

Citizen Science Resource List

Projects YOU can do with your students!

What is citizen science?

Citizen science involves public participation in scientific research usually under the direction of or in collaboration with professional scientists. It is a terrific tool for both educators and scientists. Students, teachers, and other citizens can be involved with one or more scientific practices connecting directly with the Next Generation Science Standards (NGSS) practices below.

PRACTICES FOR K-12 SCIENCE CLASSROOMS

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Citizen scientists are able to make important contributions to the field of science through their participation in projects. Some projects are local in scope and others are national and international, but all of them further our understanding of the world around us and connect us to each other. The projects below are just a few of the many projects that can add relevance to the content your students are learning in the classroom and give the student's the opportunity for real world application of knowledge and skills.

Please contact us if you have any questions about using citizen science in your classroom.

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Sullivan County Conservation District Projects

Pollinator Garden Phenology – The Sullivan County Pollinator Gardens were established in 2015 to illustrate practices to improve and enhance native bee habitat. The gardens use a combination of existing landscape and new plants, and are designed to provide the longest flowering period possible. Nearly all of the plants are native to New Hampshire, although many have become uncommon or even rare in the state. The plants are marked for easy identification. We want to know when each plant in our pollinator garden blooms and how long the blooms last. The goal is to always have something blooming during the growing season for pollinator use. We also want to know what kind of pollinators are visiting each plant. This involves observing the plants in the garden, taking pictures of pollinators at specific plants and uploading them onto iNaturalist, and recording the number of blooms of each species.

<http://sullivancountynh.wixsite.com/educationandoutreach/service-learning>

Biodiversity Inventory – What is out there? We want to know and we want your help to identify every organism found on Sullivan County Lands. If you are hiking, hunting, or farming on counties lands, just take some pictures of any organisms you see and upload them to the *Biodiversity Inventory: Sullivan County, NH* project on iNaturalist. If you don't know what they are, that's okay, just make your best guess and scientists and naturalists will double check your identifications. We will use this list to create keys and guides to the common organisms on county lands for educational purposes. This inventory will also help us make informed land management decisions.

www.iNaturalist.org

Pond Monitoring - We would like to gather water quality data on all five of the ponds on county lands. Some of the data can be collected just once a year, but other data needs to be collected on a more routine basis. Monitoring the Ponds includes water chemistry testing, habitat survey, and biotic sampling. Sullivan County will supply all the monitoring equipment and train volunteers to use it. The information gathered will be used to inform and direct future pond management decisions on county lands.

<http://sullivancountynh.wixsite.com/educationandoutreach/service-learning>

Saint Gaudens National Historic Site Projects

Dragonfly Monitoring – The "Dragonfly Mercury Project" (DMP) engages citizen scientists such as students and visitors in national parks to collect dragonfly larvae from distinct sampling sites. The samples are then sent to the University of Maine, US Geological Survey, or Dartmouth College laboratories for mercury analyses. The study connects people to parks and provides baseline data to better understand the spatial distribution of mercury contamination in national parks.

http://www.nature.nps.gov/air/studies/air_toxics/dragonfly/index.cfm

Bioblitz – This is a 24-hour event, in which, teams of volunteer scientists, families, students, teachers, and other community members work together to find and identify as many species of plants, animals, microbes, fungi, and other organisms as possible. In 2016, Claremont and Newport schools participated in a Bioblitz hosted at Saint Gaudens in Cornish, NH. The Education and Interpretation Ranger is available to help you set-up a bioblitz at your school or in your community.

<http://www.nationalgeographic.com/explorers/projects/bioblitz/>

National Projects

Project Budburst – Get outside and take a moment to observe how plants in your community change with the seasons. Project BudBurst participants make careful observations of the timing of leafing, flowering, and fruiting phases of plants (plant phenophases) throughout the year. Spring, summer, fall, and winter phases are all valuable. When you share your observations, they become part of an ecological record. Scientists and educators can use the data to learn more about how plant species respond to changes in climate locally, regionally, and nationally. Project BudBurst data are freely available for anyone to download and use and are provided in several formats in the Data section of the website. <http://budburst.org/home>

Project Feeder Watch – Observe, identify, and count the birds that show up at your feeder in your schoolyard or backyard. Project FeederWatch is a winter-long survey of birds that visit feeders at backyards, nature centers, community areas, and other locales in North America. FeederWatchers periodically count the birds they see at their feeders from November through early April and send their counts to Project FeederWatch. FeederWatch data help scientists track broadscale movements of winter bird populations and long-term trends in bird distribution and abundance. Anyone interested in birds can participate. New participants are sent a research kit with complete instructions for participating, as well as a bird identification poster and more. You provide the feeder(s) and seed. <http://feederwatch.org/>

Monarchs in the Classroom - Monarchs in the Classroom provides a wide variety of materials and professional development opportunities for teachers, naturalists and citizens throughout the US. Two groups of behind the scenes people work together in a unique partnership to make this program successful: classroom teachers and scientists committed to sharing their expertise with the broader community. All of our programs reflect this partnership, combining real science with techniques that work for teachers, students and citizens, and promoting practices in which children learn science in ways that reflect the inquiry methods used by scientists to understand the natural world. <http://monarchlab.org/>

