

Complete Plastics Bundle

- Lesson
- Video Worksheet
- Activities
- Readings and Case Study



SCROLL
to take a look inside!

Plastics and their Environmental Impact Bundle

- Grade 9-12
- Interactive Lesson

- Worksheets
- Activities
- Case Study Readings



1 Fully Editable & Engaging Lesson and Worksheets

Videos embedded directly in your lesson

Reading & Questions

Case Study: The Effects of Plastic Pollution on Marine Ecosystems

Introduction

Marine ecosystems are home to a diverse range of organisms, from tiny plankton to enormous whales. Unfortunately, these ecosystems are under threat from a range of human activities, including pollution. One of the most significant forms of pollution affecting marine ecosystems today is plastic pollution. This case study will explore the direct impacts of plastic pollution on marine ecosystems and the organisms that depend on them.

The Effects of Plastic Pollution on Marine Ecosystems:

Plastic pollution in marine ecosystems comes from a variety of sources, including discarded fishing gear, plastic packaging, and microplastics. Once in the ocean, plastic debris can have a range of harmful effects on marine organisms. Large pieces of plastic can entangle and suffocate marine animals, while smaller pieces can be mistaken for food and ingested, leading to blockages in the digestive system and other health problems. Additionally, plastic pollution can alter the physical and chemical properties of marine environments, leading to changes in water quality and temperature.

One of the most striking examples of the impact of plastic pollution on marine ecosystems is the Great Pacific Garbage Patch, a massive collection of floating plastic debris in the North Pacific Ocean. The patch is estimated to be twice the size of Texas and contains an estimated 1.8 trillion pieces of plastic. This debris poses a serious threat to marine life, with reports of animals becoming entangled in plastic and ingesting it.

Plastic pollution can also have a ripple effect through marine ecosystems, with the potential to disrupt entire food webs. For example, if a species of fish ingests microplastics, these particles can accumulate in the fish's tissues over time. When predators higher up the food chain consume these fish, they can also ingest the microplastics, leading to biomagnification. This can have serious implications for the health of the ecosystems, as well as for human health if we consume contaminated seafood.

Conclusion:

The impact of plastic pollution on marine ecosystems is significant and ongoing. Despite our best efforts to reduce plastic waste, the problem is only getting worse, with an estimated 8 million metric tons of plastic waste entering the ocean each year. To protect marine ecosystems and the organisms that depend on them, we need to reduce plastic pollution at its source and develop more sustainable alternatives to single-use plastics.

The Effects of Plastic Pollution on Marine Ecosystems Questions:

1. What are some sources of plastic pollution in marine ecosystems?
2. How can plastic pollution affect marine organisms?
3. What is the Great Pacific Garbage Patch?
4. How can plastic pollution impact entire marine ecosystems?
5. What can be done to reduce plastic pollution in marine ecosystems?

Answer Key

Plastic Pollution and Marine Ecosystems Case Study



Exit Ticket

Plastic - Exit Ticket

* Indicates required question

What is a polymer? *

1 point

☐ A chemical added to plastic for color

☐ A large molecule made of many smaller units

☐ A type of natural plastic found in plants

☐ A process used to recycle plastic

Next

Page 1 of 4

Clear form

Google Access

Thank you for your purchase. Clicking the link button below will automatically create a copy of the Google resources and place them into your Google Drive. You'll find the folder inside the 'Shared with me' section on the left side of your Drive.

Important: Before you click, make sure you're signed in to the Google account you'd like the resources placed into. If the resources are added to the wrong account, simply sign out and then into the correct one and repeat the process.

[Click here to place a copy of your resources into your Google account](#)

TWF

Google Classroom Ready
One-Click Google Slides Access



Student Notes

Student & Teacher Versions

Plastics: Student Notes

What Are Plastics?

