

# SMITHSONIAN

IN YOUR CLASSROOM

FALL 2011

WHAT'S **YOUR** PROBLEM?

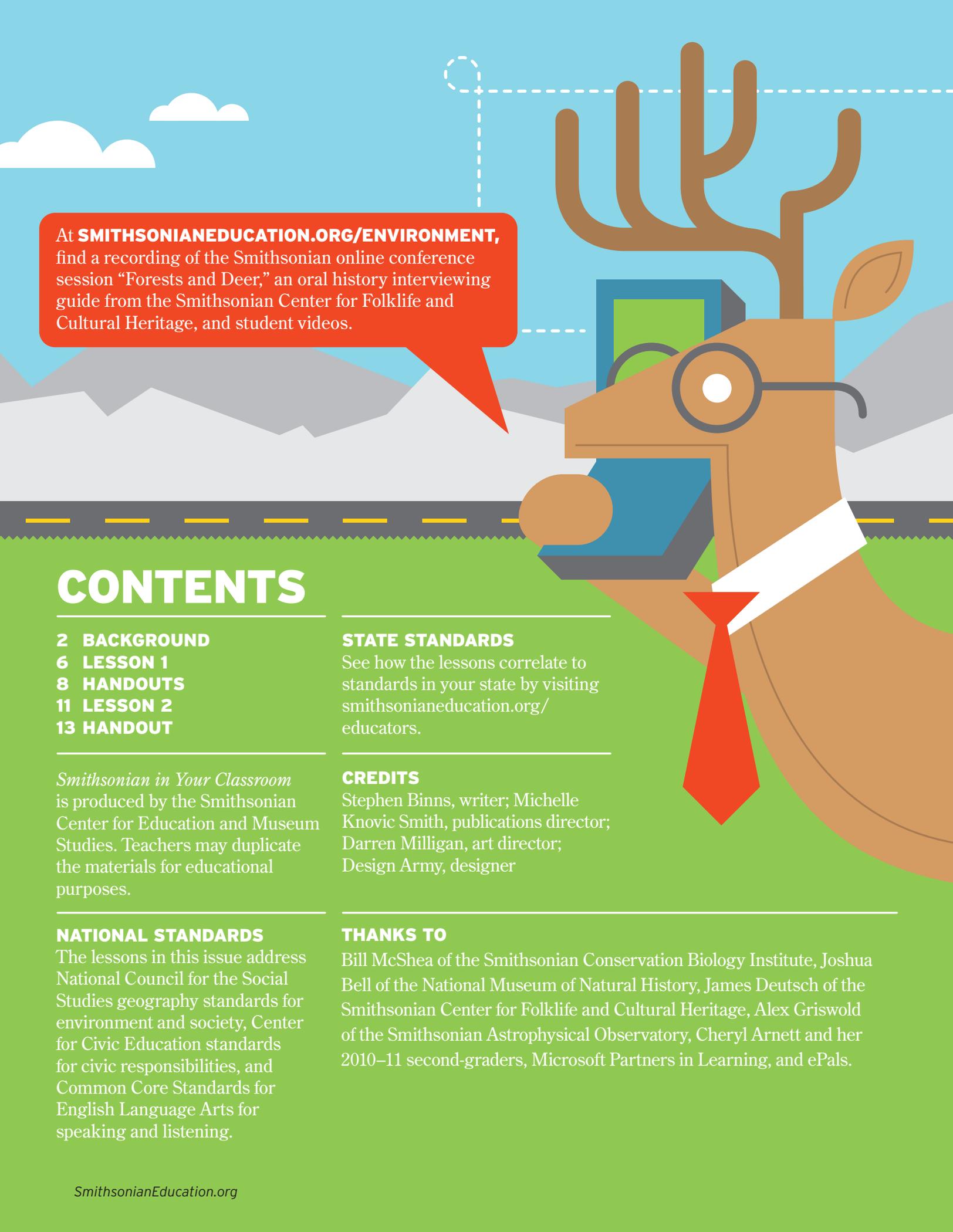


**A Look at the Environment in Your Own Backyard**



Smithsonian Institution

*SmithsonianEducation.org*



At **SMITHSONIANEDUCATION.ORG/ENVIRONMENT**, find a recording of the Smithsonian online conference session “Forests and Deer,” an oral history interviewing guide from the Smithsonian Center for Folklife and Cultural Heritage, and student videos.

