



MERCURY MESSES WITH THE ENVIRONMENT



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Mercury Messes with the Environment

by

The United States Environmental Protection Agency

EPA Region 9
the Office of Public Affairs

Follow Blue the Heron and friends to learn how mercury affects the environment and your health. This book is for children, their caretakers and educators.

Hi there! I'm a heron named Blue.

Heron, like me, hang out in both freshwater and saltwater. You can find my friends and me in streams, rivers, lakes, marshes, lagoons, bays, oceans and other water bodies. I like to eat fish, amphibians, reptiles, small mammals, insects, and other birds.

Something has been polluting the water in the places where I live and hunt called mercury. With this book in your hands, we'll learn about mercury and environmental justice and how we can keep ourselves and our communities safe. Let's get started!





WHAT IS MERCURY AND WHERE DOES IT COME FROM?

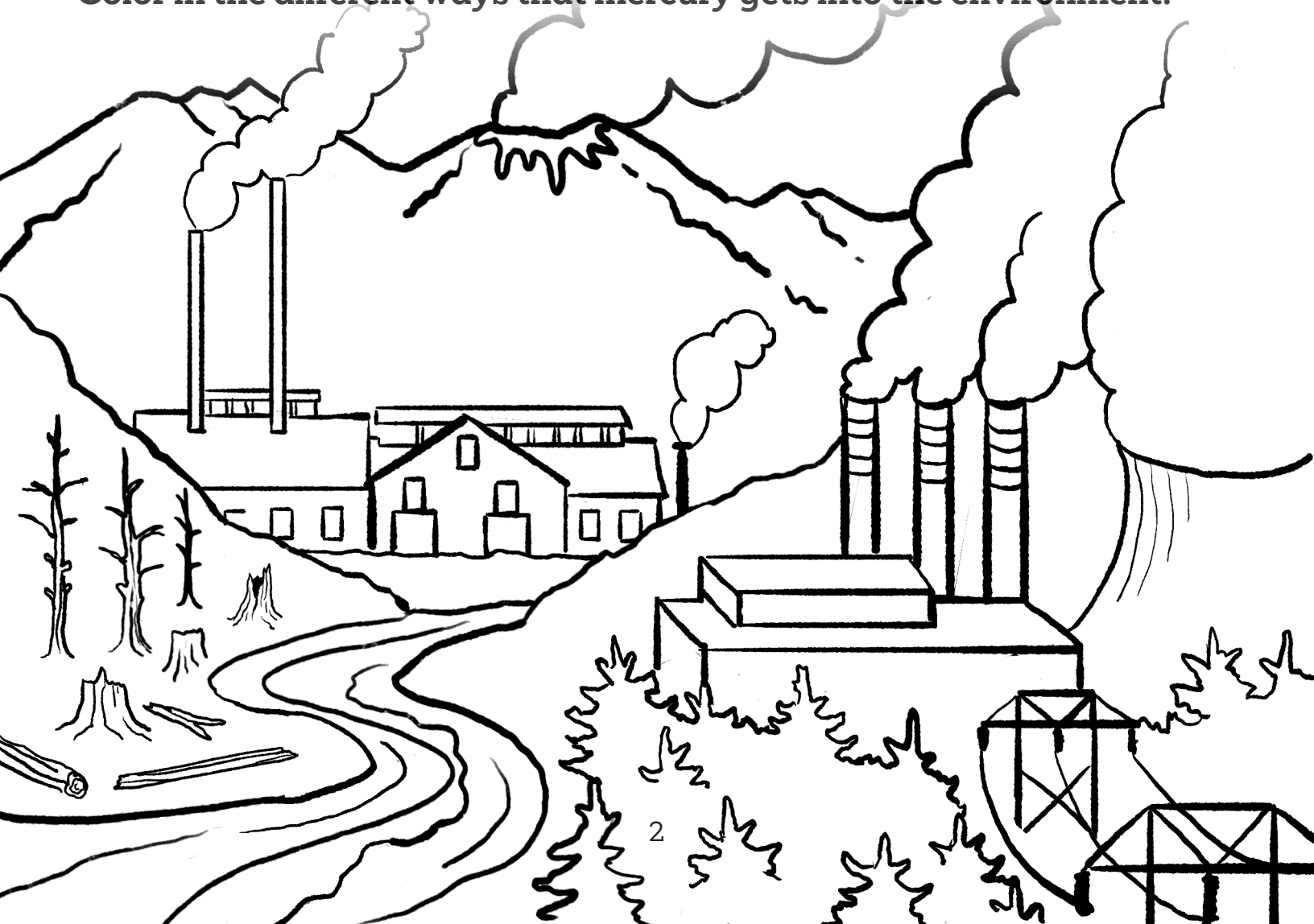
Mercury is a naturally occurring element found in the Earth's crust. But, it can be harmful when it takes different forms.

Mercury is released into the air and water from both natural and human-made sources. For example, volcanoes and forest fires are natural sources of mercury.

