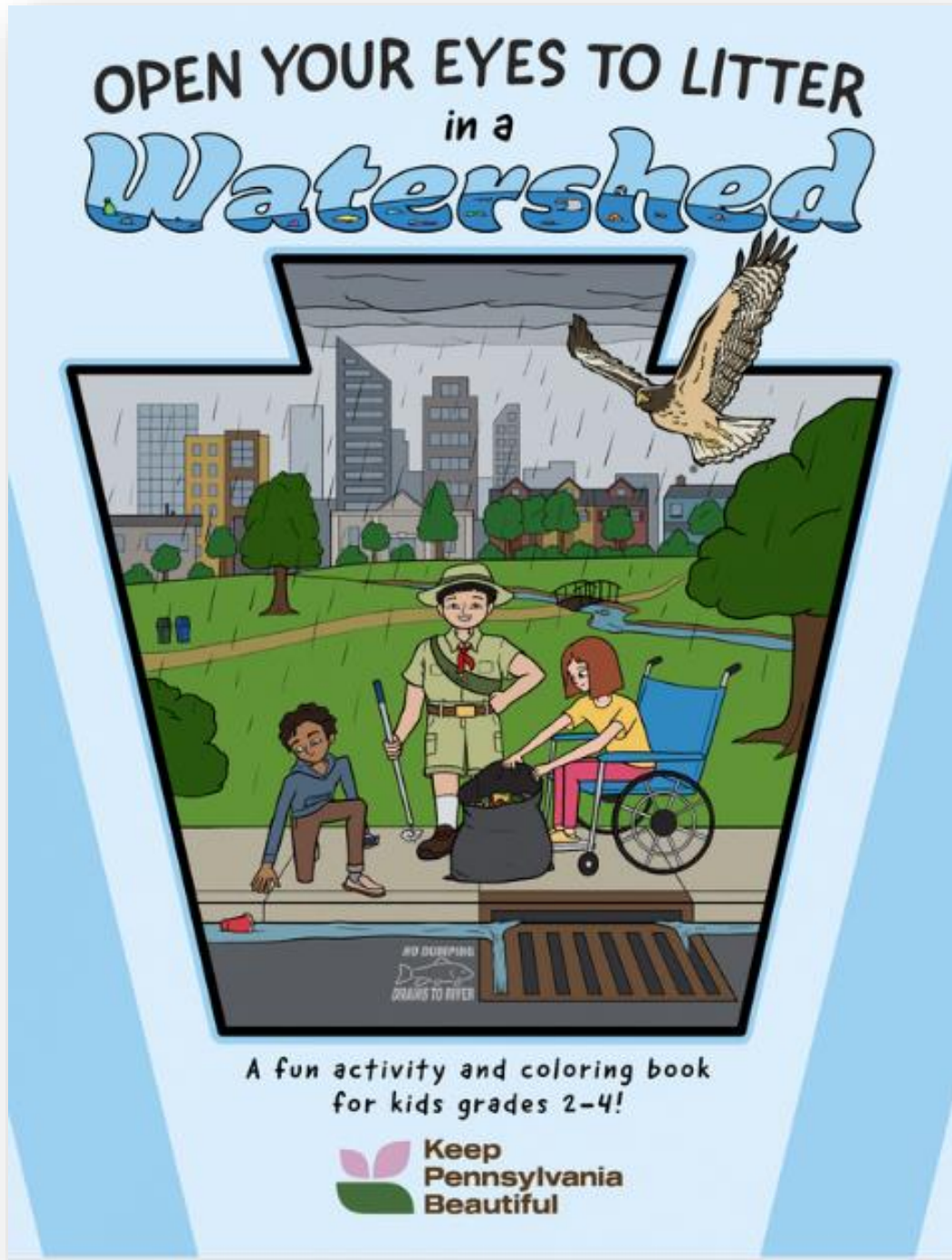


TEACHER'S GUIDE
OPEN YOUR EYES TO LITTER – VOLUME 2
IN A WATERSHED



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Open Your Eyes to Litter – Volume 2
In a Watershed

Academic Standards for the Arts & Humanities

Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts

9.1.3. A. Know and use the elements and principles of each art form to create works in the arts and humanities. (Page 12 & 24)

Academic Standards for Career Education & Work

Career Retention & Advancement

13.3.3.F Identify the changes in family and friend's roles at home, at school and in the community

Academic Standards for Civics & Government

Principles and Documents of Government

5.1.3.J Explain the importance of respect for the property and the opinions of others

Rights and Responsibilities of Citizenship

5.2.3 B. Identify personal rights and responsibilities.

Academic Standards for English Language Arts

Reading Informational Text

CC.1.2.2.K Determine of clarify the meaning of unknown and multi-meaning words and phrases based on grade-level reading and content (page 6)

Reading Literature

C.C.1.3.2.C Describe how characters in a story respond to major events and challenges (page 9)

C.C.1.3.2.J Acquire and use grade-appropriate conversational, general academic, and domain-specific words and phrases

