

What is Environmental DNA

Graphic Reading

DNA (deoxyribonucleic acid) is very stable. Its famous double helix structure makes it resistant to degrading. All organisms leave behind DNA when they die and decompose, but they also shed DNA into their environment while going about their daily activities. DNA is found in leaves, flowers, poop, skin cells, hairs, saliva, sweat, tears, and other body fluids. Consequently, water, soil, or sediment samples contain fragments of DNA that can be amplified and analyzed to assess an area's biodiversity. DNA found in samples collected from the environment is called environmental DNA or eDNA.

Directions: In small groups, discuss the graphic *When a Bear Poops in the Woods: A Story of Environmental DNA*. Then, answer the questions in the spaces below.

If you collected dirt, scat, bark and other material from these woods, you would have DNA from many different organisms. Discuss with a partner what the biggest challenges might be to identify the species the DNA came from?

Assume you've collected samples of dirt, scat, woody debris, standing water, etc, from various soil samples. How many species would you expect to find DNA from? Explain your answer.

Based on the information you obtained from the graphic, in small groups, discuss how eDNA could be used to assess an area's biodiversity. In 2-3 sentences, summarize your thoughts in the space below.

When a Bear Poops in the Woods

A STORY OF ENVIRONMENTAL DNA

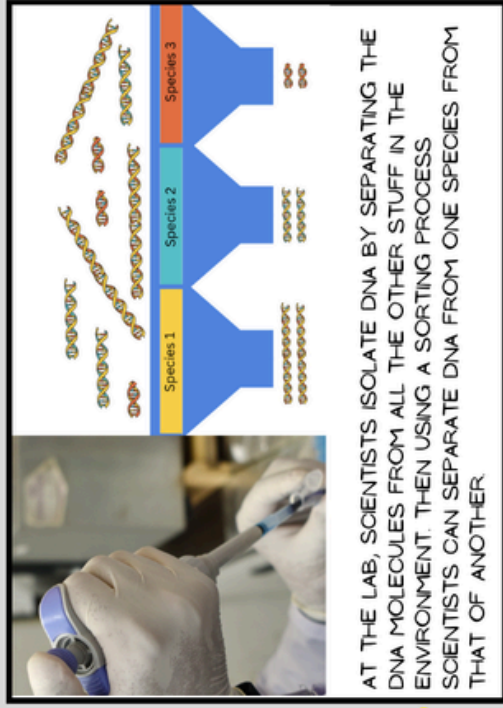


DNA IS DISTRIBUTED ALL OVER THE WOODS AND IT'S SURPRISINGLY DURABLE.
THERE ARE AMAZING METHODS FOR AMPLIFYING AND IDENTIFYING WHO LEFT IT. WE CAN USE DNA ALMOST LIKE A SPECIES BIODIVERSITY RADAR OR METER.

How do we know there is a bear in the woods?



SAMPLES OF WATER OR SOIL ARE COLLECTED IN THE FIELD THAT CONTAIN A LOT OF DNA



AT THE LAB, SCIENTISTS ISOLATE DNA BY SEPARATING THE DNA MOLECULES FROM ALL THE OTHER STUFF IN THE ENVIRONMENT. THEN USING A SORTING PROCESS SCIENTISTS CAN SEPARATE DNA FROM ONE SPECIES FROM THAT OF ANOTHER.



FINALLY, USING DATABASES MADE FROM PREVIOUS INFORMATION, SCIENTISTS CAN MATCH DNA SEQUENCES TO SPECIFIC TELLTALE SEQUENCES, LIKE A BARCODE FOR EACH ORGANISM