



Where to start with citizen science programming: An introduction for librarians

Megan Carlton, MLIS

Science Librarian @ UNC Greensboro

On behalf of NCLA STEM-LINC



What is citizen science?

- » Scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions (Oxford English Dictionary).

A watercolor illustration on the left side of the slide. It depicts a pair of hands, rendered in warm, earthy tones of brown and orange, cupping a mound of dark, rich soil. From the center of the soil, a small green seedling with two leaves and a thin stem grows upwards. The background around the hands and soil is a soft, abstract wash of light green and blue, suggesting a natural, outdoor setting. The overall style is artistic and gentle.

What is citizen science?

- » Public participation in scientific research.

A very brief history of Citizen Science



Lighthouse keepers
collect data about
bird strikes for
scientists

1880

National Audubon
Society starts
annual Christmas
Bird Count

1900

Public Participation
in Ornithology
(Cornell Lab)

1992

National Weather
Service Cooperative
Observer Program
begins

1890

NSF's Public
Understanding of
Science Program

1958

What in the Zooniverse!

Step 1: <http://go.uncg.edu/snapshot>

Step 2: Click on 'classify'



Snapshot Serengeti ✓

ABOUT

CLASSIFY



Step 3: Go through the tutorial

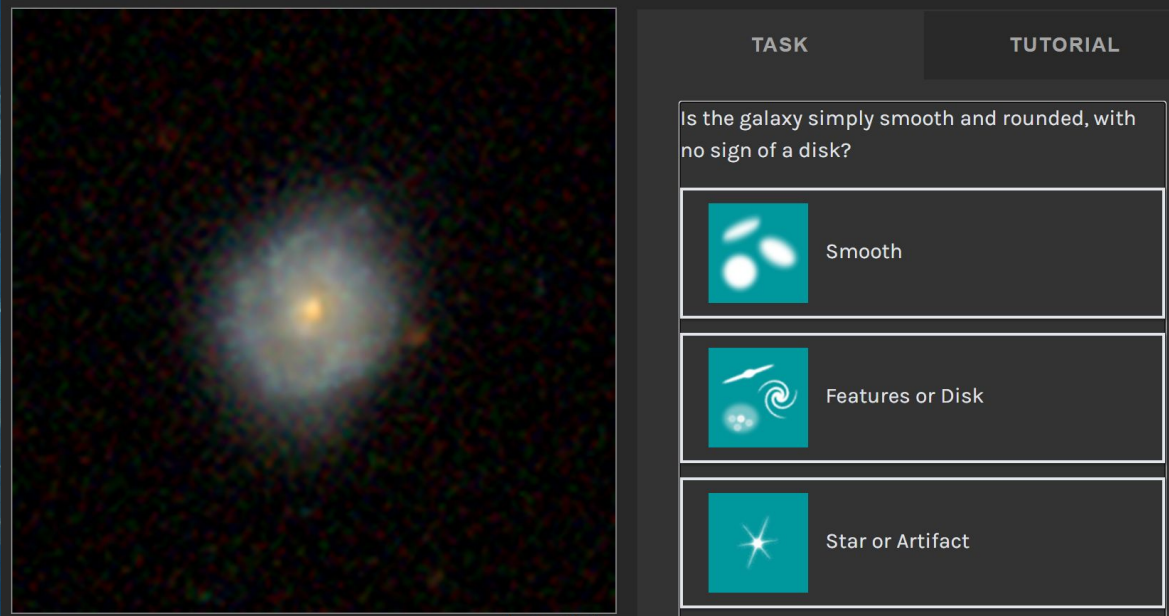


Camera-Trap Technology

- Can greatly expand geographic study area
- Noninvasive
- Easy to operate
- Reduces field time commitments
- No trapping/immobilizing training needed
- Produces a large amount of data...



Sloan Digital Sky Survey



Dark Energy Survey

Produced 1 petabyte (1,000 TB) of data (2.5 TB per night)

Large Synoptic Survey

Will collect 15–30 TB of data every night

2007 – Oxford graduate student
Spent 1 month classifying
galaxies for 12 hours/day = 50,000

