San Diego Zoo Kids

WATERSHED HEROES

Teacher Resources & Activities

GRADES 3 TO 5

LIGHT-FOOTED RIDGWAY'S RAIL

TABLE OF CONTENTS

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WELCOME FROM ZOOLOGIST RICK SCHWARTZ

"Watershed...WHAAAT?"

That's what I said when I first heard that word in fourth grade. But from what I learned in school and what I've experienced in life, I now know watersheds are so very important to us all.

Watersheds are the ecosystems where we live, and the habitats, wildlife, and waters within them. They are areas of land that water flows across or through, and that includes our homes, schools, and businesses. Here in San Diego, we have 11 watersheds in the county that all drain toward the Pacific Ocean. The San Diego Zoo lies within the Pueblo Watershed, the smallest watershed in San Diego County. While it is the smallest, covering just over 36,000 acres (56 square miles), it is the most developed and densely populated watershed in the San Diego Bay area, which is why it is so vital for us to keep our watershed clean and healthy.

So, what kinds of wildlife live in a watershed? All different kinds! Even though San Diego is an urban area, there are about 27,000 acres (42 square miles) of preserved open space. The City of San Diego Park and Recreation Department has used motion-activated field cameras to detect bobcat, mule deer, and coyotes walking along local trails. If you are hiking through these areas, you might be lucky to see their tracks. Other animals include skunks, opossums, raccoons, foxes, squirrels, bats, rabbits, rodents, snakes, lizards, hawks, songbirds, and...whew...so many more.

Because watersheds support life all around us, it is everyone's job to keep our watersheds healthy. A few ways you can help are to use water wisely, avoid putting anything down storm drains, clean up after your pet, pick up litter in your area, and throw away your trash in a trash can. And, of course, tell other people about watersheds too, because we are all hopeful that as more people learn about watersheds, more people will join together to help them.

THE 11 WATERSHEDS OF SAN DIEGO COUNTY

WATERSHED HEROES PROGRAM

The Watershed Heroes Program inspires students to become heroes for wildlife and watersheds, both locally and globally. This program includes a fourth-grade classroom visit and a fourth-grade field trip to the San Diego Zoo. Throughout this two-part program, students discover what a watershed is, and how their daily actions affect the health of watersheds. Students are encouraged to become stewards of their local watershed by participating in experiential activities founded on inquiry-based learning. These activities challenge students to make direct observations, and discover how simple actions have dramatic impacts on watersheds.

GO WITH THE FLOW

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

Fresh water is vital to plants, animals, and humans alike. It is a precious resource, because the water that exists today is all we have. In fact, the water we drink is the same water that dinosaurs drank! Of all the water on Earth, less than 1 percent is fresh water that we can use. As the worldwide human population continues to grow, it's even more important that we take care of our water. Contaminated water poses a dangerous threat to us and to wildlife.

In this activity, students apply the knowledge they've learned about watersheds, water usage, and conservation to create a board game that can be used to test their classmates' knowledge. These games can be played in the classroom, or at home.

LEARNING OUTCOMES

- Students create a board game to model the movement of water through a watershed.
- Students identify 10 ways humans use water.
- Students analyze and assess current solutions to issues about water usage.

MATERIALS

Per student group:

- Paper or poster board
- Colored paper, index cards, or construction paper
- Pencils, colored pencils, or markers
- Scissors
- Dice
- Computer access and/or research resources

ACTIVITY

Step 1: To begin, assign cooperative learning groups of three or four students.

Step 2: Explain that students will work together in their groups to create a board game about watersheds. Each board game will include 20 trivia question cards with answers, 10 water usage cards, a playing picture/map on a board, and four individual game pieces to move around the board. The game-play path on the board should start in the mountains and end in the ocean, with varying locations spaced throughout showing the movement of water through a watershed.

Creating the playing cards:

Trivia question cards: these cards are questions and the answers about the flow of water through a watershed, or facts about a watershed. Tell student groups they can use different colored paper to denote level of difficulty; for example, green for beginner, yellow for intermediate, and red for advanced.

Water cards: these cards give examples of positive or negative human activities within a watershed and give instructions for game play. For example, one statement could be: "You left the water running while you brushed your teeth. Miss two turns." or "You planted native plants in your watershed. Move ahead one space." Ask students to assign 10 spaces on the game board for players to pick up water cards.

When creating the playing cards, allow students Internet access, for information regarding watersheds and water usage. Also use the Web pages provided in *Watershed Heroes Teacher Resource* PDF found at **kids.sdzwa.org/curriculum**.

Step 3: After student groups complete their board games, explain the game rules. Each student is assigned a playing piece, and all players start at the same place on the board. A student rolls the dice, and answers a trivia question. If their answer is correct they move forward one space on the board. If a student lands on a water-card space, the student follows the specific instructions on the card.

Step 4: Ask each student group to set up their game in the classroom. In rotation, coordinate student groups to play each other's games, allowing five to seven minutes for each game play.

NGSS performance expectations 5-ESS2-1, 5-ESS3-1

GO WITH THE FLOW

Step 5: At the end of play, review key points with the class. Questions to consider:
- What was the hardest question you and your group faced?
- Was there a question that no one in your group could answer?
- How does water move throughout a watershed?
- What were some of the effects of pollution on the watershed?

EXTENSIONS

1. Begin this activity by discussing and graphing water distribution on Earth.
2. Allow students to create their own instructions for playing the game.
3. Go outside and ask students to create a life-size board game where other students are the playing pieces.
4. Tell students to create a game about their local watershed. Include actual locations; for example, their house, their school, and the local creeks and rivers.

WATERSHED HEROES AND VILLAINS

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

In this activity, students create character profiles of watershed heroes and villains. They base their profiles on the conditions of a healthy watershed, and the effects of human activity and pollution on watersheds. Students share their heroes and villains profiles with other students, staff, and community members to inform them about threats to watersheds, and what humans can do to help.

LEARNING OUTCOMES

- Students identify four characteristics of a healthy watershed.
- Students describe four pollution problems currently happening in watersheds around the world.
- Students construct profiles of watershed problems and benefits.
- Students explain their profiles to their peers and members of their community.

MATERIALS

- Pencils, colored pencils, markers, and/or crayons
- Copies of the *Character Bio* activity sheet
- Internet access and/or research resources

ACTIVITY

Step 1: To begin this activity, lead a class discussion to review key concepts such as: what is a watershed, the movement of water throughout a watershed, types of pollution in a watershed, effects of pollution on wildlife, and ocean gyres.