Writing

C.C.1.4.2.E Choose words and phrases for effect

C.C.1.4.3.1 Support an opinion with reasons

C.C.1.4.2.W Recall information from experiences or gather information from provided sources to answer a question

Academic Standards for Environment & Ecology

Watersheds and Wetlands

4.1.7.B Understand the role of the watershed. • Identify and explain what determines the boundaries of a watershed. • Explain how water enters a watershed. • Explain factors that affect water quality and flow through a watershed

4.1.4.D Identify a wetland and the plants and animals found there. • Identify different kinds of wetlands. • Identify plants and animals found in wetlands. • Explain wetlands as habitats for plants and animals

4.1.4.E Recognize the impact of watersheds and wetlands on animals and plants. • Explain the role of watersheds in everyday life. • Identify the role of watersheds and wetlands for plants and animals

Renewable and Nonrenewable Resources

4.2.4.D Identify by-products and their use of natural resources. • Understand the waste stream. • Identify those items that can be recycled and those that can not. • Identify use of reusable products. • Identify the use of compost, landfills and incinerators.

Environmental Health

4.3.4.B Identify how human actions affect environmental health. • Identify pollutants. • Identify sources of pollution. • Identify litter and its effect on the environment. • Describe how people can reduce pollution.

4.3.4.C Understand that the elements of natural systems are interdependent. • Identify some of the organisms that live together in an ecosystem. • Understand that the components of a system all play a part in a healthy natural system. • Identify the effects of a healthy environment on the ecosystem.

Ecosystems and their Interactions

4.6.4.A Identify plants and animals with their habitat and food sources. • Identify environmental variables that affect plant growth. • Describe how animals interact with plants to meet their needs for shelter. • Describe how certain insects interact with soil for their needs. • Understand the components of a food chain

4.6.4.B Understand the concept of cycles. • Explain the water cycle

Humans and the Environment

4.6.4.B Know that environmental conditions influence where and how people live. • Identify how regional natural resources influence what people use. • Explain the influence of climate on how and where people live.

4.8.4.C Explain how human activities may change the environment. • Identify everyday human activities and how they affect the environment. • Identify examples of how human activities within a community affect the natural environment.

Academic Standards for Geography

Basic Geographic Literacy

7.1.3.B B. Identify and locate places and regions.

Physical Characteristics of Places and Regions

7.2.3.A A. Identify the physical characteristics of places and regions. • Physical properties

7.2.3.B B. Identify the basic physical processes that affect the physical characteristics of places and regions. Extreme physical events (e.g., earthquakes, floods, hurricanes, tornadoes)

K-12 STEELS Standards

Life Science

3.1.3.A Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

3.1.2.C Make observations of plants and animals to compare the diversity of life in different habitats.

3.1.3.D Use evidence to support the explanation that traits can be influenced by the environment.

3.1.3.H Make a claim supported by evidence about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change

Physical Science

3.2.4.G Generate and compare multiple solutions that use patterns to transfer information.

Earth and Space Science

3.3.2.B Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

3.3.2.C Develop a model to represent the shapes and kinds of land and bodies of water in an area.

3.3.3.A Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

3.3.3.C Make a claim supported by evidence about the merit of a design solution that reduces the impacts of a weather-related hazard.

3.3.4.C Analyze and interpret data from maps to describe patterns of Earth's features.

3.3.4.D Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Agricultural and Environmental Systems and Resources

3.4.3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them.

Introduction:

Our goal in creating this guide was to provide teachers with resources to help teach students about litter and the impact they can have on their environment by taking responsibility for litter in their own community. The OPEN YOUR EYES TO LITTER book can be used as a singular activity, or as part of a larger cross curricular curriculum. Activities can be adapted to suit a variety of grade levels and abilities. Feel free to pick and choose the activities that work best for your classroom.

Our experience is that the more hands-on, real-life activities you involve your students in, the more they integrate their own personal connection with the environment and understand that one person can make a difference. If you live in an area that has a Keep Pennsylvania Beautiful affiliate, the folks there can be a valuable resource. Keep Pennsylvania Beautiful also offers support for anyone in a county where there isn't an affiliate. Visit www.keppabeautiful.org for an affiliate listing. This book was carefully written so as not to encourage young readers to pick up trash. Likewise, if you choose to use any of the following teaching suggestions, be sure to use common sense and build safety into all activities. Encourage parents and volunteers to accompany students involved in research out into the community. Use gloves where necessary and don't go anywhere alone.

Suggested Activities:

Cover:

4.8.3.A: Identify the impact of human activities on the environment and describe actions that can be taken to reduce harmful effects.

Ask students to examine the cover and summarize what they see in the picture.

Discussion Questions: What is the weather like? What are the kids doing? Where will the trash go?

Page 2 - KWL Chart:

C.C.1.4.2.W Recall information from experiences or gather information from provided sources to answer a question

KNOW, WONDER, LEARNED

Have students complete the **KNOW** section about *watersheds*. This can be done individually or collaboratively, as a class. Next, have students fill in what they **WONDER** about with any questions or further thoughts they'd like to learn more regarding watersheds. Add their responses to the class chart. After completing the book, or as it comes up, go back and fill in what students **LEARNED** about watersheds. It is encouraged to give students time to conduct additional research on their own, whether online, using books or outside in nature.