## CONTENTS

### 2 BACKGROUND

### 6 LESSON 1

### 8 HANDOUTS

### 11 LESSON 2

### 13 HANDOUT

*Smithsonian in Your Classroom* is produced by the Smithsonian Center for Education and Museum Studies. Teachers may duplicate the materials for educational purposes.

### NATIONAL STANDARDS

The lessons in this issue address National Council for the Social Studies geography standards for environment and society, Center for Civic Education standards for civic responsibilities, and Common Core Standards for English Language Arts for speaking and listening.

### STATE STANDARDS

See how the lessons correlate to standards in your state by visiting [smithsonianeducation.org/educators](http://smithsonianeducation.org/educators).

### CREDITS

Stephen Binns, writer; Michelle Knovic Smith, publications director; Darren Milligan, art director; Design Army, designer

### THANKS TO

Bill McShea of the Smithsonian Conservation Biology Institute, Joshua Bell of the National Museum of Natural History, James Deutsch of the Smithsonian Center for Folklife and Cultural Heritage, Alex Griswold of the Smithsonian Astrophysical Observatory, Cheryl Arnett and her 2010–11 second-graders, Microsoft Partners in Learning, and ePals.

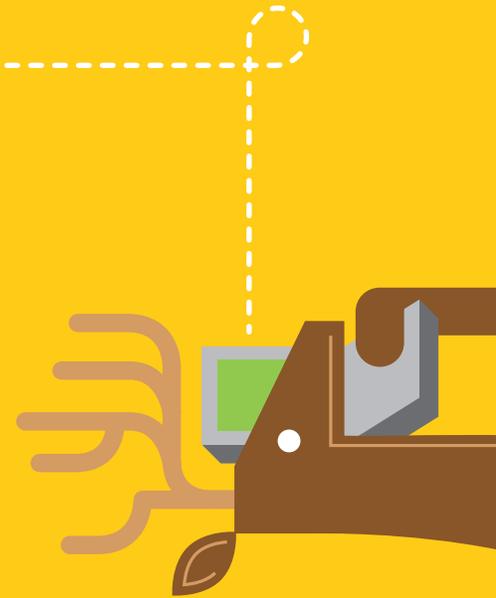


ate in 2010, teacher Cheryl Arnett and her second-grade class in Craig, Colorado, took part in a Smithsonian online conference on environmental issues. One session was led by wildlife ecologist Bill McShea, who discussed the exploding population of deer in the United States. The class could certainly relate. Craig, a town of about nine thousand in the northwestern corner of the state, had been overrun in the last few years by hundreds of mule deer.

The conference was one in a series that challenged students not only to learn about the environment, but also to take action to improve it. The class accepted the challenge. After researching the larger issue of deer populations and environmental change, they began looking for ways to educate the rest of the town and to offer possible local solutions.

On the next few pages we tell their story in the hope that it will inspire you and your class to take on your own environmental challenge. In the first lesson plan, your students begin their research by interviewing people who live in the community. They ask about the state of the local environment—and how it has changed over the years—before deciding on a problem to tackle. In the second lesson, Cheryl Arnett recounts the steps of the Craig project, which might serve as a loose outline for your own project.

Says Arnett: “The project fulfilled several parts of our required curriculum and standards. The students learned about local government. They used communication skills, persuasive writing, critical thinking, and science concepts. What’s more, they attached emotion and pride to the work. They learned that they can do something worthwhile, no matter their age.”





# DEER IN

Smithsonian wildlife ecologist Bill McShea is a specialist in a very broad field: the management of deer populations around the world. There are nearly fifty species of deer living in all kinds of habitats, from tundra to tropical islands. They range in size from the moose, one of the largest animals on land, to the South American pudu, which stands little more than a foot tall.

Maintaining the health of these species and their ecosystems can be a paradoxical business. While deer in much of the developing world are threatened with extinction, McShea faces the opposite problem

at his home base in the Appalachian Mountains of Virginia and throughout the eastern United States. In the last few decades, the population of the native white-tailed deer has grown to such numbers that it is now a threat to its own ecosystem.

