

Trace Effects Teacher’s Manual Chapter Four: The Environment

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Introduction to Chapter Four

Chapter Themes

- Environmental activism
- Community activism

Chapter Location

- Grand Canyon National Park, Arizona, U.S.A.

Chapter Summary

1. The Chapter Four introduction video shows Trace and friends arriving in Arizona and being greeted by Park Ranger Jamie Henderson. Trace meets George Runningwater, whom he helps throughout the rest of the chapter to clean up river pollution.
2. Trace and George find three separate sources of pollution in the river: water bottles, plastic bags, and newspapers. Each source of pollution requires Trace and George to complete different tasks around town in order to stop the pollution.
3. Trace and George meet members of the community, learn how to recycle properly, teach others how to do so, and convince them to stop polluting the river.



Chapter Four Main Characters

In addition to Trace, Professor Peterson, Eddie, and Kit, there are three main characters in Chapter Four: George Runningwater, Jamie Henderson the park ranger, and Brooke.



George Runningwater works with Trace to clean up the river and stop pollution. He is of American Indian descent.



Jamie Henderson is a park ranger who helps Trace and George.



Brooke the Recycler shows Trace and George how to recycle properly.



Sierra the Local Artist designs a reusable bag for Sydney.



Sydney the Shopper uses plastic bags.



Zach the Newspaper Carrier

convinces his boss to print fewer editions of the town newspaper.

Not pictured: The Walkers, who learn about recycling from Trace and George.

Chapter Four Objectives and Tasks

Action Words to Collect In-Game

- Separate:** This word is located in the street near the ranger station where Trace begins the chapter.
- Deliver:** This word is located in the middle of the main street in front of the bridge at the top of the map (north).
- Crush:** This word is located in the recycling area, which is on the north side of the town.
- Flatten:** This word is located in the middle of the dark gray street to the west of the main street
- Wash out:** This word is located at the end of the dark gray street in front of the Walker's house.
- Compost:** This word is located on the light gray road in front of the theater.

Items to Collect In-Game

- George's photos:** Trace receives these photographs from George after they arrive at George's house.
- Can:** Brooke gives this item to Trace to recycle first.
- Box:** Brooke gives this item to Trace to recycle after he recycles the can.
- Bottle:** Brooke gives this item to Trace to recycle after he recycles the box.
- Toy package:** Brooke gives this item to Trace to recycle after he recycles the bottle.
- Cardboard (toy):** Trace gets this item by *Separating the Toy Package*.
- Plastic (toy):** Trace gets this item after *Separating the Toy Package* and recycling the cardboard of the toy package.
- Food scraps:** Brooke gives this item to Trace to compost after he recycles the plastic toy package.
- Bin:** Brooke gives this item to Trace after he composts the food scraps.
- Bag:** Trace receives this item from Sydney in order to decorate it.
- Walkie-talkie:** Jamie the Park Ranger gives this item to Trace during Task 7.

Map in Chapter Four



Tasks that Trace Needs to Complete

1. Find George's house
2. Stop pollution from water bottles
3. Find Brooke and help recycle
4. Deliver recycling bin to the Walker family
5. Stop pollution from plastic bags
6. Stop pollution from newspapers
7. Get Jamie the park ranger's help
8. Deliver photographs to Zach and wish George luck

Grammar in Chapter Four

This table shows the main grammar points learned or reviewed in Chapter Four. See the *Teacher's Manual* introduction for ideas on teaching grammar within Trace Effects.

Trace's Task	Grammar Point	Proficiency Level
Find George's House	<ul style="list-style-type: none"> • Yes/No questions 	Beginner
Stop Pollution from Water Bottles	<ul style="list-style-type: none"> • Present progressive tense • Yes/No questions • Modals: <i>can</i> and <i>will</i> 	Beginner
Find and Greet Brooke	<ul style="list-style-type: none"> • Conditionals • Infinitives 	Intermediate
Help Brooke Recycle	<ul style="list-style-type: none"> • Reported speech • Present perfect tense • Statements with <i>need</i> + the infinitive 	Beginner to Intermediate
Deliver Recycling Bin to Walker Family	<ul style="list-style-type: none"> • Modals: <i>can</i> and <i>will</i> • Polite requests • Conditionals 	Beginner to Intermediate
Stop Pollution from Plastic Bags	<ul style="list-style-type: none"> • Yes/No questions • Present conditional tense • Present perfect tense • Polite requests 	Beginner to Intermediate
Stop Pollution from Newspapers	<ul style="list-style-type: none"> • Yes/No questions • Future actions • Polite requests 	Beginner to Intermediate
Get the Park Ranger's Help	<ul style="list-style-type: none"> • Directions • Prepositions of location • Prepositions of movement • Expressing thanks 	Beginner
Deliver Photographs	<ul style="list-style-type: none"> • Yes/No questions • Expressing thanks 	Beginner

Vocabulary in Chapter Four

Following are some words that your students might not know. These are all useful words for your students to learn, memorize, and review if they do not know these words. If you are teaching or reviewing these words, see the *Teacher's Manual* introduction for ideas on pre-teaching new words and helping students figure out new words while they play the game.

Word	Example from Trace Effects	Meaning of Word in Context
Activist	"George Runningwater is a famous photographer and environmental activist ."	Someone who works hard to change something such as laws or ideas (noun)
Aluminum	"Here's a can. It goes into the aluminum bin."	Light-grey colored metal used to make cans (noun)
(To) Appreciate	"Yes, we really appreciate your help."	To be thankful; a polite way to say thank you (verb)
(To) Belong	"Wow, that doesn't belong in a river!"	To be in the right place, where it should be (verb)
Bin	"Here's a can. It goes into the aluminum bin ."	A container for trash or recyclables (noun) 
Boss	"Could you ask your boss about it?"	The person who gives you a job and is in charge of you at work (noun)
Boulder	"Find a huge boulder ."	A very large rock (noun)
Can	"I took all of my empty cans and bottles to the recycling center last week."	The metal container that holds prepared food or drinks (noun) 
Cardboard	"That's the first step! Here's the cardboard ."	Thick brown paper used for boxes (noun)
(To) Catch	"What did you catch ?"	Here, to use a pole or bait in the water to get something, usually fish (verb)
Certainly	"It certainly doesn't. It will kill the fish."	Definitely true or definitely not true (adverb)
Cliff	"I can guide you from up here on the cliff ."	A large area of rock or a mountain with a tall, straight side (noun)
(To) Compost	"You can only compost food."	To turn food, leaves, or other natural waste into rich soil (verb)
(To) Continue	" Continue from the mossy side."	To go further in the same direction (verb)

