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The *Natural Inquirer* Monograph Series

Time Out! How Much Time Do Kids Spend Outdoors?

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DEPARTMENT OF AGRICULTURE

The
Natural Inquirer
Monograph Series

Time Out! How Much Time Do Kids Spend Outdoors?

Produced by
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Cradle of Forestry in America Interpretive Association

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Who are Scientists?

Scientists are people who collect and evaluate information about a wide range of topics. Some scientists study the natural environment.

To be a successful scientist, you must:

Be curious:

Are you interested in learning?

Be enthusiastic:

Are you interested in a particular topic?

Question everything:

Do you think about what you read and observe?

Be open-minded:

Are you willing to listen to new ideas?

Be careful:

Are you accurate in everything that you do?

Welcome to the *Natural Inquirer* Monographs!

Scientists report their research in a variety of special books. These books enable scientists to share information with one another. A monograph is a book about research that focuses on a single science project. This monograph of a *Natural Inquirer* article was created to give scientists the opportunity to share their research with you and other middle school students.

The monograph presents scientific research conducted by scientists in the Forest Service, U.S. Department of Agriculture. If you want to learn more about the Forest Service, you can read about it on the inside back cover of this monograph, or you can visit the *Natural Inquirer* Web site at **http://www.naturalinquirer.org.**

All of the research in this *Natural Inquirer* monograph is concerned with the natural environment, such as trees, forests, animals, insects, outdoor activities, and water. First, you will "meet the scientists" who conducted the research. Then you will read about one of the many interesting aspects of science and about the natural environment. You will also read about a specific research project. The research article is written in the format that scientists use when they publish research in scientific journals. Then YOU become the scientist as you go through the FACTivity associated with the article. Don't forget to look at the glossary and the special sections highlighted in the article. These sections give you extra information that is educational and interesting.

At the end of each section of the article, you will find a few questions to help you think about what you have read. These questions will help you think like a scientist. They will help you think about how research is conducted. Your teacher may use these questions in a class discussion, or you may discuss these questions in a small group.

Each *Natural Inquirer* monograph will help you explore the exciting world of science and prepare you to become a young scientist. You will learn about the scientific process, how to conduct scientific research, and how to share your own research with others.

Visit **http://www.naturalinquirer.org** for more information, articles, and resources.

Editorial Review Board

Boys and Girls Club of Round Valley

Eagar, Arizona

Tammi-Jo Anders and Brenda Jensen's group

The most important thing I learned was to spend more time outside and investigate nature.

Add more pictures of animals and fun facts.

The most important thing I learned is that spending more time outdoors is better than watching tv.

More pictures would be much better for me.

The most important thing I learned was that spending time outdoors may have positive benefits for people of all ages including kids.

The most important thing I learned is that kids need to spend more time outdoors.

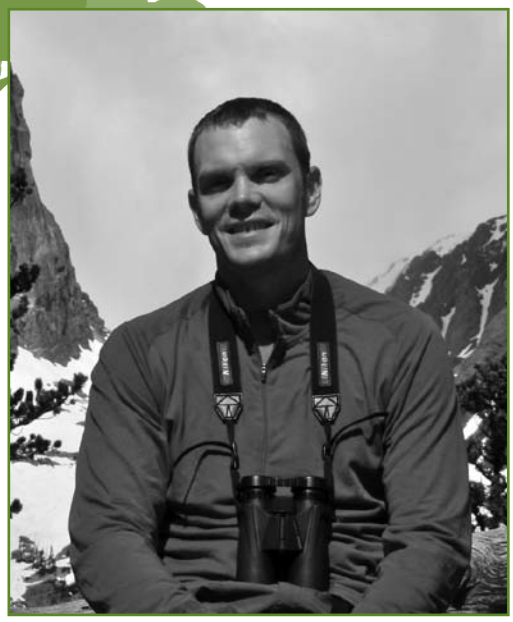
The most important thing I learned is that it is okay to explore.

The most important thing I learned is to play outside.

Time Out!

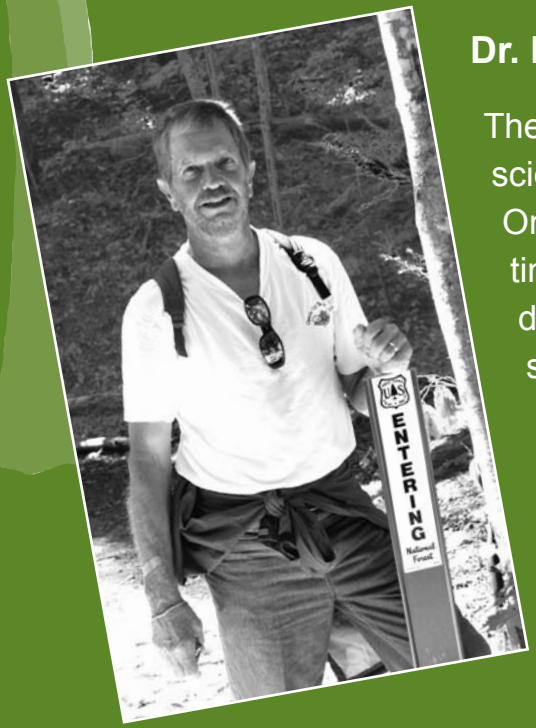
How Much Time Do Kids Spend Outdoors?

Meet the Scientists!



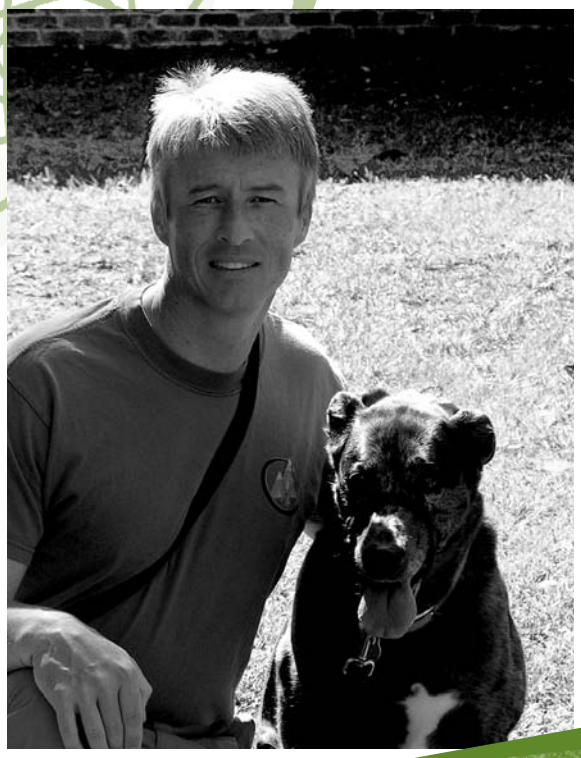
Dr. Lincoln Larson, Social Scientist

My favorite science experiences involve traveling to cool places and learning new things. My work has taken me around the world to places like Alaska, Africa, and the Amazon. I'm constantly trying to discover ways to help people understand, appreciate, and interact *sustainably* with their natural environment.



Dr. Ken Cordell, Social Scientist

The thing I like most about being a scientist is discovering something new. One recent discovery was how much time kids spend outdoors and what kids do when they go outdoors. Our team of scientists found some surprising new things about kids and the outdoors. You will also discover what we found when you read this article. I wonder whether what we found will be surprising to you too!



Dr. Gary Green, Social Scientist

My favorite science experience was visiting the Particle Accelerator at CERN (The European Organization for Nuclear Research) on the French-Swiss border. During the trip, I got into an elevator and dropped 100 feet below the surface of the ground. When we got out of the elevator, I saw a magnet the size of a house and a 27-kilometer looped tunnel (figure 1). The scientists operating the accelerator fired protons and electrons inside the looped tunnel. The scientists at CERN study nature's building blocks; they explore what everything is made of. It was pretty cool to see it in action.

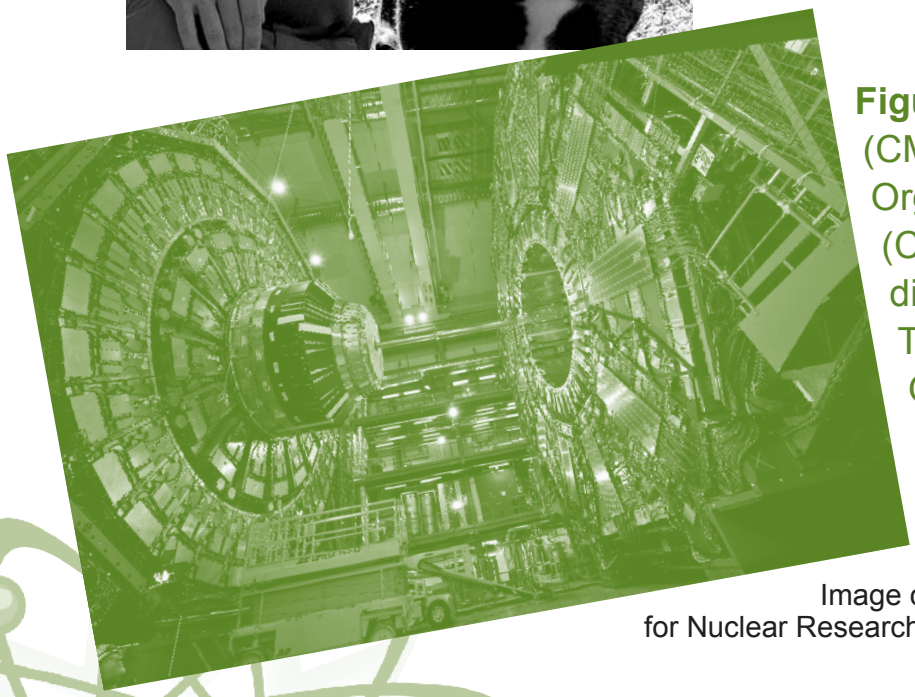


Figure 1: The Compact Muon Solenoid (CMS) detector at the European Organization for Nuclear Research (CERN) helps scientists study different parts of proton collisions. The CMS has many different layers. One of these layers is a magnet that collects particles released during proton collisions. Learn more by visiting http://www.cern.ch

Image courtesy of the European Organization for Nuclear Research (CERN).

