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Turtle's Climate Adventure is produced under Youth Climate Action Team Incorporated ©, a 501(c)(4) nonprofit, dedicated to youth involvement in climate activism and education.

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Discussion Ouestions



For teachers and parents – these are examples of guiding questions you can use to facilitate discussion between yourselves, students and their peers. YCAT emphasizes the importance of inviting young people into conversations about climate change and encouraging their curiosity and exploration of the topic. It is okay not to have all the answers.

- 1. Did you learn something new from the story? What was it?
- 2. What questions do you still have about climate change?
- 3. What have you observed in your own community? Do you see climate change in effect?
- 4. What will you do with your new knowledge?

Reading Resources

- National Geographic
- <u>NASA</u>
- NASA Climate Kids
- <u>Climate Reality Project</u>
- <u>American Lung Association</u>
- <u>National Institute of Health(NIH)</u>
- NIH Environmental Justice
- <u>Natural Resources Defense</u> <u>Council</u>

Word Search



CPBNSMOGGZ LOPKSXMTEU LFLUZLWOR MLKEACWHJE AUCBMSAAXC TGARMTTR Y BSIYEIXC F OLEVRRMCL ZNEAEZGXBE TDPAUDLVSR

pollution water plastic air smog climate recycle

Key Story Concepts



Pollution

Pollution occurs when harmful substances enter our atmosphere and environment. These substances include various gases, trash, and chemicals, among others, and are collectively referred to as **pollutants**.

In Turtle's Climate Adventure, we talk about three major types of pollution: air, land, and water. Some air pollution comes from natural places, such as volcanoes. But most air pollution comes from human-created sources and occurs when harmful gases (i.e. **carbon dioxide** and **methane**) enter our atmosphere. These gases are also known as **greenhouse gases** and are a major contributor to climate change.

Air pollution can come from factories, cars, and even our own homes, all of which are created by humans. When air pollutants mix with different gases and fumes they can produce **smog**, which you will learn more about on page five. These gases affect everyone and can harm the health of humans and cause coughing and other issues. They also harm our environment.







Sources: National Geographic, NIH, Berkey, Harvard, Science Journals

Water pollution describes the contamination of our water sources, such as oceans, rivers, and lakes. Polluted water sources often look brown or muddy. This is caused by runoff. Runoff happens when dirt and chemical substances from factories, farms, and homes, often during or after rainfall, mix with water and run into our water sources such as those we drink and use for bathing. Some examples of chemicals found in runoff include fertilizer, petroleum, and pesticides from farms. Some of the worst examples of water pollution cause toxic, undrinkable water and damage the homes of millions of animals.

Landfills

Sources: EPA, NRDC, Climate Central, NPR

Landfills are major contributors to land pollution. A landfill is a deep hole in the ground where our trash often ends up. Like their name, we use them to fill the land with discarded plastics, food, paper, rubber, textiles-anything you can think of. Some materials can take up to a million years to decompose, partly due to a lack of oxygen in landfills. Excessive waste, which we all contribute to, is what causes these mountains of trash from homes, schools, factories, and public areas such as cities, to name a few sources.





Landfills emit greenhouse gases, such as methane and carbon dioxide, from decomposition. These gases are harmful to the humans, animals, and the environment, and speed up the progression of climate change. Toxic substances can end up in landfills, which seep into the earth and water we use from underground (called groundwater) over time, harming humans and wildlife. Landfills can be so toxic that being near one for a short amount of time can cause coughing, eye irritation, and illness. Unfortunately, some people live very close to landfills and experience these negative health effects and worse.

Greenhouse Effect

A spike in greenhouse gases produced throughout the past century has permanently altered our planet's temperatures and weather. They are known as heattrapping gases, trapping heat from the sun in our atmosphere and preventing it from returning to space. This makes our air warmer. We call this the "greenhouse effect." Greenhouse gases are natural and essential to regulating temperatures on Earth, but excess gases emitted by factories, coal plants, transportation, agriculture, etc., cause Earth's average temperature to increase.





Warming temperatures and sea level rise also escalate the frequency of and exacerbate extreme weather, increasing the probability and destruction of hurricanes, storms, and tsunamis. In warmer air, more **water vapor** forms, resulting in heavier **precipitation** (i.e. rain or snow). Too much precipitation in one area can lead to **drought** and extreme heat in another. The warmer temperature, the quicker moisture evaporates which dries out soil and vegetation, escalating the risk of drought and heat waves. And the warmer and drier conditions are, the more vulnerable a region becomes to **wildfires**.

Sea Level Rise

There are two primary factors responsible for **sea level rise: thermal expansion** and **melting ice**. Thermal expansion occurs when water gets warmer, causing it to rise. As the planet warms, the ocean absorbs the heat and becomes warmer, too. While this is happening, the volume of the water increases and the ocean expands, thus prompting **sea level elevation**.