Human activities are responsible for much of the mercury that is released into the environment including:

- Historic gold and silver mining
- Present-day gold mining
- Burning of coal, oil, and wood for fuel
- Old factories that used mercury to make products
- Thermometers and fluorescent light bulbs

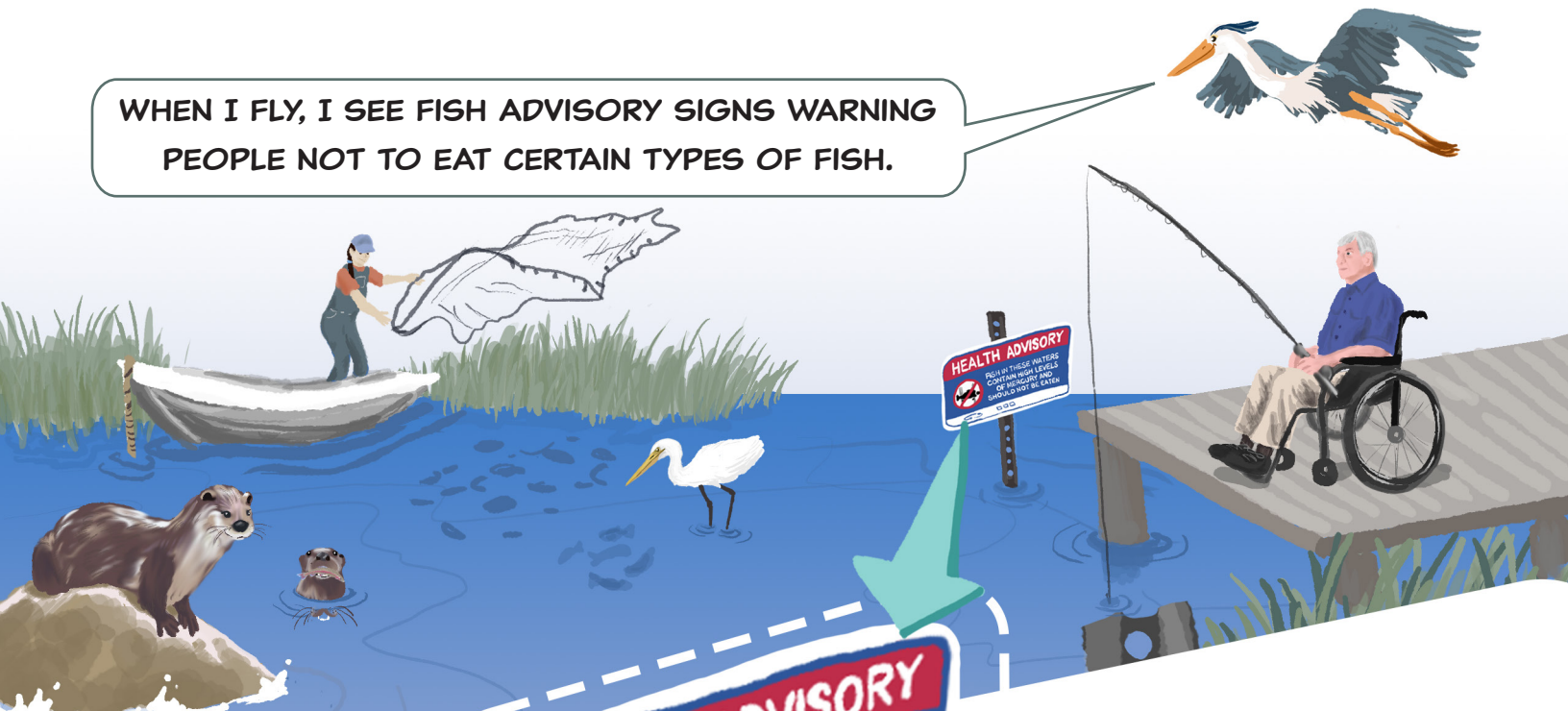
Color in the different ways that mercury gets into the environment.



HOW MERCURY BUILDS UP IN THE ENVIRONMENT

- There are different forms of mercury. For example, bacteria in the water changes mercury into a more toxic or harmful form.
- This form of mercury builds up or **bioaccumulates** as it moves through the food chain. As bigger fish eat smaller species, they absorb more mercury. As a result, game fish (which are the top of the food chain) contain some of the highest mercury levels.
 - Game fish with mercury might not be safe to eat. But you can do catch and release fishing, swimming, and other activities in the water. If possible, try not to swallow the water.
- Mercury is a **neurotoxin**, which means it's a poison that acts on the nervous system. It can affect brain and kidney functions.

WHEN I FLY, I SEE FISH ADVISORY SIGNS WARNING PEOPLE NOT TO EAT CERTAIN TYPES OF FISH.



Learn more about fish advisories:



Draw your own fish advisory sign.

