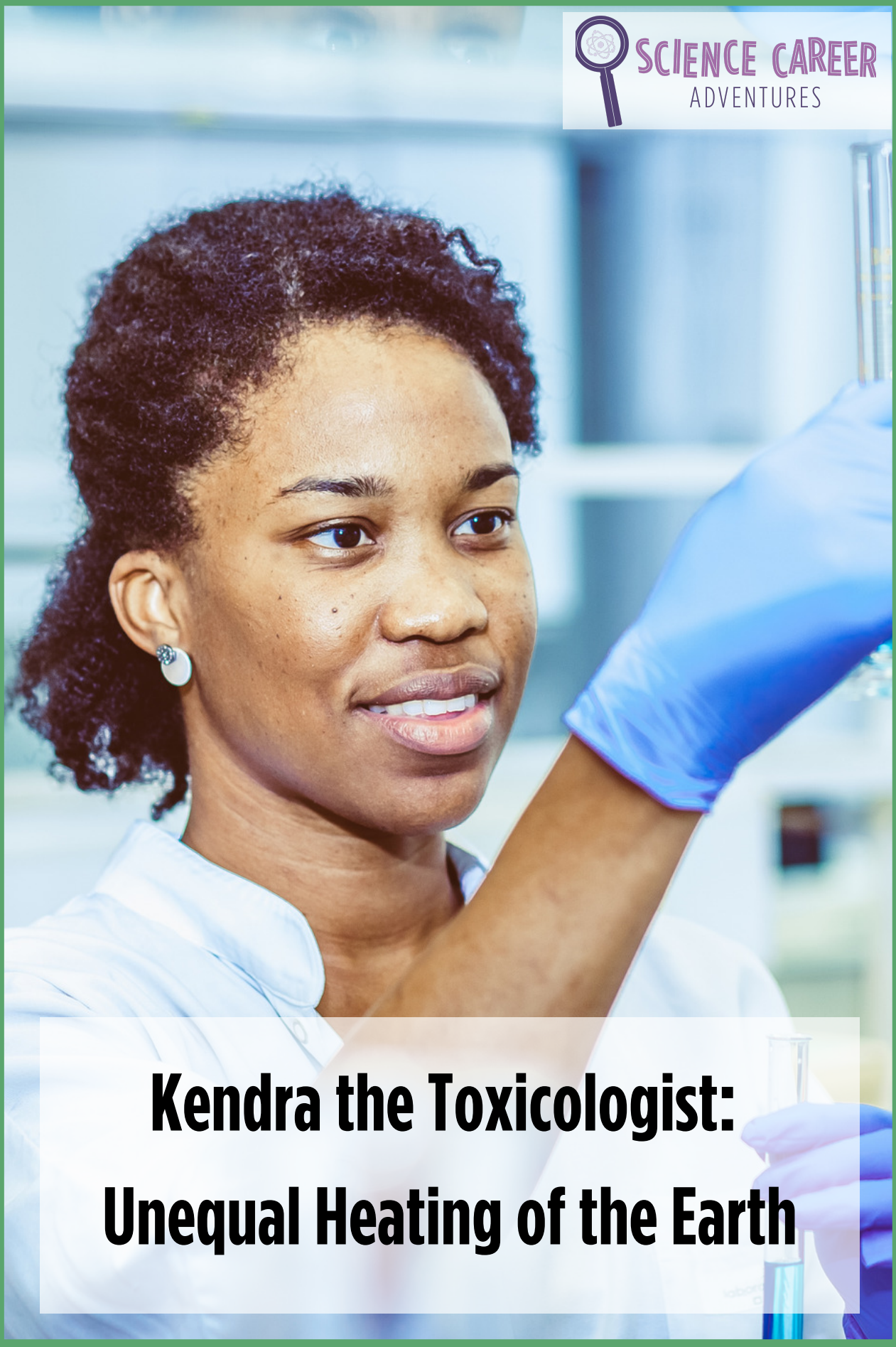


Kendra the Toxicologist: Unequal Heating of the Earth

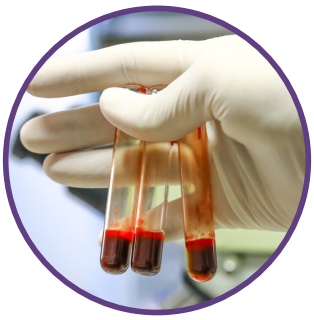
Who is Kendra?