(To) Convince	"The pictures might convince him."	To make someone feel sure that something is true (verb)
(To) Crush	"Oops—don't crush that!"	To press something hard to make it small or damage it until it breaks (verb)
(To) Decorate	"Could you make a decorated bag for us now? We need to give it to someone."	To make something look better by putting something pretty on it (verb)
(To) Deliver	"Just deliver them all to me."	To take something to a certain person (verb)
Directions	"Follow the trail and I'll give you directions ."	Instructions on how to get from one place to another (noun)
Edge	"Go down to the river's edge ."	The part of something farthest away from the center or middle (noun)
Edition	"We print three editions a day."	A batch, or group, of newspapers or magazines (noun)
Enough	"That's enough for now, guys."	A sufficient amount (adjective)
Environment	"George loves the environment and takes good pictures."	The air, water, and land (noun)
(To) Find out	"Let's find out how it got there."	To learn or figure out (verb)
Fish	"The trash in the river harms the fish ."	An animal that lives in water and uses fins and a tail to move (noun)
Fishing pole	"It's my fishing pole ."	A long thin pole with string and a hook used to catch fish (noun)
(To) Flatten	"You don't need to flatten the photos."	To make something flat by rolling it out or crushing it; to take away something's shape (verb)
(To) Follow	" Follow the trail."	To go after someone else or to go somewhere using someone's signs (verb)
Go for it!	" Go for it! Bye, guys."	A way to say "Good luck!" and "Keep trying!"
Green Club	"We're helping the Green Club ."	Organizations that work on helping the environment are called "green" in the United States. The Green Club would be a club that works on cleaning the environment.
(To) Guide	"I can guide you from up here on the cliff."	To show someone the right way (verb)



(To) Harm	"The trash in the river harms the fish."	To hurt or damage something so that it is not okay anymore (verb)
Heap	"Here are the pictures of the worst trash heap on the river."	A large pile of something (noun)
Hill	"Let's climb back up the hill ."	Like a mountain, but smaller (noun)
(To) Hurt	"They're hurting the fish."	To injure, damage, or harm someone or something (verb)
I'm with you!	I'm with you!	A way to say you agree with someone, like saying "Yes!" or "You're right!"
Litter	"Come to my house, and you'll see how I pick up litter! "	Items that have been thrown away and that are lying on the ground in a public place (noun)
Log	"Jump over the log behind the log pile."	A long, heavy section of a tree that has fallen or been cut down (noun)
Moss	"Find a huge boulder. It has moss on one side."	A very small green plant that grows on wet ground, trees, or rocks (noun)
Mossy	"Continue from the mossy side."	Describes ground, trees, or rocks that have moss growing on them (adjective)
		
Package	"Here's a package with plastic and cardboard."	A paper or plastic container that food or things are sold in (noun)
Park ranger	"I'm Jamie Henderson, the park ranger ."	Someone whose job is to take care of a forest or nature park (noun)
(To) Persuade	"We hope we can persuade the newspaper."	To make someone decide to do something, to convince someone (verb)
Photo	"We'll come back with more photos ."	Short for "photograph," a picture from a camera (noun)
Pile	"Jump over the log behind the log pile ."	A large amount of something collected together that looks like a hill; a heap (noun)
Plastic	"Here's a package with plastic and cardboard."	A light, strong material used to make many things, such as credit cards, bags, or toys (noun)
Pole	"Here's my pole! "	A long man-made stick made of wood, metal, or plastic (noun)

(To) Pollute	"If you recycle the bottles, they won't pollute the river."	To make air or water dangerously dirty so people cannot use it (verb)
Pollution	"I'm working to stop pollution ."	The stuff that makes air or water dirty so people cannot use it (noun)
(To) Print	"We print three editions a day."	To make a newspaper, book, or magazine (verb)
Recyclable	"Sort first, then put the recyclables in the right place."	Something that can be recycled (noun)
(To) Recycle	"They should recycle ."	To process used things so they can be used again (verb)
Reusable	"Maybe you could find a reusable bag."	Something you can use more than one time (adjective)
Scraps	"I've got some food scraps for you to compost."	Pieces of things, such as food, left over after you finish an activity (noun)
(To) Separate	"You need to prepare the recyclables first: crush the cans... and separate the toy package."	To divide or make something into different parts or different piles (verb)
Sequoia	"Find a really big tree. It's a sequoia . It's 600 years old."	A tree from the western United States that can grow to be very tall and very old; a redwood tree (noun)
(To) Sort	" Sort first, and then put the recyclables in the right place."	To put things into different groups (verb)
Spot	"But it's very hard to get to the worst spot ."	A particular place or area (noun)
Trail	"Follow the trail . It's over there."	A rough path through a forest (noun)
Trash	"We couldn't find the trash pile."	Things that you throw away, such as old food or empty bottles (noun)
Walkie-talkie	"Can I have the walkie-talkie back?"	One of a pair of radios you can carry and use to speak with the person who has the other radio (noun)
(To) Wash out	"You can wash out bottles."	To clean the inside of something quickly; to rinse (verb)



Waste	“It does cost a lot of money to have so much waste. ”	Something that you do not need or cannot use, like trash (noun)
(To) Wonder	“We wondered if you printed all the newspapers around here.”	To think about something you do not know and guess the answer (verb)

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Chapter Four Activities and Task Descriptions

Pre-Game Activities

Consider doing some of the following activities to help students prepare for Chapter 4.

Vocabulary: Pollution

a. It is important that students know the word “pollution” and understand that Trace is at the Grand Canyon to clean up the river. Teach students the word “pollution.” Then show students pictures of pollution and ask them to talk in groups about what they already know about it—what it is, how it happens, who is responsible, how to prevent it, how to clean it up, and so forth. Encourage students to relate this to their own experience by sharing examples of pollution that they have seen or heard about. Students can write a letter to an editor of a newspaper about pollution in their town, design a poster promoting clean environments, or act out skits to show how to fight pollution.

b. Bring pictures to class, some of beautiful nature and others of polluted nature. Show the clean pictures first and have the students describe them (either with the whole class or in pairs). This is a good opportunity to practice descriptive vocabulary (for example, “clean,” “fresh,” and “refreshing”). Then move to the dirty and polluted pictures and have students describe them (for example, “dirty,” “filthy,” “waste,” and “harmful”). Finally, have them compare and contrast the dirty pictures with the clean pictures. You can practice comparison words; for example, “In the first pictures, nature looked cleaner than in the second pictures” or “Those pictures are dirtier than the other ones.”