Example of possible answers:

Wonder about Watersheds?

Fill in a few things you **know** and **wonder** about watersheds.

K	W	L
What I know about watersheds:	What I wonder about watersheds:	What I learned about watersheds:
Watersheds have to do with water.	What is a watershed?	
I live in a watershed.	What watershed do I live in?	
Animals live in a watershed.	What animals are in this watershed?	

Page 3: We all live in a watershed - *Watershed Tarp Activity*

3.3.2.B Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

3.3.2.C Develop a model to represent the shapes and kinds of land and bodies of water in an area.

4.1.7.B Understand the role of the watershed. • Identify and explain what determines the boundaries of a watershed. • Explain how water enters a watershed. • Explain factors that affect water quality and flow through a watershed

Students will model a rain event over a model watershed by spraying a tarp with water. This activity can get messy so only do outside in an area that can be hosed down and be mindful to cover children's clothing.

Materials:

- white tarp or light-colored shower curtain/tablecloth
- blue non-toxic tempera paint
- spray bottles with water (1 per student or students can work in groups)
- recycled items to put under the tarp to create model land formations
- additional colors of non-toxic tempera paint

Prep: Add objects such as pool noodles, pots, recycled cardboard or foil under the tarp. If windy, secure tarp down with a rock. Fill spray bottles with water. Add some blue paint to the tarp just prior to starting.

Procedure: Start by having students examine the tarp. Then, to act as a rain event, have the students spray the tarp. Point out streams, rivers and water basins that start to form. Explain that all the land that leads to a specific body of water is a **watershed**.

Watershed Model

Standard - 4.1.4.E Recognize the impact of watersheds and wetlands on animals and plants. Explain the role of watersheds in everyday life. Identify the role of watersheds and wetlands for plants and animals

Point out the following on the Watershed model. Allow students time to color the Watershed model. Additionally, the following words can be added to the vocab sheets (see Appendix A).

Watershed - an area of land that drains or "sheds" to a specific waterbody.

Tributaries - a river or stream flowing into a larger river or lake.

Forest - large area covered with trees and undergrowth (plants).

Stream - a small, narrow river.

Wetlands – an area of land covered by water or saturated (soaked) with water.

Water Basin – an area of land where water meets or collects.

Page 4: Watershed Web

4.3.4.C Understand that the elements of natural systems are interdependent. Identify some of the organisms that live together in an ecosystem. Understand that the components of a system all play a part in a healthy natural system. Identify the effects of a healthy environment on the ecosystem.

4.6.4.A Identify plants and animals with their habitat and food sources. • Identify environmental variables that affect plant growth. • Describe how animals interact with plants to meet their needs for shelter. • Describe how certain insects interact with soil for their needs. • Understand the components of a food chain

Food Web Activity

Using the provided food web cards, students will connect with one another using yarn, creating a dynamic representation of ecological relationships. This activity promises loads of enjoyment!

Materials:

- Blank paper or index cards
- String or yarn
- scissors

Background:

Begin by explaining how energy flows through an ecosystem:

- Plants get their energy from the sun.
- Herbivores eat plants and transfer some of that energy.
- Carnivores eat herbivores, but only about **10% of the energy** moves from one level to the next.
- Some energy is lost as heat, waste, or through organisms that die without being eaten.

Instructions:

1. Assign Organisms & Drawings:

- Give each student the name of a living or non-living part of their habitat (e.g., rock, hawk, grass, snake, tree, mushroom, fly, human).
- Have students draw their assigned organism on paper or index cards.

2. Forming the Web:

- Arrange students in a circle (sitting on the floor or on chairs).
- One by one, students say their organism's name and what they eat or interact with.
- The teacher starts with a ball of yarn and connects organisms based on their relationships (e.g., fox → rabbit → clover).
- Continue passing the yarn, forming an interconnected web.

3. Observing the Web:

- Have students lift their yarn to see how energy moves through the ecosystem.
- Discuss what happens if one species disappears.
- Introduce a "pollution" scenario (e.g., oil spill, habitat destruction) and see how it disrupts the web.

Extension: Challenge students to recycle plastic cups and the string from this experiment to create 'tin-can phones.'

Recycled Phone:

3.4.3.C Plan and carry out fair tests in which variables are controlled and failure points are considered to improve a model or prototype.

Materials:

- recycled plastic cups (clean)
- recycled string or yarn
- needle
- paperclips
- scissors

Prep: Cut tiny holes in the bottom of each cup. String one end through a cup and the other through a paperclip to hold it.

Procedure: With a partner, have students thread the string through another cup and tie off the end to a paperclip. Try using the phone to speak with a partner. What happens when you feel the string while you speak?

Page 5: Watershed Comparisons

3.1.2.C Make observations of plants and animals to compare the diversity of life in different habitats.

Ask students to draw an animal that they might encounter in each watershed. Encourage them to use their imagination, even making up plants or animals with unique adaptations.

