

THE AIR POLLUTION MYSTERY

Gamify your students' learning with this interactive and engaging Mystery Activity.

NO PREP

The Air Pollution Mystery

Part 1 – Mission Briefing & Case Overview

Name: _____ Date: _____

Case File #402 – The Air Pollution Mystery

Air is something we depend on every second of every day. We cannot see it, but we need it to survive. Most of the time, we do not think about the air we breathe. However, scientists and doctors are becoming increasingly concerned about what is in the air—and how it is affecting both people and the environment.

In many cities and communities around the world, air quality has been declining. Levels of smoke, gases, and tiny particles have been rising. People are reporting more breathing problems, wildlife is being affected, and entire ecosystems are showing signs of stress.

Air pollution has been detected in:

- Major cities
- Rural farming areas
- Near highways and factories
- Inside homes and schools

No one is sure exactly which sources are causing the most damage or how far the pollution is spreading. What is clear is that air pollution is not just a local problem—it is a global one.

You are a science detective assigned to investigate this growing problem.

Your Mission

- Identify where air pollution comes from
- Explain how it spreads through the environment
- Describe why it is dangerous
- Develop solutions to reduce the problem

critical thinking, attention to detail, and strong scientific reasoning skills. Your findings and ecosystems may depend on what you discover.

Pollution?

provided by your teacher. Then answer:

ent from clean air?

as find air pollution difficult to control and remove?



SCROLL
to take a look inside!

**DETECTIVE FILE ON HOW HUMANS
IMPACT THE ENVIRONMENT**



HOW THIS ACTIVITY HELPS YOU

- Saves prep time with a fully structured, print-and-go investigations.
- Drives high engagement while still meeting academic goals as students are interested in what they're doing.
- Builds deep understanding with **real-world relevance** as they analyze real evidence, make connections, and using CER to explain human impact.

10-PART INVESTIGATION

Students:

1. Step into the role of a Science Detective.
2. Examine real scientific evidence from around the world.
3. Track the hidden pathways of air pollution.
4. Interrogate suspects (vehicle exhaust, Farming and agriculture, etc.) and identify the main culprits.
5. Build a scientific case using Claim-Evidence-Reasoning.
6. Propose real solutions that matter.

★★★★★ The added images and graphs enhanced the activity. My students were engaged and motivated during the case study, and it was an effective introduction to the topics. - Mystery Resource Buyer

HOW THIS MYSTERY WILL HELP YOU



- Prep-FREE and fully editable Mystery Investigation - just print/upload and assign with no materials.
- Evidence Cards can be printed with and without images or projected on board.
- Engages every learner through hands-on, high-interest mystery investigations that boost motivation and participation.
- Builds essential skills such as graph interpretation, problem-solving, teamwork, creativity, and communication.



A complete student case file with guided worksheets for every step of the investigation.



10 detailed evidence cards based on real air pollution research and real-world examples that include images, graphs, and text.



A full teacher answer key with sample responses and support for grading.

What You Get

NO-PREP. JUST PRINT TO GO!