In part, this is the result of a conservation success. After a sharp decline in the population in the early twentieth century, deer hunting became well regulated in the United States and poaching well controlled. We succeeded in placing limits on ourselves as predators, but we did so after limiting and even eliminating such predators as wolves and mountain lions.



# AMERICA

## THE LARGER ISSUE

More significantly, we have changed the habitat in ways that benefit deer at the expense of other species. The white-tailed deer and the closely related western mule deer flourish on the edges of forests, in clearings where vegetation is not in the treetops but within easy reach. Urban development creates patchworks of new edges. Landscaping offers a steady supply of new food.

McShea's particular worry for the Appalachians is the decline of native oak trees. Like a coral reef along a coastline, oaks are "foundation species" of the Appalachian forest, the base of the ecosystem. With more deer to eat fallen acorns, there is less food for

the sixty or so mammals and birds that depend on acorns. And, of course, because mighty oaks from acorns grow, there are fewer new trees.

The goal of conservationists is to bring the deer back to their natural place in the ecosystem, in which they thrive but do not dominate.

"A forest without deer," says McShea, "functions just as poorly as a forest with too many deer."



## BACKGROUND

# DEER IN CRAIG, COLORADO

## THE LOCAL QUESTION

Bill McShea talked of human costs and well as ecological change in the online conference attended by the second-graders in Craig, Colorado. As the deer population increases, so do highway accidents, property damage, and incidents of Lyme, or deer-tick, disease. The control of the population, said McShea, will have to be done on a local basis, with people asking themselves, “Are deer a problem in our community and what can we do about it?”

Teacher Cheryl Arnett was happy to see that the students stayed attentive during the hour-long session. They were able to connect the discussion to concepts they had studied in science—food chains, food webs, predators and prey—and to connect the concepts to the situation in Craig.

The town’s population of mule deer (so named for their extra-long ears) had been estimated at between two and four hundred. Everyone had seen the deer, but not everyone saw them as a problem. Some argued that there was tourism potential in being

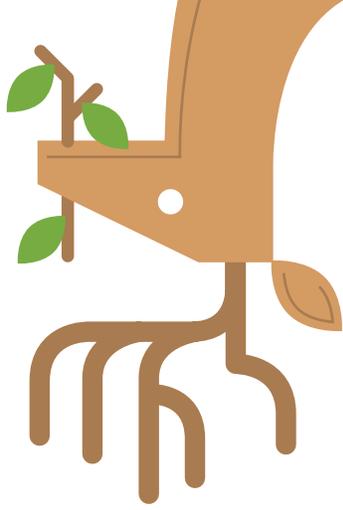
the urban mule deer capital of Colorado. Many were aghast when the Colorado Division of Wildlife offered a plan for extermination, which included stationing sharpshooters around town at night.

Many others could not regard the deer as anything but pests, however magnificent these pests were. In addition to eating up gardens, landscaping, and even Halloween jack-o’-lanterns, they had turned a predator-prey relationship on its head by attacking small dogs.

As for the second-graders, they were undivided on the question *Are deer a problem in our community?* They had learned that deer in such numbers represent an environmental imbalance. The question that remained: *What can we do about it?*

Arnett invited a wildlife official to the classroom for an interview with the students. He told them that the city council had voted down the plan of systematic killing and that other measures had not worked.





One deer was tranquilized, tagged, and driven five miles out of town. The next day it was back on the streets, tag and all.

The students came to a decision. They would share their research with the rest of Craig. By way of a solution, they would suggest limiting the food supply. One thing they knew is that an abundance of food leads to more breeding. Some of the local does were giving birth to twins and triplets.

The mayor of Craig also came to the classroom for an interview. The students told him that they wanted to create a brochure about the deer and distribute it through local businesses. He endorsed the idea.

Titled “The Deer Are Here to Stay,” the brochure encourages residents to plant flowers, shrubs, and trees that deer avoid. It also tells how to set up effective barriers. A deer, it seems, won’t jump a fence if it can’t see what’s on the other side.

As the title foretold, the problem hasn’t gone away. But the class had proposed long-term management rather than quick fixes. This was a result, they say, of their collective gathering of facts.

“You use all your minds together to make this whole one brochure,” a student told the *Craig Daily Press*. “You stuff everything that’s in your mind about the deer into a six-inch-tall paper.”