Watershed Adaptations

Materials:

- play dough/clay
- googly eyes
- pipe cleaners

Allow students to create their own made-up animals that they can justify living in each environment. Discuss how the adaptations might give animals advantages over other animals in that habitat.

Play Dough Recipe

Make ahead or as a class to be used in the above activity.

Materials:

- 1 cup flour
- ½ cup salt
- 2 tablespoons Cream of Tartar
- 1 tablespoon oil
- 1 cup boiling water
- 3 drops food coloring

Mix and roll.

Page 6: The Ocean Begins at your Door

4.8.4.C Explain how human activities may change the environment. Identify everyday human activities and how they affect the environment. Identify examples of how human activities within a community affect the natural environment.

CC.1.2.2.K Determine or clarify the meaning of unknown and multi-meaning words and phrases based on grade-level reading and content.

Background info:

“Marine debris” is anything man-made that ends up in marine environments. Eighty percent of marine debris comes from land-based sources, traveling to an aquatic environment via stormwater runoff, wind or other means.

Plastic bags, discarded fishing nets, and other waste pose a significant threat to fragile ecosystems like coral reefs, eelgrass beds and the diverse communities living on the seabed. Annually, numerous marine mammals, birds, and other creatures suffer from entanglement or ingestion of debris, leading to malnutrition and endangerment. The shipping and fishing sectors also bear the brunt of marine debris, with vessels facing damage and navigation challenges. Repairing vessels and replacing equipment become costly necessities for these industries. Furthermore, marine debris adversely affects sectors like tourism and recreation, with coastal areas spending substantial sums each year on shoreline cleanup efforts.

Top Marine Debris Items and Percentages of Debris:

Cigarettes 32%, food wrappers 9%, caps, lids 8%, cups, plates, forks etc. 6%, plastic beverage bottles 6%, plastic bags 5%, glass bottles 4%, cans 4%, straws 4%, rope 2%

<https://namepa.net/wp-content/uploads/2018/05/NAMEPAMARINEDEBRIS-2018-web-1.pdf>)

Marine Debris Roleplay Activity:

Materials: examples of some possible marine debris (plastic bags, plastic cups, glass bottles, aluminum cans etc.)

Begin by asking students to share their experiences of being near water bodies like beaches, lakes or rivers. Have them recall if they noticed anything unusual or out of place during those times. Encourage them to create a list of these items and discuss

where they think these items might have come from. Prompt them to consider if the items could be harmful to wildlife or people. Invite volunteers to share their observations and thoughts.

Prepare a collection of actual marine debris items for students to observe and interact with. Lay out these items on a table or pass them around the class. Encourage students to identify the materials each item is made of (plastic, glass, metal, etc.) and discuss how the items might have ended up in the ocean. Facilitate a discussion about which types of debris are most commonly found in marine environments and why.

Guide the students through a discussion about marine debris, its impact on the environment, wildlife, and people. Use real-life examples and stories to illustrate the consequences of improper waste disposal. You can introduce concepts like *entanglement*, *ingestion by wildlife*, *habitat destruction* and the *cost of cleanup efforts*. Encourage students to share their own experiences and thoughts on how marine debris affects the world around them.

Divide the class into small groups and assign each group a role. Provide scenarios related to beachgoers, seafarers, homeowners, factory managers, and waste disposal company managers. Encourage the groups to brainstorm ways they can reduce or prevent marine debris based on their assigned roles. Afterward, reconvene as a class and have each group present their ideas. Facilitate a discussion about the importance of collective action in addressing marine debris and encourage students to think about how they can contribute to solutions in their daily lives.

Page 7: Aquatic Passage

3.3.2.B Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Background:

Aquatic passage is the ability for aquatic organisms (mainly fish) and wildlife to move freely through stream corridors without blockage.

Aquatic passage allows species to migrate for food, mating partners and more suitable habitats. It helps ensure the survival of species like the Eastern Brook Trout.

Culvert Creations

This activity helps students understand culverts and their role in allowing aquatic animals to move safely under barriers.

Materials:

- Large cardboard boxes or tubes

- Blue construction paper or paint
- Craft materials (markers, stickers, etc.)
- Toy aquatic animals
- Scissors
- Glue or tape

Procedure:

Explain culverts as tunnels that let water and animals pass under roads. Show pictures to help students understand.

In small groups, use cardboard to create culverts. Add blue paper (or paint) inside to simulate water. Decorate culverts with craft materials, adding aquatic features like plants and rocks. Place toy animals inside culverts and tilt to simulate water flow. Observe ease of movement.

Discuss observations:

Did the aquatic animals move through the culvert easily? What features of the culvert helped or hindered their passage? Why are culverts important for aquatic animals? How can we ensure that culverts are effective in allowing safe passage for aquatic animals?

Page 8: Litter in our Oceans

3.3.4.D Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Review the process of how trash can lead to the ocean if not properly disposed.

Marine Cleanup

Students will see firsthand how adding trash to water pollutes it. Then, they will clean up the pollution.