Hi, my name is Kendra! I am a toxicologist. A toxicologist is a scientist who studies chemicals that are harmful to humans, animals, or the environment. Toxicologists can have different specialties, or areas that they are experts on.

Here are a few examples of what a toxicologist might do:

Forensic Toxicology:

Forensic toxicologists help police by performing tests on blood and other human tissues. These tests can tell police if a suspect of a crime was under the influence of drugs or alcohol.



Occupational Toxicology:

Occupational toxicologists study chemicals that people might encounter in the workplace. For example, occupational toxicologists have studied a group of chemicals called asbestos that are very hazardous to human health. They can be found in old buildings and can cause lung diseases in humans.

Veterinary Toxicology:

Veterinary toxicologists perform tests on animal and pet food to make sure that it is safe for animals to eat.

What I Am Working On

I am an environmental toxicologist. This means I study how chemicals affect organisms and their environments. An environment includes living and non-living things in the environment. Non-living things include sunlight and air.

An environmental toxicologist might study how an oil spill impacts an ocean shoreline.

Right now, I am traveling to Maine to study a type of fish called cod. Recently, the Cod population has been decreasing. It is my job to figure out whether chemicals are causing the fish to die.

Collecting and Testing Water Samples

When I get to Maine, I am going to take a few water samples where the fish live. That way, I see if there are chemicals in the water that are causing fish to die.

Once I collect the samples of ocean water, I will run them through a mass spectrometer. A mass spectrometer is a special machine that will print out a report that shows which chemicals are in the water.

After collecting and testing samples of ocean water, I found out that there are several chemicals in the water! For example, there was a lot of mercury in the water.

Following up on my Test Results

Now that I know that there is a lot of mercury in the water, I need to figure out if these chemicals caused the fish to die. To do this, I have to cut up a dead fish!

After cutting up the fish and running some tests, I learned something interesting. While the cod I tested did have mercury in its system, it was not an unusual amount. Almost all fish have at least some mercury in their bodies. As long as that mercury level is below the amount recommended by the environmental protection agency (EPA), it is safe to eat. My testing has shown that the mercury levels are not high enough to have affected the cod's health, so there must be another cause for the cod population to decrease.

Did you know?

When you cut up an animal in a science lab in order to learn something, it is called a dissection. Dissections let us learn more about how different organisms' bodies work. Many classrooms dissect frogs, pigs, and even cats!

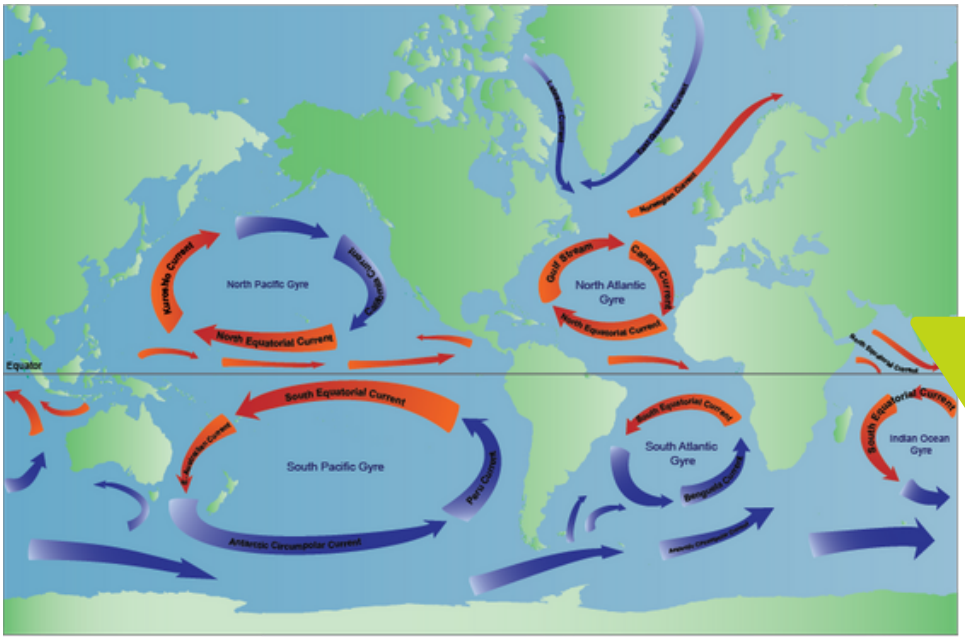
Conducting Research

I need to figure out why the cod population is decreasing if it isn't caused by chemicals. It's time to do some research! I decide to look up some recent research done by other scientists to see if anyone else has determined reasons fish populations may be decreasing.