- Plastic: _____
- Polymers: _____
- Organic: _____
- Some found in nature
- Most synthetic (man-made)
- Most: _____
- E.g., won't dissolve when in contact with most substances, including acid, alcohol, and gasoline

Two main types: _____

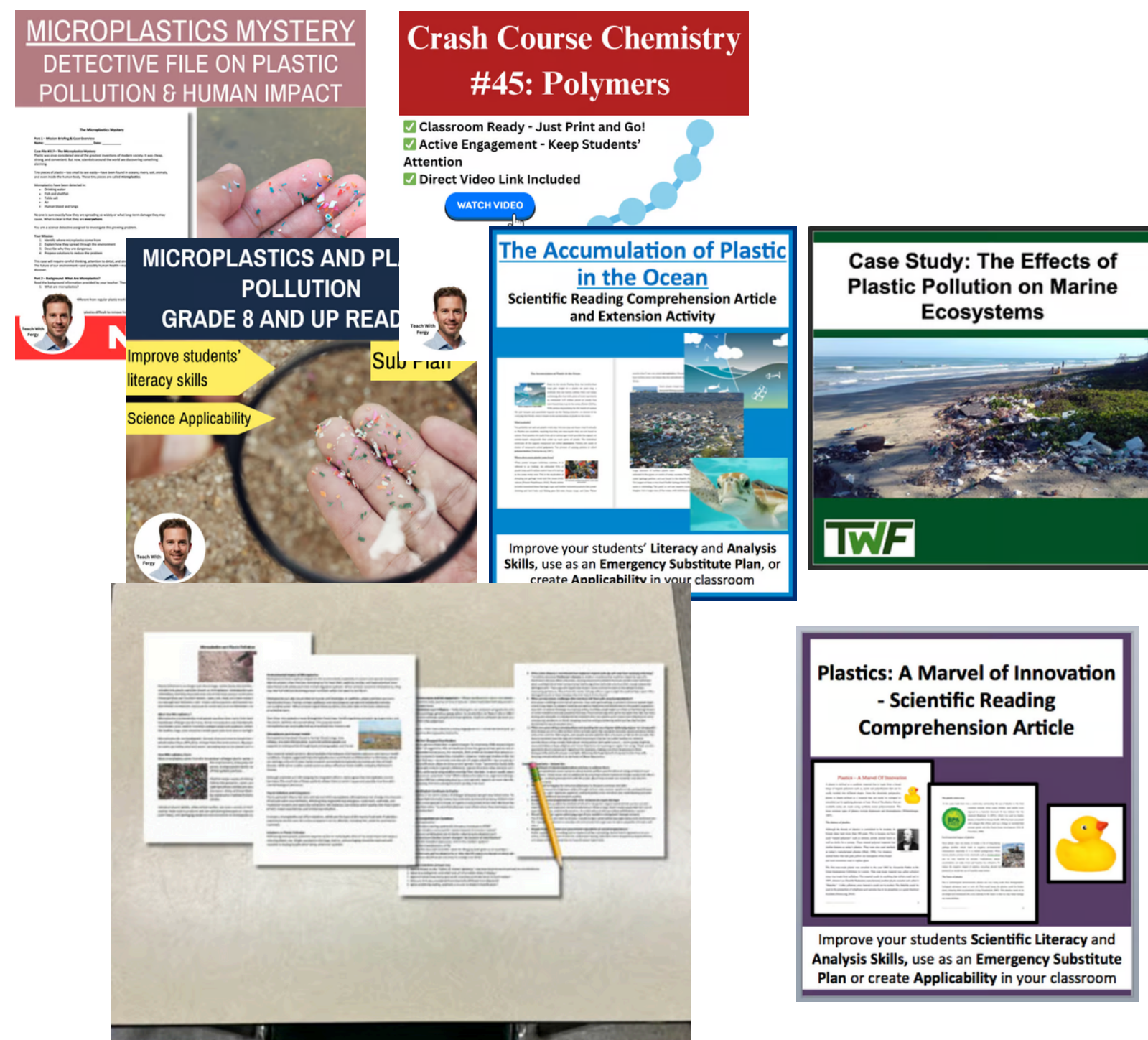
- Thermoset plastics
 - Molecules linked irreversibly during molding process
 - _____ be melted down to make something new
- Thermoplastics
 - _____ (~90% of modern plastics)
 - Monomers joined via chemical reactions prior to molding
 - Looser bonds
 - _____ be melted down and made into another product