Step 2: Distribute the *Character Bio* activity sheets. Tell students they will create profiles of at least one watershed hero and one watershed villain. Each profile should include a drawing of the character, a brief biography, the character's superpowers, and its hobbies. Show the example of Cruella De Bag, explaining each of the sections students need to complete.

Tell students other characters they may choose are Polly Styra (Styrofoam), Six-pack Strangler (six-pack ring), Dr. Native/ Professor Invasive (invasive plants), and Mike Roe Trash (microtrash). Suggest to students that their heroes and villains can be on land or in the water, from any watershed around the world. These characters can be realistic or imaginary, and the watershed hero could be the student too, because they have learned how to be a watershed hero.

Step 3: When complete, ask students to present their profiles to the class. You could also hang the papers around the room, and invite students in the class or even in the school to a gallery walk.

EXTENSIONS

1. Have students write a story about their watershed heroes and villains, and read the stories aloud, or act them out to the class.
2. Use upcycled trash items such as newspaper, plastic, or other items to create 3-D posters of the heroes and villains.

NGSS performance expectation 5-ESS3-1

CHARACTER BIO

Villain Name: Cruella De Bag

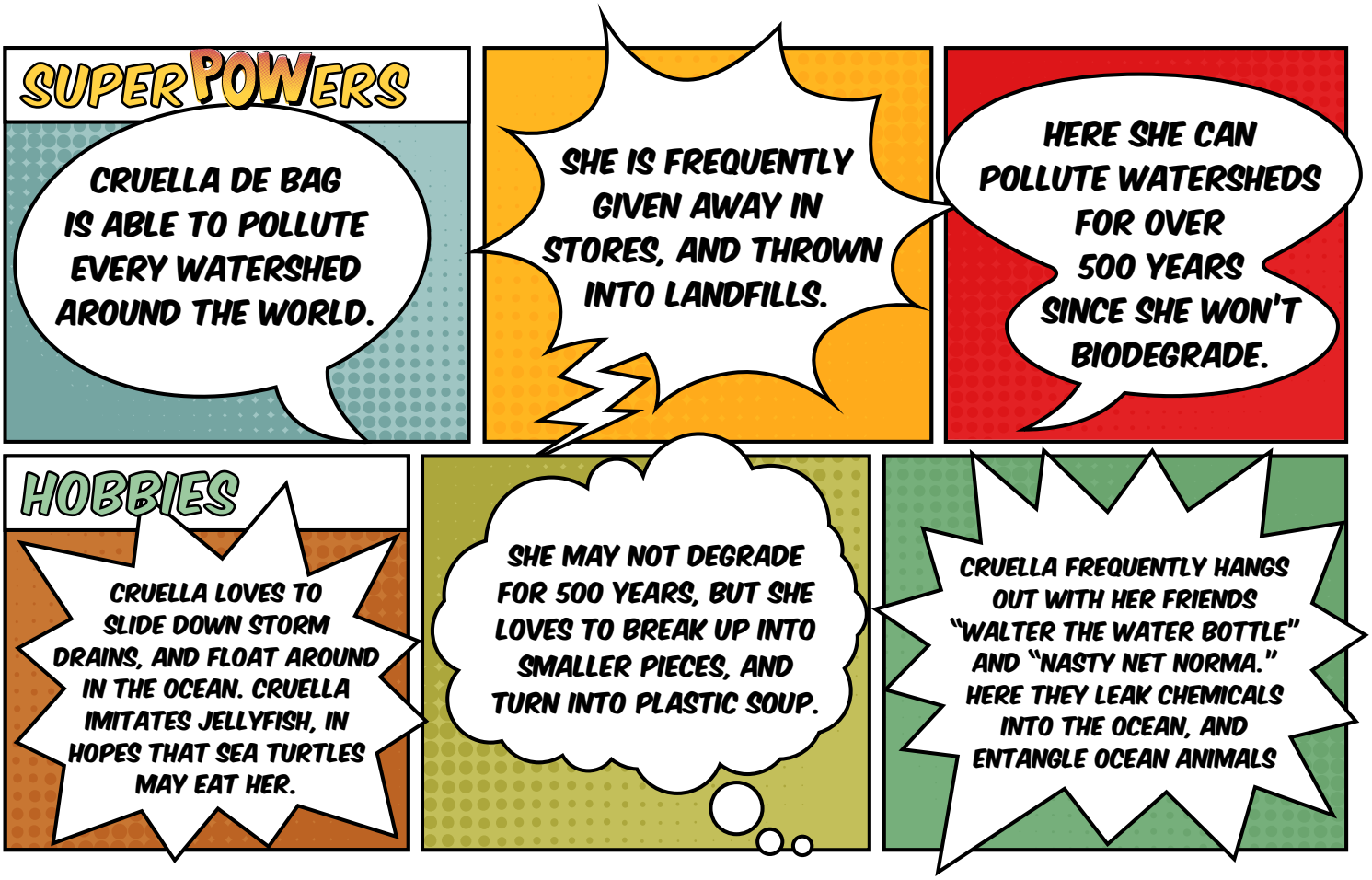
Height: 27 inches (68 centimeters)