Number Crunches

How many miles is 27 kilometers?

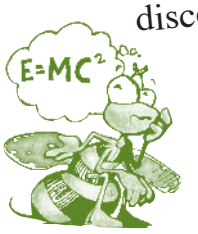
Hint: One kilometer is equal to 0.62 miles.

Thinking About Science

How can you tell if something has changed over time? If you want to know, for example, how tall you have grown since you were 6 years old, what information do you need? If you said that you need to know how tall you were at age 6, you are right! Without a beginning point with which to compare later measures, it is impossible to accurately track change. Scientists call this beginning number a **baseline**.

All of us use baselines. Let's say your height was not recorded at age 6. How would you know whether you have grown since that age? You might have to begin with your height at age 7. Or, you could take the average of your height at age 5 and age 7, although an average would not be as accurate as having your actual height at age 6. Without a baseline, scientists, or you, cannot say for sure whether or how much something has changed.

The scientists in this study were interested in how much time kids spend outdoors. They wanted to know how the amount of time has changed over the years. The scientists discovered, however, that a baseline had not been established. In this study, therefore, they wanted to establish a baseline for how much time kids like you spend outdoors.



Glossary words are defined on page 22.

Thinking About the Environment

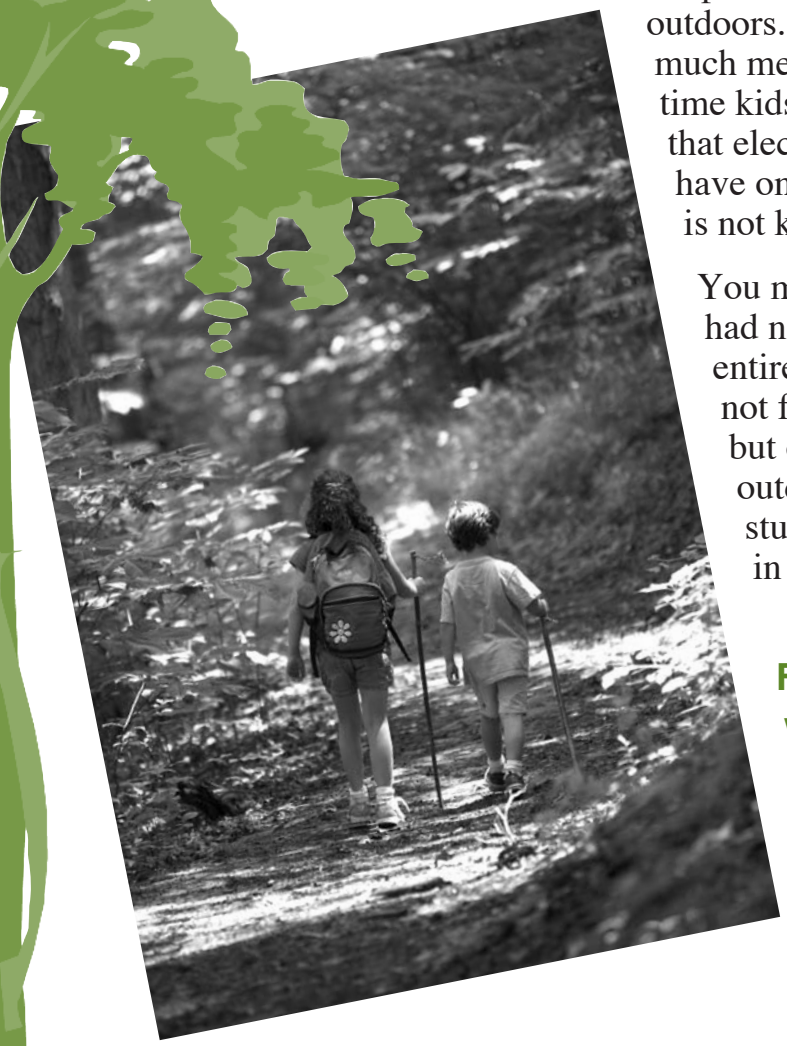
What activities do you think about when you think about spending time outdoors? Some people think of doing things such as biking, camping, fishing, swimming, or bird watching, as well as many other activities (figure 2). Activities like these may benefit people. Some scientists believe that spending time outdoors may help people be healthier. Spending time outdoors may also help people develop an appreciation for nature and **conservation**. Some scientists believe that spending any amount of time outdoors is good for kids, and certain activities may provide more benefits than others. Studies have shown that outdoor physical activities are especially important for kids trying to maintain an active and healthy lifestyle.

Figure 2. Using binoculars while birding (also known as bird watching) can help you see birds up close and personal! Seeing birds up close helps you identify them based on their features, such as beak shape, body size, and color. What benefits do you think these kids are getting from this activity?

Introduction

Spending time outdoors may have positive benefits for people of all ages, including kids (figure 3). Because of these benefits, getting kids outdoors has become a main goal for many groups and organizations. During the past several years, however, scientists have noticed something interesting. Some research has shown that kids are spending less time outdoors than in previous years. Few of these research studies, however, looked at kids' time outdoors across the entire United States. In addition, many of these studies focused on how much time kids spent doing certain activities. These studies did not focus on how much time kids just spent outdoors overall, regardless of what they were doing.

People have looked for reasons why kids might not be going outdoors as much as they once did. One possible reason is the increasing use of electronic media and technology, such as the Internet and video games. Some researchers point out, however, that kids may be using cell phones and other electronic media outdoors. These researchers wonder how much media use affects the amount of time kids spend outdoors. The effect that electronic media and technology have on kids' time outdoors, therefore, is not known.



You may recall that previous studies had not looked at kids across the entire Nation. These studies also did not focus on time spent outdoors but on nature-based activities done outdoors. The scientists in this study wanted to do research to fill in these gaps.

Figure 3. Hiking is one way to explore the great outdoors and build physical strength.

To answer their question of how much time kids are spending outdoors, the scientists first needed to establish a baseline for understanding change in the amount of time kids spend outdoors. In addition to creating a baseline, the scientists wanted to understand what kids do outdoors.

The scientists called their study the National Kids Survey. The National Kids Survey examined three main areas. These areas are—

1. The amount of time kids spend outdoors.
2. The outdoor activities in which kids participate.
3. The reasons kids are not spending more time outdoors.

The scientists wanted to know how the amount of time spent outdoors varies among kids from different **demographic** groups. The scientists hoped that this study would help other scientists. They also wanted to help **recreation managers** understand kids' time outdoors.

Methods

The study took place from September 2007 to August 2009. The scientists surveyed 1,450 kids ages 6–19 across the United States. It would have taken too much time and money to interview all of the millions of kids across the country. Because the scientists could not ask all kids in the United States their questions, they used a **random sample** of kids from across the country.

A computer generated a list of random telephone numbers. Calling random telephone numbers helped ensure the results weren't **biased** (figure 4).The scientists asked to interview the family member age 6–19 with the most recent birthday. Kids between the ages of 16–19 were interviewed directly. Younger kids between the ages of 6–15 had a **proxy** speak for them (see the sidebar to find out what a proxy is).

The scientists and other partners at the University of Tennessee asked the survey participants questions about time spent outdoors. These questions

What is a proxy?

Sometimes social scientists cannot get answers directly from the individuals they are interested in studying. For example, in this survey the scientists could not interview kids younger than 16 years old. Scientists have to ask parents, guardians, or older siblings questions to get information about young people. A person acting on behalf of another is called a proxy. Have you ever had to act as a proxy for another person? If so, why did you have to act as a proxy? Share this experience with your class. What is one advantage of having a proxy? What is one disadvantage?

included the amount of time kids spent outdoors during the past week, common outdoor activities, and reasons for not spending more time outdoors. To learn more about the individual, the scientists also asked for demographic information, such as the individual's gender, age, and **ethnicity**.

