



The Mini Page

Betty Debnam, Founding Editor and Editor at Large



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Seekers of Knowledge

Young Citizen Scientists

Hundreds of thousands of kids and adults are helping to solve the mysteries of Earth and beyond. They are known as citizen scientists.

Although these volunteers are not professional scientists, they are making valuable scientific discoveries throughout the world. They are gathering data on thousands of subjects, ranging from monarch butterfly migration, to galaxy shapes, to water quality, to penguin lifestyles.

In order to learn more about young citizen scientist explorers, The Mini Page talked with experts from the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA).



photo courtesy National Phenology Network

A student checks the timing of flowering and insect pollinators. She is working with a network that monitors seasonal events.



photo by Claire Fackler, NOAA National Marine Sanctuaries

This middle school student is collecting a water sample from a local creek in Santa Barbara, California. He is a citizen scientist with the NOAA Channel Islands Argonaut program.

Citizen detectives

Amateurs have been making important scientific discoveries for thousands of years. Since the late 1800s, professional scientists have been joining forces with these volunteers. For example, in 1900, the National Audubon Christmas Bird Count organized birders to gather data. It is the longest-running citizen scientist group survey in the world.

The number of citizen scientists has exploded in the last 15 years. Technology, such as the Internet, apps, smartphones and GPS, has made it much easier for everyone to join in the hunt for knowledge.

Hand in hand with experts

Citizen scientists usually work closely with scientific experts. Often, professional scientists need help collecting or analyzing a lot of data over a wide area and over a lot of time.

For example, the Hubble telescope has collected hundreds of thousands of images of the universe, far too many for astronomers to look at closely. Citizen scientists help analyze the huge amounts of data in these images.

Sometimes, citizen scientists set up their own projects. Volunteers may follow up on something that has made them curious, or they may want to find ways to help their community.

Kids can work on their own on a project, but most kids work within their classes or youth groups such as 4-H, Boy Scouts or Girl Scouts.



photo by Robert E. Moore, courtesy NSF

When she was 14, Caroline Moore discovered a very rare type of supernova.

Studying Nature Around Us

A win-win situation

Citizen scientists learn to notice the world around them. Under the guidance of professional scientists, they learn to compare data and question what the information means.

Doing the actual research is exciting. Many students get their first real experiences in nature through citizen scientist projects.

It is especially important when kids become citizen scientists. The world needs people who have learned how to think creatively and to look for answers that are backed up by tests and research, experts say.

Collecting accurate data

Studies have found that trained students usually collect information that is as accurate and high-quality as that from professional scientists. Citizen scientists have often helped contribute to important discoveries. They may help scientists see the world in a new way and ask new questions.



photo by Carlye Calvin, University Center for Atmospheric Research, courtesy Project BudBurst

Two students record observations for Project BudBurst.

Recording changes

In Project BudBurst, 13,000 citizen scientists are recording information on when plants start changing each season. For example, they record when leaves change color in the fall and when plants begin to flower in the spring.

This helps scientists monitor the effects of temperature changes and rainfall and to gather information about climate change.

You can learn more at: BudBurst.org

Measuring rain and snow

In an NSF/NOAA project called CoCoRaHS (ko-ko-RAHS), observers measure precipitation that falls near their homes. When whole communities come together to monitor the precipitation, it gives groups such as the weather service, farmers, insurance companies, water supply managers and outdoor lovers a better idea of patterns. It helps them predict what to prepare for.

Even one real-time report of major precipitation can speed up emergency responses such as flood warnings, experts say.

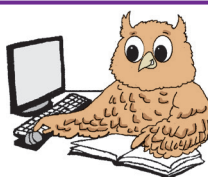
A father and son measure rainfall in Concord, North Carolina, as part of CoCoRaHS.

You can learn more at: cocorahs.org



photo by Henry Reges, courtesy NSF

Ready Resources



The Mini Page provides ideas for websites, books or other resources that will help you learn more about this week's topics.

On the Web:

- scistarter.com
- science.nasa.gov/citizen-scientists
- 1.usa.gov/1zLQBPv
- bit.ly/1zrdqYI

At the library:

- "Citizen Scientists: Be a Part of Scientific Discovery From Your Own Backyard" by Loree Griffin Burns



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Try
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Citizen Scientists

S	D	S	Y	G	O	L	O	N	H	C	E	T	S	K
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Words that remind us of citizen scientists are hidden in the block above. Some words are hidden backward or diagonally. See if you can find: APP, BIRD, BUD, CITIZEN, CLASS, DATA, HELP, HUNT, KID, KNOWLEDGE, LEARN, MONITOR, PRECIPITATION, RECORD, SCIENTIST, SEA, SKY, SPACE, STUDENTS, TAG, TECHNOLOGY, TIDE, WATER, WEB.



Mini Spy

Mini Spy is keeping count of the monarch butterflies that visit her backyard. See if you can find:

- | | | | |
|--|---------------------------------|----------------------------------|-------------------------------------|
| <input type="checkbox"/> word MINI | <input type="checkbox"/> parrot | <input type="checkbox"/> frog | <input type="checkbox"/> cat |
| <input type="checkbox"/> large butterfly | <input type="checkbox"/> bucket | <input type="checkbox"/> teapot | <input type="checkbox"/> man's face |
| <input type="checkbox"/> peanut | <input type="checkbox"/> dragon | <input type="checkbox"/> bandage | <input type="checkbox"/> horseshoe |



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Rookie Cookie's Recipe Blueberry-Lemon Breakfast Cake

You'll need:

- 1 (18-ounce) box lemon cake mix
- 1 (6- to 8-ounce) container plain yogurt
- 4 eggs
- 1 1/2 cups blueberries (fresh or frozen)
- Round tube cake pan
- Cooking spray

What to do:

1. Combine cake mix, yogurt and eggs. (Do not add oil and water.)
2. Blend until moist, then beat 2 minutes at medium speed.
3. Gently stir in blueberries.
4. Spray tube pan with cooking spray. Pour batter into tube pan.
5. Bake in oven at 350 degrees for 40 minutes or until done. Cool for 15 minutes before removing from tube pan.