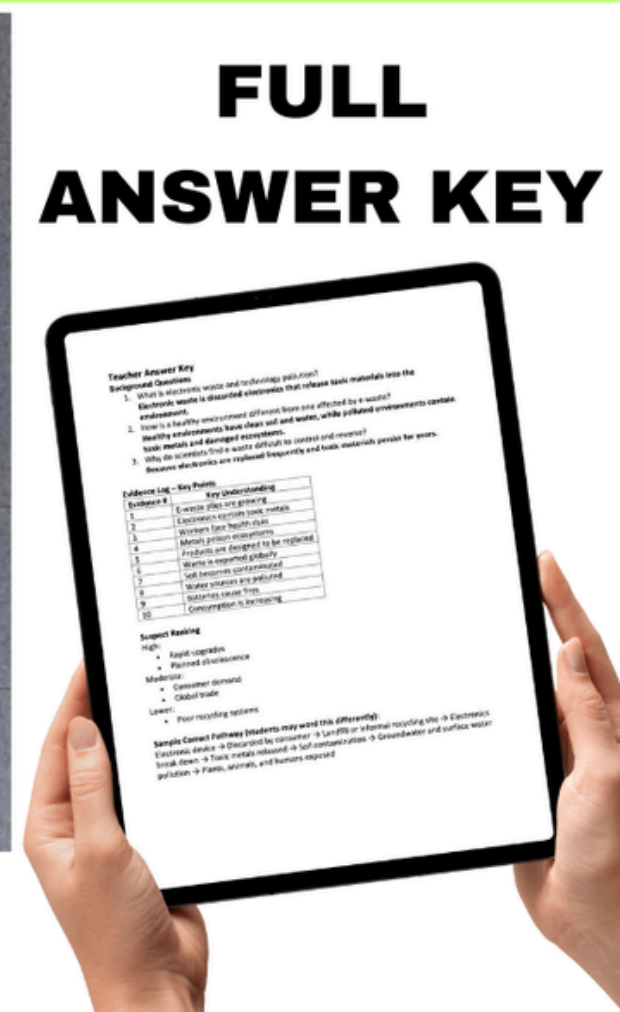
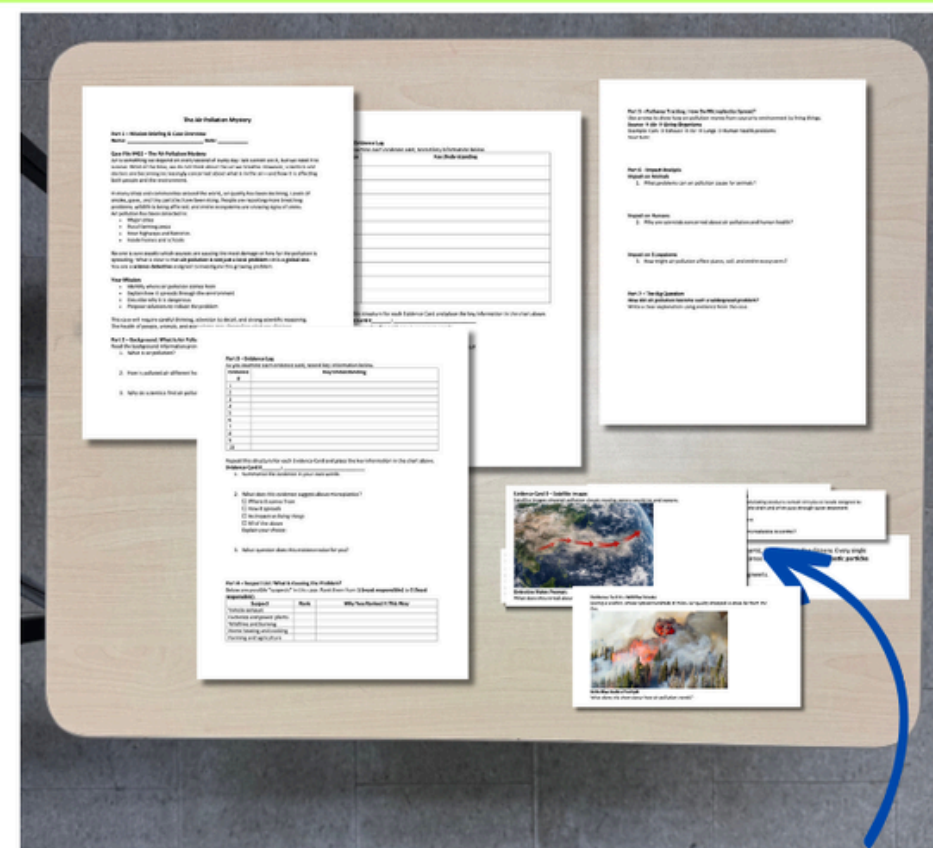
Full investigation breakdown

Interpretation of Data

10 Evidence Cards to Determine Culprit

What Will Your Students Learn?