Gameplay: Map Reading

Have students practice their reading skills by doing map activities. You can draw a map for students and distribute it on paper. Have students do a scanning activity where you say the location and they see who can find the location on the map first. Then tell students the route they will need to take and have them work in pairs to map it out.

Here is the route: George’s house by the river → the Walker’s house → Brooke by the recycling bin → the Walker’s house → Sydney outside her house → Sierra in her shop → Sydney outside her house → Zach by the newspaper building → Jamie by the ranger station → Trail to the trash pile by the river → Jamie at the ranger station → Zach by the newspaper building → George’s fishing spot

After this activity, have students explain how they get from place to place in their own towns.

U.S. Culture: Diversity

Chapter Four can help students understand the indigenous peoples of the United States, as George Runningwater is of American Indian descent. Students might be interested in American Indian tribes and cultures. Try going to [America’s Story at America’s Library](#) and search for terms such as “Native Americans” or “American Indians” or specific tribes. Try having students work in groups, reading these texts and doing poster sessions on what they learn. You can invite community members to hear the students’ presentations. Have students learn about nature, history, and culture at the Grand Canyon at [ASU’s Grand Canyon History](#) site as well.

Task 1: Find George’s house and learn about the river pollution – Chapter Checkpoint

Trace’s Actions	Student Learning Objectives	Helpful Gameplay Tips
<p>1. Follow George to his house and look at his photographs.</p> <p>2. Go fishing for trash with George.</p> <p>3. Learn from George about the river’s pollution.</p>	<p>Students can give and seek personal views and options on topics such as the importance of recycling.</p>	<p>Students need to follow George at the beginning of the chapter; if they stop following him, they may not be able to find him again easily.</p> <p>The game animations are important to the plot. Students who do not pay attention carefully may miss what they should do next.</p> <p>Chapter Four features a large outdoor area, which includes a forest and a river. If students get lost exploring the environment they can check the Map (“M”).</p> <p>Be sure that students know that after they complete this task they should look for the source of the water pollution. If they get stuck, you can tell to turn left from George’s house and follow the river till they find people and water bottles all over the yard. This is near the action word “Wash Out.”</p>
<p>Extension Activities</p> <p>a. Reduce, Reuse, Recycle. Introduce the class to this idea. Ask students if they can give a couple examples of each of the above words. For instance, we can reduce our use of water by taking shorter showers. We can reduce the amount of food we eat. We can reuse bags when we go to the store. We can reuse plastic bottles instead of throwing them away. We can recycle aluminum cans or bottles. Next, put students in groups and ask them to work together. Each group should produce a list with three columns: Reduce, Reuse, Recycle. Under each heading, they should make a list of possibilities. There are thousands of possibilities. Some overlap and can be written under two or more headings. For instance when you bring a cloth bag to the grocery store you are reducing waste, and you are reusing the bag. Creative ideas should be encouraged. Students may enjoy this task as a competition, making a winner of the teams with the most ideas in each column.</p>		

Below is how students can earn the most points in the *Find George’s House* task:

Trace’s comment or action (student chooses)	George’s response	Points
Wow, these are really nice photographs.	Thanks a lot. I did them myself. Keep them. Here’s my fishing pole.	1
What’s that for?	You’ll see, come on out to the river.	0
What are you doing?	I’m going to catch some trash. Just watch!	1

Trace follows George to the river

	You see that? There are very few fish in the river because of the pollution.	0
That's really bad! What can we do about it?	I don't know. Let's go see where this came from.	1
All right. Let's go up the river.	I'm with you!	2

Task 2: Stop pollution from water bottles

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
1. Find the source of the river pollution (the Walker family). 2. Introduce yourself and George to the Walker family. 3. Ask Walkers to recycle.	Students can express their reactions and emotions to others. Students can give and seek personal views and options on topics such as the importance of recycling. Students can express and support opinions and make recommendations on a variety of topics in culturally appropriate ways.	Students may have trouble finding the Walker family. Remind them about their Map ("M") resource. After talking with the Walkers, Traces objective is to "Find the recycling bin." It may help students to look for Brooke, who is next to the bin.
Extension Activities a. "What's That For?" That is the question Trace asks about George's fishing pole. It is a very useful question. Bring to class a bag or box of 20 intriguing items. For instance, a toothbrush, a sock, a doll, a magnet, an apple. Put students in teams. Draw one item at a time from your bag or box, and show it to the class. Ask, "What's this for?" Students will answer: "That's for brushing your teeth." A competition can make things fun. The first student group to raise their hands or ring a bell earns the right to answer the question. You can keep students on their toes by occasionally asking "What is this not for?" In the case of the toothbrush, the answer might be "It's not for brushing your hair," or "It's not for eating soup." b. Introducing Yourself. Trace introduces himself many times during his adventures. Have all students stand up. Their goal will be to introduce themselves to every other student by moving around the classroom. First, solicit ideas from the class of what polite things can they say when introducing themselves.		

Below is how students can earn the most points in the *Stop Pollution from Water Bottles* task:

Trace's comment or action (student chooses)	Carlos and Connie Walker's responses	Points
Hello, I'm Trace. This is George. Could we talk with you for a minute?	Hi there. I'm Carlos Walker, and this is my wife Connie and the kids. We're just resting for a minute.	1
Can you tell me, are these your empty bottles?	Yes, they are. What about it?	0
If you recycle the bottles, they won't pollute the river.	We're too busy exercising to go to the recycling center!	1