Eye Color: Black

Hair Color: Clear

Occupation: Polluter

Secret Watershed Lair: Floating in the Ocean



WATERSHED HEROES AND VILLAINS ▶ ACTIVITY

CHARACTER BIO

Villain Name: _____

Height: _____

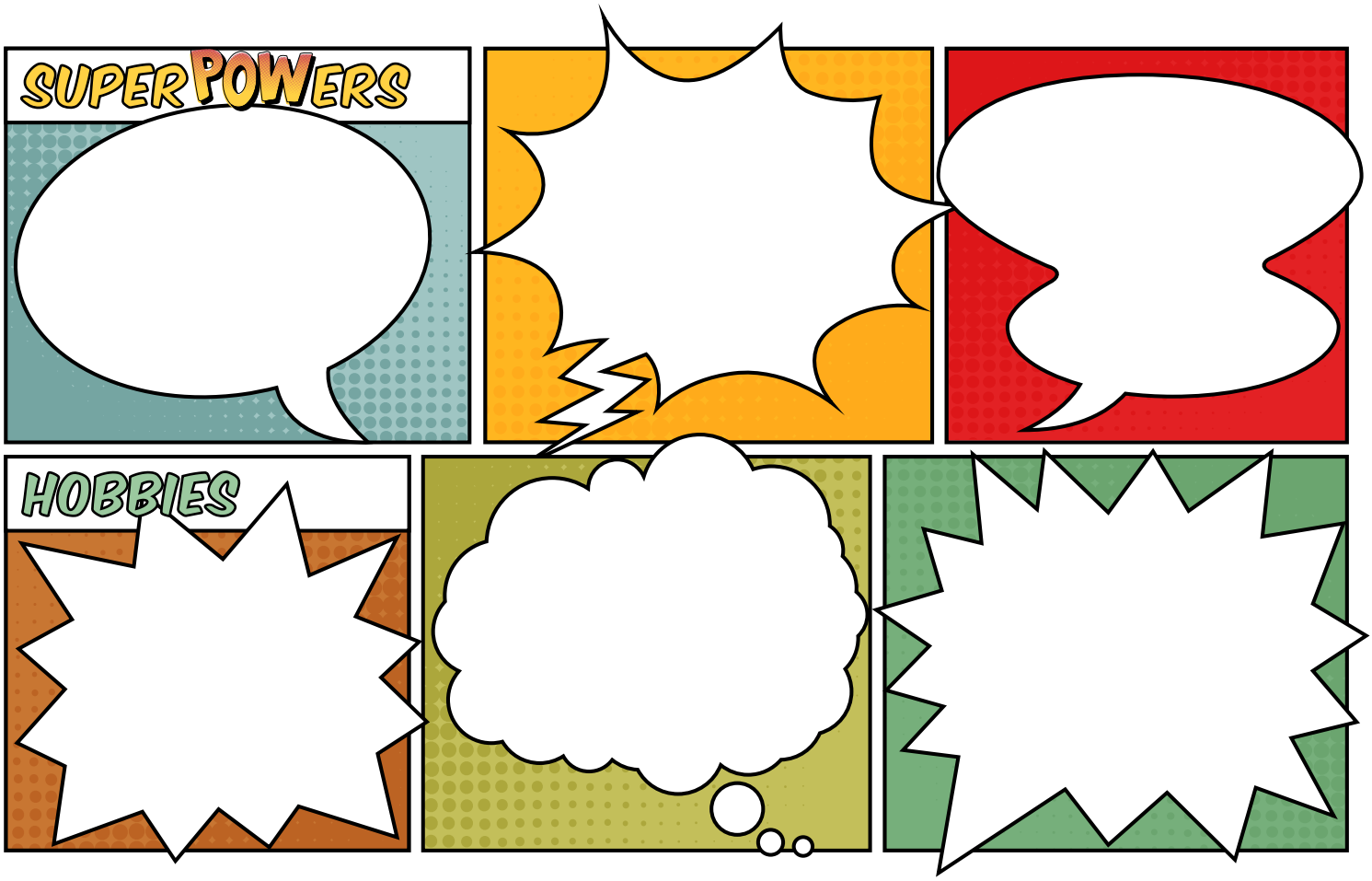
Eye Color: _____

Hair Color: _____

Occupation: _____

Secret Watershed Lair: _____

_____



WATERSHED PSA

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

Public Service Announcements (PSAs) aim to raise awareness; that is, to change public attitude and behavior toward an issue. In this activity, students create a Watershed PSA with content that provides information about local and global watersheds, and states action steps needed to conserve these areas.

LEARNING OUTCOMES

- Students identify four threats to watersheds around the world.
- Students define their role in the environment, and state two actions they can do to help.
- Students create a public service announcement to spread awareness about watershed conservation.

MATERIALS

- Internet access and/or research resources
- Whiteboard or poster paper
- Optional: tablet, video camera, or smart phone

ACTIVITY

Step 1: Introduce the Public Service Announcement—often shortened to PSA—which is an advertisement that aims to raise awareness about an issue and change public attitude and behavior toward that issue. Show students sample PSA videos provided in *Watershed Heroes Teacher Resource* PDF found at **kids.sdzwa.org/curriculum**. These videos were created for San Diego Zoo Wildlife Alliance to show how the Zoo is bringing species back from the brink of extinction, and what the public can do to help.

Step 2: Next, tell students they will be creating their own one-minute PSAs about watershed conservation. Begin with a brainstorm session with the class to generate ideas. Ask leading questions such as the ones below to keep the ideas flowing.

"What messages does the public need to hear about watersheds, pollution, and protecting wildlife?"
"What are some slogans, such as Don't Throw It All Away or Put Litter in Its Place, that can be used?"
"What can people do to help?"

As the brainstorm session progresses, write class ideas on a whiteboard or poster paper. After a list has been generated, ask students to rank the topics. Are some better than others?

Step 3: Create groups of two to three students. Ask each group to select a topic from the list. Tell students to research their topic to create a script that includes a statement of the problem, a suggestion to help, and a slogan. Remind students this is a one-minute PSA.

Step 4: Videotape or otherwise record the spot (as broadcasters call them). If technology is unavailable, students can present their PSA to the class using props, background materials, or a cardboard cutout of a TV screen.

EXTENSIONS

1. Students share their PSAs in other classrooms or to their parents.
2. In place of a written script, ask students to create a comic strip, song, or children's story to spread awareness to younger kids.

NGSS performance expectations 3-LS4-3, 3-LS4-4, 5-ESS3-1, 3-5-ETS1-1

WATERSHED SHARK TANK

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

Students become entrepreneurs and pitch their watershed-saving ideas to the "sharks." The "sharks" (teachers, parents, or community members) will be searching for the best product that will benefit watersheds. Students will create a product that accomplishes one of these actions: it replaces a current ineffective product, it removes watershed pollution, it prevents watershed pollution, or it raises awareness about watersheds.

LEARNING OUTCOMES

- Students identify four or more threats to watersheds around the world.
- Students design a product that is beneficial to watersheds, and the wildlife inhabiting them.

MATERIALS

- Paper
- Pencils
- Colored pencils, or markers
- Scissors
- Poster paper
- Internet access and/or research resources
- *Watershed Shark Tank* activity sheet

ACTIVITY

Step 1: As a class, review and discuss the many challenges facing watersheds, such as pollution, water shortage, ecosystem and food web imbalances, and human impacts on watersheds.

Step 2: Divide the class into groups of two or three students and distribute the *Watershed Shark Tank* activity sheet. Ask students to work in their groups to create a product that will improve the health of a watershed. Students should use the activity sheet to guide their product development.

Students can use PowerPoint, a poster, or a model to explain their product. They should write a script or topic outline to cover important points. Presentations should be at least two minutes long.