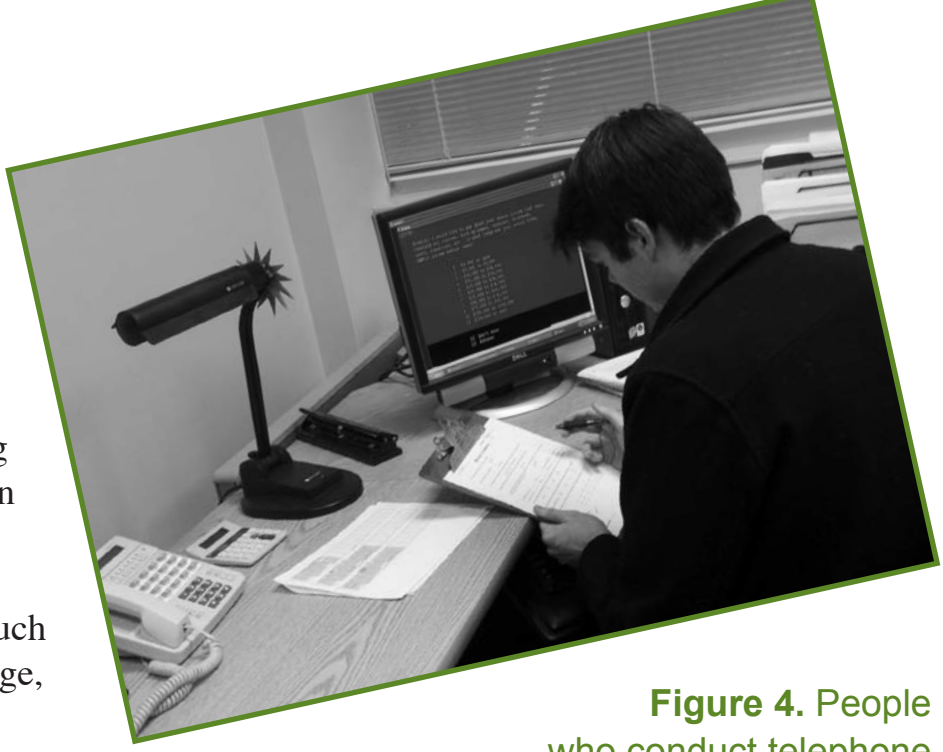


Figure 4. People who conduct telephone interviews usually have a script they follow so they ask the same questions of each person they speak with.

Reflection Section

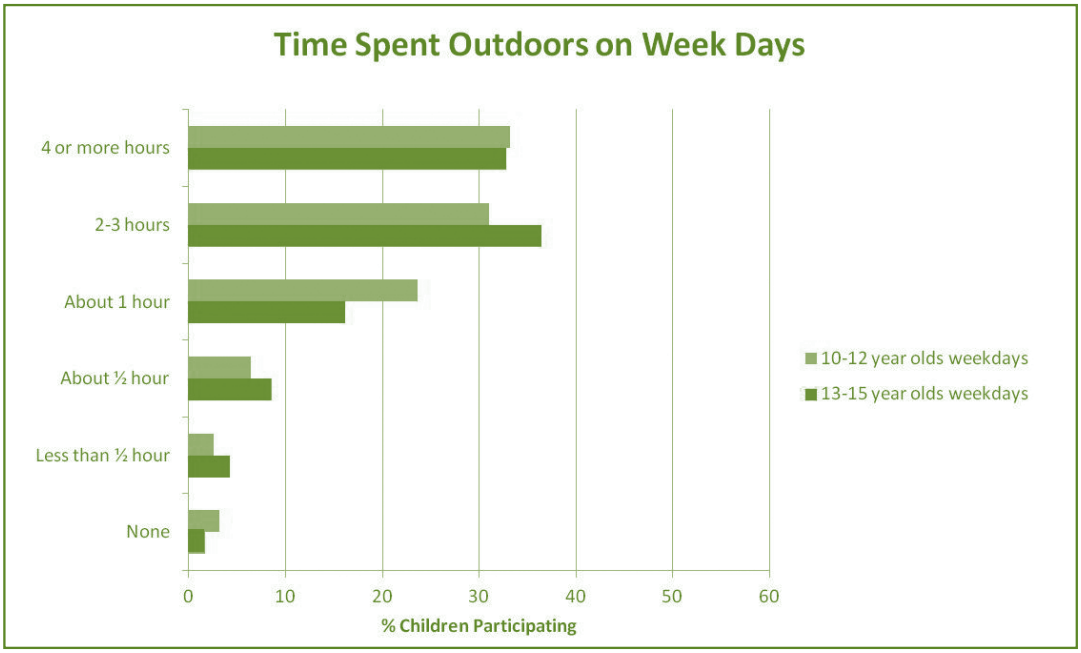
Why would the scientists not want the results to be biased? How might the results of the survey be affected if the research were biased?

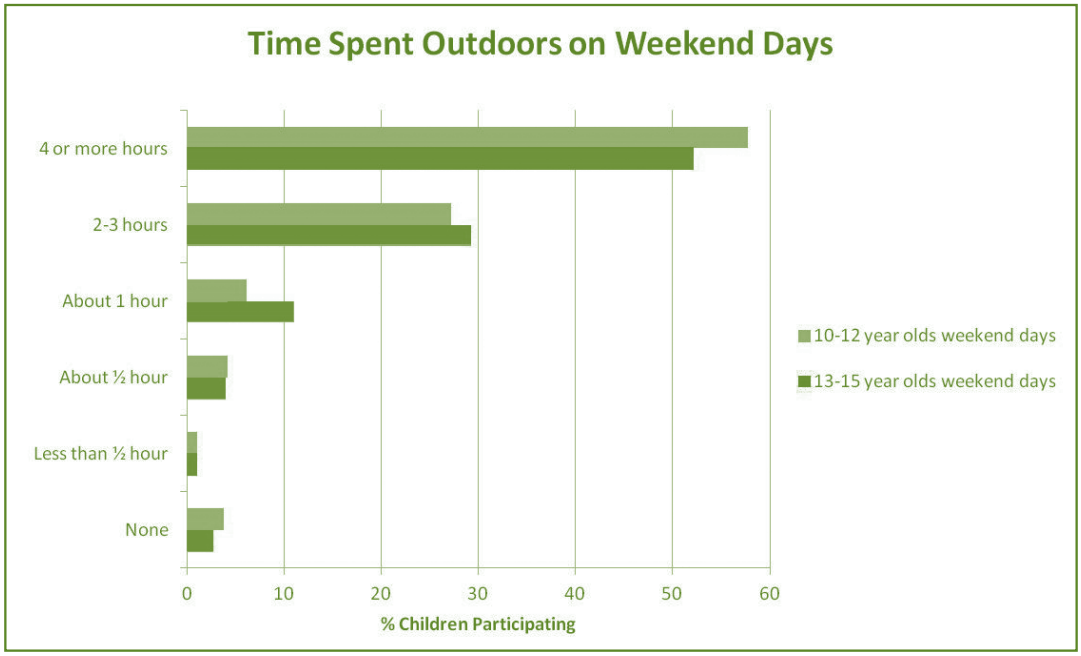
What did the demographic information enable the scientists to compare?

Why did the scientists have to speak with a proxy for kids under 16 years old?

Findings

Most kids in the survey, regardless of their age or gender, spent time outdoors daily. In fact, more than 50 percent of kids surveyed spent 4 or more hours outdoors on weekends. Kids ages 6–12 spent more time outdoors on weekends than kids ages 13–19. Kids ages 13–15 spent more time outdoors on weekdays than 10- to12-year-olds. Less than 5 percent of kids ages 10–15 reported spending no time outdoors (figures 5a and 5b).