FULLY EDITABLE AND READY-TO-GO INVESTIGATION



EVIDENCE CARDS

“

★★★★★ This product will make a great addition of Environmental Mystery Mondays for my Environmental Issues Curriculum, with no teacher prep needed. - Mystery Resource Buyer

”

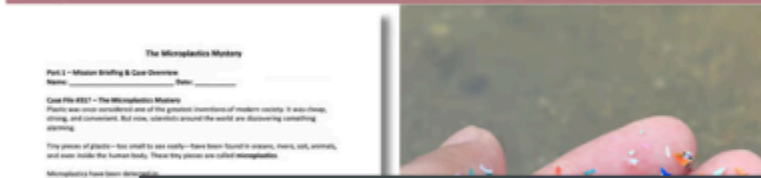
- ✓ What air pollution is, where it comes from, and how it is produced.
- ✓ How air pollution spreads through wind, weather, ecosystems, and living organisms.
- ✓ Why air pollution is harmful to humans, animals, plants, and entire ecosystems.
- ✓ How to analyze data and evidence to identify patterns and draw conclusions.
- ✓ How to use Claim-Evidence-Reasoning (CER) to support scientific arguments.
- ✓ How to trace cause-and-effect relationships in complex environmental systems.

Upgrade to the Environmental Science Detective Mystery Bundle

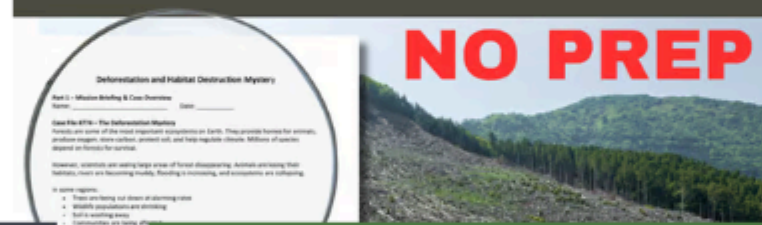
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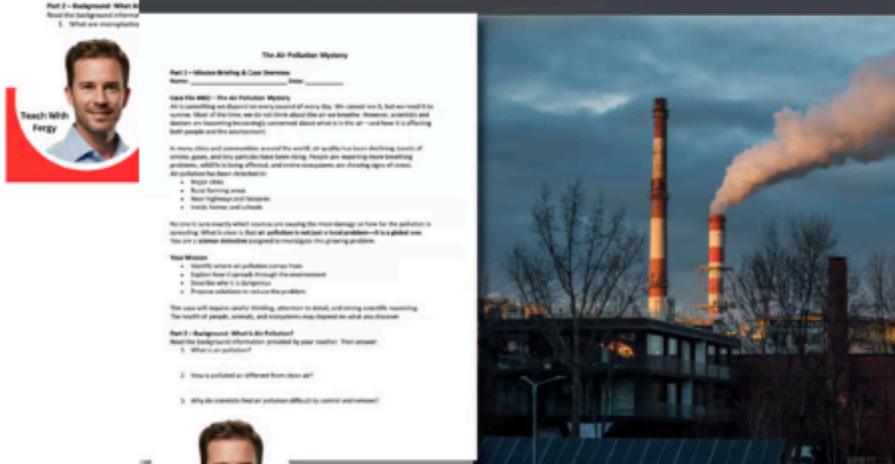
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THE RESOURCE DEPLETION & MINING MYSTERY