Step 3: As students work on their product presentations, assemble a "shark" panel of school staff, parents, or even community volunteers. Consider asking local business owners to participate. "Sharks" should be ready to ask clarifying questions.

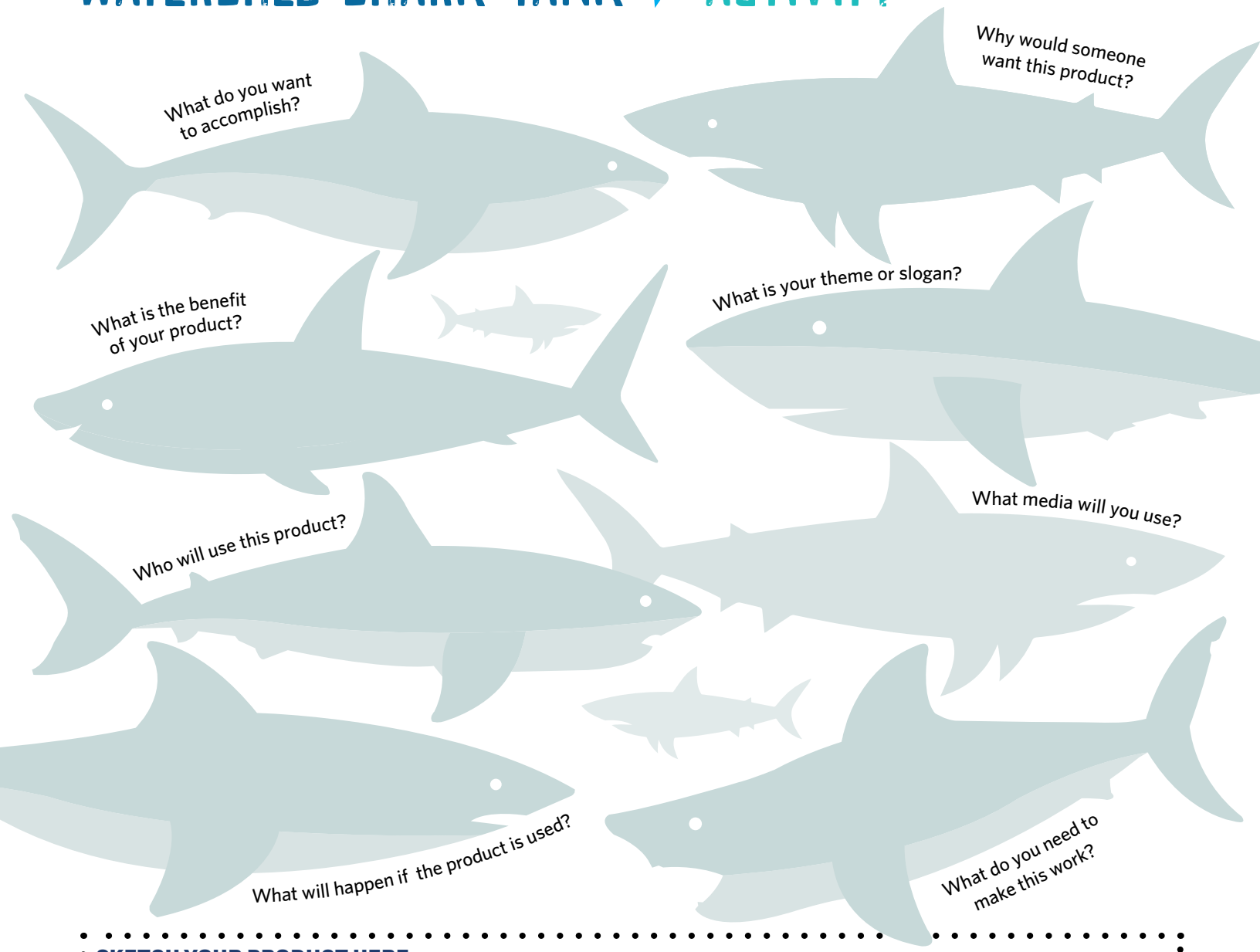
Step 4: When ready, students pitch their product to the "sharks." Students need to answer the questions posed by the "sharks" at the end of their presentation. After hearing all the student products, "sharks" select the top product.

EXTENSIONS

1. Have students write a business plan that includes a marketing strategy and a budget.
2. Have students present their products to other classes, and cast votes for a winning product.

NGSS performance expectations 3-LS4-4, 5-ESS3-1, 3-5-ETS1-1

WATERSHED SHARK TANK ▶ ACTIVITY



SKETCH YOUR PRODUCT HERE

EYEWITNESS NEWS

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

The overall health of a watershed depends on many different factors. Two major factors—human activity and habitat loss—cause significant declines in water quality and wildlife populations. Identifying and reversing the harmful effects can improve watersheds and the lives of plants and animals that call it home.

Education research has shown that students who talk about what they have learned and act on what they have learned often retain that knowledge longer and remember facts in more detail. In this activity, students become "news reporters" and "field-research experts" who specialize in an animal living in a watershed anywhere around the world. These "field experts" share their knowledge with "news reporters."

LEARNING OUTCOMES

- Students collect and analyze information about an animal of their choice.
- Students synthesize their animal information to create a newscast script, with the goal of informing fellow classmates of the information they've gathered.
- Students present their newscasts, teaching their classmates about what they've learned.

MATERIALS

- Pencil or pen
- Paper
- Internet access and/or research resources
- Copies of activity sheet *Reporter Interview Notes*, four per student

ACTIVITY

Step 1: Ask students to choose an animal to be the focus of their research, and prepare a 60-second news report about their animal. "Field experts" will tell this report when being interviewed by a "news reporter." The report should:

- Describe the watershed where the animal lives (if the animal lives in multiple watersheds, choose only one watershed)
- Explain the current status of that animal's watershed
- Explain the availability of water in that watershed
- Explain any factors affecting the animal in that watershed
- Give two ways that people can help that animal and its watershed

Step 2: When the reports are ready, divide class into student pairs. Distribute the *Reporter Interview Notes* activity sheet to each student, and tell them they will take turns role-playing the characters of a "news reporter" and a "field-research expert."

