Teacher's Guide

NGSS-Aligned STEM Activities for Grades 1–4

32-Page Teaching Guide with Printable Science and Sustainable Activities, and Worksheets Inspired by We Are One.

For Classrooms, Libraries, and Home School

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Support the Story That Started It All!

The activities in this guide connect the story to real-world science.

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ABOUT THIS RESOURCE

We Are One introduces young learners to Earth's systems, natural resources, biodiversity, ecosystem services, and human impact in a developmentally appropriate, story-driven way. The book supports multiple Next Generation Science Standards for Grades 1–4 through observation, sense-making, and discussion.

Themes:

- Natural resources
- Ecosystems
- Human impacts
- Conservation
- Interdependence

VOCABULARY

- **Natural Resource:** Something Earth gives us that we use.
- **Ecosystem:** A place where living and nonliving things work together.
- **Interdependence:** Living things rely on one another.
- **Pollinate:** Help plants make seeds. (pollinators include: butterflies, beetles, moths, wasps, flies, hummingbirds, bats, ants, and even some mammals and birds that move pollen between flowers.)
- **Natural Service:** A job nature does that helps Earth.
- **Garbage/Waste:** Things thrown away that do not disappear.
- **Recycle/Reuse:** Using something again instead of throwing it out.

NGSS SUPPORT

Grade 1: (Back Matter Support Material)

1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
(This aligns with the Innovations Inspired by Nature section on pg. 46 in the back matter.)

Grade 2:

2-LS2-1: Plants depend on water and sunlight.
2-LS4-1: Understand that many different types of living things live in different places.
2-ESS2-1: Earth's materials and their uses.
2-ESS2-3: Human solutions to reduce land impacts.

Grade 3:

3-LS4-3: Environmental changes affect organisms.
3-LS4-4: Solutions to reduce impacts on the environment.
3-ESS3-1: Ways humans can protect Earth's resources.

Disciplinary Core Ideas (DCIs)

ESS3.A	**Natural Resources** Earth supplies water, air, soil, and materials we use every day.
ESS3.C	**Human Impacts on Earth Systems** Humans use resources faster than they can be replaced and create waste that affects Earth.
LS2.A	**Interdependent Relationships in Ecosystems** Plants, animals, and humans all depend on one another and on Earth's systems.
LS4.D	**Biodiversity & Humans** Earth is home to many living things, big and small, and each has a role in keeping Earth healthy.
ETS1.A/B/C	**Engineering Design** Students think about how to reduce waste and solve environmental problems creatively.

Crosscutting Concepts

Cause & Effect - How waste impacts Earth's systems. e.g., "More garbage = dirtier water and air.

Systems & System Models - Understanding Earth is a system of air, water, land, and life.

Stability & Change - Earth can stay healthy, but only if we reduce waste and protect resources.

Patterns - Daily habits lead to patterns of resource use and pollution.

Energy and Matter: Flows, Cycles, and Conservation - Describing how matter transfers among plants, animals, decomposers, and the environment.

SCIENCE & ENGINEERING PRACTICES (SEPS) ALIGNMENT

Asking Questions & Defining Problems

The story encourages students to ask questions such as:

- How Earth's systems work together
- How humans affect the natural world
- How living and non-living things are connected

Students can ask questions such as:

- What happens if an ecosystem becomes unbalanced?
- How do my actions help or harm Earth?

Developing & Using Models

Students can create simple models to show the relationships between living and nonliving things:

- How living and non-living things depend on each other
- Cycles (water cycle, energy flow, resource use)
- Interconnected systems on Earth

These models help them visualize the idea of "We Are One."

Planning & Carrying Out Investigations

Encourages students to test ideas about caring for Earth through real observations and inquiry-based activities.

- Observing local habitats
- Collecting data on schoolyard plants, animals, or weather
- Investigating how waste or recycling works

Analyzing & Interpreting Data

Students can examine patterns in nature, recycling habits, or environmental changes.

- Analyze data about pollution, recycling, energy use, or biodiversity
- Compare class data about ecosystems, plant growth, or water use
- Interpret patterns that show cause + effect in nature

This connects directly to the story's message about ecological relationships.

SCIENCE & ENGINEERING PRACTICES (SEPS) ALIGNMENT

Using Mathematics & Computational Thinking

Though simple at younger grades, this can include:

- Counting species or types of litter
- Graphing waste reduction
- Comparing resource use
- Measuring water use

These reinforce the story's themes of responsibility and care.