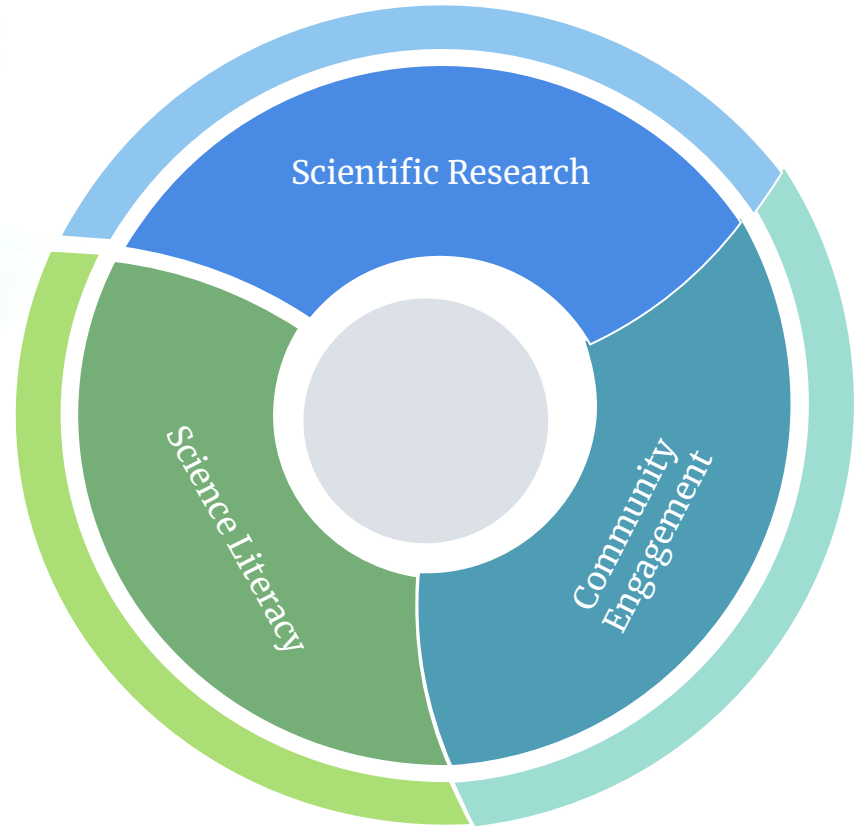
Launched Galaxy Zoo

70,000 per/hour in first days
50 million in first year

Images CC-BY Sloan Digital Sky Survey

Klesman, A. (2018, Sept 26). Zooniverse: A citizen science success story. Astronomy.

Benefits of Citizen Science





Scientific Research

Data sets that are too large to be analyzed by individuals.

Computers are not able to analyze all types of data.

Humans are better at some tasks.

Community Engagement

If you can, build upon an existing, motivated community group.

People are always interested in what is happening in their own backyard.



Science Literacy

Promotes engagement with the process of science

Projects are excellent for developing science-related skills such as:

Identifying organisms

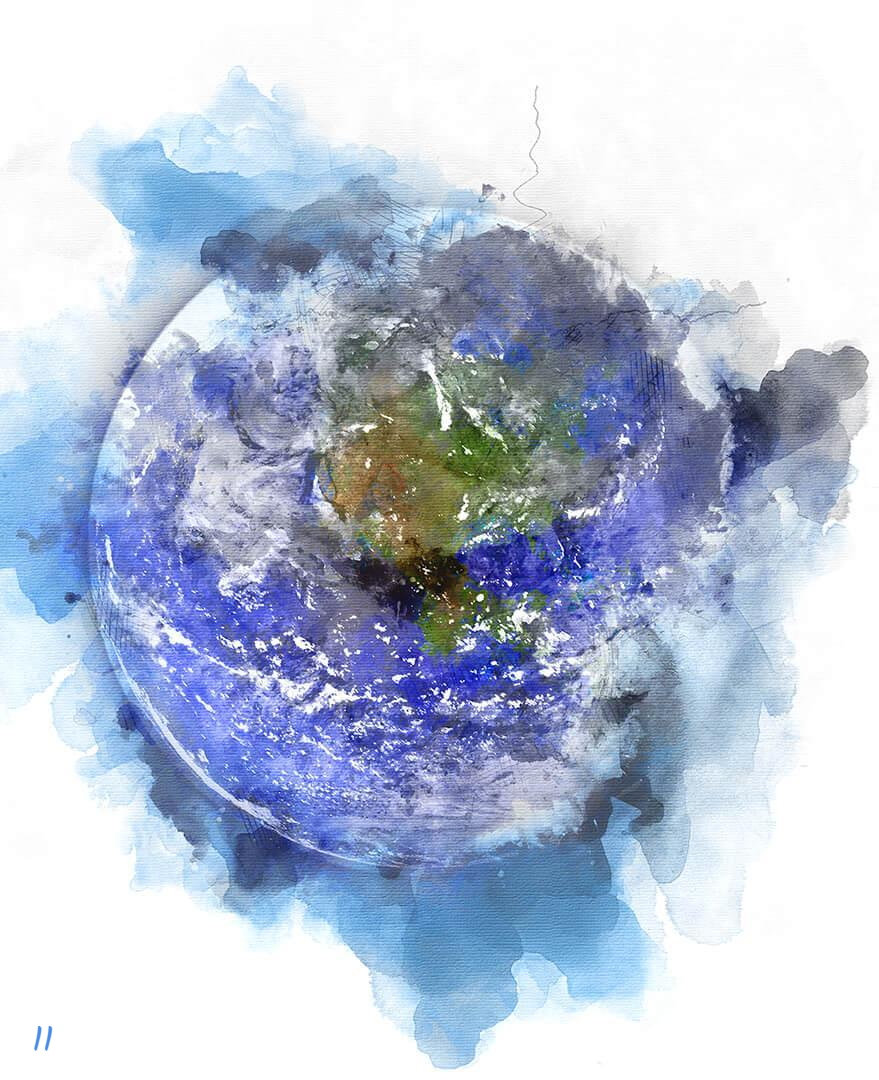
Using measurement instruments

Collecting field data

Following protocols

Process of research

How scientific questions are asked and answered



How school libraries can get involved

Many projects have correlating K-12 lesson plans.

OBJECTIVE

Students will be able to:

- Identify asking questions as an element of doing scientific research
- Define citizen science

STANDARDS

AAAS Benchmarks:

1B/M1b*, 1B/M2c*, 1C/M1, 1C/M3, 1C/M6*, 1C/M9**(B-SL), 3A/M2, 3C/M2*, 6A/M8** (BSL)

Common Core:

RST 6-8, 2, 10

Next Generations Science Standards:

Dimensions:

- Crosscutting Concepts:
 - Patterns
- Science and Engineering Practices:
 - Asking Questions & Defining Problems
 - Obtaining, Evaluating and Communicating Information



LESSON 7: CREATING AND INTERPRETING LIGHT CURVES

81

In this activity, students will interpret light curves to determine exoplanets' characteristics, including size, period, and distance from a star. Students will calculate the orbital period and use it to identify the distance between the detected planet and the host star using graphs displaying calculations based on Kepler's Third Law.

Supplementary Materials

- | | |
|-----------------------------|----|
| • Kepler's Third Law graphs | 88 |
| • Homework | 89 |
| • Homework Answers | 90 |

Project Finder

can be done online

have classroom materials ✓

use a smartphone or tablet app

are SciStarter affiliates

are U.S. Federally funded



Monarch Migration Game

In this curriculum activity by the University of Minnesota Monarch Lab, students will play a game that illustrates the challenges faced by monarchs that migration to Mexico. These challenges include finding enough to eat, dealing with often adverse weather conditions, and avoiding external sources of mortality. A K-2 version is available on the Monarch Lab website.



Teaching about the Magnificent Monarch: Resource Recommendations for Conservation Educators

The Association of Fish and Wildlife Agencies received a 2016 Multi-state Conservation Grant Program grant to complete the project titled Expansion and Implementation of the North American Conservation Education Strategy's Outdoor Recreation Adoption Model (Natural Pathways to Recruitment). This grant included funding to create this resource recommendation to ensure that conservation educators have the best-available resources for teaching about the conservation of monarch butterflies. Resources were reviewed by professional conservation educators from across the United States using criteria developed from the Guidelines for Excellence: Environmental Education Materials.



Monarch life cycle wheel

This activity by Kathleen Marie Garness is a great way to learn about the monarch butterfly life cycle. Print it, color it, cut it out, and make a spinning dial!



Wildlife Express: Perfectly Amazing Pollinators

This brochure by the Idaho Fish and Game Department highlights various different pollinators with activities for kids and students.

A watercolor illustration of solar panels. The panels are depicted with a grid pattern and are colored in various shades of blue and white, giving them a textured, artistic appearance. They are set against a background of soft, blended watercolor washes in blue, white, and light green, suggesting a sky and grassy field. The overall style is painterly and ethereal.

How public libraries can get involved

Organize events

House resources

NC Arboretum



eco
EXPLORE













See It. Snap It. Share It.