Model an interview to the class, outlining suggested conversation exchanges. For example, as the reporter, students can address an imaginary camera, with a microphone in hand, and welcome the audience to "Worldwide Watersheds with Dr. *student's-name*." The reporter then welcomes the professor with, "Welcome to our show. Today we are interviewing the world-renowned expert in animal X, Dr. *student's-name*. Please tell us, Dr. *student's-name*, what is so important about animal X?" The "field-research expert" will then present their report, and the "news reporter" will take notes on the *Reporter Interview Notes* activity sheet.

Step 3: Allow each student pair about three minutes to present their reports and switch roles. When complete, ask the current "news reporters" to stay seated and the "field experts" to move to another "news reporter." Allow another three minutes for the new student pairs to exchange reports. Continue for two more rotations. By the end of the three rotations, "field experts" should have given their animal report four times, and "news reporters" should have taken reports on four different animals.

Step 4: As a class, facilitate a group discussion highlighting what the students learned throughout the process.

EXTENSIONS

1. Have student perform their interviews in front of the class using props or stage sets. Videotape interviews to view later.
2. Allow "field experts" time to prepare for a follow-up interview based on questions asked by the "news reporters" that the "field expert" may not have been able to answer.
3. Have students generate their own interview questions beforehand.

NGSS performance expectations 3-LS4-4, 5-ESS3-1

EYEWITNESS NEWS ▶ ACTIVITY

REPORTER INTERVIEW NOTES

Watershed Description

Watershed Status and Water Availability

Factors Affecting Animal

Ways to Help

Additional Notes

ALIEN INVASION

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

Invasive species are organisms that cause ecological or economic harm in their non-native environments. Invasive animals and plants can decrease biodiversity, compete against native wildlife for resources, and pollute watersheds. Invasive plants, in particular, are a threat to watersheds. They can outcompete native plants, spreading quickly to take over wetlands and streams. This can decrease water quality and disrupt ecosystems.

In this activity, students will research an invasive plant or animal in their community, and then collaborate as a class to create an educational pamphlet. Students will learn how plants and animals can be invasive in one watershed, yet not in another. They also will be empowered with the action steps necessary to help their local watershed.

LEARNING OUTCOMES

- Students define invasive species.
- Students give examples of four invasive species in their local community.
- Students state two harmful impacts of invasive plants and animals on local watersheds.
- Students recite two action steps for removing invasive species in their local watershed.

MATERIALS

- Paper
- Pencils
- Colored pencils, or markers
- Scissors
- Copies of *Invasive Species Research Sheet*
- Internet access and/or research resources
- Whiteboard or poster paper

ACTIVITY

Step 1: What is an invasive species?

- To answer this question, ask students to read the Invasive Plant Introductory Article, "Green Invaders." You can also read it aloud to the class.
- Next, tell students to write their own definition for invasive species, and to determine at least two harmful impacts invasive species have on watersheds. As a class, compare and contrast student responses.
- Show *Scientific American's* Invasive Species Examples slide show given in the *Watershed Heroes Teacher Resource* PDF found at **kids.sdzwa.org/curriculum**. After the slide show, ask students:
  - -Have you previously heard of the fungus that infects trees, or any of the animals?
  - -Were you surprised to find out that they are considered invasive species?
  - -How can a species be invasive in one place, but not invasive in another?
- To conclude, record student ideas, definitions, and harmful impacts on a whiteboard, or poster paper, to return to later.

Step 2: How do I create awareness about an issue?

- First, ask students to imagine that they have been hired by a local conservation organization to create awareness of invasive plant and animal species in their community. Their task will be to work in small groups to research and write profiles of assigned species, and then design an educational pamphlet for local distribution.
- Divide the class into small groups corresponding to the number of invasive species to be researched. Assign each group one invasive species.
- Distribute copies of the *Invasive Species Research Sheet*. Tell student groups they can use the previous brainstorm session and all available resources to answer the questions about their species. Along with the information, students should find a photograph or illustration of their assigned species.
- Once groups have finished the research on their invasive plant or animal, the class as a whole will assemble their information to create an educational pamphlet for your local community. This could be done as an individual pamphlet for each invasive plant or animal, or a pamphlet compiling all invasive species together. Students can share their pamphlets with friends and families.

Pamphlet information should include the definition of an invasive plant or animal, pictures and short descriptions of the invasive plants or animals, and helpful tips about conservation and helping watersheds.

NGSS performance expectations 3-LS4-3, 3-LS4-4, 3-ESS2-2, 4-LS1-1, 5-ESS2-1, 5-ESS3-1

ALIEN INVASION

EXTENSION

1. Organize a field research day where students sketch or photograph their own images of an invasive species.
2. Share student pamphlets with other classes or the community. Create a larger version of the pamphlets on poster board to share at your school's Open House or Back to School Night.
3. Explore the dynamics of invasive plants using a game of tag. Designate a few students as invasive plants that then tag other students. Once tagged, the native plant withers and dies. After the game, have the students reflect on what it means if a few invasive plants invade a watershed and cause the native plants to die.

The brown trout is native to Europe and Scotland. It is a voracious predator on native trout including the California state freshwater fish, the golden trout.

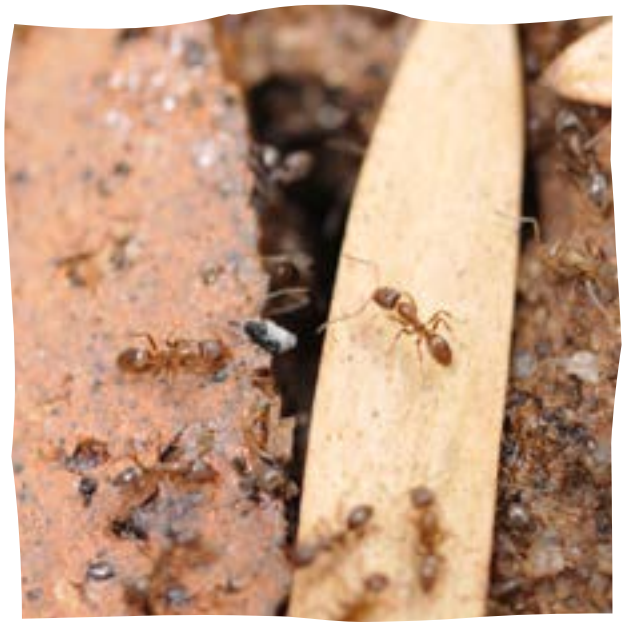
The European green crab is native to Europe and North Africa. It arrived in San Francisco Bay in 1990 and now lives all along California's coastline.