And how was it that a group of second-graders could educate a whole town?

“The older you get, the more you forget about things. We’re still learning.”

## THE DEER ARE HERE TO STAY

### PLANT THINGS OUTSIDE YOUR FENCE THAT DEER DON'T LIKE TO EAT.



#### TREES

Pine, Spruce, Birch, Poplar, Green Ash, and Juniper



#### SHRUBS

Lilacs, Red Osier Dogwood, and Potentilla



#### FLOWERS

Dianthus, Iris, Marigold, Foxglove, Geranium, Peony, Snapdragon, Nasturtium, Oriental Poppy, and Cosmos

When there is always plenty of food the deer have more fawns and the herd grows larger. We can help by limiting the food supply.

## LESSON ONE

### GETTING THE LAY OF THE

# LAND

Craig, Colorado, experienced an environmental change that could not have been more obvious, but the students had to do some research to see the change as part of a larger trend and to look for ways of addressing it.

Your students will probably have to research the question of whether there is a local environmental issue that they can address. In this lesson, they conduct interviews with people in your town or neighborhood.



In a class discussion, seek out the students' own views of the environment. What comes to mind when they hear the word *environment*? Do they think in terms of natural beauty and outdoor activities? Are their first thoughts, instead, of problems like climate change or endangered species? Ask them to consider: *Have you changed anything in your own life out of concerns for the environment?*



Share the story of the class project in Craig, Colorado. Ask the students: *Is there an environmental problem here that we could take on? How would we do it?* Point out that an important part of the Craig project was to bring in the thoughts of others by interviewing them.

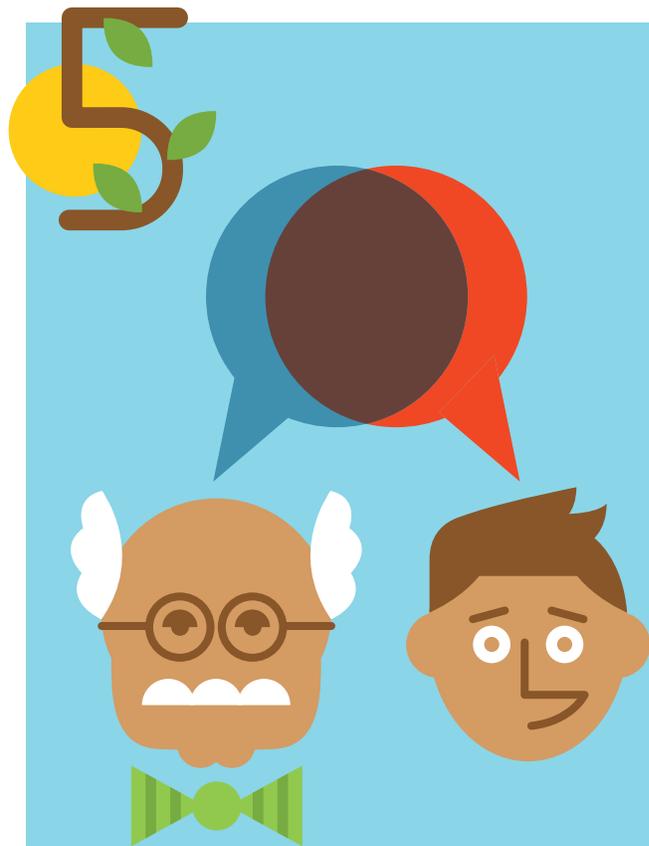


Tell the class that each student will pick a person to interview, ideally someone who has lived in the community for a long time—a parent or grandparent, a neighbor, a teacher. Before narrowing the focus to current problems, the students will try to get some historical perspective from the interviewees, both on changes to the local environment and on changing attitudes toward the environment. On page 8 are tips on interviewing from Smithsonian oral historians. On page 9 are example questions.



After students have shared their findings with the class, consider whether these are more “environmentally friendly” times than previous times. A student might have discovered, for example, that the idea of recycling—at least for environmental reasons—was unknown in a grandparent’s time. On the other hand, the childhood of a grandparent might have required less fossil fuel than the life of the student. The grandparent may have grown up in a town or neighborhood in which the needs of daily life were within walking distances.