CHOOSING FISH TO EAT

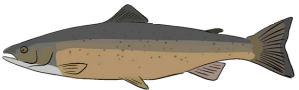
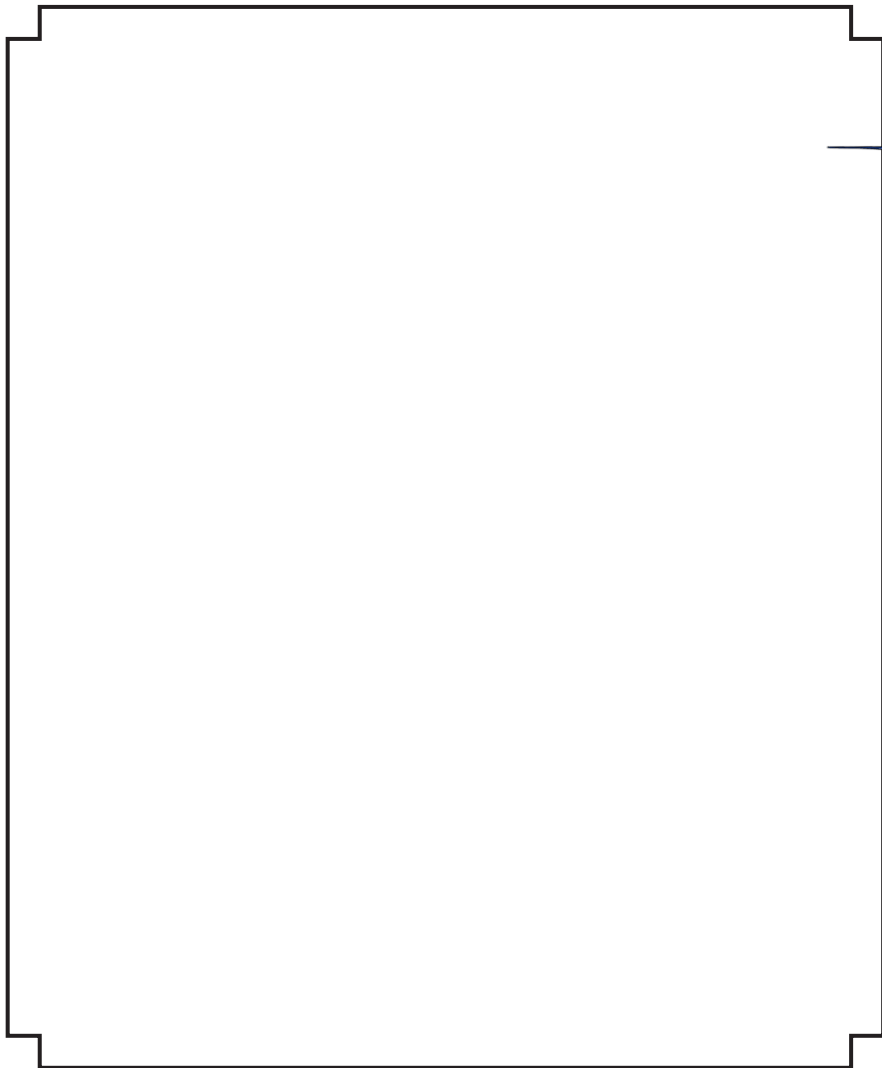
Compare this list with the fish and seafood you eat regularly. It is important to know the types of fish and seafood that may contain high levels of mercury.



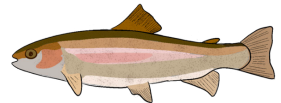
Best Choices			Good Choices		
Anchovy	Herring	Scallop	Bluefish	Monkfish	Tilefish (Atlantic Ocean)
Atlantic croaker	Lobster, American and spiny	Shad	Buffalofish	Rockfish	Tuna, albacore/white tuna, canned and fresh/frozen
Atlantic mackerel	Mullet	Shrimp	Carp	Sablefish	Tuna, yellowfin
Black sea bass	Oyster	Skate	Chilean sea bass/Patagonian toothfish	Sheepshead	Weakfish/seatrout
Butterfish	Pacific chub mackerel	Smelt	Grouper	Snapper	White croaker/Pacific croaker
Catfish	Perch, freshwater and ocean	Sole	Halibut	Spanish mackerel	
Clam	Pickrel	Squid	Mahi mahi/dolphinfish	Striped bass (ocean)	
Cod	Plaice	Tilapia			
Crab	Pollock	Trout, freshwater			
Crawfish	Salmon	Tuna, canned light (includes skipjack)			
Flounder	Sardine	Whitefish			
Haddock		Whiting			
Hake					

Choices to Avoid	HIGHEST MERCURY LEVELS	
King mackerel	Sacramento blackfish	Tilefish (Gulf of Mexico)
Marlin	Shark	Tuna, bigeye
Orange roughy	Swordfish	

Create a poster or drawing to show the different types of fish and seafood that are safe to eat in moderation and which ones should be avoided.