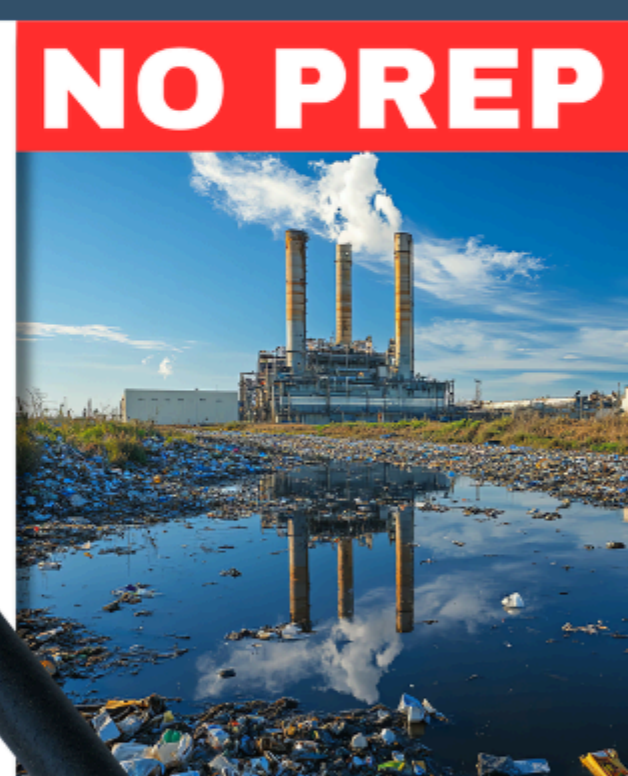
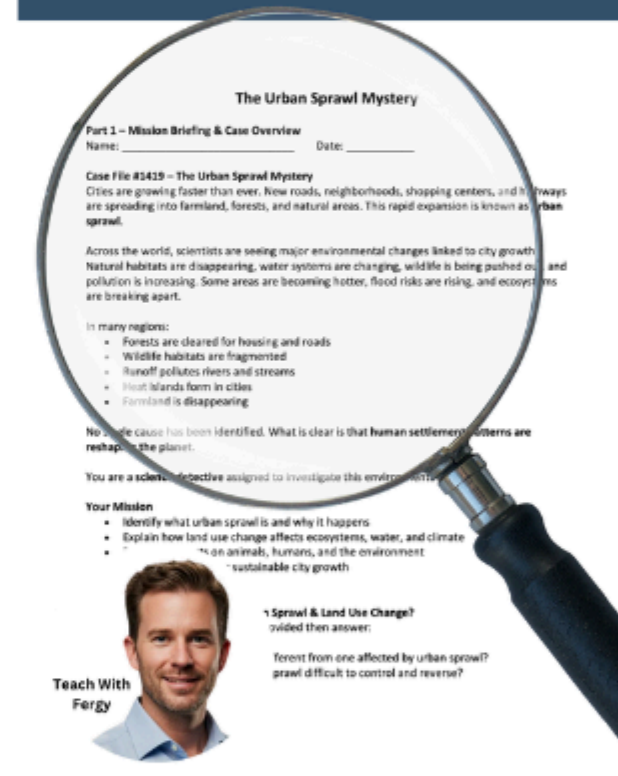
THE AIR POLLUTION MYSTERY DETECTIVE FILE ON AIR POLLUTION & THE ENVIRONMENT



THE INVASIVE SPECIES MYSTERY



DETECTIVE FILE ON HOW HUMANS IMPACT THE ENVIRONMENT



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Part 1 & 2

The Air Pollution Mystery

Part 1 – Mission Briefing & Case Overview

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Air is something we depend on every second of every day. We cannot see it, but we need it to survive. Most of the time, we do not think about the air we breathe. However, scientists and doctors are becoming increasingly concerned about what is in the air—and how it is affecting both people and the environment.

In many cities and communities around the world, air quality has been declining. Levels of smoke, gases, and tiny particles have been rising. People are reporting more breathing problems, wildlife is being affected, and entire ecosystems are showing signs of stress.

Air pollution has been detected in:

- Major cities
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No one is sure exactly which sources are causing the most damage or how far the pollution is spreading. What is clear is that **air pollution is not just a local problem—it is a global one.**

You are a **science detective** assigned to investigate this growing problem.

Your Mission

- Identify where air pollution comes from
- Explain how it spreads through the environment
- Describe why it is dangerous
- Propose solutions to reduce the problem

This case will require careful thinking, attention to detail, and strong scientific reasoning. The health of people, animals, and ecosystems may depend on what you discover.