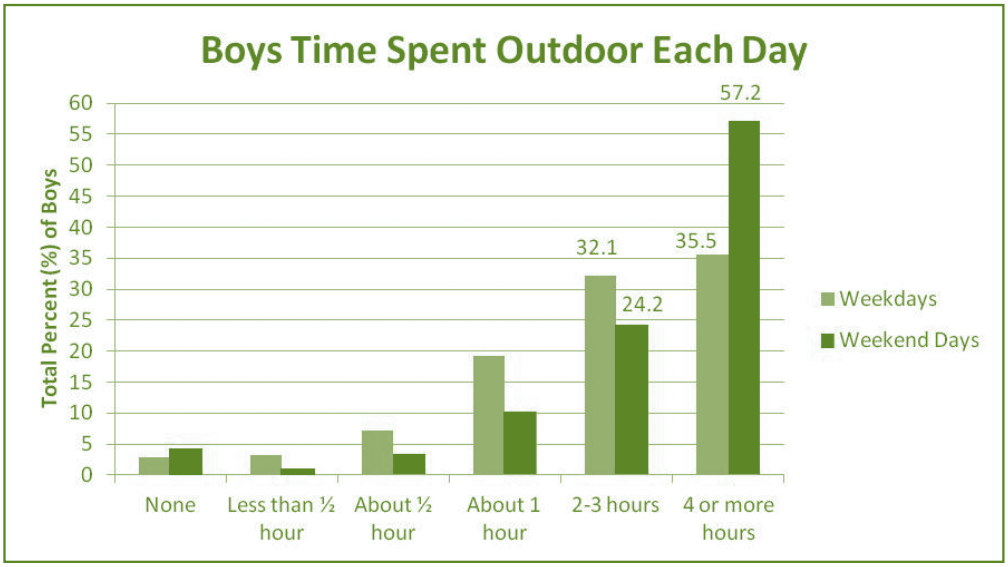


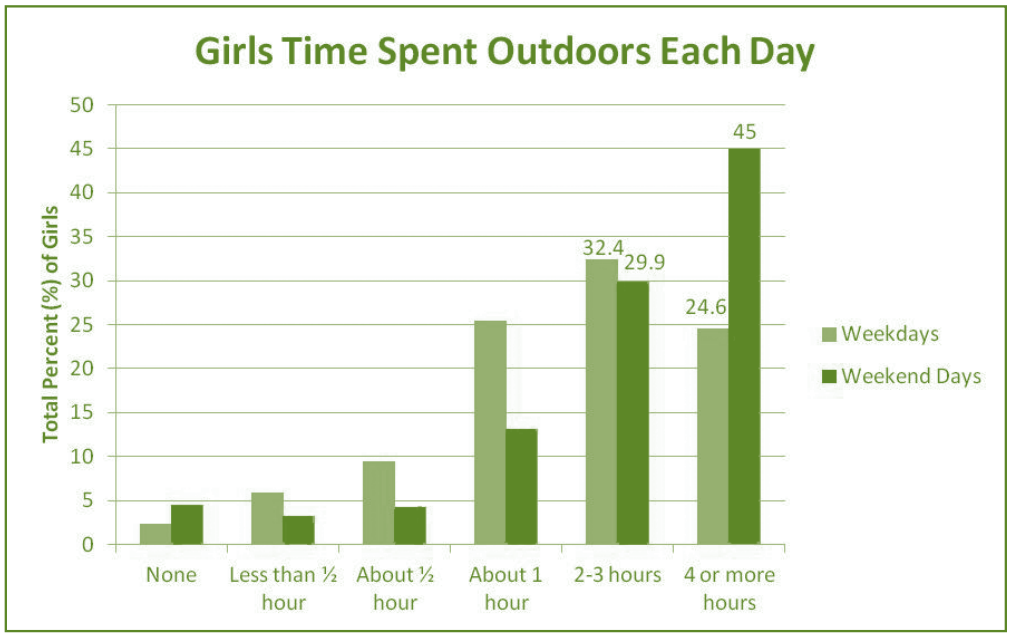


Figures 5a and 5b. Most kids ages 10–15 spent at least some time outdoors.

Overall, boys spent more time outdoors than girls. Both boys and girls, however, spent more time outdoors on the weekends than during the week (figures 6 and 7).

On weekdays, scientists found that 67.6 percent of boys spent 2 or more hours outdoors, whereas only 57 percent of girls spent 2 or more hours outdoors. On the weekends, 81.4 percent of the boys spent at least 2 hours outdoors per day compared with 74.9 percent of girls.





Figures 6 and 7. Many of the boys and girls surveyed spent at least 4 hours per day outdoors on the weekend.

The most common outdoor activities for kids of all ages were:

- Playing or just hanging out (figure 8a).
- Biking, jogging, walking, skateboarding, etc.
- Listening to music, watching movies, or using electronic devices (figure 8b).

Figure 8a. Hanging out with friends is an activity enjoyed by many kids of all ages.

Figure 8b. Austin Hernandez (left) and Teddy McClellan (right) enjoy spending time outside. According to Austin, "We like to text, play stuff outside, and talk on the phone."

Number Crunches

How did the scientists determine the percentage of boys and girls that spent at least 2 hours per day outdoors?

Use the charts in figures 6 and 7 to find out. Hint: Look at the bars for "2–3 hours" and "4 or more hours."

Nature-based activities, such as bird watching and wildlife viewing or hiking, camping, and fishing, were not as common as other activities (figures 9a and 9b).

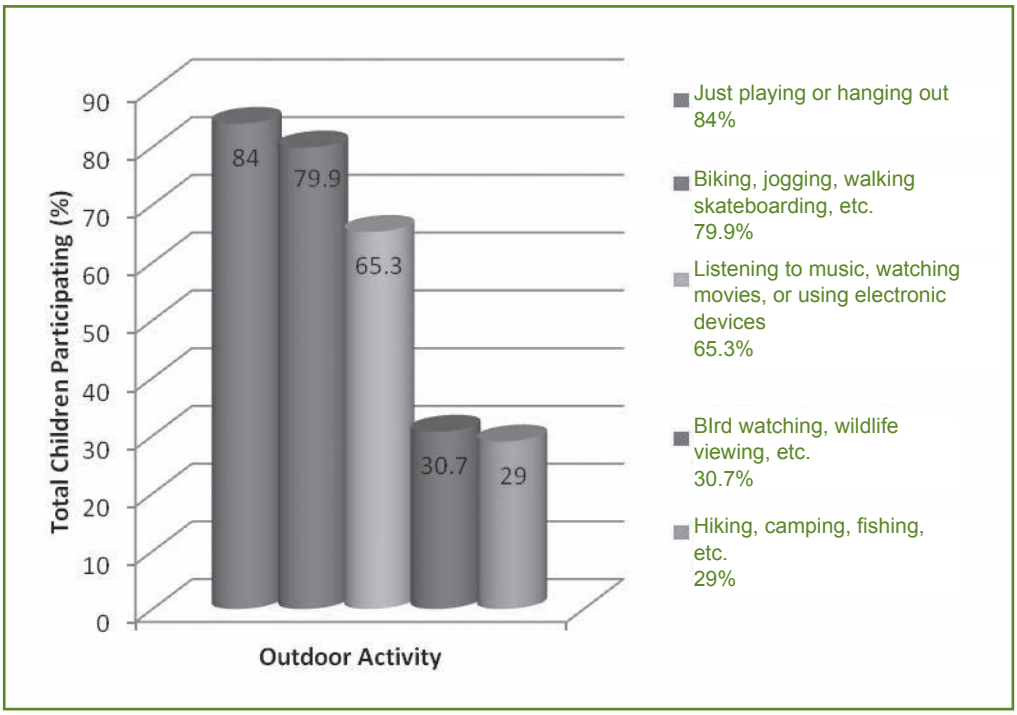


Figure 9a. Nature-based activities were not as popular as other activities.

Figure 9b. Biking is popular with many kids.

Younger kids played or hung out and participated in physical activities more than older kids. Older kids used electronic devices outdoors more than younger kids. Kids ages 13–15 played or practiced team sports more than other age groups, and they participated less in reading or studying outdoors. Nature-based activities were more common for 10- to 12-year-olds than for 13- to 15-year-olds.

Boys were more likely than girls to go outdoors to play or hang out; take part in team sports; and ride motorcycles, ATVs (all-terrain vehicles), or other off-road vehicles. Girls were more likely to be outdoors reading or studying.

The main reasons kids did not spend more time outdoors were—

- Listening to music, creating art, or reading indoors.
- Watching TV, DVDs, or playing video games indoors.
- Using electronic media such as Internet and texting indoors.
- Participating in indoor sports.

Watching TV, DVDs, or playing video games indoors was the most common reason boys did not spend more time outdoors. These activities were also common reasons 10- to 15-year-old boys and girls did not go outdoors. For girls, listening to music, creating art, reading, playing on the Internet, and text messaging indoors were the most common reasons for not going outdoors.

Technology also affected the amount of time kids spent outdoors. Kids with either a TV or computer in their room (or both) spent less time outdoors on the weekend than kids who did not have a TV or computer in their room.

Fun Fact!

DVD stands for **D**igital **V**ersatile **D**isc.

Number Crunches

What is the difference in the percentage of kids playing or just hanging out and the percentage of kids hiking, fishing, and camping?

Hint: Use the graph in figure 9a.

Reflection Section

Are you surprised by the results of the study? How do they compare with you and your friends? Discuss with your class whether you believe these results are similar to or different from your time outdoors.

Do you think technology affects the amount of time you spend outdoors each day? Estimate how many hours a day you spend indoors watching TV or DVDs, playing video games, or spending time on the computer. Compare these hours with how many hours a day you spend outdoors.

Create a profile!

Reread the findings and create three profiles describing time outdoors for kids 13–15 years old. You should create a profile for all 13- to 15-year-olds, for 13- to 15-year-old girls, and for 13- to 15-year-old boys. Your profiles can be written in paragraph form. For example, you might write, “Almost all 13- to 15-year-olds spend some time outdoors. Boys spend more time outdoors than girls. When they are outdoors, most 13- to 15-year-olds do things like hang out, bike, jog, skateboard, or walk. They also listen to music, watch movies, and use electronic devices when they are outdoors.” Writing these profiles will help you to better understand the findings. The profiles will also help you to determine how well the findings match your own experience.

Discussion

The results of the National Kids Survey suggest that kids go outdoors more than some people believe. Previous surveys have tended to focus on specific outdoor activities, such as camping, fishing, hiking, and hunting. This survey showed that if you widen the set of outdoor activities to include general activities, kids spend more time outdoors than previously thought.

Older kids participate in outdoor recreation activities less than younger kids. Scientists believe this may reflect the lifestyle of older kids, who have less free time and more responsibilities, such as school or work. Older kids might also be more likely to participate in indoor social activities. The scientists suggest that recreation professionals could encourage older kids to spend time outdoors through programs that focus on social interactions.

The indoor use of electronic devices such as the Internet, TV, or video games, was one of the main reasons given for kids not spending more time outdoors (figure 10). Some people are concerned that technology and electronic media will continue to affect the amount of time kids spend outdoors. Technology and the outdoors, however, can be combined through activities such as geocaching. (Find out more about geocaching in the sidebar.)

Surveys like the National Kids Survey can be useful in helping to understand kids' time outdoors.

Organizations involved in getting kids outdoors can use this information to better understand how kids spend time outdoors. Such information can help them plan outdoor activities and experiences for kids across the country.