Task 3: Find Brooke and help recycle

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
<ol style="list-style-type: none"> 1. Greet Brooke at the recycling center and ask her about the Walkers. 2. Ask for a recycling bin. 3. Agree to help Brooke recycle and get instructions on how to recycle properly. 4. Help Brooke recycle. 5. Receive a recycling bin from Brooke for the Walkers. 	<p>Students can ask and answer questions on familiar topics to keep a conversation going.</p> <p>Students can follow multi-step instructions on how to complete a task, such as recycling.</p> <p>Students can give and seek personal views and options on the importance of recycling.</p>	<p>Brooke is at the recycling center on the north side of the town. Lost students should be directed to the Map feature.</p> <p>The directions for recycling are long and students may miss them. Remind them of their Dialogue History.</p> <p>Make sure students have all the Action Words needed to complete all parts of this task. If they do not, they will need to collect them.</p> <p>Students need to combine words and items at the appropriate recycling bin for the items; for example, they must “Crush” the can after interacting (pressing “E”) at the aluminum bin. Advise students to approach the bins to find out what they are.</p>
<p>Extension Activities</p> <p>a. Action Words. The action words for recycling could easily be used in class with a few readily available props (such as aluminum cans, cardboard boxes, and plastic bottles). Have students say and act out the correct verbs for each recycling item, for example, “crush” the can, “flatten” the cardboard box, and “wash out” the bottle. Of course, you don’t actually need props—you can imagine them. In this case, students mime the actions, pretending they are crushing cans, washing out bottles, and flattening boxes.</p> <p>b. Matching Cards. To help students associate the correct verb with the correct item, write the verbs and different words for recyclables (or use the actual items themselves) on small pieces of paper and mix them up. In groups, students then should turn over the cards and match the items with appropriate verbs. New combinations should be encouraged.</p> <p>c. Earth Day. For more advanced students, you can provide recycling instructions or a website about recycling in English at the EPA’s Earth Day website. Students can analyze the text or videos on the website for the verbs and words they learned from Chapter Four and notice any different uses as well.</p> <p>d. Make a sculpture. Many artists reuse discarded materials, even trash, and use them to make sculptures. A collection of paper, plastic, packing materials, foam, string, and the like will be useful and fun. With some tape and glue students can make objects or structures.</p>		

Below is how students can earn the most points in the *Find Brooke and Help Recycle* task:

Trace's comment or action (student chooses)	Brooke's response	Points
Hello! Are you cleaning up the river?	Hi! Yes! I'm working to stop pollution!	1
We're Trace and George. Hi.	Hi! I'm Brooke. I'm sorting trash we found by the river.	0
We met the Walkers. They like to exercise.	I've seen them. They throw bottles around.	1
They said they were too busy to recycle.	That's silly. It's not hard if you have a bin like this.	3
Maybe we could give them a recycling bin like you have.	Good idea! If you help me, I'll give you a bin for them.	0
I can help you.	Great. Sort first, then put the recyclables in the right place. You need to prepare the recyclables first: crush the cans, flatten the boxes, wash out the bottles, and separate the toy package. Put the food in the compost bin. Here's a can. It goes into the aluminum bin.	3
<i>Trace goes to green aluminum bin</i> Action: Crush + Can	Good job! Here's a box. Cardboard goes into the cardboard bin.	5
<i>Trace goes to blue cardboard bin</i> Action: Flatten + Box	Good job! Plastic bottles go into the plastics bin.	5
<i>Trace goes to yellow plastics bin</i> Action: Wash Out + Bottle	That's great! Here's a package with plastic and cardboard.	5
Action: Separate + Toy Package	That's the first step! Here's the cardboard.	5
<i>Trace goes to blue cardboard bin</i> Action: Flatten + Cardboard	Here's the plastic.	5
<i>Trace goes to yellow plastics bin</i> Action: Wash out + Plastic	I've got some food scraps for you to compost.	5
<i>Trace goes to red compost bin</i> Action: Compost + Food	Great! That's enough for now, guys. Here's the bin. I hope you can persuade the Walkers to recycle.	30
Don't worry, I'll persuade them. See you later, Brooke.	Go for it! Bye, guys. Good luck!	2

Task 4: Deliver recycling bin to the Walker family – Chapter Checkpoint

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
1. Return to the Walkers and deliver the recycling bin. 2. Ask the Walkers again to recycle.	Students can start, maintain, and end a conversation on the topic of recycling. Students can give and seek personal views and opinions on the importance of recycling.	Students can lose points during this task if they combine the wrong Action Word with the wrong item from their inventory. They can pay attention to character reactions since characters will react negatively if Trace tries to do an action incorrectly.
Extension Activities a. Letter. After playing, invite students to write a letter to the Walker family about why their new recycling bin will save them time. For higher proficiency students, the letter can be a formal letter, while for lower proficiency students, the letter can be a list of reasons. b. Recycle Hunt. Let students engage in a recycling hunt in class. Get a bin or a box to hold the recyclables. Hide a certain number of items (plastics bottles, bottle caps, paper, etc.) around the class and allow students out of their desks to hunt for the items. When a student finds a recyclable item he or she can bring it to the bin. Afterwards, students will say where they found the item.		

Below is how students can earn the most points in the *Deliver Bin to Walker Family* task:

Trace's comment or action (student chooses)	Carlos and Connie Walker's responses	Points
Hello again!	Hello!	3
We have something for you.	What is it?	1
This is a recycling bin.	So what?	1
Action: Deliver + Recycling Bin	So how do we use this?	25
If you use this bin to recycle, you'll save a lot of time.	That's wonderful!	2
We hope you'll use the bin from now on.	We certainly will! It looks like good exercise, too.	3

Task 5: Stop pollution from plastic bags – Chapter Checkpoint

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
<p>1. Find Sydney outside of the antiques shop on the main street and offer to get her a nice reusable bag.</p> <p>2. Find Sierra in her shop across from the recycling center and have her decorate the bag.</p> <p>3. Return to Sydney and give her the decorated bag.</p>	<p>Students can express their reactions and emotions to others.</p> <p>Students can follow some simple directions or instructions, especially when people use gestures or there is repetition.</p> <p>Students can discuss and solve problems in uncomplicated situations.</p> <p>Students can ask for help at school, at work, or in the community.</p> <p>Students can express appreciation and gratitude and respond appropriately to others.</p>	<p>At the beginning of this task, the Objectives box tells students to find the source of pollution. They will need to find Sydney in town. She's standing in front of a store—students can use the Map resource.</p>
<p>Extension Activities</p> <p>a. Why We Don't Recycle. In pairs, have the students think of all the reasons they (or their family and friends) do or do not recycle and reuse. There are many reasons why people do not recycle. What are they? As a follow-up, students might create posters or design a brochure to encourage family and friends to recycle.</p>		

Below is how students can earn the most points in the *Stop Pollution from Plastic Bags* task:

Trace's comment or action (student chooses)	Response	Character	Points
	You see? The fish can't live with that trash.	George	0
Wow, that doesn't belong in a river!	People just don't take care of the river.	George	0
That's really bad. What should we do?	Let's find who threw it in the river. We can ask around the village.	George	0
Okay. Let's look for whoever throws bags in the river.	Let's go.	George	3
<i>Trace walks around to find Sydney</i>			
Hello, I'm Trace. This is George. Could I talk with you for a minute?	Hello guys. I'm Sydney. That's spelled with a "y."	Sydney	1
Nice to meet you, Sydney. I noticed that you are carrying a plastic bag.	Yes, that's my bag.	Sydney	0

If you put bags in the river, they'll hurt the fish. Would you try a reusable bag?	I have one! Those ratty old things! If it's something to reuse, it has to look nice!	Sydney	5
Wait here, I'll bring you a nice reusable bag.	Well, it has to be better looking than this one. Here, take this. It's ugly.	Sydney	2
Okay, I'll do my best to get you a nicer bag. See you later!	Bye, Trace. Nice to meet you!	Sydney	2

Trace finds Sierra in her shop

Hello, Sierra. I'm Trace. Nice to meet you. You have a beautiful shop.	Nice to meet you two. Welcome to my shop.	Sierra	3
George loves the environment and takes good pictures. Could you put George's photos on a reusable bag?	Oh, you're George Runningwater, the photographer! I've heard about you. Maybe. I'll give it a try. Give me the photos and let me see what I can do.	Sierra	5
Action: Deliver + Photos	Thanks! Those look like great photos.	Sierra	5
Could you make a decorated bag for us now? We need to give it to someone.	I could do that. You could show it around.	Sierra	3
	Here are the bag and photos. The bag looks pretty good!	Sierra	25
Thank you very much, Sierra. This is a big help.	Bye, Trace! Good luck with your clean-up!		3

Trace goes back to Sydney

Sydney! Wait up! We have a new bag for you.	Let's see that.	Sydney	2
Action: Deliver + Bag	Wow! That's beautiful!	Sydney	25
Yes! It's yours to reuse.	Thanks so much, guys! I love it! I'll never use plastic again!	Sydney	1
You're welcome, Sydney. See you later!	See you! I'm going to tell all my friends about this bag!	Sydney	3

Task 6: Stop pollution from newspapers – Chapter Checkpoint

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
<p>1. Find newspaper in the river with George at his fishing spot.</p> <p>2. Find and talk to Zach at the newspaper building and ask him to ask his boss to stop polluting the river.</p> <p>3. Leave to get more photographs of the polluted river.</p>	Students can ask for help at school, at work, or in the community.	<p>Zach is located at the entrance to the large grey newspaper building on the south end of town. Some students may skip over this building because it is somewhat set away from the rest of the small town.</p> <p>Trace needs to talk to Jamie before he can stop the newspaper pollution.</p>

Extension Activities

- a. Picture This.** If you have access to a camera, take pictures of your school, town, city, or parks. You might include nearby water, or even the sky. Put these on the wall for students to see. Ask them to identify pollution, if there is any in evidence. Where is there trash? Why is it there? Where are the clean areas? *Why are they clean?* What about your own school and surroundings? Is it clean? If not ask student groups to come up with ideas for cleaning up the area.

Below is how students can earn the most points in the *Stop Pollution from Newspapers* task:

Trace's comment or action (student chooses)	Responses	Character	Points
	This newspaper doesn't belong in the river. It will kill the fish. Let's find out how it got there.	George	0
Let's see if the polluters live in the village.	Yes, let's go find them.	George	1
<i>Trace finds Zach at the newspaper building</i>			
Hello. I'm Trace and this is George. Can we talk to you?	Okay, but it's pretty busy around here.	Zach	3
We wondered how the newspaper got in the river.	I don't know. I guess the boss has them stacked outside. Maybe they blew into the river.	Zach	2
Newspapers don't belong in the river. The river is being destroyed by pollution.	I never thought of it that way. I wonder what we can do? It's really a problem, but we have a lot of waste paper. We print three editions a day.	Zach	2
You could print one fewer edition and save a lot of money.	I don't know. It does cost a lot of money to have so much waste.	Zach	3

Could you ask your boss about it? Show your boss the pictures of the river. It might persuade him.	That's an idea. The pictures might convince him. Maybe. Let me talk to my boss. Give me the photos and let me see what I can do.	Zach	3
Action: Deliver + Photos	Wow! Those look good.	Zach	5
	He's not convinced. Maybe you should take pictures where the river is even more polluted.	Zach	0
We'll come back with more photos. Thanks for your help. See you later.	See you later!	Zach	4

Task 7: Get Jamie the Park Ranger's help

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
<p>1. Find Jamie the park ranger by the ranger station and explain the need for pictures.</p> <p>2. Follow Jamie's directions to get to the trash heap and have George take pictures.</p> <p>3. Return to Jamie, deliver the walkie-talkie, and say goodbye.</p>	<p>Students can ask for help at school, at work, or in the community.</p> <p>Students can exchange information about what they learned using texts, graphs, or pictures.</p> <p>Students can exchange information with other people about what to do, where to go, and when to meet.</p>	<p>After receiving the walkie-talkie from Jamie, Trace needs to follow her directions to the trash heap on the river. The directions are given rather quickly and require students to pay attention. Also they reference items along a nature trail using vocabulary that students will likely not be familiar with (for example, "mossy," "boulder," and "sequoia").</p> <p>The trash heap is located in the northeast corner of the map, in case students do not follow directions or leave the trail. Remind students to use their map if they need to find their way back to town.</p>
<h3>Extension Activities</h3> <p>a. Getting Around. Have students do an activity on writing and giving directions. Students write directions from their home to the school or to any other place around town using landmarks as guides. For example, "Turn left at the library and go straight till you come to the post office." This activity is good practice for using the imperative form of verbs. Students can also practice giving directions in class in pairs. Student A: "Turn left at the chair, go straight, and then turn right at the desk." Student B follows Student A's commands, then they switch roles. If culturally appropriate, this activity can be extended by having students work in pairs, where one is blindfolded. The student not wearing a blindfold can dictate instructions and the blindfolded student will try to follow them.</p>		

Below is how students can earn the most points in the *Get Jamie's Help* task:

Trace's comment or action (student chooses)	Response	Character	Points
Hi again, Jamie! We need some help.	Hello, boys. What can I do for you?	Jamie	1
We need to get pictures of the worst pollution in the river and give them to the newspaper.	What do they want them for?	Jamie	3
The pictures will show people how bad pollution is.	I see. But it's very hard to get to the worst spot. I have to stay here to work, but I'll give you a walkie-talkie and help you find it.	Jamie	3
<i>Trace receives a walkie-talkie from Jamie</i>			
What is this?	It's a walkie-talkie. I'll talk to you with it. Follow the trail. It's over there.	Jamie	1
How does it work?	It's on already. You'll hear me. I can guide you	Jamie	2

	from up here on the cliff. Follow the trail. It's over there.		
Action: Follow direction 1	Find a really big tree. It's a sequoia. It's 600 years old.	Jamie	5
Action: Follow direction 2	Find a huge boulder. It has moss on one side. Continue from the mossy side.	Jamie	5
Action: Follow direction 3	Find a log pile. Go around the pile, and head down toward the river.	Jamie	5
Action: Follow direction 4	Jump over the log behind the log pile.	Jamie	5
Action: Follow direction 5			
Do you see the trash pile, George? Take some pictures, please.	There it is! I'll get some pictures.	George	28
	Okay, here are the photos. I'm ready to go. Which way is out?	George	0
Let's go... away from the river.	Okay. I'll follow you. Be careful!	George	3
<i>Trace and George return to Jamie at the ranger station</i>			
Hi again, Jamie! George got lots of photos.	That's good news. Thanks for doing the climb. Can I have the walkie-talkie back?	Jamie	2
Action: Deliver + Walkie-Talkie	Thanks, Trace.	Jamie	15
Thanks for helping us, Jamie. We hope we can persuade the newspaper.	No problem. But you'd better hurry. The bus is leaving soon!	Jamie	2

Task 8: Deliver photographs to Zach and wish George luck

Trace's Actions	Student Learning Objectives	Helpful Gameplay Tips
1. Return to Zach and deliver the photographs. 2. Ask how the newspaper will reduce pollution. 3. Wish George luck saving the river.	Students can answer questions about their preferences using one or more words or memorized phrases.	The wind is blowing the newspapers into the river, but this is not clearly stated during the chapter. Students may not understand this right away and may not understand some of the dialogue choices concerning newspapers blowing into the river.
Extension Activities a. Simple Solutions. In this chapter, Trace finds a simple solution for keeping newspapers out of the river. Some solutions <i>are</i> really simple—they just require action and commitment. Consider environmental problems you can discuss in class. For example, American consumers use 100 billion plastic bags per year. Do you have many plastic bags in your area? Many communities have reduced the number of bags simply by requiring stores to charge a small fee for them. Are plastic bags free at your local shops? Do you think it is a good idea to pay for them, or that it is better to get them for free? Have a class discussion, and then vote!		

Below is how students can earn the most points in the *Deliver Photographs to Zach* task:

Trace's comment or action (student chooses)	Response	Character	Points
Hi. Here are the pictures of the worst trash heap on the river.	Thanks a lot. I'll try to get the boss to use them. Give me the photos, and let me see what he thinks.	Zach	3
Action: Deliver + Photos	Wow! I'm sure he'll like these!	Zach	25
	Good news! He says he'll print the pictures with a special story on pollution.		
Did you move the newspapers so they won't blow in the river?	Yes! The boss said we can store them inside.	Zach	3
Did you persuade the boss to use less paper?	I talked to the boss, and he's going to print fewer editions. It'll save money, too.	Zach	3
Thanks for your help. I've got to go. My bus is leaving soon.	My pleasure. Have a good trip.	Zach	3
<i>Trace goes to the river with George</i>			
	Gee, I never thought I'd be a published photographer!	George	

I can see you love the outdoors,
George. Good luck on saving the river!

I think my pictures will help. Let's go back to my house to fish one last time. George

1

Final Chapter Four Video

In the final video for Chapter Four, George catches a fish in the river instead of a piece of trash. Kit tells Trace that George becomes a famous photographer and environmental activist who saves the river. Trace learns of his next mission from Prof. Peterson, which is to help Neela Desai in New York City. He decides to go to New York City with Kit and Eddie, who are going there to visit their family for Thanksgiving.

Completing Chapter Four

Congratulations! Chapter Four is complete. Students will see a screen similar to the following:



From the screen, students can:

- See their scores,
- Review Trace's activities,
- See what is next,
- Do the Chapter Four Language Practice exercises,
- Download the graphic novel of Chapter Four,
- Play again,
- Print a Level Complete Certificate for Chapter Four, and
- Go to the next chapter.

Now that students have completed Chapter Four:

1. Have students complete the following exercises in the Language Practice section of Trace Effects. Remember that for some of the exercises, the correct answers are not given. Encourage students to write down their incorrect answers so that they can be answered in class or in pairs.

Chapter Four	The Environment - Arizona	Skills
Exercise 1	Order of events activity: Students practice chronologically ordering events of the story	Reading
Exercise 2	Multiple choice chapter review: Students review events of the chapter via questions, sentence completion, and true/false statements	Reading
Exercise 3	Matching activity chapter review: Students practice conditional clauses	Reading
Exercise 4	Multiple choice sentence completion: Students practice verbs, prepositions, and determiners	Reading

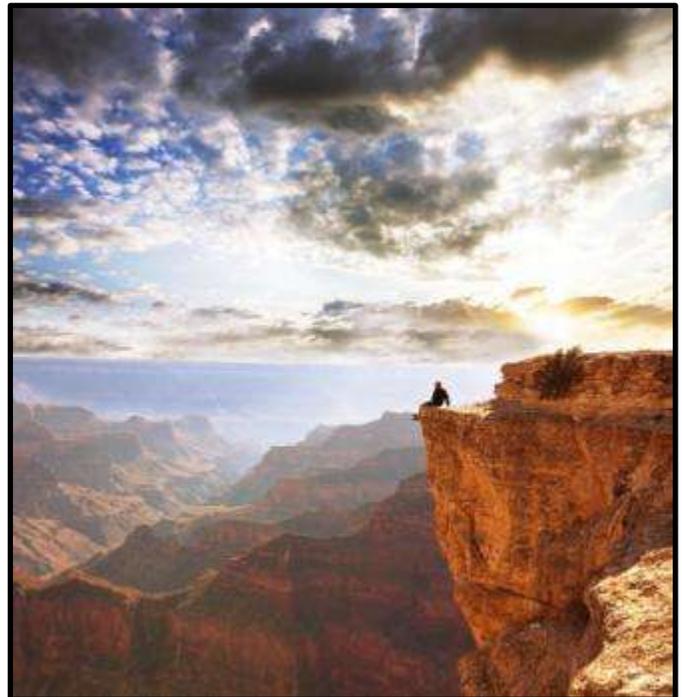
2. Have the students read the graphic novel to remind them of the storyline, new words, and new grammar points.