How Plastics Are Made

- Fractional distillation of crude oil
 - Like water purification (boil, then condense → removes contaminants that don't boil off with the water)
 - Need to get _____
 - Different hydrocarbons boil and condense at different temperatures
- Polymerization:
 - _____: bond hydrocarbons to one another by breaking double bonds between two carbon atoms, which allows them to form single bonds with other atoms
 - _____: bond hydrocarbon chains to one another by removing another molecule, usually water
 - Produces resin: _____

Engaging Activities & Worksheets

- ✓ Microplastics Mystery – Detective Case File on Plastic Pollution & Human Impact
- ✓ Microplastics and Plastic Pollution Science Reading Article
- ✓ Video Worksheet - Polymers
- ✓ Plastic Pollution and Marine Ecosystems - Ecology Case Study
- ✓ The Accumulation of Plastic in the Ocean - Science Reading Article
- ✓ Plastics: A Marvel Of Innovation - Science Reading Article



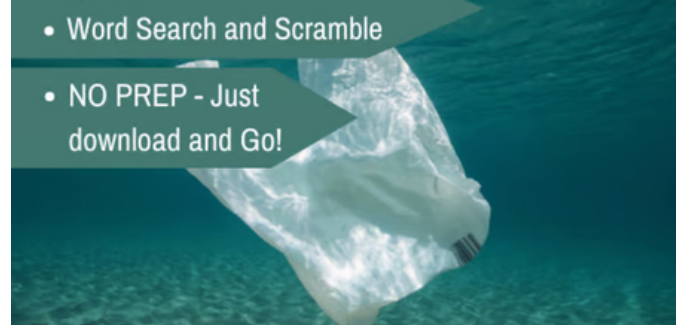
NO PREP

Just Download and Teach

Plastics & the Environment Lesson

- Lesson
- Word Search and Scramble
- NO PREP - Just download and Go!

10th, 11th, 12th Grade



Plastics: Student Notes

What Are Plastics?

- Plastic: _____
- Polymer: _____
- Organic: _____
- Some found in nature
- Most synthetic (man-made)

Most _____

- E.g., won't dissolve when in contact with most substances, including acid, alcohol, and gasoline

Two main types: _____

- Molecules linked irreversibly during molding process
- _____ be melted down to make something new

Thermoplastic

- Polyesters
- Phenolics
- _____ (~90% of modern plastics)
- Monomers joined via chemical reactions prior to molding
- Looser bonds
- _____ be melted down and made into another product

Thermoplastics

- Polyvinylidene chloride (Saran)
- Polytetrafluoroethylene (Teflon)
- Polyethylene (PE): _____

How Plastics Are Made

- Fractional distillation of crude oil
- Like water purification (boil, then condense → removes contaminants that don't boil off with the water)
- Need to get _____
- Different hydrocarbons boil and condense at different temperatures

Polymerization:

- _____ bond hydrocarbons to one another by breaking double bonds between two carbon atoms, which allows them to form single bonds with other atoms
- _____ bond hydrocarbon chains to one another by removing another molecule, usually water
- Produces resin: _____



MICROPLASTICS AND PLASTIC POLLUTION

GRADE 8 AND UP READING

Improve students' literacy skills

Science Applicability

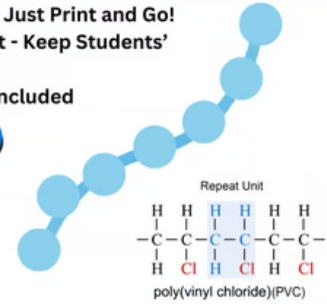
Sub Plan



Crash Course Chemistry #45: Polymers

- Classroom Ready - Just Print and Go!
- Active Engagement - Keep Students' Attention
- Direct Video Link Included