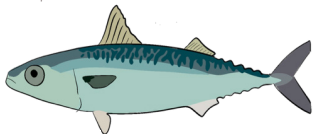
Salmon



Trout



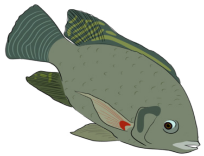
Perch



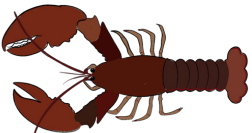
Pacific chub mackerel



Whiting



Tilapia



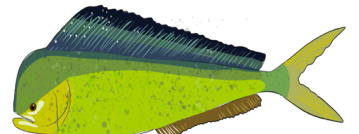
American lobster



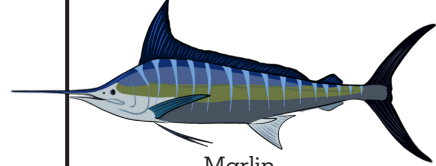
Crawfish



Oyster



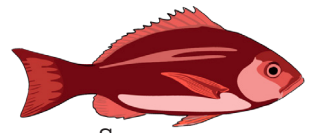
Mahi mahi



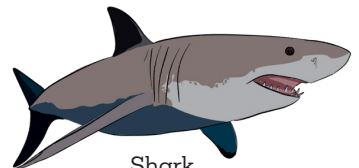
Marlin



Tilefish



Snapper



Shark



Bigeye tuna



Yellowfin tuna



Spanish mackerel



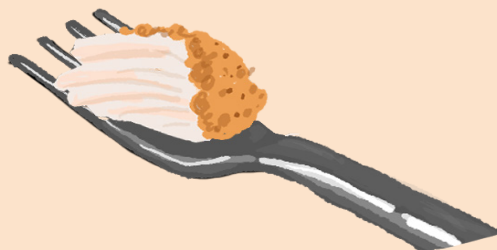
STAY SAFE: PROTECT YOURSELF FROM MERCURY

For some tribal nations and other communities, eating certain kinds of fish is an important cultural practice with a long and rich history.

Eating fish can be a healthy source of nutrients and protein. However, some fish contain more mercury than others. The good news is you can learn to protect yourself and your community from mercury by checking local fish advisories.

PROTECT YOURSELF FROM MERCURY, WHILE STILL EATING CERTAIN TYPES OF FISH

DON'T EAT, OR LIMIT YOUR INTAKE OF, CERTAIN FISH THAT HAVE UNSAFE MERCURY LEVELS.



WITH AN ADULT, VISIT THIS WEBPAGE TO:

- 1. LEARN MORE ABOUT WHICH FISH ARE AFFECTED BY MERCURY.**
- 2. LEARN TO BEST CHOOSE WHICH FISH TO EAT, AND HOW OFTEN TO EAT THEM.**



SHARE WHAT YOU LEARN ABOUT MERCURY WITH YOUR FAMILY AND FRIENDS.



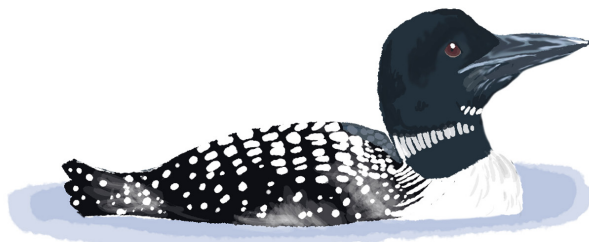


WAYS MERCURY CAN AFFECT LIVING THINGS

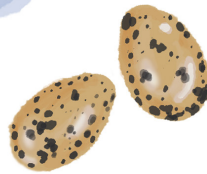
Because mercury can travel far, it gets into the bodies of animals ranging from salamanders to polar bears. Animals can absorb mercury through water, air, and soil or from eating certain plants. Mercury can harm an animal's ability to reproduce and take care of their young.

For example, mercury has harmful effects on birds:

Certain birds, such as mallard ducks, lay fewer eggs



Loons lay fewer eggs and feed their chicks less



Egret chicks get tired and are less motivated to hunt



Fill in the blanks using what you learned from reading this page and page 3:

- 1) Mercury is a _____, which means it's a poison that harms the nervous system.
- 2) Bioaccumulation is a process in which _____ substances (such as mercury or pesticides) build up in living things.
- 3) Animals can absorb mercury through water, air and _____ or from eating certain plants.
- 4) Mercury can harm an animal's ability to reproduce and take care of its _____.
- 5) Mercury can cause _____ chicks to get tired and be less motivated to hunt.



ALL LIVING THINGS ARE INTERCONNECTED

When mercury gets in our environment, it affects all living things. We are all interconnected. These relationships between people, plants, animals, and other forms of life are called food webs. Tribal communities have a tradition of understanding and respecting the food web.

All communities should have the right to live in a healthy environment.