What is geocaching?

Geocaching is an outdoor treasure hunting activity, similar to a scavenger hunt. Players try to locate hidden containers, called geocaches, using Global Positioning System (GPS) devices. Inside those hidden containers, players can find things others have left for future geocachers. Conduct your own research on geocaching to find out more!

Figure 10. Spending time on a computer may limit the amount of time kids spend outdoors.

Should kids be encouraged to spend more time outdoors? Why?

Do you spend more or less time outdoors than you did when you were younger? Why?

Glossary

baseline (**bās līn**): A baseline is a standard used in research studies against which all later changes or studies put into practice will be measured.

biased (**bī** əst): Tending to produce one outcome more frequently than others in a statistical experiment.

conservation (**kän** sər **vā** shən): The care and protection of natural resources such as forests and water.

demographic (**de** mə **gra** fik): Physical characteristics of people, such as their age, sex, or race.

ethnicity (eth **ni** sə tē): Quality or connection describing a group of people who have the same language, background, culture, etc.

particle accelerator (**pär** ti kəl ak **se** lə **rā** tər): A device that uses electromagnetic fields to move charged atoms at high speeds and contain them in beams. Particle accelerators help scientists study atoms and particles. The first TV set produced was a simple form of an accelerator. The particle accelerator at CERN, known as the LHC, is the world's largest and fastest particle accelerator.

proxy (**präk** sē): A person authorized to act or speak for another.

random sample (**ran** dəm **sam** pəl): A sample in which a participant is selected purely by chance, with every participant having an equal chance of being selected.

recreation manager (**re** kē **ā** shən **ma** ni jər): A person who takes specific actions to manage the activities and resources at a recreation area, such as a public park.

sustainable (sə **stā** nə bəl): The quality of surviving or being maintained over a specific time period.

Accented syllables are in **bold**. Definitions and marks are from http://www.Merriam-Webster.com.

Adapted from Larson, L.R.; Green, G.T.; Cordell, H.K. 2011. Children's time outdoors: Results and implications of the National Kids Survey. *Journal of Park and Recreation Administration*. 29(2): 1–20. http://js.sagamorepub.com/jpra/article/view/1089/1058

If you are a trained Project Learning Tree educator, you may use Activity 46, "School Yard Safari," as a resource.

FACTivity

Time Needed:

One class period.

Materials Needed:

- Copies of the Kids' Time Outdoors Survey.
- A bucket or bowl.
- Paper.
- Pencils.

In this FACTivity, you will act as social scientists and conduct a survey with other students in your class to determine information about each other's time spent outdoors. Determine the students to be surveyed using random sampling, much like the scientists did in the National Kids Survey. The question you will answer is: How do the results of this class survey compare with the results of the National Kids Survey? The objective of this FACTivity is to become familiar with the process of surveying and to learn how random samples can be used to represent a larger population.

Distribute a copy of the survey (following page) to all students in the class. Explain to students that instead of writing their name, they will write only their initials and date of birth. Using initials and dates of birth will help the survey results be confidential. Although using initials and date of birth within your small classroom community may not keep the answers very confidential, when you are using a larger group of students this method will help keep students answers confidential. Confidentiality is important because it helps protect people's privacy. All students will take the survey, responses will be counted, and then a sample (50 percent of the class) will be chosen. Having all students complete the survey in the beginning ensures that you will have survey answers from all students before the sample is taken.

Initials:_____ Date of birth (DD/MM/YYYY): _____

Kids' Time Outdoors Survey

Please check the answer that describes you best.

Select your gender.

_____ Male

_____ Female

Select your age range.

_____ 6–9

_____ 10–12

_____ 13–15

_____ 16–19

How much time did you spend outdoors on a typical week day this past week?

_____ None

_____ 2 hours or less

_____ More than 2 hours

During the past week, which of the following types of outdoor activities did you participate in? Check all that apply.

_____ Playing or hanging out

_____ Biking, jogging, walking, skate boarding

_____ Listening to music, watching movies, or using electronic devices

_____ Playing or practicing team sports

_____ Other outdoor activities

Which of the following are reasons you don't spend more time outdoors than you already do? Check all that apply.

_____ Interested in listening to music, art, reading indoors

_____ Interested in video games, DVDs, and TV indoors

_____ Interested in Internet, text messaging indoors

_____ Other reasons

After all students have completed the survey, count the number of responses for each question. Calculate the percentage that each represents. For example, if 22 students are in your class and 10 of them selected "Playing or hanging out" as a recent outdoor activity, divide 10 by 22 to get 0.45. This answer means that 45 percent of the students in the class played or hung out in the last week. Calculate this percentage for every possible response on the survey.

Next, select a sample of students in class. All students will need to have an equal chance of being selected to avoid biasing the results. Write the initials of each student on a piece of paper. Put all of the pieces of paper into a bowl and mix them up. The sample selected for this survey will be 50 percent of the class size. Calculate how many pieces of paper will be pulled from the bowl by taking the total number of students and multiplying it by .50.

Next, pull pieces of paper from the bowl. Once again, calculate the responses to each question. This time, however, only use the responses of students whose names were pulled. For each response to each question, calculate the percentage. Do not divide the number of responses by the total class size, but by one-half of the class size (the number of pieces of paper pulled from the bowl). After you have calculated the results, compare the percentages calculated for each question in the sample with the percentages calculated for the whole class. Are the results similar or are they different?

Compare the results from the class sample with the results from the National Kids Survey. How do the outdoor time and activities of this class compare with those of the kids surveyed by the scientists? Are the results what you expected? Discuss the results. Why did the results come out the way they did? If time allows, you can put all of the names back into the bowl and draw another 50-percent sample. Repeating the activity multiple times with random samples will help show how repeated samples can help confirm results and create more accurate results. Repeated sampling can also help students gain a sense of how social scientists conduct random sample surveys.

Extension:

Conduct this survey with a larger group of people, such as all students in the grade level. Compare the results with the results from the class and from the National Kids Survey. The students could gain more experience with random sampling by taking a random sample of all kids in the grade level.

FACTivity

Time Needed:

Two class periods. The first day will teach you how to use a compass. The second day will be a field exercise.

Materials Needed:

- Compass (One for each student. If there are not enough compasses for each student, work in groups of 4–5.)
- 4–5 items for scavenger hunt

In this FACTivity, you will complete a scavenger hunt by using a compass to locate hidden objects. Using a compass and map to navigate is called orienteering. Compasses are often easier to obtain than Global Positioning System (GPS) devices, and using a compass can be a fun way to learn about navigation. This activity includes a basic introduction on how to use a compass to navigate.

Day One:

First, your teacher will start the FACTivity by asking you and the other students about your knowledge of compasses. Your teacher may ask students to provide examples of when compasses are used (e.g., hiking, bird watching, navigating ships, military use, etc.). After this brief discussion, your teacher will distribute the compasses to the students.

As a class, review the parts of a compass. Every compass has four cardinal directions: North (N), South (S), East (E), and West (W). Some compasses also have the intermediate directions marked: Northeast (NE), Northwest (NW), Southeast (SE), and Southwest (SW).

Use the compass image to review the parts of the compass.

A. Baseplate: The rectangular bottom.

B. Compass Housing: The raised, circular portion of the compass. The numbers on the compass housing represent the 360 degrees of a circle. Note: On some compasses you will see that the compass housing rotates. If you have a compass like this then you can find out more about how to use this feature by searching on the Internet or finding a book on orienteering.

C. Compass Needle: This is the needle that moves inside the compass. In most compasses, one half of the arrow is red, and one half of the arrow is white. The red end of the compass needle always points to magnetic north. Magnetic north is where the North Pole is.

D. Direction of Travel Arrow: This arrow is on the base and often says "Read Bearing Here." This arrow points in the direction that you want to travel after orienting the compass. A good way for students to remember this arrow is that it should always be pointing in the same direction as their nose and toes.

E. Orienting Arrow: This arrow is fixed to the bottom of the compass housing and does not move. It often is marked with stripes. This arrow is lined up with the compass needle after a travel direction (or compass bearing) has been set.

After you are familiar with the parts of a compass, use the compass to find the four cardinal directions. Start by finding North. Hold the compass flat in the palm of your hand and turn your whole body until the red end of the compass needle is inside of the orienting arrow. The compass is now oriented in the North direction. Practice walking a few steps in this direction while keeping the red compass needle in the orienting arrow. Practice finding and moving in the other cardinal directions until you are comfortable using a compass.

Day Two:

Your teacher will create a mini scavenger hunt in your schoolyard or classroom. Each hidden item represents a checkpoint. Your teacher should give you directions on how to navigate to the first checkpoint at the beginning of class. For example:

1. Starting at the classroom door, walk approximately five steps into the classroom.
2. Stop and turn West. Continue West for approximately four steps.
3. Stop and turn South. Walk South for another four steps.
4. Stop and look East. Find the bookshelf.
5. Your first object is located on the top shelf.

Directions on how to navigate to the second item should be hidden with the first item. The second item has directions on how to navigate to the third item, and so on. Have the students work in teams to find all scavenger hunt items.

Extension:

Your teacher will create a map of the schoolyard, including all buildings, trees, bushes, playground equipment, etc. The map will include symbols to mark a start and finish spot and various checkpoints. Your teacher will hide an object at each checkpoint, you will need to find the hidden items by using the map and compass.