WATCH VIDEO

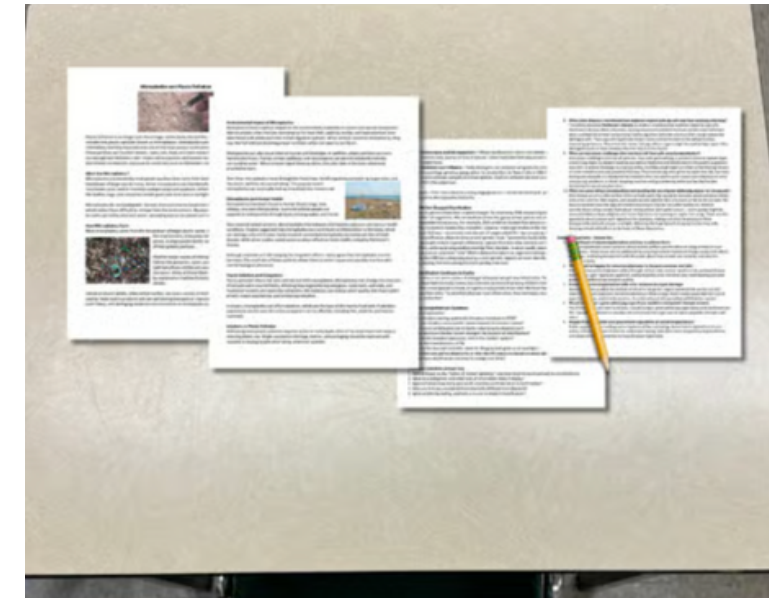


Includes Student Copy and Answer Keys

Case Study: The Effects of Plastic Pollution on Marine Ecosystems



TWF



MICROPLASTICS MYSTERY

DETECTIVE FILE ON PLASTIC POLLUTION & HUMAN IMPACT

Plastics: A Marvel of Innovation

- Scientific Reading Comprehension Article

Improve your students' Scientific Literacy and Analysis Skills, use as an Emergency Substitute Plan or create Applicability in your classroom



The Accumulation of Plastic in the Ocean

Scientific Reading Comprehension Article and Extension Activity

Improve your students' Literacy and Analysis Skills, use as an Emergency Substitute Plan, or create Applicability in your classroom



Reading & Questions

Case Study: Understanding Newton's 2nd Law - Sports Car vs. Pickup Truck

Case Study Questions: KEY

- Because the sports car had far less mass, allowing it to accelerate quickly even with the same engine force.
- It shows that acceleration increases when mass is lower, even if force stays the same, which is exactly what F = ma describes.
- Both vehicles started at the same time and experienced a similar forward engine force.
- Greater mass resists acceleration, so the truck required more force to speed up quickly and therefore accelerated more slowly.
- The sports car accelerated more because of its lower mass, showing that acceleration depends on both force and mass.

Answer Key



Plastic - Exit Ticket

* Indicates required question

What is a polymer? *

1 point

- ☐ A chemical added to plastic for color
- ☐ A large molecule made of many smaller units
- ☐ A type of natural plastic found in plants
- ☐ A process used to recycle plastic