Food web activity

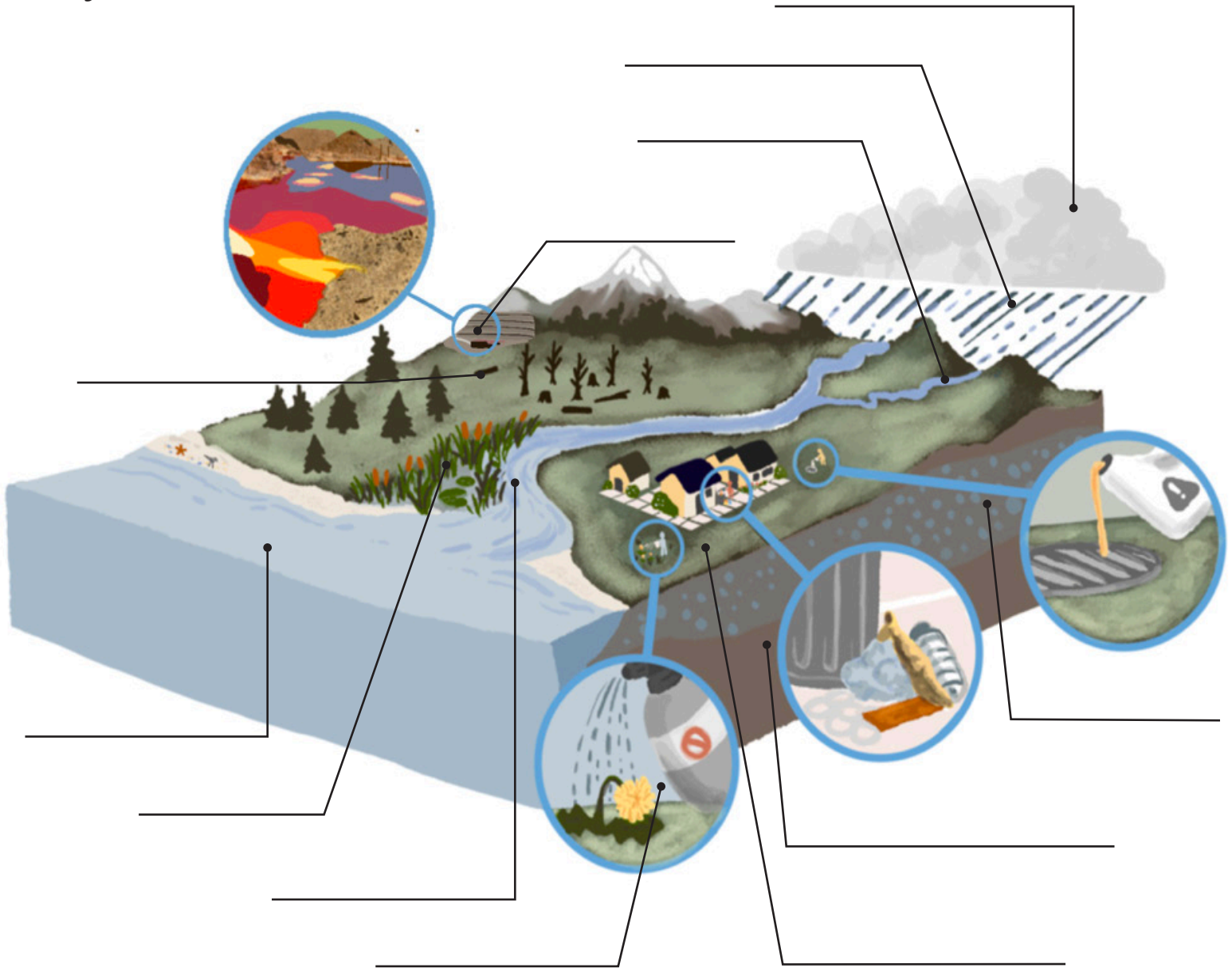
Draw a line from each animal or plant to the animal that eats it. (Many animals might eat the same foods.) For instance, the Fallon Paiute Shoshone Tribe of Nevada and California eat fish, waterfowl, wild plants, and small game as part of their traditional cultural practice. Mercury pollution can affect this important way of life.





PROTECT YOUR WATERSHED

We all live in a watershed. A watershed is an area of land where all of the water that is under it, or drains off of it, collects into the same place. Did you know a raindrop that lands on top of a mountain can end up in the ocean? It is important to clean up pollution everywhere so our water stays clean.



Fill in the blanks with the names of the features within the watershed.

mining
chemicals
groundwater

marsh
river
rain

trash
stream
wildfire

cloud
pesticides
ocean

WATER IS LIFE

Mercury and other pollutants can affect your watershed. Water comes in many forms. Below are just a few examples.

- **Wetlands:** An area of land covered by salt or freshwater or a mix of the two. This water can be either seasonal or permanent. Some wetlands include marshes, bogs and swamps.
- **Springs:** An area where water flows out of the ground, both seasonally and permanently. Springs are especially important in the desert as a water source for animals.
- **Aquifer:** An underground area where water fills cracks, stones and sand.
- **Tributary:** A river or stream flowing into a larger river or lake.
- **Bayou:** A slow-moving creek or a swampy section of a river or a lake, often found in the southeastern part of the United States.

Draw or write about your favorite body of water and how you can help protect it.

DO YOU LIVE NEAR A WATER BODY? WHAT TYPES OF ANIMALS DO YOU SEE THERE?





PROTECTING PEOPLE AND NATURE FROM POLLUTION



In the 1960s and 1970s, concerned citizens started the environmental movement. They were worried about pollution in the water they drank and the air they breathed. They wanted the federal government to do something about it. This led to the birth of the U.S. Environmental Protection Agency, which helps protect people and the environment from mercury and other pollution.

Today, we've made progress in cleaning up the environment. But with climate change and other issues, there's a lot more work to do. You can help by reducing, reusing, and recycling.