ALIEN INVASION

INVASIVE SPECIES IN CALIFORNIA

Pampas Grass

Arundo Grass



Argentine Ants

African Clawed Frog

INVASIVE SPECIES WORLDWIDE

Kudzu

Tree-of-heaven

Zebra Mussels

Burmese Python

ALIEN INVASION ▶ ACTIVITY

INVASIVE SPECIES RESEARCH SHEET

Use the following questions to learn more about your invasive species.

In what area of the world did this plant or animal originate?

How and when is it believed to have reached your community?

What are the particular needs of this plant or animal? For example, space (including roots), water, and sunlight?

Why does it thrive in your watershed?

What adaptations or structures help it thrive?

How might this impact, in turn, affect the humans in your community?

What is the impact of this plant or animal on the watershed?

What measures have been taken to control this species? By what people or organizations?

GREEN UP YOUR CLASSROOM

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

INTRODUCTION

Much of the trash we generate comes from packaging; for example, the wrappers from prepared foods. It is estimated that the average student lunch generates 67 pounds of waste per school year. For an average-sized elementary school, that equates to almost 19,000 pounds of lunch waste every year heading to our landfills. Of all the waste coming from student lunches, 70 percent is recyclable.

In this activity, students calculate their individual lunch waste and plan ways to reduce items that go to the landfill while increasing items that can be recycled or composted. The goal is a waste-free lunch.

LEARNING OUTCOMES

- Students calculate the amount of trash, food waste, and recycled material in their lunches for one year.
- Students organize and follow a personal waste-management plan with the goal of having waste-free lunches.
- Students share their plans with their family and community.

MATERIALS

- Weight scales
- Pencils
- Whiteboard or poster paper
- Copies of *My Lunch* activity sheet
- Calculators
- Cameras (optional)

ACTIVITY

Step 1: Introduce this activity by telling students they will be looking at the type of food they bring for lunch, and how much they throw away as trash after they have eaten. Distribute the *My Lunch* activity sheet, one to each student. Review the Example Lunch side of the sheet. Point out the photo, the list of lunch items, the weights, and the yearly values.

Step 2: Tell students they will now collect data on their lunches. Distribute the cameras, and ask students to take a photo of their lunches, showing all items clearly. Before lunchtime, remind students to keep all leftovers and trash after eating their lunches. After lunch, ask students to take a photo of any uneaten food and trash. If cameras are not available, ask students to draw their lunches.

Step 3: After lunch, distribute scales, calculators, and pens or pencils. Ask students to sort their leftovers into four categories: waste, food waste, recyclables, and unknown. Review these categories as a class to confirm which item belongs where. At the end of the review, there shouldn't be any items in the unknown category. Tell students to list their items on the activity sheet.

Step 4: Next, tell students to place items on the scale and record the weights on their activity sheets. To calculate the yearly total, tell students to multiply their daily total by the number of days in the school year.

Step 5: When students have completed their data and graphed the results, lead a class discussion. Combine all the student's data to create a classroom profile of waste. Create a bar graph representing the amounts in the three categories.

Step 6: Discuss student observations and feelings about this activity. Tell students the goal for the next few days is to pack a waste-free lunch. Brainstorm action steps as a class, listing ideas on a whiteboard. Use these guiding questions:

-What do you notice about your lunch prior to eating it, compared to after?
-What can we do to reduce trash?
-What can we do to eliminate trash all together?

Step 7: After brainstorming ideas to eliminate trash, ask the class to work together to create an action plan for raising awareness about implementing a waste-free lunch program at their school. This could include videos, posters, or flyers that students can distribute throughout the school, or a school-wide assembly presentation where students become characters like the "Compost Queen" or "Recycle Randy," and educate fellow classmates about ways to create waste-free lunches.

NGSS performance expectations, 5-ESS3-1, 3-5-ETS1-1

GREEN UP YOUR CLASSROOM

TEACHER RESOURCES

Visit kids.sdzwa.org/curriculum to find this curriculum in a PDF format and a list of Web links for this activity.

EXTENSIONS

1. Get your project started! Grades of Green listed in the *Watershed Heroes Teacher Resource* PDF found at **kids.sdzwa.org/curriculum** gives a step-by-step action plan for a Zero Waste program that can be implemented at your school site, as well as a variety of other student-led environmental projects.
2. Research plants to grow indoors to help reduce indoor air pollution.
3. Start your own vermicomposting bin in your classroom.
4. Research the "Bring Your Own Bag" Campaign. Distribute students equally and have them participate in a debate for and against the campaign.
5. Go to the library or the Internet and have students research a variety of related topics, such as oil spills, pollution, climate change, landfills, recycling, and other activities, and have student groups present their findings to the class.

GREEN UP YOUR CLASSROOM ▶ EXAMPLE

EXAMPLE LUNCH

EXAMPLE LUNCH TRASH

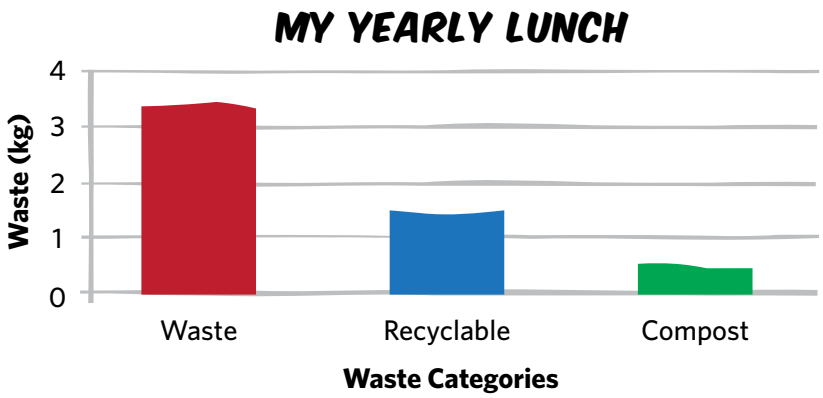
WASTE DATA TABLE

Depends on your location if this is recyclable or not

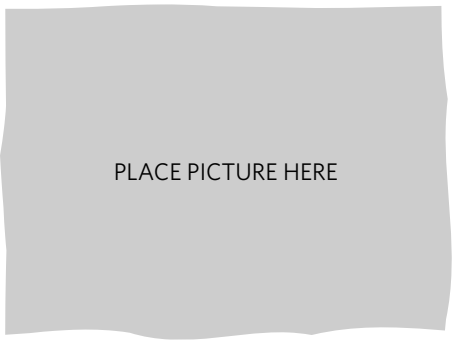
WASTE		RECYCLABLE		COMPOST	
sandwich bag	1 gram	juice carton	4 grams	Bread crust	3 grams
fruit rope wrapper	1 gram	pudding cup	4 grams		
fruit squeeze bag	11 grams				
bar wrapper	1 gram				
plastic spoon	5 grams				
Daily Total:	**19 grams**	**Daily Total:**	**8 grams**	**Daily Total:**	**3 grams**
Yearly Total:	**3,420 grams or 3.42 kg**	**Yearly Total:**	**1,440 grams or 1.44 kg**	**Yearly Total:**	**540 grams or 0.54 kg**

