Connecting Students to a World of Possibilities in Authentic Science Research

Shirley J Farrell, PhD
Program Coordinator of Gifted Education, Troy University, Alabama

WHAT?

CITIZEN SCIENCE (CS)

- Is scientific research conducted in collaboration with citizens-non-professional scientists, including children.
- Prior to the 20th century, scientific research was conducted by gentleman scientists, amateurs, or self-funded researchers.
- By mid-20th Century, universities and government labs dominated research and solicited help from citizens.
- Technology connects scientists and individuals for global opportunities
- Volunteers needed for long-term collection of data or analysis of large amounts of data
- Projects available in Biology, Humanities, History, Language, Arts, Medicine, Physics, Climate/Weather, Nature, Space

WHY?

CITIZEN SCIENCE = AUTHENTIC SCIENCE

- Easily integrate into science curricula
- Student works as the Professional
- Relevance to the students and their interest(s)
- Answers "When am I ever going to use this?"
- Real world application of science skills
- 21st Century skills employed
- Use as interest centers in classrooms

Teacher Assignment

- An activity the teacher develops and assigns to learn content or practice skills.
- **Audience:** Teacher
- Practice learning skills
- Learn content

Citizen Science

- Authentic scientific research conducted in collaboration with citizens.
- **Audience:** Global scientists & other students
- Motivating and engaging
- Practice skills and learn content
- Immersed in scientific research

Origins

Oldest physical CS: National Audubon Society-Christmas Bird Count

Computer use: SETI: Search for Extraterrestrial Intelligence http://setiathome.ssl.berkeley.edu/

CS first defined in mid 1990's: Alan Irwin (UK) & Rick Bonney (US)

Today the power of the Internet brings teams of scientists together with everyday citizens from all over the world to collaborate on research projects.

HOW: Join a Project

APPS & WEBSITES: Set up teacher classroom account for student use

iNaturalist https://www.inaturalist.org/ Global nature app to report observations of and to identify biodiversity.

The Globe Program https://www.globe.gov/ Global Learning and Observations to Benefit the Environment (GLOBE) Program is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process, and contribute meaningfully to understanding the Earth system and global environment. Atmosphere, Climate, Hydrology, Soil, Land Cover, Biology, Phenology

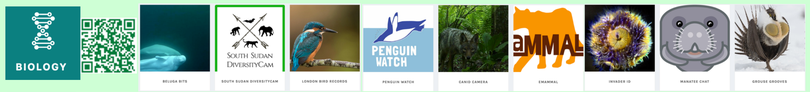
Journey North https://journeynorth.org/ North America tracking migrations and seasons birds, butterflies, whales, amphibians, season, flowers, mystery class

Project Noah https://www.projectnoah.org/ Connect with the natural world and learn about wildlife

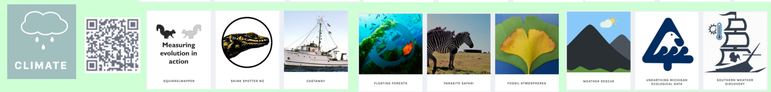
eBird https://ebird.org/ **Cornell Lab of Ornithology**: Explore birds and hot spots where ever you are, report bird sightings, keep life lists, track bird populations

ZOONIVERSE https://www.zooniverse.org The world's largest and most popular platform for research by volunteers-hundreds of thousands of people of all ages from around the world who come together to assist professional researchers. Projects are funded by state, national, and global agencies, governmental offices, and universities. **One of the best and teacher friendly citizen science websites with a repository of teacher lessons and opportunities for students to ask questions to the scientists.** Tutorials are provided for understanding and practice before starting projects.

6 projects from Africa to Europe to Australia and the US. Help scientists unlock mysteries and transcribe information.



56 projects from every continent to identify, classify, analyze and transcribe data.



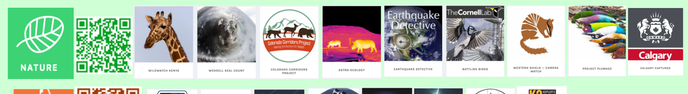
13 projects from southern oceans to northern lands identify, classify, analyze and track data.

20 projects from southern oceans to northern lands identify, classify, analyze and track data.

4 projects transcribing handwritten notes, correspondence, documents, and over 300,000 fragments of pre-modern and medieval Jewish texts from everyday receipts to biblical works.

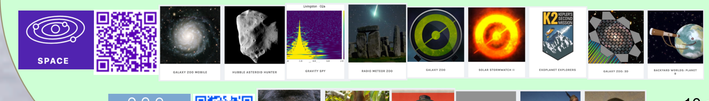
4 projects transcribing handwritten notes, correspondence, documents, and images. Projects may fit more than one category!

6 projects that analyze cells, fight resistance to antibiotics, determine differences in brains, analyze quality of life, identify white bools cells in monkeys, and understand virus replication.



62 projects from current and past animals from all over the world. Identify, classify, describe behaviors, count numbers, and analyze the data.

12 projects from muons, gravitational lenses and waves in space, classifying steel pan sounds, space radio data, and more.



20 projects from various space telescope to satellite photos for analysis, identification, and categorization of space objects.

10 projects analyzing human and animal behavior or transcribing journals and data for analysis.

HOW: Join a Project

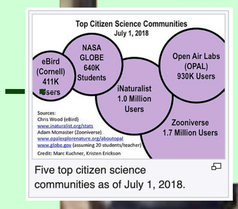
APPS:

Loss of the Night: Help scientists measure and understand the effects of light pollution on health, environment and society using your mobile device.

mPing: Are raindrops falling on your head? Is snow glistening in your treetops? We need your weather reports for our research and to improve weather radar!

ISeeChange: Investigate how weather and climate change are impacting our global communities and environment.

The game, Phylo, is actually a framework for harnessing the computing power of mankind to solve the Multiple Sequence Alignment problem.



Five top citizen science communities as of July 1, 2018.

Scan the QR code to access my Livebinder on Citizen science for a more comprehensive list of Citizen Science projects and search engines.

HOW: Create a Project

ZOONIVERSE Project Noah iNaturalist

What question(s) do you have? Create a project and post to ask others to help you collect and/or analyze data.

CITIZEN SCIENCE

Recording, assembling, and analyzing data are a necessary part of the process leading to answers, new insights, refined questions, and data reporting to give students an authentic science experience.

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Current and Future Scientists