Materials:

Tray or water table filled with clean water, blue food dye (optional), plastic sea creatures, feathers, sand (optional) and marine debris (plastic bottles, vegetable oil, coffee/cocoa mix), dish soap, sponges, toothbrushes and clean water.

Procedure:

Start with clean clear (or blue) water with the plastic sea creatures in it. Add in the pollutants. Discuss observations with class. Allow the class to brainstorm solutions to fix the dirty sea habitat for the sea life with provided materials (dish soap, toothbrushes etc.) Review what worked well and what improvements they would like to make. Discuss why maintaining a clean environment is important for sea life.

Page 9: Littered Park

4.1.4.D Identify a wetland and the plants and animals found there. Identify different kinds of wetlands. Identify plants and animals found in wetlands. Explain wetlands as habitats for plants and animals.

Before starting the journal entry, ask students to close their eyes and take a moment of mindfulness. Lead the students in a deep breathing exercise, guided meditation, play relaxing music or simply allow for quiet meditation. Then, ask students to imagine a park. Talk them through a scenario in which they are at a littered park. Ask them to contemplate and write about the following questions:

Journal Entry: “How do you think the park got littered (where did the litter come from)? Think of a place you love in nature. How would you feel if it was littered?”

Wetland Filter Challenge

Students will construct miniature wetland filters using recycled bottles and natural materials to understand the concept of water filtration and the role of wetlands in cleaning water.

Materials:

- Recycled plastic bottles (cut in half, with the top half acting as the filter and the bottom half collecting water)
- Dirty water (can be prepared beforehand)
- Found natural materials (such as grass, leaves, pinecones, rocks, etc.)

Procedure: Introduce the concept of wetlands and their role in filtering and cleaning water. Explain to students that they will be creating their own miniature wetland filters to clean dirty water. Divide students into small groups and distribute the materials. Instruct students to layer the natural materials inside the top half of the plastic bottle to create their filter. Encourage them to experiment with different combinations of materials to see which ones work best for filtration. Once the filters are constructed, pour the dirty water into the top of each filter and observe as it trickles down into the bottom half of the bottle.

Discuss the results with the students. Ask questions such as:

- Did the filter effectively clean the water?
- Which materials seemed to work best for filtration?
- How does this activity relate to the role of wetlands in cleaning water in the environment?

Encourage students to reflect on the importance of wetlands and the impact of human activity on water quality. This hands-on activity allows students to explore the concept of water filtration and gain a deeper understanding of the vital role wetlands play in maintaining clean water ecosystems.

Page 10: Leave No Trace

5.2.3 B. Identify personal rights and responsibilities.

4.3.4.B Identify how human actions affect environmental health. Identify pollutants. Identify sources of pollution. Identify litter and its effect on the environment. Describe how people can reduce pollution.

Journal Entry: “What do you think it means to “Leave No Trace” when out in nature?”.

Review the Principals of “Leave No Trace”:

1. **Plan Ahead and Prepare:** This involves thorough planning before heading into nature, considering factors like weather, terrain, and group size, to minimize the potential for emergencies and impacts on the environment.
2. **Travel and Camp on Durable Surfaces:** Stay on established trails and campsites to avoid damaging fragile ecosystems. Minimize trampling vegetation and soil erosion by sticking to designated paths.
3. **Dispose of Waste Properly:** Pack out all trash and waste, including food scraps and biodegradable items. Practice proper human waste disposal by burying it in a hole at least 6-8 inches deep, well away from water sources and trails.
4. **Leave What You Find:** Preserve nature's beauty by refraining from collecting souvenirs like rocks, plants, or artifacts. Leave natural objects, cultural artifacts, and historical sites as you found them for others to enjoy.
5. **Minimize Campfire Impacts:** If permitted, use existing fire rings and keep fires small. Use only dead and downed wood for fuel and completely extinguish fires before leaving. Consider using a lightweight camp stove instead.
6. **Respect Wildlife:** Observe animals from a distance and avoid disturbing them or altering their natural behaviors. Never feed wildlife, as it can lead to habituation and dangerous encounters.
7. **Be Considerate of Other Visitors:** Respect other outdoor enthusiasts by keeping noise levels down, yielding the trail to others, and maintaining a friendly and courteous attitude.

Discussion:

Discuss whether it is a person’s right to enjoy clean areas in nature? Discuss whether it is someone's responsibility to clean up after themselves. Discuss whether it is a person’s responsibility to clean up after a mess they didn’t make? If they don’t, who will?

Page 11: Super Powers

C.C.1.4.2.E Choose words and phrases for effect.

Journal Entry: What are some of your powers or strengths? How can you use these powers to be a nature superhero?

Example: "I am great at art. I can create posters to teach others not to litter."

Discuss how we all have unique talents and things we like or enjoy doing. To make changes happen, teaming up with others who have different talents will help get things done more efficiently.

Page 12: Beauty in Nature

9.1.3. A. Know and use the elements and principles of each art form to create works in the arts and humanities

Ask students to think of a place they have been in nature that is beautiful. Either have them draw a picture of the area or encourage families to send a picture. Create a class collage showcasing the pictures.