The other major contributor to sea level rise has to do with the melting of **glaciers** and large sheets of ice. Warming temperatures melt these bodies of ice at a faster rate than they can gather snow and freeze over, so these melted masses of ice just add to the volume and rise of the ocean. Ice acts as a barrier, reflecting heat from the sun and keeping the ocean and colder regions cool. This is vital to survival for marine ecosystems and animals such as polar bears.

Yet not only does this threaten the **ecosystems** that rely on the ocean to live, it also threatens humans and our homes, especially those closer to the seashore that are at risk of flooding.

Smog (Smoke + Fog)

When smoke and fog mix they create a thick, smelly, brown or grey form of air pollution called smog. Common in large cities with lots of traffic and industry, such as factories, smog can not only make it difficult to see but it is also unhealthy for people, plants, and animals. Today, the called smog see is we photochemical smog, which occurs when sunlight reacts with nitrogen oxides (a mix of nitrogen and oxygen, i.e exhaust from cars and emissions from factories and coal power plants), and something called a volatile organic compound or VOC. VOCs come from gasoline (what we use to fuel most cars), some paints, and many cleaning products. VOCs are harmful to both the planet and humans.



Photo credit: Huffington Post

Smog can also be called **ozone**. You may have heard of the '**ozone layer**', a protective layer in our atmosphere shielding us from **ultraviolet radiation** emitted from the sun. Our ozone layer has been damaged over the years, creating holes which allow some of that radiation through. This is why it is important to wear sunscreen when you go outside-even on cloudy days!

This ozone is positive because it protects us. But smog is a negative kind of ozone that can make our eyes itchy and irritable, as well as damage our lungs and make it difficult for people with lung illnesses, such as asthma, to breathe properly. One of the best ways you can help reduce smog is to walk and/or ride a bike instead of driving when you can. Since you are not driving yet, ask a parent or family member about taking walks or riding bikes. This can also be a fun activity to do with your loved ones while also helping the planet!







Source: National Geographic

Write to Your Representative!



Each year, we vote for people to become our representatives (or elected officials). They are called representatives because they are elected by voters to represent you and the people who live in your area in state and local government. We are called **constituents.** You must be at least 18-years-old to vote, but you are still a constituent and your elected officials represent you and the issues you care about, too.

You don't have to wait until you are 18 to participate in government. One way you can participate is by writing to your elected officials. In your state, you can write to your governor, mayor, senator, city council member, or someone on your school board, to name a few. You can also write to officials in Congress and even the President! For issues in your local community, we recommend starting with representatives in your town or county.

To find out who your representative is, ask an adult to search for USA.gov online. There you can find your town's website where there will be information about your who your representatives are and where to send your message.

Even though you must be at least 18-years-old to vote, you can still make your voice heard right now. Writing to our representatives or elected officials is something we can all do, and it is a powerful way to advocate for climate change!

Ready to write your own letter?

Writing Your Own Letter



Example:

Dear Representative Brown,

My name is Jane Smith and I am in 1st grade at Hillside Elementary School in Hillside County. I am learning about climate change and am concerned about smog in our community. This issue affects me, my loved ones, and my community because it makes the air unclean and difficult to breathe. This issue is important because smog can cause sickness and harm our hearts and lungs. With your help, I would like to find a solution to this problem in our community so that we can breathe clean air and spend more time outside.

Thank you! Sincerely, Jane Smith

Write Your Own!

Dear Representative (name),



My name is (your name) and I am in (your grade) at (your school) in (your town). I am learning about climate change and am concerned about (issue). This issue affects me, my loved ones, and my community because (how it affects you.) This issue is important because (why it is important). With your help, I would like to find a solution to this problem in our community.

Thank you! Sincerely, (your name)

What is Compost?



Composting is a method of reducing and recycling waste by diverting it from landfills to your own backyard! Essentially, you add organic material, a.k.a. compost, to a bin or container in your backyard. When exposed to **heat, CO2, and water,** fungi and other decomposers are produced which then break the organic waste down into **humus.** Humus is a dark, soil-like product of the decomposed compost. Finally, you can add the humus to your garden where it acts as natural fertilizer for plants and crops, and creates more nutrient-rich soil.



You can compost, too! Visit these sources to learn more.

<u>KidsGardening</u> <u>SciShow Kids</u> <u>NatGeo Kids</u> <u>PBS Kids</u> <u>Teach Go Green</u> <u>KidsDo: Gardening</u> DID YOU KNOW: Turtles existed with dinosaurs, over 100 million years ago!





Print this page to color Turtle riding a dinosaur!





YOUDID IT!

You completed the Turtle's Climate Adventure activity guide! Are you ready to continue learning?

Order a digital or printed copy of the book today on <u>Amazon</u>! All proceeds support the expansion of the project.

Stay in touch with us!

Website: ycatinc.com Instagram & TikTok: @youthclimateinc LinkedIn: Youth Climate Action Team Inc.

For additional questions, resources or support, contact us at <u>contact@ycatinc.com</u>.

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