Makes 8 to 12 servings.

You will need an adult's help with this recipe.

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Meet Antonio Banderas



photo © Paramount Pictures Animation

Antonio Banderas stars as Burger Beard in "The SpongeBob Movie: Sponge Out of Water."

Antonio is an actor and director who has starred in many movies, including "The Mask of Zorro" and the "Spy Kids" trilogy. He was the voice of Puss in Boots in "Puss in Boots" and three of the "Shrek" movies. He has also acted in several plays and TV shows.

Antonio, 54, was born in Málaga, Spain. He wanted to be a professional soccer player until he broke his foot when he was 14. He began studying drama in school and started acting in a small theater company in Málaga. Then he moved to Madrid, where he gained success in a bigger theater.

He has homes in the United States and in Spain. He is one of several stars on the UNICEF CD "Children First." UNICEF helps children in trouble because of wars or natural disasters.

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Goldie Goodsport's Supersport



Height: 5-10
Age: 17
Hometown: Clarksville, Indiana

Haley Libs

On the volleyball court, Haley Libs is ready for any challenge. This past season, Haley and her team from Our Lady of Providence High School in Clarksville, Indiana, won the state title for the second year in a row.

It was off the court, however, that Haley faced her hardest challenge. At age 3, she was diagnosed with leukemia, a type of cancer that affects a person's white blood cells. Before Haley could read or write, she was in a fight for her life. For many months, young Haley endured chemotherapy to fight her cancer. Later, blood clots and other problems required more medicine and physical therapy. But Haley fought on. By age 10, she was cancer-free.

Each Christmas, Haley and her family take toys to the young patients at the children's hospital where Haley won her greatest victory. This fall, Haley will play volleyball at Northern Kentucky University, where she hopes to study occupational therapy.

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Mighty Funny's

Mini Jokes

All the following jokes have something in common. Can you guess the common theme or category?

Sienna: Why are chemists good at solving problems?
Steven: Because they have most of the solutions!



Susan: What is a nuclear scientist's favorite lunch?
Stanley: Fission chips!

Samantha: What did the limestone tell the geologist?



Sarah: "Don't take me for granite!"

Sea, Skies and Space

LIMPETS

In the NOAA LiMPETS* network, middle school, high school and college students monitor national marine sanctuary beaches in California.

Students collect data on rocky intertidal areas and sandy beach areas. **Intertidal areas** are beach areas that are covered by the sea at high tide and uncovered at low tide.

The information collected helps officials track the health of marine life.

* LiMPETS stands for **Long-term Monitoring Program and Experiential Training for Students**.



photo by Aelfric Wolf, courtesy NOAA

Middle school students monitor Pacific mole crabs through the LiMPETS sandy beach network. They measure the crabs, check to see if they are male or female and if the females are carrying eggs. The crabs are an important link in the sandy beach food web.

You can learn more at: limpetsmonitoring.org

The Mini Page thanks Claire Fackler, NOAA Office of National Marine Sanctuaries; Ann Marie Trotta, education outreach, NASA; and Maria Zacharias and Ellen McCallie, program director, NSF, for help with this issue.



photo by Bruce Leventhal, Forest Lake High School, Forest Lake, Minnesota

Students in the Monarch Larva Monitoring Project examine a Mexican butterfly weed, which is in the milkweed family. You can learn more at: mlmp.org

On wings of beauty

A lot of what we know about monarch butterflies has come from citizen scientists. Many monarch groups rely on help from families, students and groups such as 4-H.

Young scientists identify and monitor monarchs and their larvae. Citizen scientists have also helped tag individual butterflies to help scientists study migration.

Monarch Watch, based at the University of Kansas, helps monitor monarchs and has started a Waystation Program. It encourages people to plant flowers that monarchs like and milkweed, which the larvae need.

You can learn more at: monarchwatch.org



photo courtesy Lost Ladybug Project

Youth at the Akwesasne Nation help identify different species in the Lost Ladybug Project. You can learn more at: lostladybug.org

Next week, The Mini Page is about ice hockey.

Research through the Web

Citizen scientists do not always have to go into the field to gather data. Many projects are done through the Internet.

Scientists need people's help analyzing the tons of data they've gathered. Computers are great at tasks such as measuring objects, but they can't interpret things like humans do. Humans can spot things that computers cannot.

Zooniverse is a doorway to web-based projects. Volunteers help researchers analyze photos and other information, such as ancient writings. Projects range from searching for disks of stardust to monitoring penguin nesting areas.

You can learn more at: zooniverse.org



photo courtesy NASA

The EDC winning project flew onboard Orion's first flight in December. You can learn more at: 1.usa.gov/16SuJ9x

Team Ares from the Governor's School for Science and Technology in Hampton, Virginia, won NASA's 2014 Exploration Design Challenge (EDC). They designed and built a device to test for radiation in long-term space flight.

Look through your newspaper for stories about exciting science issues.

The Mini Page Staff

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