(Yearly Total = Daily Total x 180 school days)

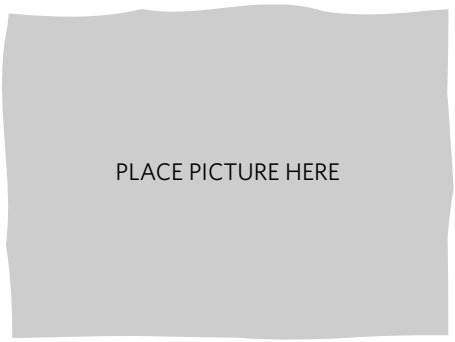
1. My yearly total for waste is: 3.42 kilograms
2. My yearly total for recyclables is: 1.44 kilograms
3. My yearly total for compost is: 0.54 kilograms
4. The yearly waste total for my class is: 109.44 kilograms



GREEN UP YOUR CLASSROOM ▶ ACTIVITY



MY LUNCH BEFORE



MY LUNCH TRASH

WASTE DATA TABLE

Depends on your location if this is recyclable or not

WASTE		RECYCLABLE		COMPOST	
Daily Total:	**_____ grams**	**Daily Total:**	**_____ grams**	**Daily Total:**	**_____ grams**
Yearly Total:	**_____ grams or _____ kg**	**Yearly Total:**	**_____ grams or _____ kg**	**Yearly Total:**	**_____ grams or _____ kg**

(Yearly Total = Daily Total x 180 school days)

1. My yearly total for waste is: _____
2. My yearly total for recyclables is: _____
3. My yearly total for compost is: _____
4. The yearly waste total for my class is: _____

MY YEARLY LUNCH

Don't forget to title your graph and label the x and y axes.

CONNECTION TO THE NEXT GENERATION SCIENCE STANDARDS

The materials and activities presented in this guide are for correlating Common Core standards, check the NGSS website.

PERFORMANCE EXPECTATIONS

Grade 3: 3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Dimension	Name or NGSS citation	Student tasks in *Alien Invasion*	Student tasks in *Watershed PSA*
Science and Engineering Practices	*Constructing Explanations and Designing Solutions*	*Students examine invasive species living in their community.*	*Students identify four threats to watersheds and offer suggestions for help.*
Disciplinary Core Ideas	*LS4.C Adaptation*	*Student report how some plants and animals are invasive in one area, but not in another.*	*Students compare how species adapt (or don't) to the threats.*
Cross-cutting concepts	*Cause and Effect*	*Students show the effect of invasive species on native species.*	*Students tell how threats impact plants and animals in the watershed.*

Grade 3: 3-LS4-4: Make a claim 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.

Dimension	Name or NGSS citation	Student tasks in *Watershed Shark Tank*	Student tasks in *Watershed PSA*	Student tasks in *Eyewitness News*	Student tasks in *Alien Invasion*
Science and Engineering Practices	*Constructing Explanations and Designing Solutions*	*Students pitch product ideas, including benefits and drawbacks.*	*Students identify four threats to watersheds and offer suggestions for help.*	*Students identify four threats to watersheds and offer suggestions for help.*	*Students examine invasive species living in their community.*
Disciplinary Core Ideas	*LS4.D Biodiversity and Humans*	*Students infer how their product changes plants and animal assemblages.*	*Students outline human impact on watershed.*	*Students outline human impact on watershed.*	*Students tell how human activity has introduced invasive species.*
Cross-cutting concepts	*Systems and System Models*	*Students identify the components of the watershed and their product's role in that system.*	*Students explain how their suggestions support the components of the watershed.*	*Students explain how their suggestions support the components of the watershed.*	*Students relate how invasive species change the roles of other animals and plants in the watershed.*

Grade 4: 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Dimension	**Name or NGSS citation**	**Student tasks in *Alien Invasion***
Science and Engineering Practices	*Engaging in Argument from Evidence*	*Students debate impacts of invasive species in their community.*
Disciplinary Core Ideas	*LS1.A Structure and Function*	*Students describe how invasive plants survive in new watersheds.*
Cross-cutting concepts	*Systems and System Models*	*Students relate how invasive species change the roles of other animals and plants in the watershed.*

Grade 5: 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Dimension	**Name or NGSS citation**	**Student tasks in *Go with the Flow***
Science and Engineering Practices	*Using Mathematics and Computational Thinking*	*Students research and create playing cards that address water usage.*
Disciplinary Core Ideas	*ESS2.C The Roles of Water in Earth's Surface Processes*	*Students review and analyze real watershed models and maps to draw a generic watershed.*
Cross-cutting concepts	*Systems and system models*	*Students identify myriad components in a watershed, from headwaters to discharge in the ocean.*