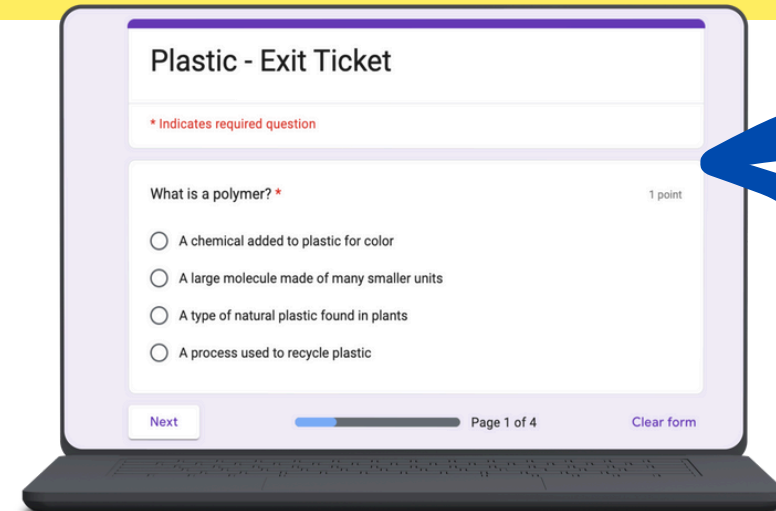
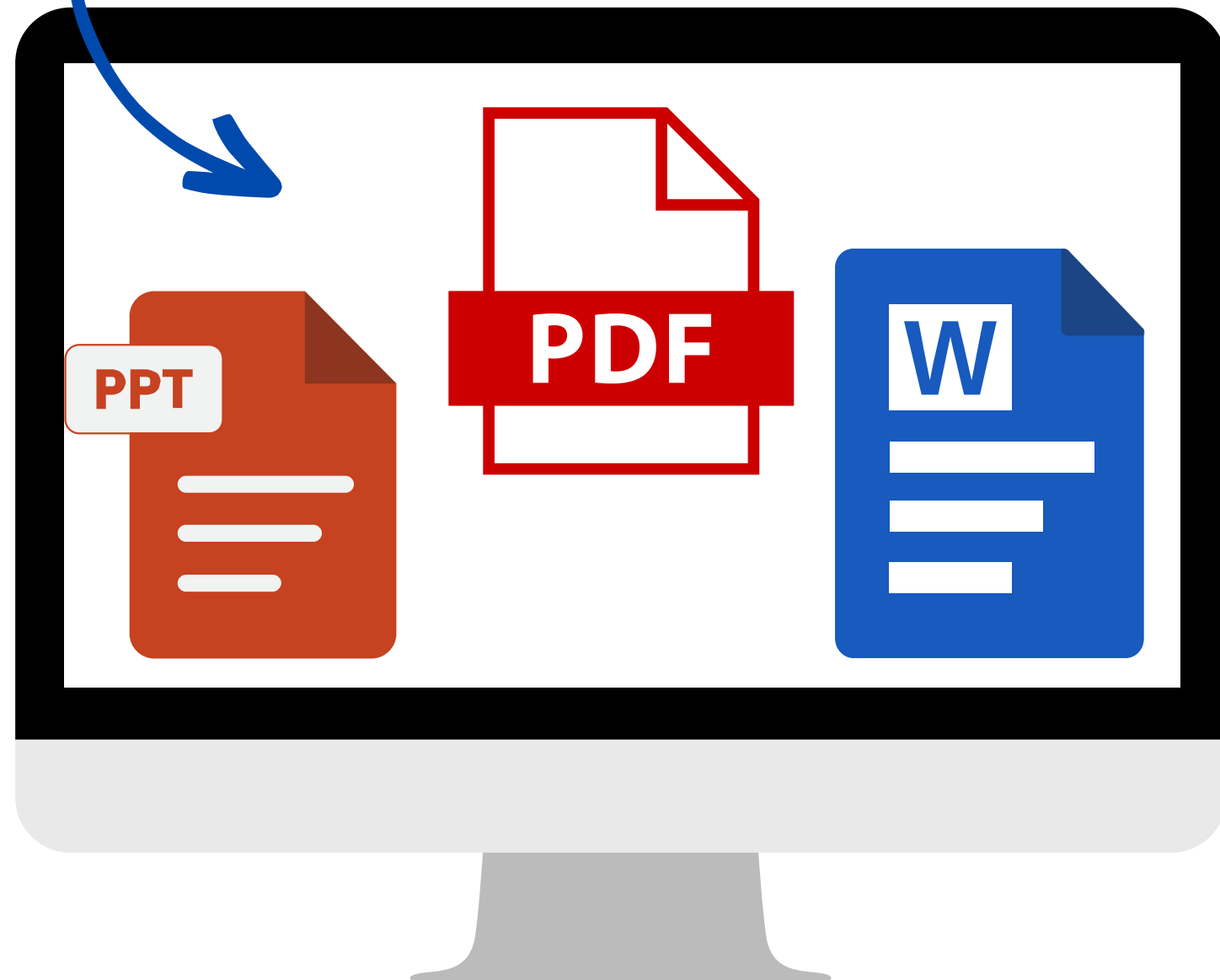
Next