Back to the Future Outside!

Think for a minute about the activities and things you like to do outside. How do you think these activities are different from what your parents or caregivers did outside when they were your age? Tonight when you go home, ask your parents or caregivers what they liked to do outside when they were your age. Write a short paragraph describing what your parent or caregiver liked to do at your age and what you like to do now. In class the next day, discuss what different students discovered. What are the similarities and differences? Discuss why you think there may be these similarities and differences.

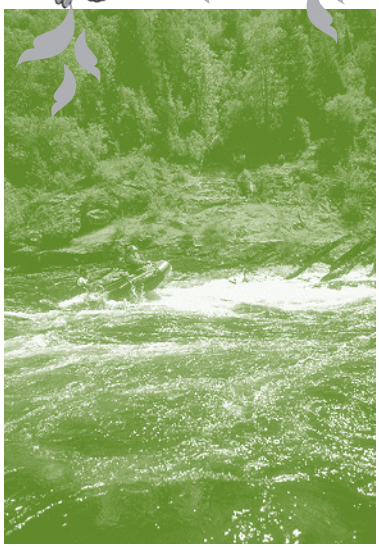
SUMMER 2012

Nature-Oriented Parenting®

A guide for caregivers to teach children about the natural world

A Companion to the *Natural Inquirer*

...Be natural



Inspired by Water

I spent the first 25 years of my life in Florida playing in the gentle ocean, lazy rivers, clear lakes, and frigid springs. Few sensations compare to that sincere peace I get when I am around brilliant water. I can truly relax, be free, and release my fears and anxieties. It's the calming hand on my shoulder, telling me everything will be all right.

A few months ago, I moved from the land of palms and big sky to western North Carolina. The water is completely different here. While Florida water is friendly and welcoming as an old dog, western North Carolina water slinks around like a feral cat—unpredictable and secretive. Looking out at the busy, rocky rush of the French Broad River was like looking at an old friend who had grown up, changed, and forgotten me. At first, it was disconcerting and disheartening; but as I spent more time around the river, I became determined to learn the language of the water in this new place. While Florida water represented love and safety, I have realized North Carolina water is all about adventure and new experiences. Far from the old, changed friend, it's more like a new, strange one, beckoning me to grow, move on, and expand my horizons.

As the weather warms up and the outdoors become more inviting for you and your family, I encourage you to do the same. Seek out something unfamiliar in nature, be it your next-door neighbor's backyard or a national forest in another State. You and your family will be able to share in the exhilaration of discovering something new in nature for years to come.
– Ashleigh Boice – CFAIA Education Intern

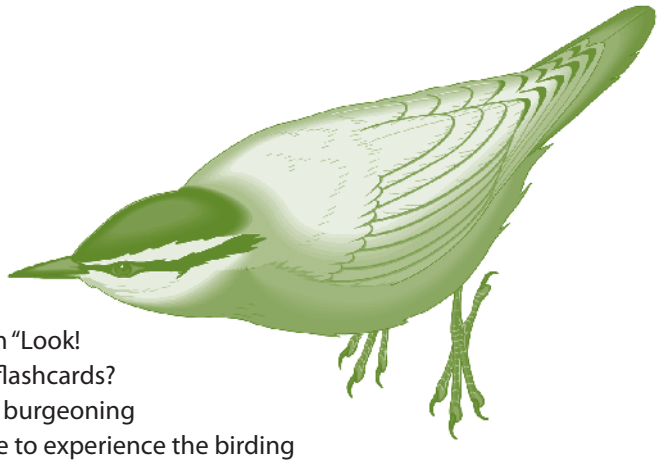
The Nature-Oriented Newsletter is designed for cutting out of the journal and taking home to share with parents or other caregivers. Please encourage students to cut along the dotted line, then take the page home to share with family or caregivers.

Wildlife Spotlight: Bobcat

As a child, I remember waking in the middle of a warm, summer night to the sounds of a woman wailing, as if she had lost someone special. I never fully knew what that strange sound was until much later in life. A co-worker played the call of a male bobcat on his mammal sounds CD. That experience prompted me to learn more about this elusive creature. The bobcat (*Lynx rufus*) is a member of the cat family *Felidae* and is one of the most resilient and widespread mammals in the United States. Bobcats are nocturnal (meaning they are most active in the evenings and nighttime), however, so they are seldom seen by the human eye. The bobcat inhabits almost any environment, from semideserts to deep woods to swamps, even crossing the border into neighborhoods and heavily populated areas. The bobcat's diet contributes to such a huge population (some say up to 1 million inhabit the United States). Their diet is mostly comprised of rabbits, large insects, rodents, and even small deer. These prey are readily available in most environments, making this beautiful carnivore extremely adaptable. Are you wondering where the name bobcat comes from? The unusual moniker refers to the cropped or "bobbed" tail that makes this feline so different from all other North American cats. Other characteristics include long legs, large paws for effective hunting, and tufted ears. Of all the wildlife I've encountered in my camping and hiking experiences, this is one creature that has continued to elude me. I hope to catch site of the bobcat one day. This animal is a majestic and formidable predator that successfully uses the forest shadows and foliage the way its cousin, the lion, might stalk and conceal its identity in tall grass prairies. Adam DeWitte – CFAIA Director of Education

Did You Know?

The mixture of saltwater and freshwater is called "brackish" water and is usually found in coastal marshes. Many different types of plant and animal species exist only within this delicate balance. Too much saltwater or too much freshwater in this habitat can actually kill off these highly adapted species, changing the ecology of the marsh completely.



Family Outdoor Activity: Bird Bingo

Every birder has to start somewhere. How can you get your child from "Look! A bird!" to "Look! A Northern Flicker!" without boring him or her with flashcards? Simple—*Bird Color Bingo*! This fun activity is highly adaptable to your burgeoning birder's learning ability and, more importantly, gets your child outside to experience the birding world in his or her own backyard. It also brings you together in an experience that the child will always remember, no matter what other hobbies or interests bubble up inside of your child as he or she grows. Also, the winner gets to pick dessert!

For the littlest bird enthusiast in your life, all you need is a sheet of paper, a clipboard, and a pencil. Simply create a bingo board on your paper by drawing blocks that are four rows by three. Within the squares write red, orange, green, purple, blue, yellow, black, white, gray, stripes, spots, and a free space in the middle (aside from the free space, make the arrangement of colors in squares different for each bingo board). Now all you have to do is visit your backyard or a local park and start the game. Every time you or your child spots a bird, ask the child what color it is, and if it had spots or stripes on it. Then, mark off the color on your bingo board. You can also use this opportunity to teach your child the names of the birds, birdsongs, or types of bird habitats.

For your junior birders, you can make it even more complex. Adding bird names, diet requirements (carnivore? herbivore? insectivore?), whether the bird is common or uncommon, and the species range means the possibilities for fun and learning are endless. Get outdoors and find those birds!

Never doubt that a small group of thoughtful committed citizens can change the world; indeed, it is the only thing that ever has.

- Margaret Mead, anthropologist

Cradle of Forestry In America Interpretive Association
66 South Broad Street, Brevard, NC 28712
http://www.cfaia.org
Main Office: 828-884-5713
http://www.naturalinquirer.org
http://www.scienceinvestigator.org

Word Scramble

Unscramble the words to create a sentence from this monograph!

were scientists the in how much kids outdoors spend in study interested this time

help outdoors spending an time nature conservation and for people may also develop appreciation

healthier people be help outdoors may time that spending believe some scientists

lifestyle and healthy maintain active an trying kids to especially for important are physical activities that outdoor shown have studies

outdoors kids spend of time amount the use affects much how media the wondered researchers

physical build strength outdoors and great the explore to way is one hiking

a called proxy is of another on behalf the a person acting

the weekend on 4 day per hours least spent at girls and surveyed the many of boys outdoors

than kids younger devices outdoors more electronics kids older used

likely studying to be reading or outdoors more girls were

some than believe people outdoors go survey kids that kids the national of the results suggest more

younger than kids less recreation activities outdoor in older kids participate

social on interaction programs focus that through time outdoors spend to kids older could encourage that professionals recreation suggest the scientists

Word Scramble Answers

The scientists in this study were interested in how much time kids spend outdoors.

Spending time outdoors may also help people develop an appreciation for nature and conservation.

Some scientists believe that spending time outdoors may help people be healthier.

Studies have shown that outdoor physical activities are especially important for kids trying to maintain an active and healthy lifestyle.

The researchers wondered how much media use affects the amount of time kids spend outdoors.

Hiking is one way to explore the great outdoors and build physical strength.

A person acting on the behalf of another is called a proxy.

Many of the boys and girls surveyed spent at least 4 hours per day outdoors on the weekend.

Older kids used electronic devices outdoors more than younger kids.

Girls were more likely to be outdoors reading or studying.

The results of the National Kids Survey suggest that kids go outdoors more than some people believe.

Older kids participate in outdoor recreation activities less than younger kids.

The scientists suggest that recreation professionals could encourage older kids to spend time outdoors through programs that focus on social interaction.