Part 2 – Background: What Is Air Pollution?

Read the background information provided by your teacher. Then answer:

1. What is air pollution?
2. How is polluted air different from clean air?
3. Why do scientists find air pollution difficult to control and remove?

Part 1 – Mission Briefing & Case Overview

Students are introduced to the air pollution problem and take on the role of science detectives. They learn their mission and begin the investigation with a real-world hook.

Part 2 – Background: What is Air Pollution?

Students read a short background passage and answer guiding questions to build foundational understanding before analyzing evidence.

Part 3 & 4

Part 3 – Evidence Log

As you examine each evidence card, record key information below.

Evidence #	Key Understanding
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Repeat this structure for each Evidence Card and place the key information in the chart above.

Evidence Card #: _____:

1. Summarize the evidence in your own words:

2. What does this evidence suggest about microplastics?

- ☐ Where it comes from
- ☐ How it spreads
- ☐ Its impact on living things
- ☐ All of the above

Explain your choice:

3. What question does this evidence raise for you?

Part 4 – Suspect List: What Is Causing the Problem?

Below are possible “suspects” in this case. Rank them from 1 (most responsible) to 5 (least responsible).

Suspect	Rank	Why You Ranked It This Way
Vehicle exhaust		
Factories and power plants		
Wildfires and burning		
Home heating and cooking		
Farming and agriculture		

Part 3 – Evidence Log

Students begin examining the evidence cards and record key information, observations, and insights in their evidence log.

Evidence Card 10 – Climate Connection

Scientists found that some air pollutants also trap heat in the atmosphere.



Air pollutants also trap heat in the atmosphere.

Detective Notes Prompt:

How might air pollution be connected to climate change?

Evidence Card 3 – Factory Emissions

A factory was observed releasing thick smoke from its chimneys. Air tests nearby showed high levels of chemicals that are known to irritate lungs.



Detective Notes Prompt:

Why might factories be a source of air pollution?

Evidence Card 4 – Wildfire Smoke

During a wildfire, smoke spread hundreds of miles. Air quality dropped in areas far from the fire.



Detective Notes Prompt:

What does this show about how air pollution travels?

Part 4 – Evidence Analysis

Students summarize each piece of evidence, identify what it reveals about air pollution, and generate questions, building critical thinking and reasoning skills.

EVIDENCE CARDS

- All Evidence Cards come in two versions - With images and graphs and Without and can be printed or projected as needed.
- Students analyze each Evidence Card and record the following in their Evidence Log
 1. Summarize the evidence in their own words.
 2. Determine what this evidence suggests
 - ❑ What causes it
 - ❑ Pathway
 - ❑ Its impact on living things
 3. Explain what question(s) this evidence raises for them?

**Images
&
Graphs**

Evidence Card 7 – Crop Damage

Plants growing near highways showed yellowing leaves and reduced



Detective Notes Prompt:

Why would polluted air affect plant health?

Evidence Card 8 – Indoor Air Test

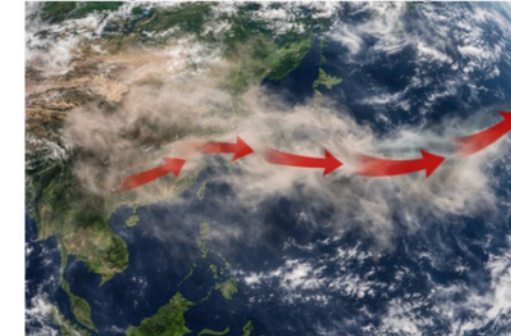
Air samples inside homes showed pollution from cooking, h

Detective Notes Prompt:

Why is indoor air quality important too?

Evidence Card 9 – Satellite Images

Satellite images showed pollution clouds moving across cou



Detective Notes Prompt:

What does this reveal about air pollution as a global issue?