Page 1 of 4

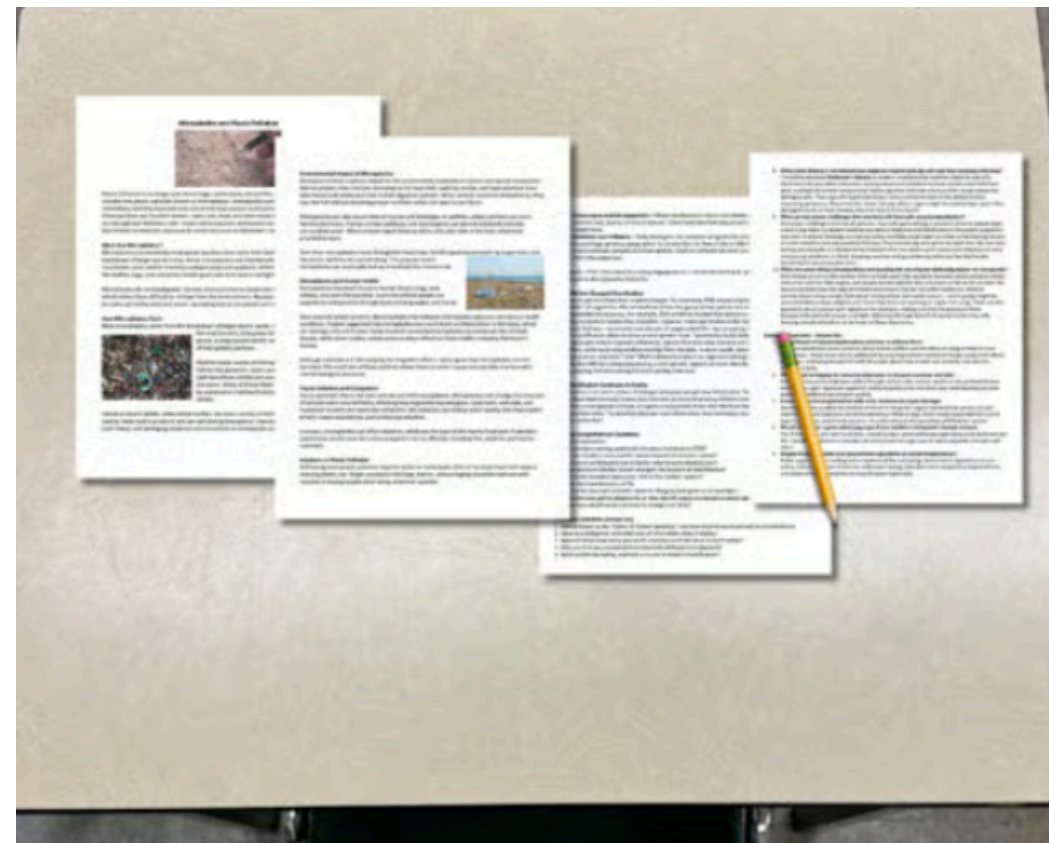
Clear form

Editable and Interactive

Office, Google,
and PDF Versions
Fully Editable



Hands-on and
Interactive Activities



Engaging and Colorful Lesson