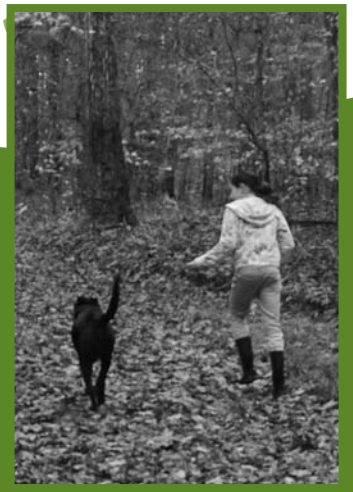
Figure It Out!

Look at the following pictures and see if you can determine what benefits the kids might be gaining from these outdoor activities. Write two or three sentences for each photo explaining the potential benefits of each activity and why.

Photo courtesy of Lynn Jackson, USDA Forest Service

Photo courtesy of U.S. Fish and Wildlife Service

Photo courtesy of U.S. Fish and Wildlife Service



Note to Educators

The Forest Service's mission is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. For more than 100 years, our motto has been caring for the land and serving people. The Forest Service, U.S. Department of Agriculture (USDA), recognizes its responsibility to be engaged in efforts to connect youth to nature and to promote the development of science-based conservation education programs and materials nationwide.

The *Natural Inquirer* is a science education resource journal to be used by students in grade 5 and up. The *Natural Inquirer* contains articles describing environmental and natural resource research conducted by Forest Service scientists and their cooperators. These are scientific journal articles that have been reformatted to meet the needs of middle school students. The articles are easy to understand, are aesthetically pleasing to the eye, contain glossaries, and include hands-on activities. The goal of the *Natural Inquirer* is to stimulate critical reading and thinking about scientific inquiry and investigation while teaching about ecology, the natural environment, and natural resources.

A *Natural Inquirer* journal contains six to seven articles, rewritten from the original published scientific paper. This *Natural Inquirer* monograph contains just one article. When you use this monograph in your classroom, you may take advantage of the educational resources available in the monograph and on the Web site. The monograph stands alone as a classroom resource. **The following sections will provide everything you need to use this monograph in your classroom.**

Meet the Scientists: Introduces students to the scientists who did the research. This section may be used in a discussion about careers in science.

Thinking About Science: Introduces something new about the scientific process, such as a scientific habit of mind or procedures used in scientific studies.

Thinking About the Environment: Introduces the environmental topic being addressed in the research.

Introduction: Introduces the problem or question being addressed by the research.

Method: Describes the method used by the scientists to collect and analyze their data.

Findings: Describes the results of the analysis.

Discussion: Discusses the findings and places them into the context of the original problem or question.

Reflection Section: Presents questions aimed at stimulating critical thinking about what has been read or predicting what might be presented in the next section. These are placed at the end of each of the main article sections.

Number Crunches: Presents an easy math problem related to the research.

Glossary: Defines potentially new scientific or other terms to students. The first occurrence of a glossary word is **bold** in the text.

Citation: Gives the original article citation with a Web link to the original article.

FACTivity: Presents a hands-on activity that emphasizes something presented in the article.

Lesson Plan: Presents a lesson plan for using the *Natural Inquirer* monograph in the classroom.

Please let us know what you think!

On page 38, you will find a list that identifies the National Science Education Standards that the article addresses. On the *Natural Inquirer* Web site, you will find educator and student evaluation forms. We welcome any feedback, so please visit http://www.naturalinquirer.org and complete the online evaluation forms. In addition, you may contact Dr. Babs McDonald at the address below with any comments you have.

Dr. Babs McDonald
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706.559.4224
bmcdonald@fs.fed.us
(Please put "Educator Feedback" in the subject line)

Visit the *Natural Inquirer* Web site at http://www.naturalinquirer.org.

From this site, you can order more editions and read and download lesson plans, word games, and other resources to help you use the *Natural Inquirer* in your classroom. You can also view and download a yearlong lesson plan aimed at helping your students learn about the scientific process.

Lesson Plan

Note: This lesson plan may be used with this and any *Natural Inquirer* monograph or article.

Time needed:

1-2 class periods, depending on student progress and length of class period.

Materials needed for each student:

Natural Inquirer article

Template provided on page 36

Pencil

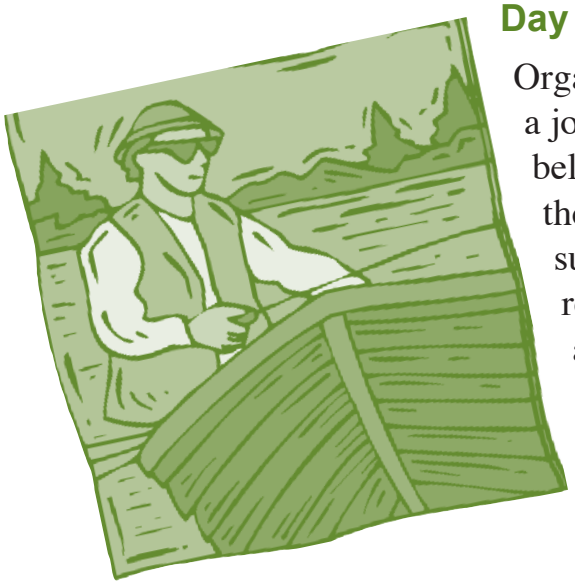
One die for each group

In this lesson, students will increase their reading comprehension and summarization and explanation skills. Students will work in groups to share information about the *Natural Inquirer* article and assist with teaching others about the article.

Day One:

Introduce the *Natural Inquirer* article. Explain how scientists conduct research and write it up using a standard format. This format generally includes the following: Introduction, Method, Findings, and Discussion. See the "Note to Educators" on page 34 for more information.

Have each student read the article section by section. This can be done as a class with students taking turns reading out loud, reading in small groups, or silently reading alone.



Day Two:

Organize students into groups of four. Give each student a journal or an article and copies of the template given below. Provide students with subtopics or let them choose their own. For the "National Kids Survey," possible subtopics are (1) Benefits of going outside, (2) Questions researchers wanted to answer, (3) Results of the study, and (4) Ways to motivate kids to go outside.

Have them write the subtopics in the four rows under the left-hand column, labeled "Subtopics," of the template page.

Tell students that their job will be to work in groups and summarize the main points of the article according to the different subtopics. The students in the group will take turns rolling the die. The numbers rolled indicate the order the students will participate in, with the highest number rolled going first.

Have the first student in each group choose one of the subtopics to summarize. After choosing a subtopic, the student will roll the die one time. The number rolled determines the number of statements or observations the student will write related to the subtopic.

Explain to the students that while the one student is brainstorming out loud and providing information about the subtopic, the other group members will take notes in the "Statements and Observations" column of the template page.

After the first student has shared his or her information on the chosen subtopic, the student chosen to go second will roll the die and make the appropriate number of statements about the next subtopic. This process will be continued until all four group members have taken their turn and all four subtopics have been covered. If time allows, all groups should share their information with the class.

Tips/variations:

- In place of dice, use strips of paper with the numbers "1" through "6."
- Some students may struggle with developing their statements. If you notice students that are struggling to make the number of statements needed about the subtopic, allow other students to assist them.
- If the students disagree on any statements or observations another student has made regarding a subtopic, have them refer to the article text for clarification.

Extension:

Divide the class into four groups and assign one of the chosen subtopics to each group. Have each group work together to develop a set number of statements and observations about the subtopic. Ask each group to share its observations with the rest of the students in the class. As a class, discuss the article and identify the main points of the article.

Natural Inquirer Summary Statements

General Topic: _____

Group Members' Names: _____

_____

Subtopics	Statements and Observations

Reflection Section Answer Guide

Note to Educator: The purpose of the Reflection Section questions is to encourage students to think critically about what they have read. The following "answers" are only suggestions to assist you in using these questions in the classroom.

INTRODUCTION

What are the questions the scientists wanted to answer? *The scientists wanted to determine the amount of time kids are spending outdoors, in which outdoor activities kids participate, and the reasons kids are not spending more time outdoors.*

If you were a scientist wanting to learn about kids' time outdoors, how would you go about gathering information? *A variety of answers are possible for this question. Encourage students to come up with ideas and discuss the advantages/disadvantages of each idea. Some possible ways include a questionnaire, online social media, Web surveys, interviews, and phone surveys.*

Why do you think understanding kids' time outdoors would help recreation managers? *Recreation managers provide facilities and activities for people who like to do things outdoors. If managers better understand what kids like to do outdoors, they can do a better job of providing facilities and activities for kids.*

METHODS

Why would the scientists not want the results to be biased? How might the results of the survey be affected if the research were biased? *The scientists wanted the results to be unbiased because biased results can affect the survey in a negative way. Biased research usually produces results that are not accurate. For example, if the survey was biased by selecting more girls than boys, the results would be biased towards girls and would not allow for an accurate comparison across genders.*

What did the demographic information enable the scientists to compare? *The demographic information enabled scientists to compare results among different groups, such as by age, gender, and ethnicity. They compared outdoor activities, for example, between boys and girls.*

Why did the scientists have to speak with a proxy for kids under 16 years old? *Students will have their own answers to this question. In class, discuss why students think kids under 16 are not allowed to answer questions in a Government survey. One reason is that children under 16 are protected under law. The class may also discuss why kids under 16 are protected by law.*

FINDINGS

Are you surprised by the results of the study? How do they compare with you and your friends? Discuss with your class whether you believe these results are similar to or different from your time outdoors. *Students will have individual answers to this question. Some students will be surprised by the results, while others may not. A brief discussion among classmates will enable students to determine if the results of the National Kids Survey are similar to their own time spent outdoors.*

Do you think technology affects the amount of time you spend outdoors each day? Estimate how many hours a day you spend indoors watching TV or DVDs, playing video games, or spending time on the computer. Compare these hours with how many hours a day you spend outdoors. *Students will have individual answers to this question. They should, however, suspect that technology may affect the amount of time they spend outdoors each day, particularly if they have a computer or TV in their bedroom.*

DISCUSSION

Should kids be encouraged to spend more time outdoors? Why? *Students will have individual answers to this question. A brief discussion among classmates will enable students to consider whether kids should be encouraged to spend more time outdoors.*

Do you spend more or less time outdoors than you did when you were younger? Why? *Students will have individual answers to this question. Regardless of the answer, encourage your students to examine their amount of play time to determine why they spend more or less time outdoors than they did when they were younger.*

Which National Science Education Standards Can Be Addressed Using This Monograph?