EVIDENCE CARDS – No Images

Evidence Card 1 – City Smog

Air quality sensors in a large city recorded very high levels of smog. The air was thick and difficult to see through. People reported coughing, burning eyes, and trouble breathing.

Detective Notes Prompt:

What does this suggest about pollution in urban areas?

Evidence Card 2 – Traffic Study

Researchers measured air near busy highways and found high levels of nitrogen dioxide and carbon monoxide. These gases come from car and truck exhaust.

Detective Notes Prompt:

How could traffic be connected to poor air quality?

Evidence Card 3 – Factory Emissions

A factory was observed releasing thick smoke from its chimneys. Air tests nearby showed high levels of chemicals that are known to irritate lungs.

Detective Notes Prompt:

Why might factories be major pollution sources?

Evidence Card 4 – Wildfire

During a wildfire, smoke traveled hundreds of miles. Air quality dropped in areas far from the fire.

Detective Notes Prompt:

What does this show about how pollution travels?

Evidence Card 5 – Hospital Visits

Doctors reported an increase in asthma attacks on days when air quality was low. Many patients said their symptoms worsened outdoors.

Detective Notes Prompt:

What connection might exist between air pollution and health?

**No
Images**

Part 5-7

Part 5 – Pathway Tracking: How Do Microplastics Spread?

Use arrows to show how air pollution moves from source to environment to living things.

Source → Air → Living Organisms

Example: Cars → Exhaust → Air → Lungs → Human health problems

Your turn:

Part 6 – Impact Analysis

Impact on Animals

1. What problems can air pollution cause for animals?

Impact on Humans

2. Why are scientists concerned about air pollution and human health?

Impact on Ecosystems

3. How might air pollution affect plants, soil, and entire ecosystems?

Part 7 – The Big Question

How did air pollution become such a widespread problem?

Write a clear explanation using evidence from the case.

Part 5 – Suspect List

Students rank possible sources of air pollution, defend their choices, and determine which human activities are most responsible for the problem.

Part 6 – Pathway Tracking

Students trace how air pollution moves from everyday sources through the environment and into living organisms, strengthening cause-and-effect understanding.

Part 7 – Impact Analysis

Students analyze how air pollution affect animals, humans, and ecosystems, using evidence from the case to support their answers.

Part 8-10

Part 8 – Claim-Evidence-Reasoning (CER)

Claim

What is the main cause of air pollution in this case?

Evidence

List two pieces of evidence from the case that support your claim.

- 1.
- 2.

Reasoning

Explain how your evidence supports your claim.

Part 9 – Solutions & Action Plan

Personal Actions (Things individuals can do)

- 1.
- 2.

Community / School Actions

- 1.
- 2.

Government or Industry Actions

- 1.
- 2.

Part 10 – Reflection

1. One thing that surprised me in this case was:

2. One change I would make after learning this information is:

Part 8 – The Big Question

Students synthesize all their learning to explain how air pollution ended up everywhere, using evidence from the investigation.

Part 9 – Claim-Evidence-Reasoning (CER)

Students write a structured scientific argument, making a claim, supporting it with evidence, and explaining their reasoning.

Part 10 – Reflection and Solutions

Students propose realistic actions at the personal, school, and government levels, moving from awareness to problem-solving.

Full Teacher Answer Key

TEACHER ANSWER KEY

Background Questions

1. What is air pollution?
Harmful gases, smoke, and particles in the air that are not naturally present.
2. How is polluted air different from clean air?
Polluted air contains chemicals and particles that can harm living things.
3. Why is air pollution difficult to control?
It spreads easily, comes from many sources, and cannot be easily filtered.

Evidence Log – Key Points

Evidence	Key Understanding
1 – City smog	Pollution builds up in urban areas.
2 – Traffic study	Vehicles release harmful gases.
3 – Factory emissions	Industry contributes heavily.
4 – Wildfire smoke	Fires add large amounts of particles.
5 – Hospital data	Air pollution linked to asthma.
6 – Animal study	Wildlife breathing affected.
7 – Crop damage	Pollution harms plants.
8 – Indoor air	Pollution also exists inside homes.
9 – Satellite images	Pollution travels long distances.
10 – Climate link	Pollution and climate connected.