Try to draw connections between local issues mentioned by the interviewees and environmental subjects that students might have learned about in science. For instance: If an interviewee mentioned seeing fewer songbirds in the neighborhood, this might lead to a discussion of habitat loss for native species.



Consider both the students’ ideas and those of the interviewees as you try to come to a consensus on a local problem to address. On page 10 is an organizer based on Cheryl Arnett’s method of giving a framework to class discussions. You might use it when choosing between possible projects. Or you might use it, as her class did, when you have chosen the project but need to clarify and revise your ideas.





# CONDUCTING AN INTERVIEW

ADVICE FROM SMITHSONIAN ORAL HISTORIANS

“The kind of research you’re doing is called ‘community history.’ It’s a great way to add voices to history by talking to people who have experienced changes firsthand.”

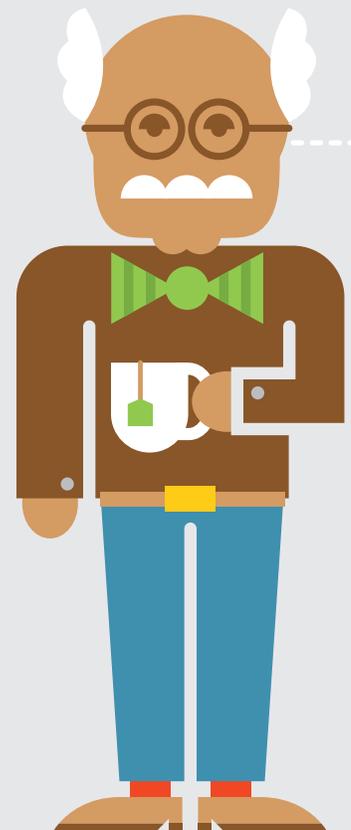
“Find people who have been members of the community for a number of years and be very frank with them. Tell them what sorts of information you are hoping to find.”

“Why are you interviewing them? Why have you selected them? What stories do you expect them to be able to share with you? You should know all this in advance.”

“Start with a few easy questions. *What’s your name? Where were you born? How old are you?* Simple questions can build a rhythm before you work your way into more complex questions.”

“Always remember that the people you are interviewing are the experts. That’s why you have chosen them—they have something important to say. Ask your question and then get out of the way!”

“What is most important is to *listen*. If the interviewees see your enthusiasm and your interest in the subject, that will encourage them to be more forthcoming and maybe give you stories or information that they had never told anyone before!”



When were you born? Where did you grow up? How long have you lived here?