Constructing Explanations & Designing Solutions

Students can explain and propose ways to protect habitats and conserve resources.

- Why Earth's systems must stay in balance
- Why humans should protect resources

And they can design solutions such as:

- Ways to reduce waste
- Plans to improve habitats
- Classroom "Earth Care" routines

This mirrors the story's message that everyone can help.

Engaging in Argument from Evidence

Students can make claims using using story and observation-based evidence from:

- The story
- Class observations
- Environmental data

Examples:

- Reducing plastic helps protect animals because...
- Trees are important because...

Obtaining, Evaluating, & Communicating Information

Students communicate findings and actions to support Earth stewardship by:

- Reading about Earth systems
- Sharing what they learn
- Communicating actions that protect Earth

The story models clear communication about nature's interconnections.

PRE-READING IDEAS

A. See–Think–Wonder

Show students a photo of Earth from space. Ask:

- What do you see?
- What do you think Earth is made of?
- What do you wonder about Earth as an interconnected web of life?

B. Earth's "Neighbors"

Briefly look at pictures of Mercury–Mars. Ask:

- What makes Earth special?

C. Waste Walk (indoor or outdoor)

Prime thinking before reading by doing a quick scan for items made from natural resources (paper, metal, plastic).

DURING-READING QUESTIONS

Use these to stop and discuss or turn and talk:

Earth as a System

- Earth says she has a blanket of air. How does that support life?
- What would happen if Earth didn't have water?
- How does water get into the clouds?

Natural Resources

- Earth says she provides water, soil, minerals. Discuss or draw a picture to show how we use each one?" Or, identify an object in your classroom and ask how water, soil or minerals were used to make it.

Interdependence

- Earth says everyone depends on each other. What does that mean?

Human Impact

- Earth says garbage never disappears. Pick something out of the garbage pail. Where will it go from the garbage pail? Could it go somewhere where it can be used again? Can it be replaced with an alternative that comes from recycled material and can be used over and over again?
- Introduce items that are made from recycled materials.

Call to Action

- What small change could you make to help Earth today? Use action worksheets to introduce behavior changes that will use fewer resources and make less trash.

ACTIVITY IDEAS

ACTIVITY — Earth's Resource Sort (ESS3.A)

Materials: Use real objects from around the classroom and sort them into categories based on what resource(s) was/were used to make the object:

- Water
- Air
- Soil
- Minerals / Rocks

Discussion:
What happens if we use up one of these too fast?

ACTIVITY — Natural Services Scavenger Hunt (LS2.A)

Go outside and look for examples of organisms that perform the following natual services:

- Make oxygen
- Filter and clean water
- Produce food
- Grow Medicine
- Store carbon
- Pollinate
- Recycle Waste

ACTIVITY — Trash Doesn't Disappear Demo (ESS3.C)

Materials:

- Water in a clear jar
- Bits of paper, plastic, cotton, biodegradable food

Ask students to predict what will "disappear" (decompose) and what will not.
Shake, observe, and discuss:

- Where does trash go on Earth?
- What harm could each item cause?

ACTIVITY — Daily Habit Engineering Challenge (3-LS4-4 / Engineering Design)

Ask students design a solution for:

- Reducing lunchroom waste
- Saving classroom paper
- Reducing plastic use
- Reusing materials

Their design must include:

1. The problem
2. The constraints (What they can/can't change)
3. Their design or idea
4. How it helps Earth

ACTIVITIES IDEAS CONTINUED

EXTENSION IDEAS

- Create classroom Compost Bin
- Do schoolyard Clean-Up
- Do “One Small Change” Challenge (using behavior change worksheets)
- Use Earth as a Character in a Writing Activity
- Poster Campaign: We Are One!
-

HOME CONNECTION

- Send students home with one action worksheet each week. But first, create a baseline for the student to use to measure their saving by having them measure their uses
- Ask students to share their new behaviors. Did anyone come up with another way of doing their new behavior?
- Share any challenges students had in making a change. How can these challenges be
- overcome?
- Celebrate successes.

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The action worksheets on pages 11-25 are taken directly from the book’s back matter.

The activity worksheets on pages 26-31 will extend your student’s learning as well as provide writing prompts.