3. Does your community recycle? Do your students? If so, motivate your students to recycle more. Have students come up with ideas to help their community like Trace. Can they convince the school to recycle more? Can they help clean up pollution around town by convincing people to reuse bags? Can they collect evidence of pollution and show it to companies to persuade the companies to recycle more? Think of as many other ideas as possible to recycle or help clean up pollution. Then organize groups of students and community members and do an environmental project using skits, fliers, posters, or making videos to post on YouTube if resources are available. Remember: Reduce, Recycle, and Reuse.

4. Have students work in groups to think of any activists they know who are trying to save the environment. Students can invite some to class to speak about how they try to persuade people to save the environment. Students can prepare questions for the speakers before they give their presentations.

Congratulations on Completing Chapter Four!

Pictures of the Grand Canyon



Images © Shutterstock.com

Script for Chapter Four

Following is the complete script for your reference. Please do NOT share this script with students. It is for teachers to use if needed.

Character	Line
Jamie Henderson	Hello everyone! I'm Jamie Henderson, the park ranger. We want our guests to work with local students. Let's see how much trash we can clean up! While you are picking up trash, think about how we can reduce, reuse, and recycle. We want to have less trash next year!
George Runningwater	Trace, I'm George. We're working together.
Trace	Nice to meet you!
George Runningwater	Come to my house, and you'll see how I pick up litter!
Trace	See you later!
George Runningwater	Come on, Trace.
George Runningwater	Let me show you some photographs.
Trace	Wow, these are really nice photographs.
George Runningwater	Thanks a lot. I did them myself. Keep them. Here's my fishing pole!
Trace	Why do you have a fishing pole?
George Runningwater	You'll see! Come on out to the river.
Trace	Are you going to catch a fish?
George Runningwater	Nope. This pole is for catching trash.
George Runningwater	You see that? There are very few fish in the river because of the pollution.
Trace	That's really bad! What can we do about it?
George Runningwater	I don't know. Let's see where this came from.
Trace	All right. Let's find the polluter!
George Runningwater	I'm with you!
Trace	Hello, I'm Trace. This is George. Could we talk with you for a minute?

Character	Line
Carlos Walker	Hi there. I'm Carlos Walker, and this is my wife Connie and the kids. We're just resting for a minute.
Trace	I wonder, are these your empty bottles?
Carlos Walker	Yes, it's important to drink plenty of water when exercising.
Trace	If you recycle the bottles, they won't pollute the river.
Connie Walker	We're too busy exercising to go to the recycling center!
Trace	We're Trace and George. Hi.
Brooke	Hi! I'm Brooke. I'm sorting trash we found by the river.
Trace	The Walkers run by the river.
Brooke	I've seen them. They throw bottles around.
Trace	They said they were too busy to recycle.
Brooke	That's silly. It's not hard if you have a bin like this.
Trace	Maybe we could give them a recycling bin like you have.
Brooke	Good idea! If you help me, I'll give you a bin for them.
Trace	Okay, let me help you.
Brooke	Great. Sort first, then put the recyclables in the right place. You need to prepare the recyclables: crush the cans, flatten the boxes, wash out the bottles, and separate the toy package. Put the food in the compost bin.
Brooke	Here's a can. It goes in the aluminum bin.
Trace (action)	Crush the Can
Brooke	Good job! Here's a box. Cardboard goes into the cardboard bin.
Trace (action)	Flatten the Box
Brooke	Good job! Plastic bottles go into the plastics bin.
Trace (action)	Wash Out the Bottle

Character	Line
Brooke	That's great! Here's a package with plastic and cardboard.
Trace (action)	Separate the Toy Package
Brooke	That's the first step! Here's the cardboard.
Trace (action)	Flatten the Cardboard from the toy package
Brooke	Here's the plastic.
Trace (action)	Wash Out the Plastic from the toy package
Brooke	I've got some food scraps for you to compost.
Trace (action)	Compost the Food
Brooke	Great! That's enough for now, guys. Here's the bin. I hope you can persuade the Walkers to recycle.
Trace	Don't worry, I'll persuade them. See you later, Brooke.
Brooke	Go for it! Bye, guys. Good luck!
Trace	Hello again!
Carlos Walker	Hello!
Trace	We have something for you.
Carlos Walker	What is it?
Trace	You can use a recycling bin to recycle easily.
Carlos Walker	Oh? How?
Connie Walker	May we have the bin?
Trace (action)	Deliver the Recycling Bin
Connie Walker	So how do we use this?
Trace	You can sort your recyclables with this bin.
Connie Walker	Okay. Kids, we can ALL do this!

Character	Line
Trace	We hope you'll use the bin from now on.
Connie Walker	We certainly will! It looks like good exercise, too.
George Runningwater	You see? The fish can't live with that trash!
Trace	Could we find who threw it in the river?
George Runningwater	Let's try. We can ask around the village.
Trace	Okay. Let's look for whoever throws bags in the river.
George Runningwater	Let's go.
Trace	Hello, I'm Trace. This is George. Could I talk with you for a minute?
Sydney	Hello, guys. I'm Sydney. That's spelled with a "y."
Trace	Nice to meet you, Sydney. I notice you are carrying a plastic bag.
Sydney	Yes, that's my bag.
Trace	I'm sorry, but if the plastic gets in the river, it hurts the fish. Maybe you could find a reusable bag.
Sydney	I have one! Those ratty old things! If it's something to reuse, it has to look nice!
Trace	Wait here. I'll bring you a nice reusable bag.
Sydney	Well, it has to be better looking than this one. Here, take this. It's ugly.
Trace	Okay, I'll be back soon.
Sierra	Bye, Trace. Nice to meet you!
Trace	Hello, Sierra. I'm Trace. We're helping the Green Club.
Sierra	Nice to meet you two. I really support recycling.
Trace	George loves the environment and takes good pictures. Could you put George's photos on a reusable bag?
Sierra	Oh, you're George Runningwater, the photographer! I've heard about you. Maybe. I'll give it a try. Give me the photos and let me see what I can do.