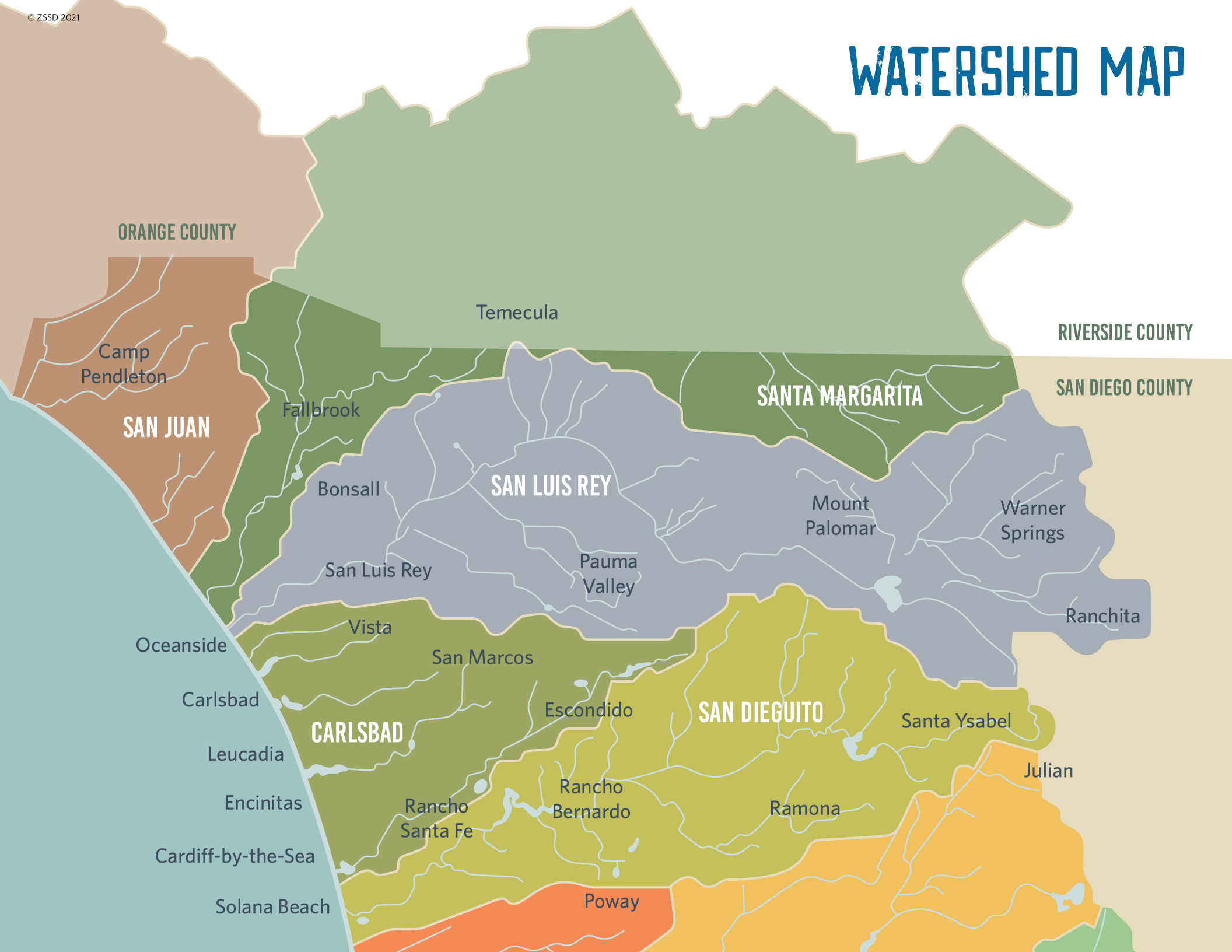
Grade 5: 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Dimension	**Name or NGSS citation**	**Student tasks in** *Watershed Shark Tank*	**Student tasks in** *Green Up Your Classroom*	**Student tasks in** *Watershed Heroes and Villains*
Science and Engineering Practices	*Obtaining, Evaluating, and Communicating Information*	*Students research and report about a product that will improve watershed health.*	*Students catalog and analyze waste volume from their school lunch, and report on data collected.*	*Students research and report on the impacts of human activity and pollution on watersheds.*
Disciplinary Core Ideas	*ESS3.C Human Impacts on Earth Systems*	*Students relate how human activities have affected watersheds.*	*Students correlate waste from their lunch to its impact on the environment.*	*Students connect that human activity has negative effects on the health of a watershed.*
Cross-cutting concepts	*Systems and System Models*	*Students identify the components of the watershed and their product's role in that system.*	*Students relate the their lunch waste flow to the total waste disposal in their community.*	*Students define the components of a healthy and ailing watershed system.*

Grades 3-5: 3-5ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or costs.

Dimension	**Name or NGSS citation**	**Student tasks in** *Watershed Shark Tank*	**Student tasks in** *Green Up Your Classroom*	**Student tasks in** *Watershed PSA*
Science and Engineering Practices	*Asking Questions and Defining Problems*	*Students create a product to address a problem affecting watershed health.*	*Students catalog and analyze waste volume from their school lunch, and ask how they can reduce the waste.*	*Students research and report on current threats to watersheds around the world.*
Disciplinary Core Ideas	*ETS1.B Developing Possible Solutions*	*Students research and, if possible, test their products to find areas of improvement.*	*Students apply analyzed data to work toward a Zero Waste lunch.*	*Students suggest methods to help remediate threats to the watersheds.*
Cross-cutting concepts	*Influence of Engineering, Technology, and Science on Society and the Natural World*	*Students apply current technology to build their unique products.*	*Students incorporate technology in their plans to reduce lunch waste.*	*Students employ technology in their remediation methods.*

WATERSHED MAP




Del Mar
La Jolla
Pacific Beach
Mission Beach
Ocean Beach
Point Loma
Coronado
Imperial Beach
PENASQUITOS
SAN DIEGO RIVER
Santee
San Diego
El Cajon
Alpine
Descanso
Pine Valley
La Mesa
Lemon Grove
SWEETWATER
PUEBLO
Spring Valley
Jamul
Boulder Oaks
National City
OTAY
TIJUANA
Campo
Chula Vista
San Ysidro
Tecate
Tijuana
MEXICO
N
W
E
S

GLOSSARY

adaptation. A physical characteristic or behavior that helps an organism survive in its habitat.

ecosystem. The interplay and relationships between the physical, non-living environment and living organisms.

endangered. Plant and animal populations with numbers so low that they are moving toward extinction.

environment. The natural world of the land, sea, and air.

extinct. A species of animal or plant that once lived.

food web. A model that shows how energy is transferred from the sun to plants and animals.

habitat. The place where an organism lives.

invasive species. An organism that causes ecological or economic harm in its non-native environment.

landfill. An area designated for the burial of waste material.

organism. A living animal, plant, or fungus.

pollution. The introduction of items such as chemicals, trash, or extreme conditions that have harmful or disruptive effects on the environment.

species. A group of organisms that share common characteristics and mate to produce fertile young.

watershed. An area of land defined by water flowing through a system of rivers, streams, or lakes to the ocean.

LEARN MORE ABOUT ANIMALS

At the San Diego Zoo and San Diego Zoo Safari Park
animals.sandiegozoo.org

Animal Library
ielc.libguides.com/sdzg/factsheets/index

Research and Conservation
sdzwa.org

Explore the San Diego Zoo Wildlife Alliance Kids' website
kids.sdzwa.org

PACIFIC POND TURTLE

San Diego Zoo Kids

kids.sdzwa.org