Extension: have students write a poem about the location they choose.

Page 13: Consequences of Trash

3.4.3-5. A. Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them.

Discuss the potential consequences of the litter to the area in the picture:

- Animals may get caught in litter or mistake it for food and get sick or die.
- Litter near roads can lure animals onto the road where they can be hit by a car or cause an accident.
- Trash can get stuck in farm and mowing equipment, leading to expensive repairs.

Page 14: Parts of a Watershed

7.2.3.A A. Identify the physical characteristics of places and regions. Physical properties.

C.C.1.3.2.J Acquire and use grade-appropriate conversational, general academic, and domain-specific words and phrases.

Ask students to use the model on page 3 as a reference to fill in the parts of a watershed. Allow students to look up unfamiliar words and add them to a vocabulary sheet or create a vocabulary section in a notebook.

Page 15: Decoded Vocabulary

3.2.4.G Generate and compare multiple solutions that use patterns to transfer information.

Ask students use the decoding key to unlock the vocabulary word that matches each definition. Then, encourage them to create their own coded messages using a secret code. Partners will exchange their messages and attempt to decipher each other's codes.

Extension:

Coding Bracelets Activity:

3.4.3.D: Describe how information is represented and transmitted using digital technologies, such as binary code.

Background:

Computers use a special language called binary code, which consists of only two numbers: 0s and 1s. This system helps computers store and process all kinds of information, from text and images to sounds and videos. Each letter of the alphabet can be represented in binary code, allowing computers to understand and display words.

Materials:

- colored beads (at least two different colors)
- string
- binary alphabet printouts (laminated)
- String or pipe cleaners
- Beads that fit on the string or pipe cleaners (at least 2 different colors)
- Binary Alphabet printout

Activity Instructions:

1. Introduce Binary Code:

- Show students a Binary Alphabet Chart (a visual reference that translates letters into binary numbers).
- Explain that each letter is made up of a unique sequence of 0s and 1s, which computers use to process information.

2. Create Coding Bracelets:

- Provide each student with two different colored beads—one color represents 0 and the other represents 1.
- Have students look at the binary code for the first letter of their name and string the beads onto their bracelet in the correct pattern.
- If time allows, they can continue to spell out their full name or a short word.

3. Discussion & Reflection:

- Encourage students to compare their bracelets and decode each other's names.
- Discuss how binary code is a fundamental part of technology, from smartphones to video games.

Page 16: Frogs and Litter

C.C.1.4.3.1 Support an opinion with reasons.

Journal Prompt: “Do you think frogs want litter in their water? Why or why not?”

Have students think about the prompt, write in journals, share in small groups and then share with the class.

Page 17 Life Cycle of Frog

3.1.3.A Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Frog Life Cycle Craft

Materials:

- Paper plates (one per student)
- Green, brown, and white construction paper
- Glue sticks
- Scissors (kid-safe)
- Markers or crayons
- Cotton balls
- Dry pasta (small shell pasta for eggs, spiral pasta for tadpoles, and bowtie pasta for frogs)

Procedure:

1. Discuss the four stages of a frog's life cycle: egg, tadpole, froglet, and adult frog. Show pictures or a video to help students visualize the transformation.
2. Divide the paper plate into four sections using a marker.
3. Label each section with one stage of the frog's life cycle.
4. In the first section, glue cotton balls or small shell pasta to represent frog eggs.
5. In the second section, glue spiral pasta to represent tadpoles. Draw or cut out small tails for added detail.

6. In the third section, glue bowtie pasta with small legs drawn or added with construction paper to represent froglets.
7. In the final section, draw or cut out an adult frog and glue it in place.
8. Allow students to decorate their plates and share their work with the class.

Discussion Questions:

- What changes happen at each stage of a frog's life cycle?
- Why do you think frogs go through these changes?
- How might pollution or litter affect a frog's life cycle?

Page 18: Frog Habitat

3.1.3.A Recognize that plants and animals grow and change over time.

Students will follow a step-by-step guide to draw a frog and complete their illustration by designing a healthy habitat that provides everything a frog needs to survive.

Materials:

- Drawing paper
- Pencils
- Erasers
- Colored pencils, crayons, or markers

Procedure:

1. Using a separate piece of paper, follow the step-by-step guide in the book to draw a frog.
2. Think about what a frog needs in its environment to survive—clean water, food (like insects), shelter, and protection from predators.
3. Around the frog, draw a detailed habitat that includes these key elements, such as a pond, lily pads, tall grasses, logs, and nearby trees.
4. Use colors to bring the scene to life, ensuring that the habitat looks natural and healthy.

Discussion Questions:

- Why do frogs need clean water?
- What kinds of plants and animals might share a frog's habitat?
- How does pollution affect frogs and their environment?

Page 19: Waterway Detective Investigation

Standard: 4.1.3.C Identify how human actions affect the health of waterways and ecosystems.

Students will explore the concept of pollution in local waterways, investigate the sources of litter, and reflect on ways to prevent it.