While I am flipping through webpages on my iPad, I come across a study about how climate change affects fish populations. Climate is the weather over an extended period of time in a certain location. Climate change occurs very slowly.

The study talks about how when climate change happens, it can change the conditions of the ocean water in a particular spot. This means that what used to be a fish's perfect home may now be too cold or too hot. They may not be able to survive in the new conditions and may need to move somewhere else or they may even die.

This is because climate change can slow down the movement of ocean water. Sunlight hits water at the equator from straight overhead so it is very warm. As the water heats up, it rises and moves away from the equator and towards the poles. As the water moves towards the poles it cools down. Sunlight hits water near the poles at an angle so it is cooler. The cool water sinks and moves back towards the equator. The water continuously keeps moving from equator to poles. These circular movement patterns are called convection currents. When convection currents slow down, hot places get hotter and cold places get colder.



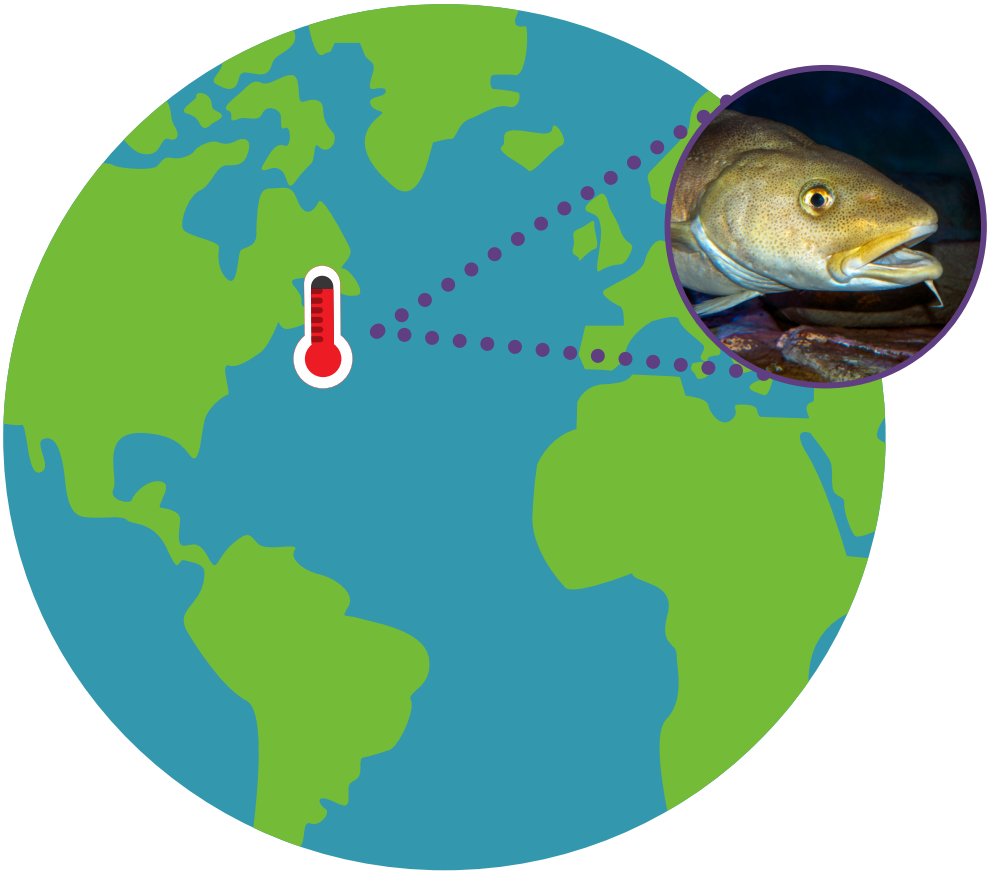
Take a look at how water moves through the ocean through convection currents.

Fun Fact:
A big swirling group of ocean currents is called a gyre.

Image courtesy of: www.quora.com

Conducting Research

The article explains that climate change has affected the air and water temperatures in many parts of the planet. This temperature change has messed with the movement of the ocean's convection currents and slowed them down a lot. This might change the conditions where the cod are used to living and make them move somewhere else.



As the ocean temperatures rise, the cod move into areas with cooler temperatures.

I am excited that I figured out what is causing the cod population to die! My next step is to work with other scientists to figure out what we can do to help protect the cods' habitat!