Journey North - Journey North engages citizen scientists in a global study of wildlife migration and seasonal change. K-12 students share their own field observations with classmates across North America. They track the coming of spring through the migration patterns of monarch butterflies, robins, hummingbirds, whooping cranes, gray whales, bald eagles— and other birds and mammals; the budding of plants; changing sunlight, and other natural events. Find migration maps, images, standards-based lesson plans, activities and information to help students make local observations and fit them into a global context. www.learner.org/jnorth/

The Great Backyard Bird Count - The Great Backyard Bird Count is an annual four-day event that engages bird watchers of all ages in counting birds to create a real-time snapshot of where the birds are across the continent. Anyone can participate, from beginning bird watchers to experts. It takes as little as 15 minutes on one day, or you can count for as long as you like each day of the event. <http://www.birdsource.org/qbbc/>

Monarch Watch - Monarch Watch is an educational outreach program based at the University of Kansas that engages citizen scientists in large-scale research projects. This program produces real data that relate to a serious conservation issue. Monarch Watch gets children of all ages involved in science. Our website provides a wealth of information on the biology and conservation of Monarch butterflies and many children use it as a resource for science fair projects or reports. Additionally, we encourage children to showcase their research or school projects on our website and we involve them in real science with the tagging program. <http://www.monarchwatch.org>

Bumblebee conservation - The Xerces Society is trying to gather information about 5 species of bumble bees that have experienced rapid population declines in the last couple of decades. They are seeking observations and photographs of these bumble bees to gather information and distribute conservation guidelines to important locations. More information about the species of interest can be found on their website and Facebook page. <http://www.xerces.org/bumblebees/>

The Great Sunflower Project - We know very little about bee activity in home and community gardens and their surrounding environments, but we *are* certain that they are a crucial link in the survival of native habitats and local produce, not to mention our beautiful urban gardens. Our local pollinator populations require our understanding & protection, and to answer that call we need to determine where and when they are at work. With enough citizen scientists collecting data, we can learn much more, much faster, about the current state of bee activity. We would love to have you join us; let's learn about pollinators together! <http://www.greatsunflower.org>

The Community Collaborative Rain, Hail, and Snow Network - CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications. We are now in all fifty states. <http://www.cocorahs.org/>

International Projects

iNaturalist - It's like Facebook for nature nerds! iNaturalist is a place where you can record what you see in nature, meet other nature lovers, and learn about the natural world. This is the perfect project for a class because kids can take and post photos of their discoveries, even (and especially) if they don't know what they've found. They can ask for help with identification, and naturalists who monitor the site answer questions and identify species. It's interactive! Make a biodiversity project page for your school! Sullivan County has a page too! Participate in our Biodiversity Inventory and add your observations to our project. www.inaturalist.org

Globe at Night - This program is an international citizen-science campaign to raise public awareness of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and submit their observations from a computer or smart phone. Participants report the number of stars they observe in well-known constellations, (e.g. Orion, Leo the Lion, Cygnus the Swan, etc). The website has all

the information you will need for teaching and participating in this project, including which educational standards are met through participation.

Light pollution threatens not only our "right to starlight", but can affect energy consumption, wildlife and health. More than 100,000 measurements have been contributed from people in 115 countries during the campaigns each winter/spring over the last 9 years, making Globe at Night the most successful light pollution awareness campaign to date! <https://www.globeatnight.org/>

Citizen Science Resources

Research and Articles

- ***Citizen Science Can Renew A Child's Love of Nature***, by Mike Mueller - A summary of how to make citizen science a cross curricular project. <http://www.education.com/reference/article/citizen-science-childrens-love-nature/>
- ***Research-based best practices for field ecology research for environmental education centers*** - Results of Heather Lumpkin's Master's research - a synthesis of interviews with coordinators of citizen science projects involving 6th-12th graders. <http://fieldecologyresearchexperience.weebly.com/index.html>
- **PLOS Blog** - Innovative blog about citizen science; interesting articles. <http://blogs.plos.org/citizensci/2012/12/31/top-citizen-science-projects-of-2012/>

Organizations

- **Citizen Science Association** - A national organization centered on the field of citizen science. <http://citizenscienceassociation.org/>
- **Citizen Science Central** - a website of Cornell. The Resources tab has links to many scholarly research articles in the field of citizen science. You can search for projects around the country. They have projects focused on mammals, birds, invertebrates, plants, invasive species, water quality, air quality, weather, climate change, and astronomy. The Citizen Science Toolkit provides guidance for setting up a citizen science project. <http://www.birds.cornell.edu/citscitoolkit>
- **Cornell Lab of Ornithology** - Browse their projects, watch nest cams, etc. <http://www.birds.cornell.edu/citsci/>
- **Cit Sci.org** - A resource for creating citizen science projects and managing them online. You can create datasheets, analyze data, etc. Has a searchable list of participating projects. <http://www.citsci.org/>
- **Citizen Science Alliance** - Crowd-sourced projects based online; no field work involved; participants catalog, identify, measure, etc. images and data already uploaded to a website. <http://www.citizensciencealliance.org/index.html>
- **Scistarter** - allows the user to search by topic or activity and have students add to existing projects. They also have a blog, which includes an article with resources to get students involved in citizen science. <http://scistarter.com/>