National Science Education Standard	Location in Article
Abilities Necessary To Do Scientific Inquiry	Thinking About Science: Explanation and use of baselines in research. Introduction Reflection Section: State the research question. Methods: Technology used, data recording. Findings Reflection Section: Drawing conclusions from data. Discussion: Scientist explanations for results.
Understanding About Scientific Inquiry	Thinking About Science: The importance of establishing a baseline. Introduction Reflection Section: Determining how to collect data. Methods: Survey protocol. Methods Reflection Section: Understanding the importance of surveys being unbiased. Methods sidebar: Description of a proxy and their use. Discussion: Implications.
Abilities of Technological Design	Introduction: Limitations of previous studies created need for new research. Introduction Reflection section: Using a questionnaire to collect data. Methods: Survey protocol. FACTivity: Creating and implementing a survey (first and second FACTivities). FACTivity: Using a compass to locate objects.
Understandings About Science and Technology	Methods: Random sample. Methods Sidebar: Description of a proxy and its use. FACTivity: Discussion of possible constraints of survey (first and second FACTivities).
Personal Health	Thinking About the Environment: Benefits of spending time outdoors. Figure 3: Hiking builds physical strength.
Risks and Benefits	Thinking About the Environment: Benefits of spending time outdoors. Introduction: Spending time outside has many positive benefits.
Science and Technology in Society	Meet the Scientists. Thinking About Science: Baselines are used in everyday life. Methods: Survey protocol. Findings: Technology impacts on children's time outdoors. Findings Reflection Section: Students examining how technology affects their outdoor time. Discussion Sidebar: Geocaching. Compass FACTivity: Uses of compasses.
Science as a Human Endeavor	Meet the Scientists. Thinking About Science, Introduction, and Introduction Reflection Section: What the scientists were interested in studying.
Nature of Science	Thinking About Science: The use of baselines. Introduction: The applied nature of science (solving a problem). Discussion: Implications and the application of science to solve problems.

Web Site Resources

Let's Move Outside! http://www.letsmove.gov/lets-move-outside

Discover the Forest: http://www.discovertheforest.org/

Finding My Forest: http://www.findingmyforest.org/

America's Great Outdoors: http://americasgreatoutdoors.gov/

Texas Parks and Wildlife—Tips for going outside and being in nature http://www.tpwd.state.tx.us/kids/get_out/

USDA Forest Service NatureWatch: http://www.fs.fed.us/outdoors/naturewatch/

U.S. Fish & Wildlife Service- Let's Go Outside! http://www.fws.gov/letsgooutside/

What Is the Forest Service?

The Forest Service is a part of the United States Department of Agriculture (USDA). It is made up of thousands of people who care for the Nation's forest land. The USDA Forest Service manages over 150 national forests and almost 20 national grasslands. These are large areas of trees, streams, and grasslands. National forests are similar in some ways to national parks. Both are public lands, meaning that they are owned by the public and managed for the public's use and benefit. Both national forests and national parks provide clean water, homes for the animals that live in the wild, and places for people to do fun things in the outdoors. National forests also provide resources for people to use, such as trees for lumber, minerals, and plants used for medicines. Some people in the Forest Service are scientists whose work is presented in the journal. Forest Service scientists work to solve problems and provide new information about natural resources so that we can make sure our natural environment is healthy, now and into the future.

Learn more about the Forest Service by visiting http://www.fs.fed.us.

What Is the Cradle of Forestry in America Interpretive Association?

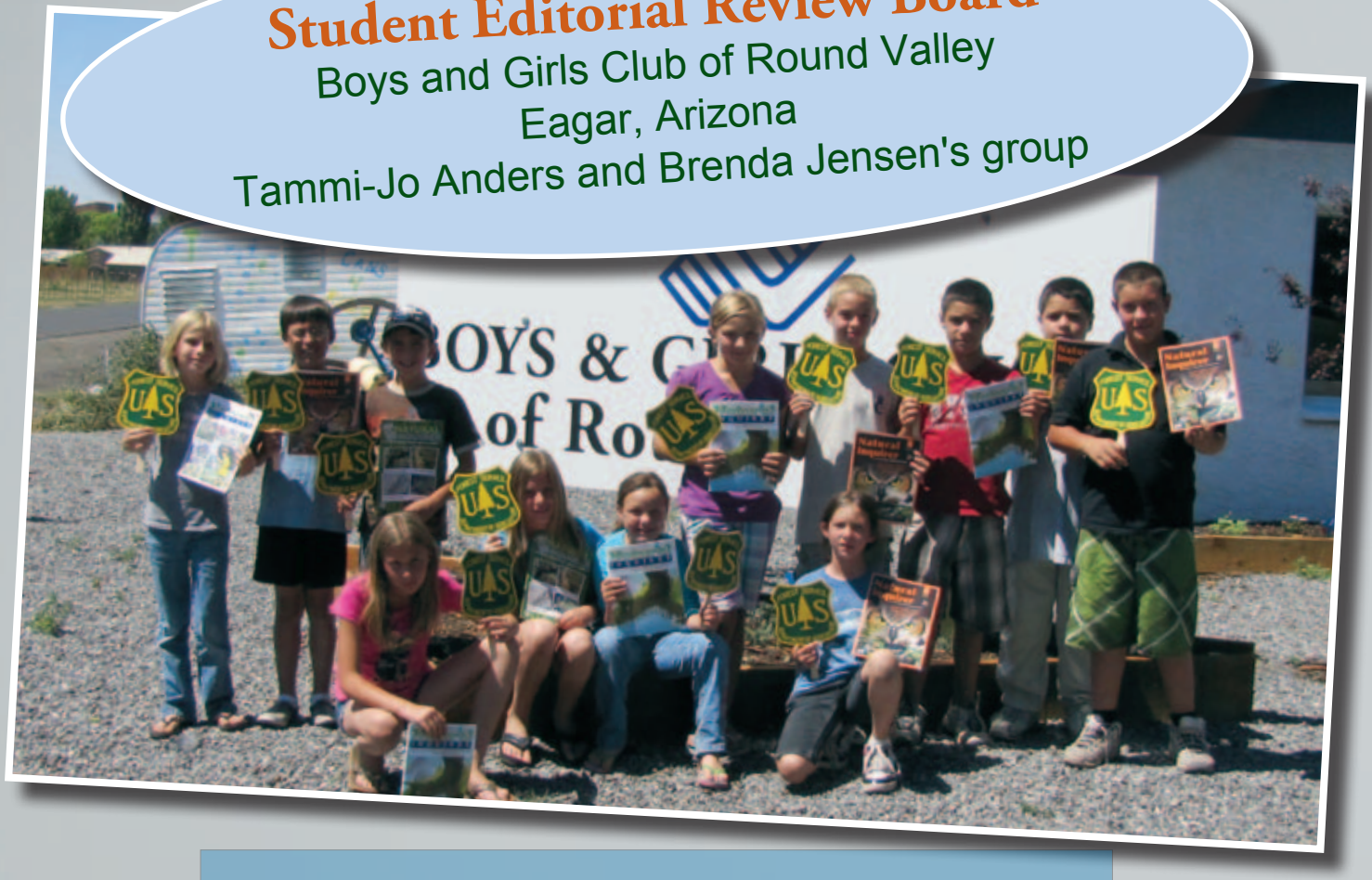
The Cradle of Forestry in America Interpretive Association is a 501(c)3 nonprofit organization based out of Brevard, NC. The Interpretive Association strives to help people better understand ecology through recreation and education opportunities. Their projects include:

- Campground and recreation area management.
- Educational programs and services, including the *Natural Inquirer* and *Investi-gator*.
- Sales of forest-related gifts and educational materials,
- Workshops, newsletters and publications.
- Partnership with the Forest Service to provide programming at the Cradle of Forestry Historic Site.

Learn more about the CFAIA by visiting www.cfaia.org

Student Editorial Review Board

Boys and Girls Club of Round Valley
Eagar, Arizona
Tammi-Jo Anders and Brenda Jensen's group



Visit these Web sites for more information:

Natural Inquirer
http://www.naturalinquirer.org

Forest Service Conservation Education
http://www.fs.usda.gov/conservationeducation

Discover the Forest
http://discovertheforest.org

Earth and Sky radio series
http://www.earthsky.org/about/radio-affiliates

Project Learning Tree
http://www.plt.org

The Investi-gator
http://www.scienceinvestigator.org

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