Suspect Ranking (Expected Reasoning)

Most students should rank:

- Vehicle exhaust – high responsibility
- Factories/power plants – high
- Wildfires/burning – moderate
- Home heating/cooking – moderate
- Farming/agriculture – varies

Justification should reference frequency and scale.

Pathway Tracking – Sample Answers

Cars → Exhaust → Air → Lungs → Health problems
Factory → Smoke → Air → Plants → Ecosystem damage
Wildfire → Smoke → Air → Animals → Breathing issues

Impact Analysis

Animals

Breathing problems, weakened immune systems, reduced survival

Humans

Asthma, lung disease, heart disease, irritation of eyes and throat

Ecosystems

Plant damage, soil changes, water contamination from air deposits

Big Question – Sample Response

Air pollution has become widespread because many human activities release gases and particles into the air. These pollutants travel through wind and build up over time, affecting people, animals, and ecosystems.

CER Example

Claim:

Vehicle exhaust and industrial emissions are the main causes of air pollution.

Evidence:

Evidence Card 2 (traffic study)
Evidence Card 3 (factory emissions)

Reasoning:

Cars and factories release large amounts of pollution into the air every day, which builds up and spreads, causing widespread air quality problems.

Solutions – Expected Ideas

Personal:

Use public transportation, walk, bike, reduce energy use

Community:

Plant trees, reduce idling, clean energy programs

Government/Industry:

Emissions laws, cleaner technology, renewable energy

Reflection

Answers will vary. Look for:

- Increased awareness
- Behavior change ideas
- Understanding of human impact

Background Reading: What Is Air Pollution?

Air is something we use every moment of the day, but we rarely think about it. Most of the time, air looks clean and invisible. However, scientists are increasingly concerned about **air pollution**—harmful substances in the air that can damage living things and the environment.

Air pollution is made up of gases, smoke, and tiny particles released into the atmosphere. These pollutants come from both natural and human sources. Cars, trucks, factories, power plants, wildfires, farming, and home heating systems all release substances into the air. Some air pollution is visible, such as smoke or smog, while other pollutants cannot be seen but are still dangerous.

Clean air is mostly oxygen and nitrogen, which living things need to survive. Polluted air contains extra chemicals and particles that do not belong there and can cause harm.

How Is Polluted Air Different from Clean Air?

Clean air supports healthy breathing and plant growth. Polluted air contains substances such as carbon monoxide, nitrogen oxides, and particulate matter that can irritate lungs and damage tissues.

Polluted air can sometimes be seen as haze or smog, and it can make breathing difficult. Inhaling polluted air over time can lead to asthma, lung disease, and other health problems. Animals and plants can also be harmed by polluted air.

Another key difference is that polluted air can **travel long distances**. Wind can carry pollution far from where it was created, affecting communities and ecosystems far away.

Why Is Air Pollution Difficult to Control and Remove?

Air pollution is difficult to control because it comes from **many sources at the same time**. Cars, factories, fires, and homes all add pollution to the air. Even if one source is reduced, others may

pollution is invisible, which allows pollution to spread quickly and widely. Unlike solid waste, air pollution cannot be collected or cleaned up easily. Once pollutants are in the air, they are hard to remove.

Air pollution is also **constantly being created**. Every time fuel is burned for transportation, heating, or electricity, new pollution is added. This makes air pollution an ongoing challenge for scientists and governments.

Background Reading

As a special bonus, I want to send you a few resources that you can use in your classroom tomorrow. Completely free and geared towards what you teach!