Reduce: Creating less trash

Example: Replacing plastic water bottles with refillable containers

Reuse: Finding new uses for something, instead of throwing it away

Example: Using recycled bags for groceries

Recycle: Turning something that could be trash into something useful

Example: Recycling aluminum cans and other reusable materials



Draw or paste pictures of things you can reduce, reuse and recycle.



DO YOU WANT TO PROTECT THE ENVIRONMENT?

EPA protects our land, water and air and the people who work there do many jobs. They make sure environmental laws are followed. They clean up pollution like mercury, educate people about the environment and much more. Protecting human health and the environment requires diverse people with different skills.

What are you good at? Circle the person with the job you'd like to have and write why you think it would be a cool job!



PUBLIC HEALTH PROFESSIONAL

CREATES PROGRAMS THAT PROTECT PEOPLE'S HEALTH.



INVESTIGATOR

MAKES SURE PEOPLE DO NOT BREAK LAWS THAT PROTECT THE ENVIRONMENT.



COMMUNICATOR

WRITES AND SPEAKS TO PEOPLE ABOUT EPA.



LAWYER

STUDIES AND INTERPRETS LAWS THAT PROTECT THE ENVIRONMENT.



ENVIRONMENTAL SCIENTIST

STUDIES PEOPLE'S HEALTH AND THE ENVIRONMENT.



EDUCATOR

TEACHES KIDS, TEACHERS AND PARENTS ABOUT THE ENVIRONMENT.



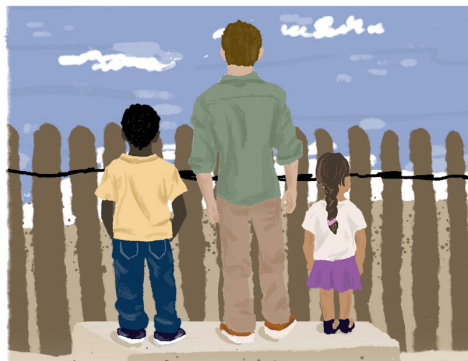
HOW POLLUTION AFFECTS COMMUNITIES

Cleaning up pollution is important for everyone, especially for communities who don't have the same resources as others. This is called an environmental justice issue. Due to a history of injustice, communities of color, tribal nations, low-income communities, and others often live in areas with more pollution. Therefore, health threats from pollution and climate change affect these communities more than others. For example, some communities of color and tribal nations eat fish as a large part of their diets. Mercury can build up in fish, which can add to health issues these communities already face.

- **Climate change** is the warming of the planet over a long period of time from both natural and human causes. In the last 100 years, there is unmistakable evidence that the Earth is warming at an unprecedented rate. Human activity is the primary cause. Climate change causes more extreme weather events, such as wildfires, excessive heat and drought.
- **Environmental justice** is the fair treatment of everyone, regardless of their race, income, or education level. This means no one should face more health threats from environmental issues than other communities just because of who they are or where they live.
- **Equality** means all people are treated fairly and have the same opportunities.
- **Equity** is recognizing that people do not all start from the same place and we need to work to ensure equal and fair opportunities.
- **Respect** is showing consideration for peoples' feelings, wishes and what makes them unique.

Fill out the crossword!

1							
2							
		3		4			
5							



Equality



Equity

ACROSS

2. ___ is recognizing that people do not all start from the same place and we need to work to ensure equal and fair opportunities.
5. ___ means all people are treated fairly.

DOWN

1. ___ is showing consideration for peoples' feelings and wishes and what makes them unique.
3. Environmental ___ is the fair treatment of everyone, regardless of their race, income or education level.
4. ___ change is the warming of the planet over a long period of time, with people's actions being one important cause.

RESOURCES

LEARN ABOUT THESE RESOURCES WITH AN ADULT IN YOUR LIFE.

Mercury Resources

Health Effects of Exposures to Mercury

[epa.gov/mercury/health-effects-exposures-mercury](https://www.epa.gov/mercury/health-effects-exposures-mercury)

EPA Mercury

[epa.gov/mercury](https://www.epa.gov/mercury)

Teacher Resources - Mercury, My Community, and Me

superfund.oregonstate.edu/teacher-resources-mercury-my-community-and-me

Mercury Contamination of Aquatic Environments

usgs.gov/special-topic/water-science-school/science/mercury-contamination-aquatic-environments

Don't Mess with Mercury — A mercury spill prevention initiative for schools

atsdr.cdc.gov/dontmesswithmercury

Choose Fish and Shellfish Wisely

[epa.gov/choose-fish-and-shellfish-wisely](https://www.epa.gov/choose-fish-and-shellfish-wisely)

Advice about Eating Fish

[fda.gov/food/consumers/advice-about-eating-fish](https://www.fda.gov/food/consumers/advice-about-eating-fish)

Environmental Education Resources

EPA Environmental Education

[epa.gov/students](https://www.epa.gov/students)

EPA Environmental Justice

[epa.gov/environmentaljustice](https://www.epa.gov/environmentaljustice)

