Engaging Students as Citizen Scientists

San Diego Children and Nature
Anne Fege and Su Scott
Presented at SDCUE, November 5, 2016

What is citizen science?

Citizen Science
Members of the public engaging in real-world scientific investigations: asking questions, collecting data, and/or interpreting results.

Source: citizenscience.org

History of citizen science

- Prior to the late 19th century when science was professionalized, most science was done by “amateurs” (individuals not paid as scientists)
- In 17th and 18th centuries, amateur experts recruited non-experts to contribute observations and collections

San Diego Natural History Museum

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Citizen Science is increasing!

Why Citizen Science?

Research Outcomes
- documenting range shifts
  (Bonter et al. unpublished data, Batalden et al. 2007)
- identifying vulnerable species
  (Crimmins et al. 2008, 2009)
- health planning
  (Leventh and Van de Water 2008)
- anticipating effects on water sources
  (e.g., GoCoho15)

Source: citizenscience.org

Why Citizen Science?

Learning Outcomes
- science learning, critical thinking
  (Trumbull et al. 2000, Kountoupes and Oberhauser 2008)
- environmental action; social networks
  (Overdevest et al. 2004)
- social capital
  (Ballard 2006)
- improved policy
  (Wing et al. 2008)

Source: citizenscience.org

Public Participation in Scientific Research
- Contributes to the understanding of key scientific concepts
- Builds interest in scientific activities
- Develops science-related skills
- Improves understanding of local conservation issues

Source: citizenscience.org

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Student experiences
- Get Outdoors
- Inquiry
- Observe
- Record data
- Analyze
- Science

Student learning
- Group/project-based work
- Technology
- Language/Math
- Communication/Outreach
- Conservation
- Networks

Citizen Science as a Learning Tool
- NGSS Science and Engineering Practices
  - Asking questions and defining problems
  - Planning and carrying out investigations
  - Analyzing and interpreting data
- Approaches
  - Start with driving question
  - Incorporate into Project Based Learning
  - Compare with other regions and countries
  - Ask local scientist to visit classroom

The Nine Steps
1. Scientific question
2. Form a team with scientist, educator, technologist, and evaluator
3. Develop, test, and refine protocols, data forms, and educational materials
4. Recruit participants
5. Train participants
6. Accept, edit, and display data
7. Analyze and interpret data
8. Disseminate results
9. Measure outcomes

Bonney, 2009

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National and local citizen science projects

www.inaturalist.org/projects/rascals

Reptiles & Amphibians of Southern California

Stats

- Total: 8812 observations
- Species: 203 species
- People: 635 people

- Most observed species:
  - California
  - 696 observations
  - 16 species
  - 244 observations
  - 9 species
  - 221 observations
  - 8 species
  - 96 observations
  - 7 species
  - 71 observations
  - 6 species

- Most observed species:
  - Western Fence Lizard
  - 391 observations
  - Axolotl
  - 380 observations
  - Green Anole
  - 376 observations
  - Common Anole
  - 351 observations
  - Western Hognose Snake
  - 351 observations
  - Western Side-Blotched Lizard
  - 349 observations

www.aza.org/frogwatch

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National Phenology Network
Phenology: the scientific study of periodic biological phenomena such as flowering, breeding, and migration, in relation to climatic conditions.

“Nature’s Notebook”

Invasive species are a threat to native plants and animals, crowding natives, consuming food sources, or acting as fire hazards. We have found that having groups such as schools run short-term “campaigns” is highly effective for locating invasive species. Join the fight against invasive species!

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www.imapInvasives.org

www.sdplantatlas.org

www.seafloorexplorer.org

www.ibol.org and www.barcodeoflife.org

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www.sdbiodiversity.ucsd.edu
UC San Diego
SAN DIEGO BIODIVERSITY PROJECT
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Welcome!
The San Diego Biodiversity Project is a National Science Foundation-funded project to incorporate authentic research into the biology curriculum at the University of California, San Diego (UCSD). Students generate novel information, species barcodes, that they will communicate to the larger research community through the Barcodes of Life Database.

Did You Know?
Penguin colonies nest on the cliffs below the Scripps Coastal Reserve. Penguin populations suffer from pesticide poisoning in the past, but have made a comeback.

Events

www.citizenscience.org
WELCOME TO CITIZENSCIENCE.ORG
Home of the Citizen Science Association
The power of citizen science
Citizen science is the involvement of the public in scientific research—whether community-driven research or global investigations. The Citizen Science Association unites expertise from educators, scientists, data managers, and others to power citizen science. Join us, and help spread innovation by sharing insights across disciplines.

www.citizenscienceacademy.org
WELCOME TO INATURALIST.ORG
Observations

www.iNaturalist.org

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www.projectnoah.org

www.zooniverse.org

www.galaxyzoo.org

www.scistarter.com

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www.openscientist.org (blog)

OpenScientist

Projects and opinions from the world of Citizen Science. Because getting started is easy.

San Dieguito River Park

- Argentine ants
- Mammal tracks
- Camera traps
- Reptiles and amphibians
- Botanical surveys
- BioBlitz

River Watch--San Diego River Park

San Diego Zoo Global

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Phenology—Cuyamaca Outdoor School

Ocean Discovery Institute

San Diego Citizen Science Network

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• Nature educators and community members work together to increase nature opportunities for children
• Vision for children and nature = A world in which all children play, learn, and grow with nature in their everyday lives.