RESOURCES

The ideas and activities included in this guide are just a brief introduction and starting point for each topic. Below are just a few resources that offer additional ideas and resources that can be used to do a deeper dive.

Water
https://backwoodsmama.com/2018/03/22-ways-kids-can-save-water.html

Packaging
https://learningmole.com/plastic-free-kids/
https://www.epa.gov/recycle/reduce-reuse-recycle-resources-students-and-educators

Food Waste
https://conservefood.org/2025/08/14/made-for-kids-resources-to-help-teach-kids-about-food-conservation-and-waste-reduction/

Electric Usage
https://www.gohenry.com/us/blog/parental-controls/energy-conservation-for-kids-30-easy-ways-to-save

Paper towels, Tissue and Toilet Paper
https://www.sustainablejungle.com/eco-friendly-paper-towels/

Food Waste
https://kids.earth.org/climate-change/10-food-waste-facts-for-kids/

Transportation
https://greeneducationfoundation.org/i-ride-green-sub/curriculum-and-activities-ride/curriculum.html

Shopping Bags
https://education.nationalgeographic.org/resource/sustainable-shoppingwhich-bag-best/

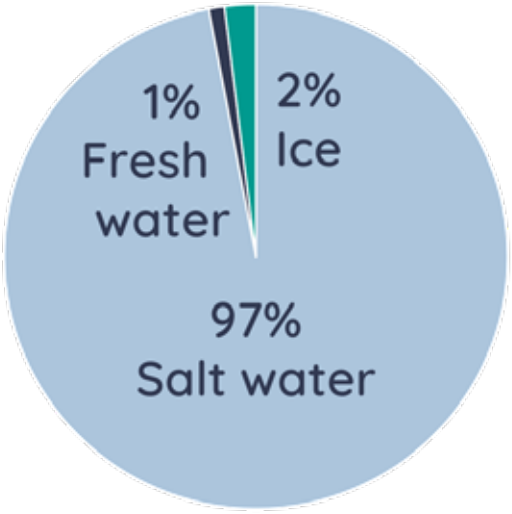
What Will You Wear?
Although this is developed for a British audience, it is an excellent resource.
https://www.oxfam.org.uk/documents/607/edu-sustainable-fashion-teachers-guide-290922-en_h8TlBZq.pdf

https://parenthology.tips/fun-ways-to-teach-kids-about-sustainable-fashion-choices/#google_vignette

Celebrating
https://greenwithless.com/eco-friendly-alternatives-balloons/

WATER

All living things need water to live. It may seem like Earth has a lot of water. But most of it is too salty to drink.



People use water for many things besides drinking.

- washing
- cooking
- irrigate crops and lawns
- clean streets and building
- when they manufacture things

How do you use water? Do you:

Run the water the whole time you brush your teeth?

Yes No

When you wash something, do you run the water the whole time?

Yes No

How many minutes are you in the shower?

5 minutes 10 minutes 15 minutes 20 minutes longer

Simple Actions You Can Do To Help

Brushing Your Teeth

When you run the water while brushing, can use as much as a half gallon. That's 1 gallon a day when you brush twice a day!

☐ Put water in a cup, then turn the water off. Turn it on again to rinse your brush. You will use:

1 cup of water each time you brush.
That's 2 cups a day.

Everyday, instead of

Taking a Shower

Every minute you run the shower can use as much as 2.5 gallons of water. That means:

A 15-minute shower uses 37.5 gallons.
A 10-minute shower uses 25 gallons.

☐ Take shorter showers!
A 5-minute shower uses: 12.5 gallons

Most hot water is heated with electricity. Shorter showers use less electricity. This makes less pollution. It also saves your family money.

What other ways can you save water?

PACKAGING

Packaging is what holds things, like cardboard, glass, plastic, and Styrofoam. Some of it, like plastic bags and straws, are only used one time before we throw them away. Plastic and Styrofoam stay on the ground and in the ocean for a very long time. That is a lot of resources and waste.

Plastic and Styrofoam is made from oil. This natural resource will run out someday.

Every year, the amount of plastic we make is equal to the weight of 30 million elephants. If all those elephants stood in a line, they could wrap around the Earth over 5 times!