Your library could:

- Host events or trainings
- Be a designated hotspot
- Be a designated getspot
- Be a designated loanspot



 <p>iPod Touch 1000 points</p>	 <p>Digital Camera 400 points</p>	 <p>Trail Camera 280 points</p>	 <p>Collapsible Snake Hook 250 points</p>
 <p>Collapsible Insect Net 120 points</p>	 <p>Bushnell Powerview Binoculars 100 points</p>	 <p>Field Bag 75 points</p>	 <p>Bugnoculars 70 points</p>
 <p>ecoEXPLORE Journal 60 points</p>	 <p>Audubon Singing Stuffed Bird 50 points</p>	 <p>ecoEXPLORE Nalgene Water bottle 40 points</p>	 <p>Bird Bandana 35 points</p>



How academic libraries can get involved

Incorporating projects into courses.

Creating projects with researchers.

The Use of Online Citizen-Science Projects to Provide Experiential Learning Opportunities for Nonmajor Science Students

Defined a list of projects students could choose from.

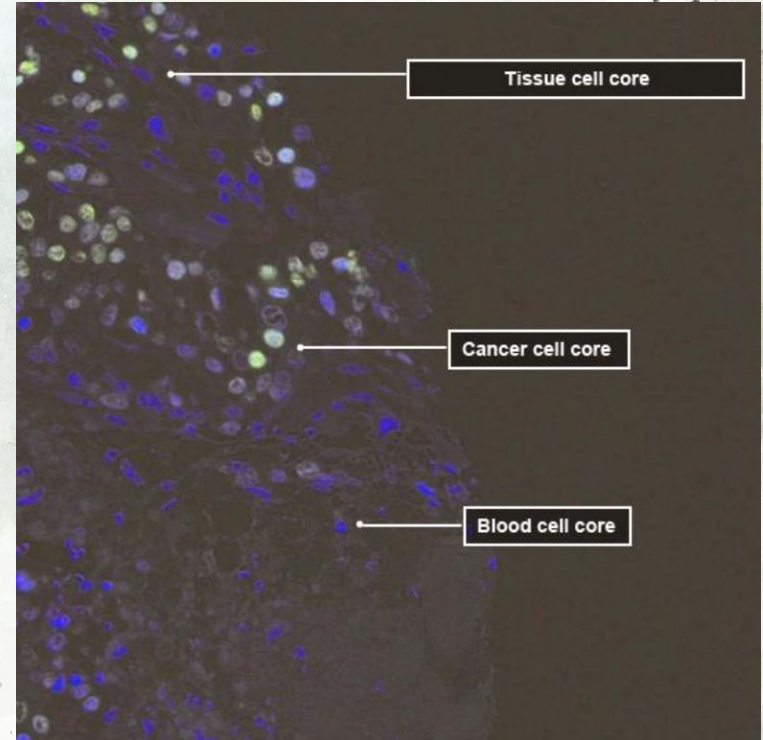
- Used SciStarter to select relevant projects

Students spent 3 hours selected project

- Recorded notes
- Took screenshots

Culminated in project report

- Required background research
- Evaluated project



Helping Faculty Create Projects





SciStarter.org
Live tour

Citizen Science Resources

iNaturalist <https://inaturalist.org/>

SciStarter <https://scistarter.org/>

Zooniverse <https://www.zooniverse.org/>

CitizenScience.gov <https://www.citizenscience.gov/>

eBird - The Cornell Lab of Ornithology <https://www.ebird.org>

EPA and other federal resources

<https://www.epa.gov/citizen-science/resources-citizen-science-projects>

Arizona State University Citizen Science LibGuide

<https://libguides.asu.edu/citizenscience>

References

Karlin, M., & De La Paz, G. (2015). *Using Camera-Trap Technology to Improve Undergraduate Education and Citizen Science Contributions in Wildlife Research*. *The Southwestern Naturalist*, 60(2), 171-179.

<https://search.proquest.com/docview/1778690402?accountid=14604>

Kridelbaugh DM. *The Use of Online Citizen-Science Projects to Provide Experiential Learning Opportunities for Nonmajor Science Students*. *Journal of Microbiology & Biology Education*, 2016 Mar;17(1):105-106. DOI: 10.1128/jmbe.v17i1.1022.

Oberhauser, K. and LeBuhn, G. (2012), *Insects and Plants: Engaging undergraduates in Authentic Research Through Citizen Science*. *Frontiers in Ecology and the Environment*, 10: 318-320. doi:10.1890/110274

Unless otherwise noted, images used are from Pixabay (cc0 license-no attribution required)

Slides template from slidescarnival.com