**DID PEOPLE WORRY ABOUT THE ENVIRONMENT WHEN YOU WERE GROWING UP?**

**WHAT WERE THE PROBLEMS THEY WORRIED ABOUT?**

**POSSIBLE QUESTIONS TO ASK**

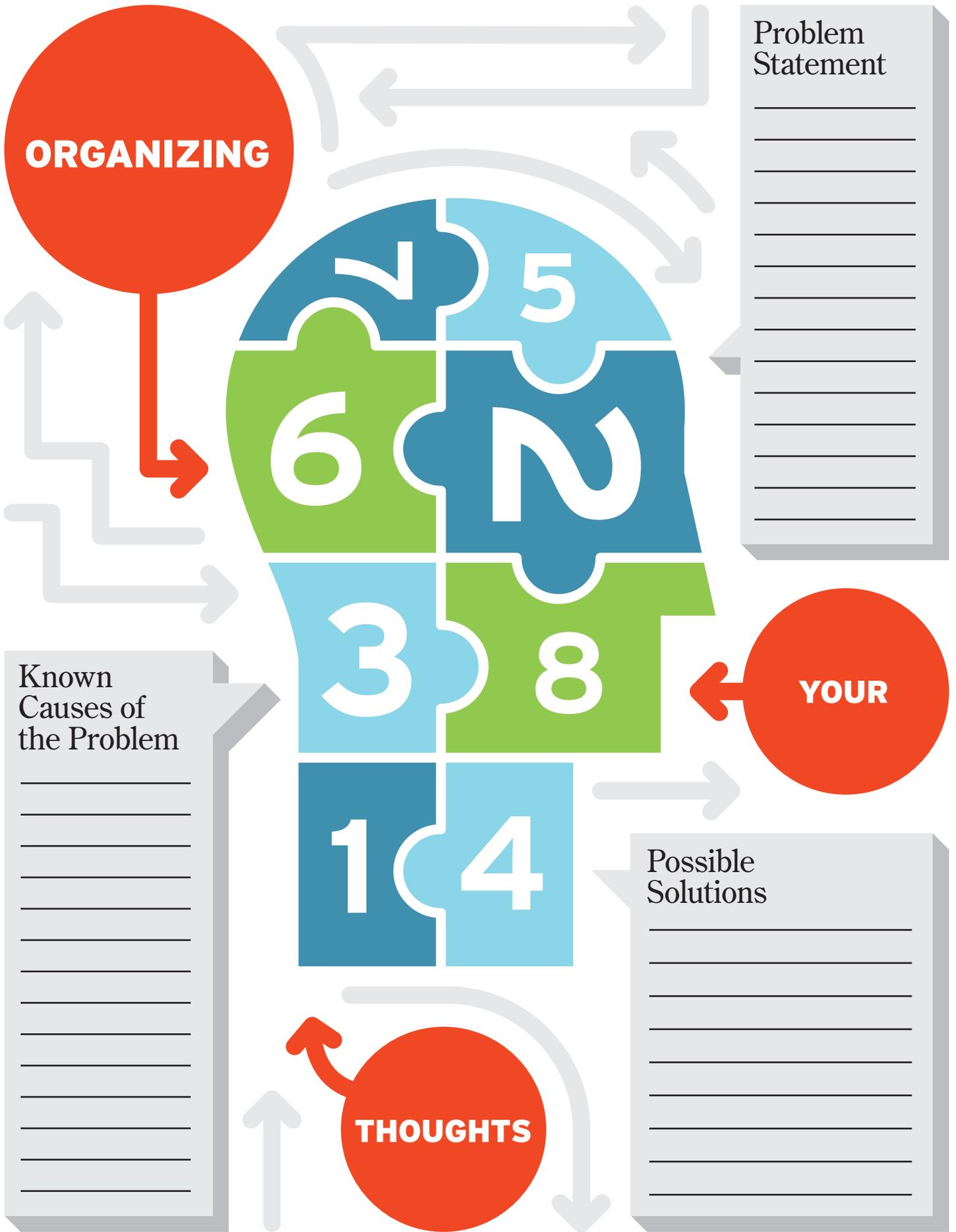
Do you think that people treated the environment better or worse than we do today?

**HAVE YOU SEEN CHANGES TO THE ENVIRONMENT IN THIS COMMUNITY IN THE TIME YOU'VE LIVED HERE?**

Do you see any local environmental problems that could be solved by the people in the community?

**WHAT ARE YOUR IDEAS ON HOW THESE PROBLEMS COULD BE SOLVED?**

Have they been changes for the good or for the bad?



# TAKING ACTION

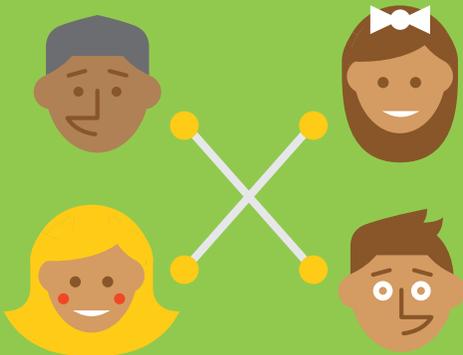
BY  
**CHERYL  
ARNETT**

My second-grade class had dealt with the concept of problem and solution in reading, math, and science, but taking on the deer question in our town was our first attempt at solving a real-world problem. We began with an issue that the community was already discussing—sometimes heatedly. The problem you address might be very different from ours, but I hope you find it helpful to see the basic steps we took.

We ourselves did not know what step would follow from the last. The students and I were learning together how to take action!

## STEP ONE: DOING THE RESEARCH

Our research began with the online session with Smithsonian conservationist Bill McShea. The session left students with questions about how our own problem related to the national situation he discussed. We saw that more research was needed. Armed with their questions, the students began to search the Internet for similar problems and possible solutions in other locations. They discovered that towns in faraway places like Michigan and New Jersey were also overrun by deer and that no one had seemed to solve the problem.