Materials:

- Notebook or journal
- Pencils
- Optional: Maps of local waterways (can be printed or displayed)

Directions:

Help students make observations about phenomena taking place in a local waterway. Model some things you might notice such as strange smells or polluted water. If possible, investigate the river, stream, or pond nearest to you. Observe its condition—does it have litter? What types of trash do you see?

If able, research or visit the location to make observations. If not, use online maps or discussions to explore local water issues.

Discussion Questions: Where might the litter have come from? Could it have traveled from storm drains, streets, or nearby parks?

Journal Prompt: Write about the ways litter can end up in our waterways. Think about wind, rain, human activity, and how everyday choices impact the environment. Share ideas on how people can help keep waterways clean.

Discussion Questions:

- How does litter travel from one place to another?
- What can we do to prevent litter from reaching our rivers and streams?
- How do clean waterways benefit both people and wildlife?

Page 20 Water Cycle

3.1.4.A: Identify and describe the water cycle, including evaporation, condensation, precipitation, and collection.

Water Cycle in a Bag

Students will learn about the water cycle by simulating evaporation, condensation, and precipitation using simple materials.

Materials:

- Ziplock bags (1 per student)
- Permanent markers
- Blue food coloring (optional)
- Water
- Tape
- Access to sunlight (or a sunny window)

Procedure:**1. Introduction:**

Begin by introducing the water cycle to the students. Explain the four stages: evaporation (water turning into vapor), condensation (water vapor turning into droplets), precipitation (water falling as rain, snow, etc.), and collection (water gathering in rivers, lakes, and oceans).

2. Create the Water Cycle Bag:

Have each student draw a simple picture of the sun, clouds, and ground on their Ziplock bag using the permanent markers. If you have blue food coloring, add a few drops of it into the bag to represent water. Then, fill the bag about halfway with water (just enough to see it inside).

3. Seal and Tape:

Seal the bag tightly and tape it to a window where it can get sunlight.

4. Observation

Over time, students will observe the water cycle in action. The sun's heat causes evaporation, which will turn the water into vapor, creating condensation on the inside of the bag. Eventually, the water droplets will "rain" down inside the bag, showing precipitation.

5. Discussion:

Have students discuss what they saw in the bag. Ask questions like:

- What happens when the sun shines on the water in the bag?
- Where did the water go when it disappeared from the bottom of the bag?
- What happens to the water droplets on the sides of the bag?

Page 21 Water Comfort Zones

12.2.3: Recognize the importance of making choices and respecting personal boundaries, while demonstrating positive self-awareness and understanding in relationships with others.

Students will explore their comfort levels through scenarios related to water, recognizing how we all have different boundaries and how we can respectfully push ourselves outside of our comfort zones.

Materials:

- Open space for movement

- Markers or cones to define the circle

Instructions:

1. Introduction:

Begin by explaining that everyone has different comfort zones, and it's important to understand where our boundaries are. Sometimes, it's healthy to stretch beyond our comfort zones, but it's important to know when we feel stretched and when we feel panicked. Discuss how panic is an alert system that can help us survive, but we can also learn to find healthy ways to push past our comfort zones.

2. Comfort, Stretch, Panic Explanation:

Explain the three zones:

- **Comfort Zone:** The place where we feel safe and confident.
- **Stretch Zone:** A situation that might feel slightly uncomfortable but helps us grow.
- **Panic Zone:** A place that feels overwhelming or too much, where we may need support.

3. Scenario Movement:

Have students gather in a circle. When you present each water-related scenario, students will move to the center of the circle if they feel comfortable with it, slightly outside the circle if it stretches their comfort zone, and further outside the circle if the scenario causes panic. Be sure to set a boundary for how far they should move outside the circle, ensuring a safe and respectful space.

Possible scenarios:

- Swimming in a pool
- Swimming in the ocean
- Drinking a tall glass of water
- Jet skiing
- Scuba diving
- Boating on a calm lake
- Seeing a large body of water (like a river or ocean) for the first time
- Taking a shower in a public place
- Playing in the rain
- Walking across a bridge over a river

4. Student-Created Scenarios:

Invite students to come up with their own water-related scenarios. Write them down and repeat the activity, allowing students to reflect on their own comfort zones and how they feel in different situations.

5. Group Discussion:

After the activity, gather the students to reflect on what they learned. Ask questions like:

- How did it feel to move in or out of the circle?

- Did you discover something new about your comfort zones?
- How can we respect each other's boundaries?
- What's a healthy way to push ourselves outside of our comfort zones?

Pages 22-23 Storm Drain Flooding

3.1.4.C: Describe the interactions between living and non-living things in an ecosystem, and the impact of human activities on these systems.

3.7.4.B: Identify and describe ways in which people can reduce the negative impact of human activity on the environment, including conserving water and managing waste.

Students will understand the impact of heavy rainfall on storm drains, the role of storm water management, and the consequences of clogged or inadequate drainage systems.