EPA EJScreen: Environmental Justice Screening and Mapping Tool

[epa.gov/ejscreen](https://www.epa.gov/ejscreen)

How's My Waterway EPA

mywaterway.epa.gov

We All Live in a Watershed

neefusa.org/nature/water/lesson-1-watershed-basics

Resources for Students and Educators about Nonpoint Source (NPS) Pollution

[epa.gov/nps/resources-students-and-educators-about-nonpoint-source-nps-pollution](https://www.epa.gov/nps/resources-students-and-educators-about-nonpoint-source-nps-pollution)

Search for Superfund Sites Where You Live

[epa.gov/superfund/search-superfund-sites-where-you-live](https://www.epa.gov/superfund/search-superfund-sites-where-you-live)

Reduce, Reuse, Recycle

[epa.gov/recycle](https://www.epa.gov/recycle)

DEFINITIONS

Bioaccumulation: (**Bio**-life/**accumulation**-build-up) Substances, like mercury, that move up the food chain and build-up in wildlife

Contamination: the process of making something dirty or polluted

Ecosystem: a biological community of organisms that live and interact with each other in a specific environment

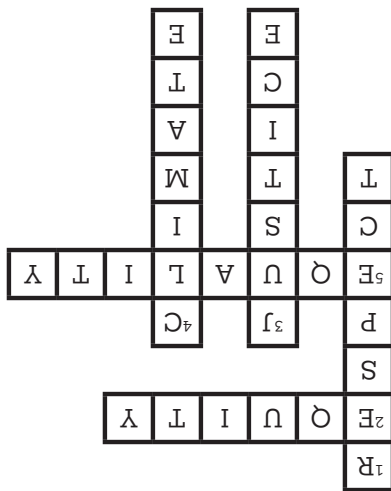
Mercury: a naturally occurring heavy metal that is released into the environment by human activity

Metallic Mercury (or Elemental Mercury): the shiny, silver-gray metal found in thermometers, barometers, thermostats and other electrical switches. See “Don’t Mess with Mercury” resource on page 12

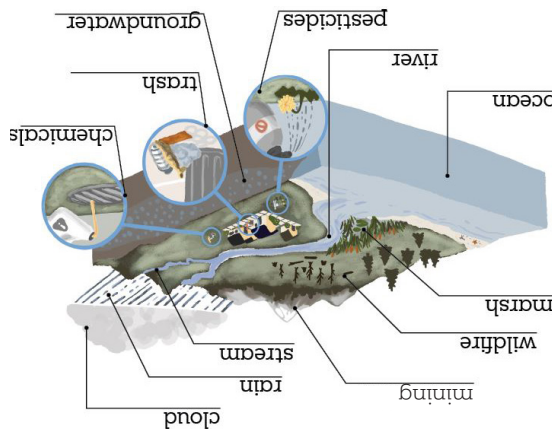
Neurotoxin: A substance that is known or suspected to be poisonous to nerve tissue