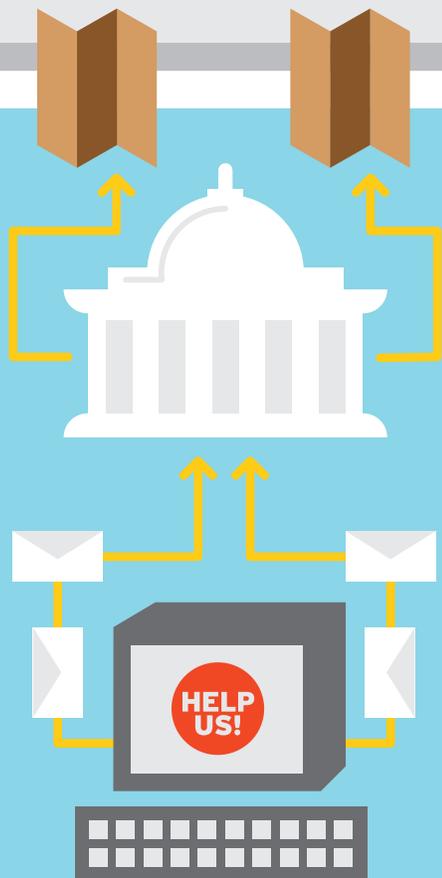


## STEP TWO: ORGANIZING YOUR THOUGHTS

In a class discussion, we came up with a problem statement, listed the known causes of the problem, and went to work on brainstorming solutions. Several times during the project we repeated the process. This was our graphic organizer of sorts. The kids worked in groups to set it down on paper, and we also wrote it all out on the board at times. It was our way of organizing our thoughts and making sure we were on the right track.

### STEP THREE: TURNING TO THE EXPERTS

Our problem involved wildlife, so we made a call to the Colorado Division of Wildlife. We explained our project, told them that we still had questions, and requested a visit from an officer. They were more than willing to help out. An officer came to the classroom and brought along the information we had requested. The visit was a wonderful opportunity for the students to engage in a dialogue about their learning with someone other than the classroom teacher. They learned new facts and received validation for their knowledge.



### STEP FOUR: TURNING TO THE COMMUNITY

After much brainstorming we realized that the problem of the deer in Craig was too large for a second-grade class to solve. The solution would require the help of the whole community.

First, we worked together to draft a letter to the city council, which we sent by e-mail to every member. The students sat in a group by the computer. I did the typing while they came up with the words to sum up their thoughts on the problem and possible solutions. I then invited the mayor to visit our class and he agreed.

It has been my experience that most adults are very willing to share their knowledge with students and only need to be asked. The students prepared for the mayor's visit by thinking of questions they would like to ask and last-minute facts they wanted to confirm. Listening to children discuss real issues with a decision maker is amazing. They were confident in their knowledge and respectful of the position of authority they were addressing. They asked permission to create a brochure and distribute it in town. The mayor approved their plan.

### THE LARGER LESSON

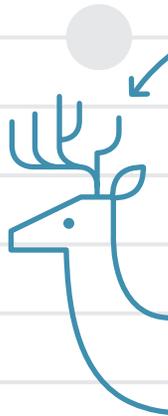
The deer question was controversial in Craig, with "pro-deer" and "anti-deer" factions. We discussed this openly and the students dealt with the controversy confidently. They had learned the difference between fact and opinions, had learned to respect differing opinions, and knew that their facts were in order to support their position.

Lesson learned by the teacher: Let's listen to the children and help them see that this world belongs to them!



# FINDING A SOLUTION

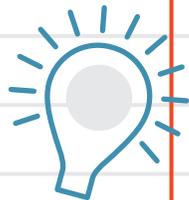
ADVICE FROM THE STUDENTS IN CRAIG, COLORADO



“First, identify a problem.”

“Think of ideas to solve the problem.”

“Send out e-mails so people will spread the word.”



“You can go online and see if other places have the same problems.”

“Put all your heads together and think of as many solutions as you can.”



“Think of a way to spread the word.”

“Think of how much it will cost.”



“Consider all the possibilities.”

“Know that some solutions won't work.”

“Ask teachers and students from other countries and towns for advice. Ask scientists and experts. Ask people to help!”

“Make sure you give facts and not opinions.”

“You have to get your message out, so you might ask your local newspaper if they can get the story out.”