Character	Line
Trace (action)	Deliver the Photos
Sierra	Thanks! Those look like great photos.
Trace	Could you make a decorated bag for us now? We need to give it to someone.
Sierra	I could do that. You could show it around.
Sierra	Here are the bag and photos. The bag looks pretty good!
Trace	Thank you very much, Sierra. This is a big help.
Sierra	Bye, Trace! Good luck with your clean-up!
Trace	Sydney! Look what we got for you!
Sydney	Let's see that.
Trace	Deliver the Bag
Sydney	Wow! That's beautiful!
Trace	Yes! It's yours to reuse.
Sydney	Thanks so much, guys! I love it! I'll never use plastic again!
Trace	You're welcome, Sydney. See you later!
Sydney	See you! I'm going to tell all my friends about this bag!
George Runningwater	This newspaper doesn't belong in the river! It will kill the fish. Let's find out how it got there.
Trace	Let's see if the polluters live in the village.
George Runningwater	Yes, let's go find them.
Trace	Hello. I'm Trace and this is George. Can we talk to you?
Zach	Okay, but it's pretty busy around here.
Trace	We wondered how the newspaper got in the river.
Zach	I don't know. I guess the boss has them stacked outside. Maybe they blew into the river.

Character	Line
Trace	Newspapers don't belong in the river. The river is being destroyed by pollution.
Zach	I never thought of it that way. I wonder what we can do? It's really a problem, but we have a lot of waste paper. We print three editions a day.
Trace	You could print one fewer edition and save a lot of money.
Zach	I don't know. It does cost a lot of money to have so much waste.
Trace	Could you ask your boss about it? Show your boss the pictures of the river. It might persuade him.
Zach	That's an idea. The pictures might convince him. Maybe. Let me talk to my boss. Give me the photos and let me see what I can do.
Trace (action)	Deliver the Photos
Zach	Wow! Those look good.
Zach	He's not convinced. Maybe you should take pictures where the river is even more polluted.
Trace	We'll come back with more photos. Thanks for your help. See you later.
Zach	See you later!
Trace	Hi again, Jamie! We need some help.
Jamie Henderson	Hello, boys. What can I do for you?
Trace	We need to get pictures of the worst pollution in the river and give them to the newspaper.
Jamie Henderson	What do they want them for?
Trace	The pictures will show people how bad pollution is.
Jamie Henderson	I see. But it's very hard to get to the worst spot. I have to stay here to work, but I'll give you a walkie-talkie and help you find it.
Trace	Thanks!
Jamie Henderson	You'll hear me. I can guide you from up here on the cliff. Follow the trail. It's over there.

Character	Line
Trail Milestone 1: Beginning of Trail	Find a really big tree. It's a sequoia. It's 600 years old.
Trail Milestone 2: Big Sequoia	Find a huge boulder. It has moss on one side. Continue from the mossy side.
Trail Milestone 3: Mossy Boulder	Find a log pile. Go around the pile, and head down toward the river.
Trail Milestone 4: Downed Logs	Jump over the log behind the log pile.
Trail Milestone 5: River's Edge	Go down to the river's edge. Across the river is a very large pile of trash.
Trace	Do you see the trash pile, George? Take some pictures, please.
George Runningwater	There it is! I'll get some pictures.
George Runningwater	Okay. Here are the photos. I'm ready to go. Which way is out?
Trace	Let's go... away from the river.
George Runningwater	Okay. I'll follow you. Be careful!
Trace	Hi, Jamie! We got some good pictures of the trash.
Jamie Henderson	That's good news. Thanks for your hard work. Can I have the walkie-talkie back?
Trace (action)	Deliver the Walkie-Talkie
Jamie Henderson	Thanks, Trace.
Trace	Thanks for helping us, Jamie. We hope we can persuade the newspaper.
Jamie Henderson	No problem. But you'd better hurry. The bus is leaving soon!
Trace	Hi. George took pictures of the worst place on the river.
Zach	Thanks a lot. I'll try to get the boss to use them. Give me the photos and let me see what he thinks.
Trace (action)	Deliver the Photos
Zach	Wow! I'm sure he'll like these!

Character	Line
Zach	Good news! He says he'll print the pictures with a special story on pollution.
Trace	How will you stop the paper from going into the river?
Zach	The boss said we can store the old papers inside from now on.
Trace	Did you persuade the boss to use less paper?
Zach	I talked to the boss, and he's going to print fewer editions. It'll save money, too.
Trace	Thanks for your help. I've got to go. My bus is leaving soon.
Zach	My pleasure! Have a good trip!
George Runningwater	Gee, I never thought I'd be a published photographer!
Trace	I can see you love the outdoors, George. Good luck on saving the river!
George Runningwater	I think my pictures will help. Let's fish one last time.
George Runningwater	Now that's more like it!
Kit	We heard from Professor Peterson. She said that in the future George Runningwater is a famous photographer and environmental activist.
Trace	Wow! I guess he did save the river!
Professor Peterson	Welcome back! There's no time to lose. Your next mission will be to help Neela Desai in New York City.
Kit	New York? Our family lives there! Eddie and I were going to go home for Thanksgiving.
Eddie	Trace—you should join us! We're leaving tomorrow.
Trace	I would love to. I can't wait to see New York!

Links for Chapter Four

[Arizona State University: Grand Canyon History](#)

Explore nature, history, and culture at the Grand Canyon when you visit this site.

[EPA Student Center](#)

The Environmental Protection Agency provides information, games, videos, quizzes, and short films for students.

[U.S. Fish and Wildlife Service Kid's Page](#)

Learn about fish, wildlife, plants, and their habitats and how you can help conserve, protect, and enhance them.

[Smithsonian Student Science and Nature Page](#)

Online games and activities on science and nature, produced by the Smithsonian.

[The Water Cycle](#)

Learn about the water cycle here.

[America's Story: Arizona](#)

Learn about Arizona here!

[Kids Saving Energy](#)

Fun games and activities for kids who want to save energy.

[Recycle City](#)

Explore Recycle City and learn how to reduce, reuse, and recycle waste.

[A Student's Guide to Climate Change](#)

Learn about the importance of greenhouse gasses and how they trap energy from the sun in the atmosphere and warm the earth.