocking Leap. *Current Biology*. Published online September 14, 2017. doi: 10.1016/j.cub.2017.08.034.

Source Story (Science News): A researcher reveals the shocking truth about electric eels