Just  **and then choose what you teach!**

thanks
**for your interest
in this resource!**



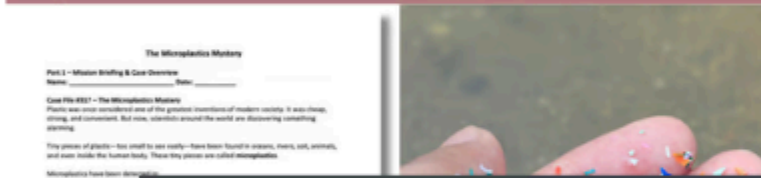
 devon@teachwithfergy.com

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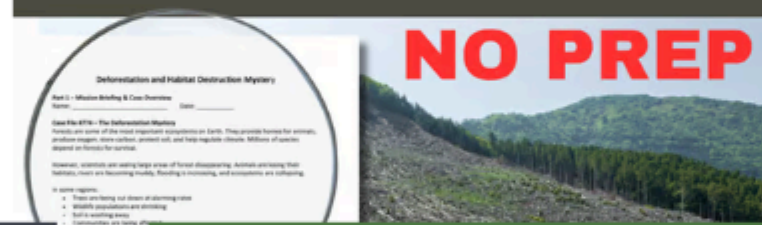
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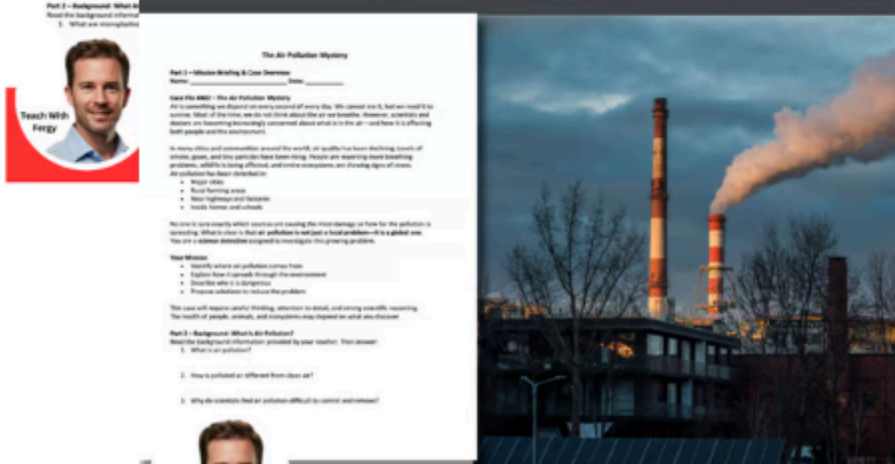
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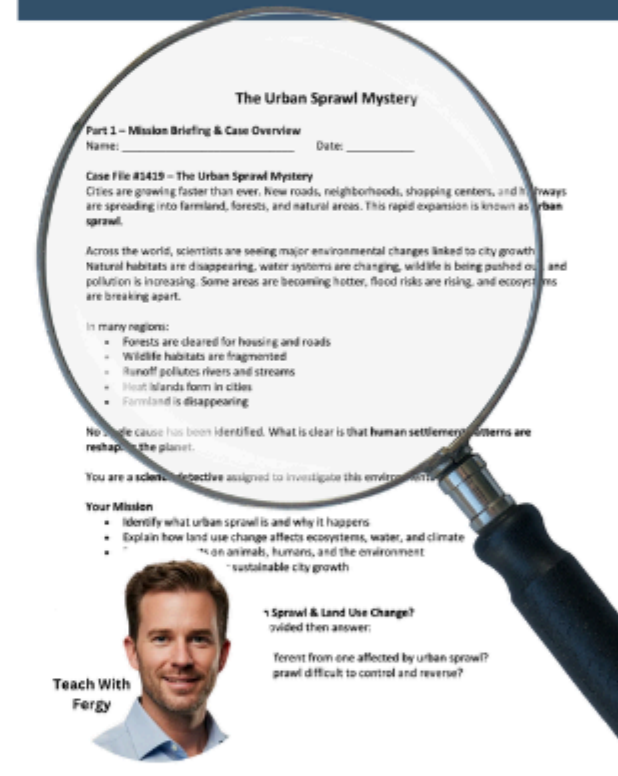
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