On the left, make a list of things in your lunch that are used once then thrown away. On the right, write a reusable item you could replace it with.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Simple Actions You Can Do To Help

Food Packaging

- ☐ **Choose fresh fruit** instead of canned or packaged fruit. It's healthier too!
- ☐ Choose snacks that come in **bulk packaging**. Bulk packaging holds a lot more food with less packaging.
- ☐ Choose food that comes in **cardboard or glass** which are recyclable.

Packing Your Lunch

- ☐ Pack sandwiches and snacks in a **reusable containers.**
- ☐ **Use silverware** instead of plastic-ware.
- ☐ Use a **reusable drinking bottle.**
- ☐ **Do you need a plastic straw?** Instead, use a reusable one.

What other ways can you reduce packaging?

DISPOSABLE THINGS

Disposable means we use it once and throw it away. Most of it is plastic, like straws, bags, bottles, spoons, forks, plates, and cups. They make our lives easy, but disposables use lots of resources and make lots of trash. Some animals think our plastic trash is food and eat it. This can make them sick and kill them.

Where Our Garbage Goes

Some garbage goes into landfills. Landfills are giant holes in the ground filled with garbage. After a landfill is full and covered, some garbage rots. This creates methane, a gas that makes the Earth hotter. Landfills also make a slimy liquid called leachate (sounds like: LEE-chayt). This liquid can leak into the ground and harm our drinking water.

Some garbage is burned to make electricity. That sounds helpful, but burning trash makes dirty smoke that pollutes our air.

Some garbage is dumped into our oceans. Just because we don't see it doesn't mean it's gone. Sea animals like turtles, fish, and whales can be harmed by it.

Some people think we should put garbage into rockets and send it into space. This will only create other problems. Blasting rockets into space makes a lot of pollution. Floating trash could crash into satellites (the machines that help us talk on phones and watch TV). Plus, it would cost way too much money!

On the left, make a list of disposable things around your home or classroom. On the right, write a reusable item you could replace it with.

_____	_____
_____	_____
_____	_____
_____	_____

Simple Actions You Can Do To Help

Disposable Things You Use

- ☐ **Use reusable plates, cups and bottles.**
- ☐ Use **reusable shopping and produce bags.**
- ☐ When eating out, bring a **reusable container for leftovers.**

Toothbrush and Toothpaste Tubes

Plastic toothbrushes handles and toothpaste tubes can't be recycled.

- ☐ Buy toothpaste in tablet form. Tablets use less packaging.
- ☐ Choose a bamboo toothbrush. The handle breaks down and turn back into soil.

What other disposables can you stop using?

FOOD WASTE

Each year, Americans throw away about 225 pounds of food. That is about how much a baby elephant weighs!

When food is wasted, so are the resources used to produce, store, and ship it. These include land, water, energy, and labor.

Most food waste goes to the dump. There it rots and makes a gas called methane. Methane goes into the air and acts like a blanket, trapping heat. This makes the Earth too warm, which is bad for people, animals, and plants.

Pre-assessment: How many pounds of food were put in the garbage:

	Classroom	Cafeteria	School Kitchen	Home
Day 1	_____	_____	_____	_____
Day 2	_____	_____	_____	_____
Day 3	_____	_____	_____	_____
Day 4	_____	_____	_____	_____
Dat 5	_____	_____	_____	_____

Develop graphs of the waste produced.

Simple Actions You Can Do To Help

What are some reasons we make food waste?

_____

_____

_____

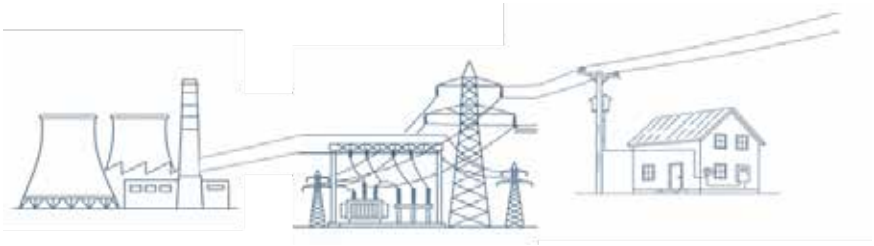
- [ ] Take smaller portions. You can always take more if you are still hungry!
- [ ] Set up a food share table, in the cafateria. Here students can put food such as uneaten fruit and packaged items.
- [ ] Donated unused, packaged food to a food pantry.
- [ ] Compost food waste, instead of throwing it in the garbage. Composting turns food waste into soil. You can make a compost pile in your backyard or use a compost bin. Some towns even have special compost programs.