Toxic: poisonous or harmful

Answers



Page 11 -



Page 6 -

- 1) neurotoxin
- 2) toxic
- 3) soil
- 4) offspring
- 5) egret

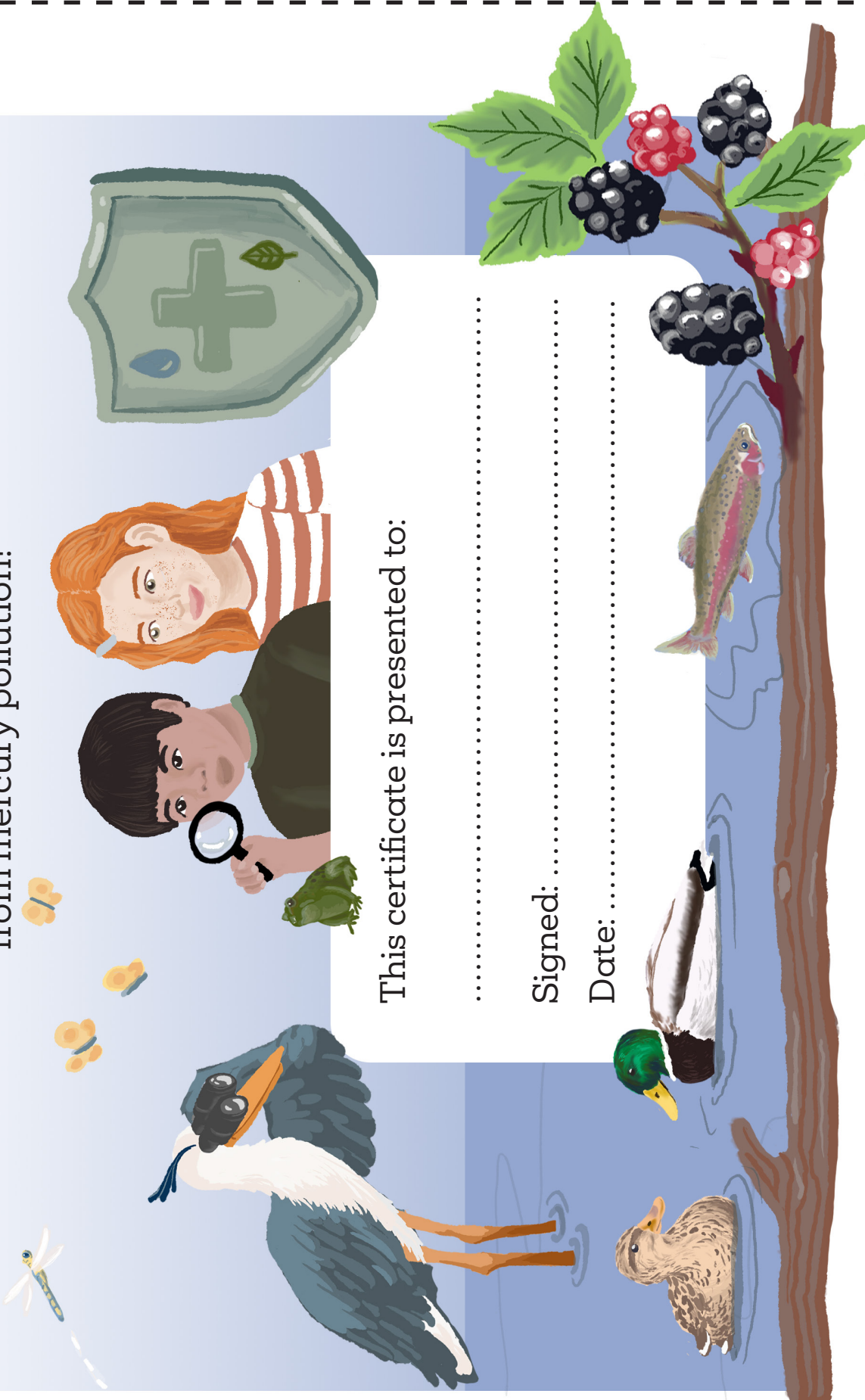
Page 5 -





Nature and Health Supporter

Excellent job! Now you know how to protect yourself and your community from mercury pollution!



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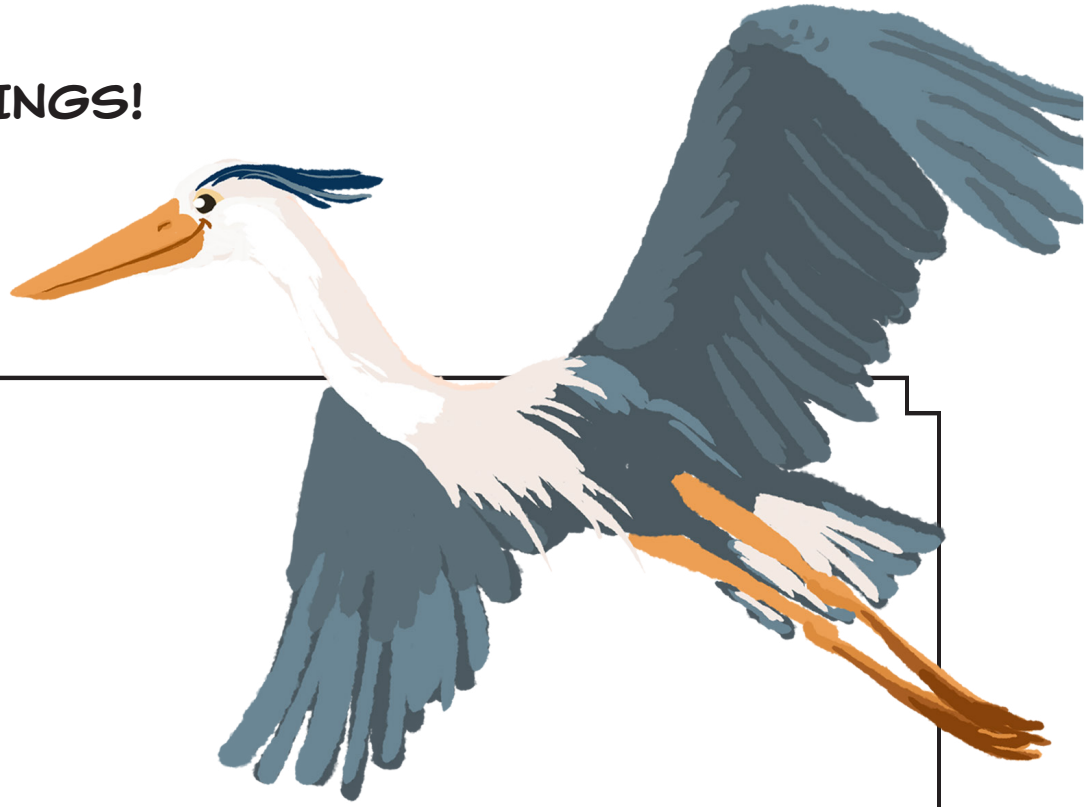
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Signed:

Date:

SPREAD YOUR WINGS!

Write or draw a picture of something you've learned.



A large, empty rectangular box with a black border, intended for the student to write or draw a picture of something they've learned.



United States
Environmental Protection Agency

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