Materials:

- Large shallow tray or plastic bin
- Small plastic storm drain (can be a plastic cup with holes in the bottom, or a model drain)
- Plastic or foam rocks, leaves, and debris (representing trash, leaves, or other obstacles)
- Water (with blue food coloring for visibility)
- Measuring cup or container for pouring water
- Small toy cars, plastic animals, or other objects for demonstration

Instructions:

1. Introduction:

Begin by explaining the purpose of storm drains: to carry rainwater off the streets and into local waterways to prevent flooding. Discuss how storm drains can become clogged with leaves, trash, or debris, causing them to overflow and flood surrounding areas.

2. Build the Storm Drain Simulation:

Set up the shallow tray or plastic bin as your "street" surface. Place the plastic storm drain at one end of the tray to represent where rainwater typically flows into the system. Scatter the debris (rocks, leaves, trash) around the storm drain to simulate an area that hasn't been properly maintained.

3. Simulation:

Pour a small amount of water into the tray to represent light rain. Allow the water to flow into the drain and observe how it is absorbed. Next, simulate a heavy rainstorm by pouring a larger amount of water into the tray all at once. As the water starts to accumulate, observe how the debris clogs the storm drain, preventing the water from draining properly.

4. Flooding Demonstration:

Continue to pour water into the tray until the drain is overwhelmed, and the water begins to spill over the edges. Discuss the consequences of this flooding: damage to property,

streets, and the environment. Show how debris blocks the drain and prevents it from handling the excess water.

5. Discussion:

After the simulation, engage the students in a discussion:

- What happened when the storm drain was clogged?
- How does this flooding affect the environment and our communities?
- What can we do to prevent storm drains from becoming clogged (e.g., picking up trash, keeping storm drains clear of leaves, grass clippings and other debris)?
- How can we reduce the impact of flooding in our neighborhoods?

Page 24 Clean the Watershed

9.1.4.B: Identify and describe elements of a variety of art forms and explain how art is created using a variety of media.

9.3.4.B: Demonstrate an understanding of the elements of visual art by producing art that communicates a message.

Students will creatively represent the process of cleaning up polluted water by using arts and crafts to "restore" a littered waterway to a clean, beautiful state.

Materials:

- Blue strips of construction paper or old magazine pages
- Scissors
- Glue or tape
- A large sheet of paper or cardboard (to represent the polluted waterway)
- Optional: Additional materials for decoration (e.g., markers, stickers, etc.)

Instructions:

1. Introduction:

Begin by discussing how pollution, such as trash in our waterways, can harm the environment. Explain that today, students will use their creativity to help "clean up" the water and make it beautiful again.

2. Cut and Prepare:

Have students cut blue strips from construction paper or old magazines to represent clean, flowing water. Encourage them to be creative with the shapes and sizes of their strips, making sure they look like flowing water.

3. Crafting:

Provide students with a large sheet of paper or cardboard that represents a polluted waterway. This could be decorated with trash or drawn with debris and litter. Students will then use the blue strips to cover the littered water and transform it into a clean, safe, and beautiful waterway. They can glue or tape the strips down and add other artistic touches (such as flowers, animals, or trees) to make the waterway even more vibrant.

4. **Discussion:**

After completing their artwork, gather the students to discuss the process of cleaning up water. Ask questions like:

- How did you feel while cleaning up the water?
- Why is it important to keep our water clean?
- What can we do in real life to help prevent pollution in our waterways?

Page 25 Litter Advocacy Roleplay

4.8.3.B: Identify the ways in which people can reduce their impact on the environment, such as reducing waste and properly managing resources.

Students will practice advocating for the environment by acting out scenarios where they try to convince a peer not to litter.

Instructions:

1. **Introduction:**

Discuss the importance of keeping our environment clean and how litter affects wildlife, waterways, and communities.

2. **Partner Setup:**

Arrange students into pairs. Explain that they will be roleplaying two scenarios: one where one partner does not care about littering, and the other will advocate for keeping the environment clean.

3. **Roleplay:**

Have the first partner act out a scenario where they litter (e.g., tossing trash on the ground or leaving it on the sidewalk). The second partner will then advocate for the environment, explaining why littering is harmful and encouraging them to pick it up and dispose of it properly. Afterward, they will switch roles.

4. **Discussion:**

After the activity, discuss the roleplay experience:

- How did it feel to advocate for the environment?
- Why is it important to speak up when we see someone littering?
- What can we do in our communities to reduce litter?

Extension:

Encourage students to create posters or write short persuasive notes to encourage others not to litter in their school or neighborhood.

Pages 26-27 Exploring Your Watershed

4.8.3.A: Identify the impact of human activities on the environment and describe actions that can be taken to reduce harmful effects.

Students will identify the watershed and river closest to their home and learn about the different watersheds in Pennsylvania by coloring a map.

Mapping:

Using the map on pages 26-27, ask students to:

- Identify the watershed they live in by locating their home on the map.
- Find the closest river to where they live.
- Color each of the six watersheds on the map a different color.

Discussion:

After completing the map, have a group discussion. Ask questions such as:

- What watershed do you live in?
- What is the closest river to your home? (Compare and contrast answers and use this to further learn about local rivers)
- Why is it important to know about our local watershed?