After several weeks do a reassessment of the amount of waste produced. Celebrate successes and discuss ways to address challenges.

ELECTRIC USAGE

Our lights, TVs, phones, and computers need electricity to run. Electricity also helps us cook, keep food cold, and make hot water.

A lot of our electricity is made at faraway power plants. Long wires, called power lines, carry electricity to our homes, schools, and other buildings.



To make electricity, power plants burn coal, gas, or oil. Burning these makes dirty air called pollution. It also makes carbon dioxide.

Too much carbon dioxide is bad for people, animals, and plants.

The good news is that more people are using clean energy made from the sun, wind, and moving water. The tricky part is that the sun doesn't always shine, and the wind doesn't always blow. But smart people are working on ways to solve this and coming up with many cool new ideas!

Simple Actions You Can Do To Help

Walk around to assess electric usage.

	School Before	School After	Home Before	Home After
Number of Empty Rooms with Lights On	_____	_____	_____	_____
Number of TVs on with no one watching	_____	_____	_____	_____
Number of Phone Chargers Plugged in Without Phones Attached	_____	_____	_____	_____

- ☐ Turn off the lights when you leave a room or your house.
- ☐ Turn off TVs and other electronics when you're not using them.
- ☐ Unplug phone chargers when not using them. They still use energy even if the phone isn't plugged in.

After several weeks do a reassessment. Celebrate successes and discuss ways to address challenges.

CLEANING UP

When you make a mess, it's easy to use paper towels, then throw them away. But paper towels are made from trees. So are toilet paper and tissue. Every year, people cut down 110 million trees just to make them! That's a LOT of trees and a lot of waste!

Trees are super important! They make the air we breathe. They also clean the air, give off water, make shade, give animals homes, and keep the soil in place.

Simple Actions You Can Do To Help

Research different paper product brands to find out what resources are used to make their products. Is the use of this resource good or not good for the Earth?

Brand	Material Used	Good for the Earth	Not Good for the Earth

- ☐ Use old rags or reusable cloth. Both can be washed and reused.
- ☐ Buy paper towels, toilet paper, and tissues that aren't made from trees. There are many. Some are made from recycled paper. Some are made from bamboo, a grass that grows very fast. Some are made from sugarcane.

GETTING AROUND

Cars, trucks, and planes help us get around quickly. Most run on gasoline. Burning gas pollutes our air. It also makes carbon dioxide, a heat-trapping gas. This makes the Earth even warmer. That's not good for people, animals, and plants. The good news is cars and trucks are being made to use less gas and run on clean energy.

Simple Actions You Can Do To Help

- ☐ **Walk or ride your bike** when you can! Both are great exercise and doesn't make pollution.
- ☐ **Share a ride with someone.** Using one car instead of two uses less gas. This keeps our air cleaner.
- ☐ **Take the bus to school.** One bus filled with kids uses less gas than all those cars and keeps our air cleaner.

SHOPPING BAGS

It takes a lot of resources to make all the shopping and produce bags we use. Some bags can be recycled. Many can't. Paper bags can turn into soil. Plastic bags don't, even biodegradable plastic bags.

Many plastic bags end up in rivers and oceans. Animals can get stuck in them or think they are food. This can hurt or even kill them.

Reusing a plastic bag more than once is good, but in the end, it still gets thrown away.

Simple Actions You Can Do To Help

Do a pre-assessment by counting how many of each type of bag is found around your home. After taking the actions steps below do a second count of how many of each type of bag is found. Celebrate successes and discuss ways to address challenges.

	Before	After
Plastic Shopping Bags		
Paper Shopping Bags		
Reusable Shopping Bags		
Plastic Produce Bags		
Reusable Produce Bags		

- ☐ Use reusable shopping bags - not just at the grocery store, but anywhere and anytime you shop!
- ☐ Use reusable produce bags.
- ☐ Create a way that will help the person doing the shopping remember the bags every time they go.

WHAT WILL YOU WEAR?

Most of the clothes we buy are known as "fast fashion" clothes. Fast Fashion clothing are cheap clothes that are made to be worn a couple of times and then thrown away. That uses a lot of resources and makes a lot of waste.

Simple Actions You Can Do To Help

- [ ] Buy just a few pieces of better made clothes. Then mix them up so you have a new look every day.
- [ ] Shop at thrift stores! They have lots of great, gently used clothing.
- [ ] Set up a thrift store at school.
- [ ] Organize a clothing Swap Party
- [ ] Choose clothes made from organic cotton, hemp, or bamboo. Growing them does less harm.
- [ ] Organize a fashion show for students to show off their thrift fashions.

CELEBRATING

Balloons are bright and colorful. Letting them go is fun and pretty, but they always come back down. When they do, they stay for a very long time. Animals can get stuck in the strings or think they are food. This can hurt or even kill them.

Simple Actions You Can Do To Help

- [ ] **Make bubbles!**
- [ ] **Create and release seed bombs**. Make them by mixing clay, compost, native wildflower or tree seeds together.
- [ ] **Fly kites!**

What Makes Earth Special?

(Supports NGSS: ESS1.C; ESS2.A; Crosscutting: Patterns)

Name: Date:

1. Earth describes many things about herself. Write or draw your favorite one.

2. Which of these make Earth unique? Check all that are true.

   Earth has water.
   Earth has a sky and clouds.
   Earth has deserts and forests.
   Earth is the only planet with life we know of.
   Earth is made of pizza.

3. Why is Earth "one of a kind"?

Natural Resources & How We Use Them

(Supports NGSS: ESS3.A – Natural Resources)

Name: Date:

Earth gives us natural resources! Match each resource to what we use it for. Draw a line to connect them.

Natural Resource	What We Use It For
Water	Making objects like phones, crayons, or this book
Air	Growing food
Soil	Drinking, washing, growing plants
Minerals	Breathing

Think & Write:
What natural resources do you use the MOST in your day?

The Family of Life (Biodiversity)

(Supports NGSS: LS4.D; LS2.A)

Name: Date:

Earth says there are many who call her home. Draw two living things mentioned in the story.

Draw a line to match the organism with the service it provides.

Living Thing	Service
Plants	Store carbon + clean air
Bees	Recycle waste
Trees	Make oxygen
Decomposers	Pollinate flowers

Write a description of one of Earth's family without using its name. Ask a classmate to read your description and guess what it is.

What is your favorite member of Earth's family. Draw it in the box.

Garbage That Doesn't Go Away

(Supports NGSS: ESS3.C – Human Impacts)

Name: Date:

Earth says garbage "doesn't disappear." Where does our garbage go? Circle all that is true.

In the air	On Mars
In water	In landfills
In soil	In animal habitats

Draw what happens when garbage blows in the wind or floats in water.

How does garbage affect Earth and living things?

What is one thing you can do to make less garbage?

Small Changes - Big Differences

(Supports NGSS: ESS3.C; SEP: Designing Solutions)

Name: Date:

Earth says: "Start simple! Small changes add up."

1. Which of these help Earth? Check the helpful actions.

- ☐ Reuse a water bottle
- ☐ Throw trash anywhere
- ☐ Turn off lights when not in use
- ☐ Use both sides of paper
- ☐ Leave garbage on the ground
- ☐ Compost food scraps
- ☐ Pick up litter you see

2. What ONE simple change will you start with?

3. Draw yourself doing your helpful action!

Cause & Effect

Supports NGSS: Crosscutting Concept: Cause & Effect

Name: Date:

Match Cause & Effect

Directions: Draw a line from the cause to the effect.

Causes	Effects
We plant more trees	Less pollution in waterways
People recycle plastic	More oxygen and cleaner air
We waste water	Water shortages
Animals lose their habitats	Animals struggle to survive
We use clean energy (sun/wind)	Cleaner air and fewer greenhouse gases
We throw trash into rivers	Landfills fill more slowly

Fill-in-the-Blank Cause & Effect

Directions: Fill in the missing effect or cause.

Cause: People pick up litter.

Effect: _____

Cause: _____

Effect: The river becomes polluted.

Cause: Kids learn how all living things are connected.

Effect: _____

Cause: Using reusable bags instead of plastic ones.

Effect: _____

Write Your Own Cause & Effect

Write one example of how you can help Earth (cause) and what happens because of it (effect).

Cause: _____

Effect: _____

We Are One — Reflection Page

(Supports NGSS: Science Practice – Obtaining & Communicating Information)

Name: Date:

1. Something new I learned about Earth is:

2. Something I want to know more about is:

3. Something I can do EVERY DAY to help Earth is: