

Science in the Wild: How to make the most of Citizen Science Projects at your School

Debbie Abilock, Ed. Vision, NoodleTools, Inc.
Susan Smith, Library Director, The Harker School
Connie Williams, Knowledge Quest Blogger

Day, July 21, 2017, Noon – 1:00 pm, Eastern



A project of the University of Michigan School of Information, U-M Library, and U-M School of Education. This project was made possible in part by the Institute of Museum and Library Services RE 00-00-15-0113-15.

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Where are you from?

- Leave
- Chat
- Participants
- Share Screen
- Settings
- Switch to Phone

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Susan Smith




Connie Williams



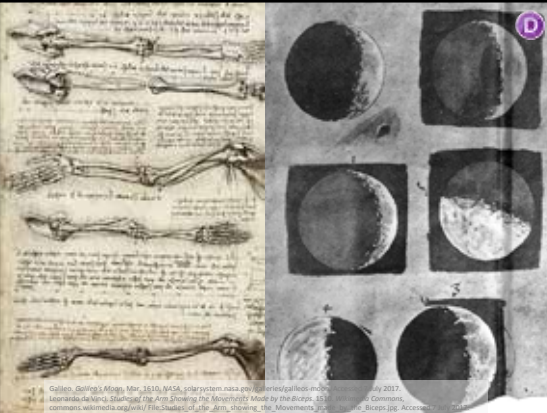


Debbie Abilock

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DATA LITERACY
CREATING DATA LITERATE CITIZENS




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Centralized labs funded by large corporations and government



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DOI: <https://doi.org/10.1101/154564>, published on March 4, 2017 as the 161,000th preprint.

Drosophila Muller F elements maintain a distinct set of genomic properties over 40 million years of evolution

Wilson Leung¹, Christopher D. Shaffer¹, Laura K. Reed², Sheryl T. Smith³, William Barshaj⁴, William Dirksen⁵, Matthew Doherty⁶, Paul Lee⁷, Jeannette Wong⁸, David Xiong⁹, Han Yoon¹⁰, James E. J. Beards¹¹, Joshua F. Macchione¹², Saadiah D. Patterson¹³, Amber L. Brink¹⁴, Dnyana A. Tamare¹⁵, Swastika Reddy¹⁶, Erin K. Luggen¹⁷, Skamron B. McCarron¹⁸, Teah A. Wally¹⁹, Chelsea A. Walker²⁰, Kenneth Sautter²¹, Maika K. Abrams²², Andrew R. Armstrong²³, William Armstrong²⁴, Robert J. Bailey²⁵, Chelsea R. Barber²⁶, Lauren R. Beck²⁷, Amanda L. Blaker²⁸, Christopher E. Blumler²⁹, Jordan P. Brand³⁰, Ethan J. Brock³¹, Dana W. Brooks³², Made Brown³³, Sarah C. Butler³⁴, Eric W. Clark³⁵, Nicole B. Clark³⁶, Ashley A. Collins³⁷, Rebecca J. Colledge³⁸, Peterson R. Cullimore³⁹, Seth G. Dawson⁴⁰, Carter T. Docking⁴¹, Sasha L. Dorsett⁴², Grace A. Dougherty⁴³, Kaitlyn A. Downey⁴⁴, Andrew P. Drake⁴⁵, Erica K. Earl⁴⁶, Trevor G. Floyd⁴⁷, Joshua D. Forey⁴⁸, Jonathan D. Frazee⁴⁹, Spencer I. Franchi⁵⁰, James P. Geary⁵¹, Cynthia K. Hanson⁵², Taylor B. Harding⁵³, Cameron S. Harris⁵⁴, Jonathan M. Hackett⁵⁵, Heather L. Hultemeier⁵⁶, Nicole A. Huey⁵⁷, Donteae A. Jacobs⁵⁸, Elizabeth S. Jewell⁵⁹, Maria Kaler⁶⁰, Elizabeth A. Karasik⁶¹, James L. Kehoe⁶², Hannah C. Koachas⁶³, Jessica Koehler⁶⁴, Dana Koenig⁶⁵, Alexander J. Kujawa⁶⁶, Jordan E. Kwa⁶⁷, Jennifer A. Lammens⁶⁸, Rachel R. Leal⁶⁹, Emily C. Leatherman⁷⁰, Rachel N. Lipfert⁷¹, Gregory S. Messenger⁷², Adam T. Murray⁷³, Victoria Newcomb⁷⁴, Haley J. Plesman⁷⁵, Stephanie J. Polocny⁷⁶, Michelle K. Powers⁷⁷, Rachel M. Ream⁷⁸, Jonathan P. Remback⁷⁹, Katherine R. Reynolds⁸⁰, Lindsey A. Reynolds⁸¹, Dong K. Rhew⁸², Aiyson B. Rivers⁸³, Adam J. Ross⁸⁴, Meghan S. Rooney⁸⁵, Lindsey S. Rubin⁸⁶, Luke R. Scherer⁸⁷, Nathan R. Schulz⁸⁸, Taylor Schuster⁸⁹, Alison R. Schweitzer⁹⁰, Robert W. Schulz⁹¹, Carl E. Smith⁹², Sarah Spencer⁹³, Bryant R. Swanson⁹⁴, Melissa A. Tatch⁹⁵, Ashley A. Tevillinger⁹⁶, Amanda K. Tzou⁹⁷, Eve VanEck⁹⁸, Matthew M. Villard⁹⁹, Megan B. Vylomey¹⁰⁰, David T. Watson¹⁰¹, Juliana A. Wheeler¹⁰², Lauren W. Wiggins¹⁰³, Monica Yakamovich¹⁰⁴, Matthew A. Zakharenko¹⁰⁵, Julia A. Emerson¹⁰⁶, Carlos Ortiz¹⁰⁷, Frederic J. Dupuchie¹⁰⁸, Lauren A. DiCeronno¹⁰⁹, Katie L. Goeller¹¹⁰, Christopher R. Mauch¹¹¹, Sarah E. Muller¹¹², Brittany D. Pizarro¹¹³, Joseph E. Sabro¹¹⁴, Jessica M. Turoff¹¹⁵, Sharynne Tyson¹¹⁶, David A. Domborj¹¹⁷, Levant H. Baker¹¹⁸, Asana C. Contreras¹¹⁹, Benjamin L. Demer¹²⁰, Gabriella A. DeMunari¹²¹, Justine A. Gonzalez¹²², Maureen S. Hammond¹²³, Colleen Y. Kelley¹²⁴, Elizabeth A. Kelly¹²⁵, Danielle Kulon¹²⁶, Catherine M. Manganey¹²⁷, Nikita L. McCabe¹²⁸, Alyssa M. Newman¹²⁹, Lindsay A. Spoadler¹³⁰, Richard A. Tuminello¹³¹, Dennis Renie¹³², Jonathan M. Benson¹³³, Michael C. Drobzhenko¹³⁴, Peiya A. Collins¹³⁵, Katherine S. Hoyer¹³⁶, Amber N. Jervis¹³⁷, Luke A. Jinneman¹³⁸, Brandon M. Katz¹³⁹, William R. Kennedy¹⁴⁰, Kimberly S. Kalish¹⁴¹, Mark V. LeBlanc¹⁴², Trung T. Nguyen¹⁴³, Daniel S. Nicolae¹⁴⁴, Melissa D. Patai¹⁴⁵, Shane M. Patai¹⁴⁶, Bryan J. Rapley¹⁴⁷, Bridget J. Savilline¹⁴⁸, Jennifer A. Weaver¹⁴⁹, Anya I. Goodman¹⁵⁰, Erica L. Alvarado¹⁵¹, Shana M. Balabanian¹⁵², Ashley B. Berman¹⁵³, Ian D. Chan¹⁵⁴, Madda Chari¹⁵⁵, Scott Chang¹⁵⁶, Avery B. Crossman¹⁵⁷, Ashley P. Custer¹⁵⁸, Tia M. D'Tonneman¹⁵⁹, Jodi El-Adimi¹⁶⁰, Marc C. Guzman¹⁶¹, Ryan A. Gross¹⁶², Nestor Gutierrez¹⁶³, Rachael B. Harms¹⁶⁴, Heather Hedden¹⁶⁵, Emily L. Hong¹⁶⁶, Barbara L. Hopkins¹⁶⁷, Vilma F. Huerta¹⁶⁸, Colin Khoobakhani¹⁶⁹, Kristin M. Lafferty¹⁷⁰, Corbin L. Lee¹⁷¹, M. ...

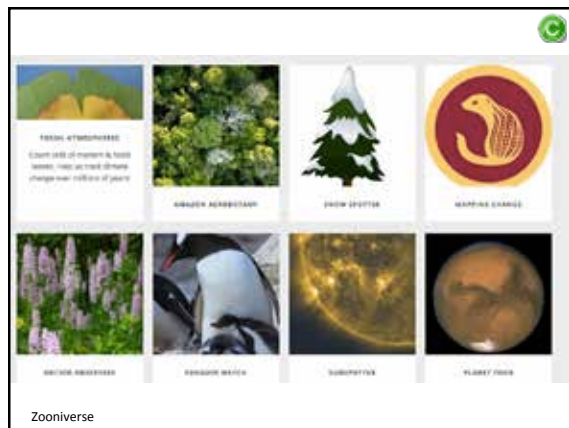
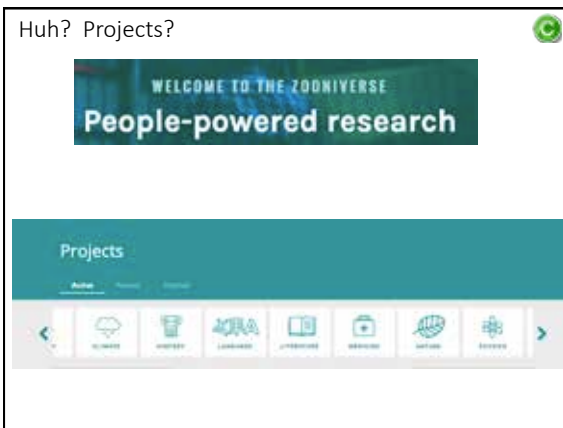
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Liftoff of Alan Shepard's Freedom 7 Mission

THE AMERICAN DREAM
AFTER THE CRUNCH OF FAILURE
THEY BECAME THE FIRST WOMEN TO GO INTO SPACE
WHO INSPIRED THE WORLD

HIDDEN FIGURES


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Meet Your Mites

Citizen scientists

Since 2011, we have been peering into pores and scraping faces in the name of science! Participants have been offering us their facial oils, as well as information about their health and geographic history, since the inception of the Meet Your Mites project. More recently, we have expanded this research to a global audience as a means to capture the true diversity and story that these mites hold.



<http://robdunnlab.com/projects/meet-your-mites/>

Citizen Science



Citizen science is a global movement through which scientists and non-scientists alike make observations, collect data, and help answer some of our planet's most pressing questions.


Share This

Ann Pikulski

C-Science generally involves...

- Ordinary people
- Large-scale data collection
- Sometimes analysis
- Usually studying the natural world
- Often guided by a professional scientist or scholar

Terminology



“Citizen”

- Community member
- The “public”
- Activist



“Participate”

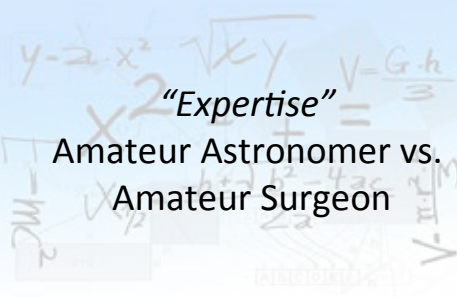
- Monitor
- Measure
- Active involvement




Science / Scientist

“Expertise”

Amateur Astronomer vs. Amateur Surgeon



Teacher Jane

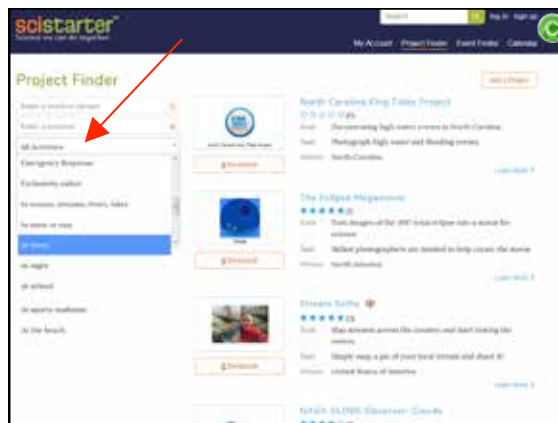


Jane teaches environmental science. All of her classes involve hands-on activities; most of which include local studies.

She becomes interested in big data after reading the article titled: [Big Data and the Future of Ecology](#).

Her conundrum: Now she would like her students to understand that by contributing data To large-scale or local studies, they can be a part of a larger scientific community.


Her challenge: But... she is not sure where to find projects useful for her students; And, she wants to Think about how to best incorporate them in the classroom. Should they participate Together as a class? Or, should she assign them to individual projects based on their own interest?



Teacher Jamil

Jamil teaches the HOSA –based pathway [Health Occupations Student Association] courses. His students learn anatomy and physiology, the biology of life, and generally study biology with a medical lens.

Each year, class members seem to get interested in the lab that focuses on anatomy. Each group makes an outline of a group member, and proceeds to draw system [circulation, muscle, etc].



Jamil would like to create a challenging project in which they take their new found location knowledge and apply it to how particular body systems work. He thinks that citizen science biology project might work. He'd like them to see how research is conducted and to feel as if they were a part of a large group of researchers.

His conundrum: should he compile a list of acceptable projects or let the students 'loose' to find their own?

His challenge: how to accurately assess their work.

Assessment

- whole class project?

DISCUSSION

small groups, whole class.

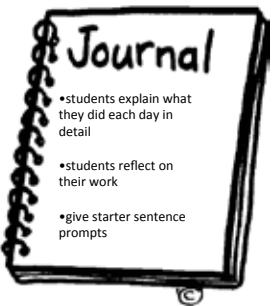


Idea: create a class timeline, map, or discussion board for daily entries

ASSESSMENT:

- Individual projects?

Journals




Idea: Use a questioning process with students to develop their own questions about their chosen projects. They can use these as their prompts for their journal.

- students explain what they did each day in detail
- students reflect on their work
- give starter sentence prompts

Try this!
Question process: rightquestion.org [Right Question Institute]

The History Department

Sandy's faculty participated in on-site Professional Development sessions in which "citizen science" was one from which she could choose. She wasn't initially attracted to it, because she teaches World History, not science.



With some encouragement from the presenters, Sandy attended the session and discovered that there were projects available in the humanities.. some of which related directly to topics taught in her classes. She returned to her department, excited about participating in projects with her classes and encouraged her colleagues to join her.


The department conundrum: Can history [social studies] students participate meaningfully with citizen science style projects?

Their challenge: time to incorporate them in the social studies classroom. ["I have to be on World War II by February or I will never complete the curriculum"].



ASSESSMENT:

Portfolio




Take screen shots, keep data sets, Outline project pages accomplished. Insert into a notebook and reflect on the pieces.

Idea: – invite students to share their learning via Gallery Walks, walk-arounds and group discussions.

Invite parents & administrators to Portfolio evenings where each student explains his/ her samples of work accomplished and the work of the organization hosting the project.

ASSESSMENT:

Presentations



Idea: Aim for TED talk style: Few notes, image rich visuals, Casual, informative, and engaging..

The challenges:

TIME: How do I fit this into my busy classroom?

LOCATION: Where do I find a project?

PROCESS: One project? Individual projects?

ASSESSMENT: Accountability and Learning

Finding the right project . . .



Field Citizen Science projects supported by EPA, June 2016. Environmental Protection Agency, June 2016. www.epa.gov/citizen-science. Accessed 13 July 2017.

Larger-world engagement?

- Does the project use social media or gamified features like leaderboards to keep volunteers engaged?



Agendas and Civic Engagement

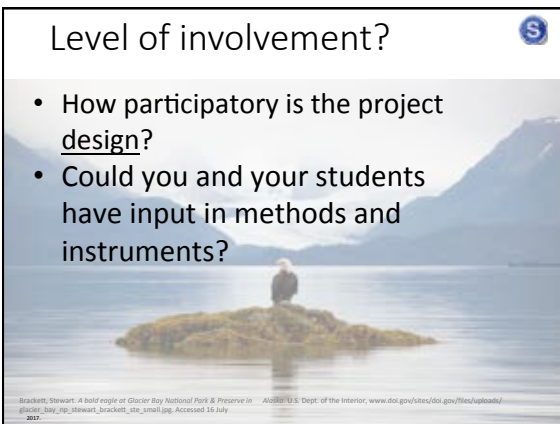
- Can you discern political or social perspectives?
- Are you comfortable discussing these with your students?



Brackett, Stewart. bald eagle at Glacier Bay National Park & Preserve in Alaska. U.S. Dept. of the Interior, www.doi.gov/sites/doi.gov/files/uploads/glacier_bay_np_stewart_brackett_ste_small.jpg. Accessed 16 July 2017.

Level of involvement?

- How participatory is the project design?
- Could you and your students have input in methods and instruments?



Brackett, Stewart. A bald eagle at Glacier Bay National Park & Preserve in Alaska. U.S. Dept. of the Interior, www.doi.gov/sites/doi.gov/files/uploads/glacier_bay_np_stewart_brackett_ste_small.jpg. Accessed 16 July 2017.


NEXT GENERATION SCIENCE STANDARDS

For States, By States



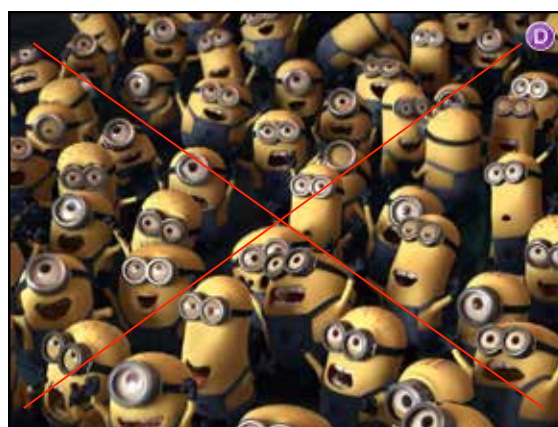
Logo. Next Gen Science, www.nextgenscience.org/. Accessed 16 July 2017.

National Council for Social Studies (C3) College, Career, and Civic Life



- Developing questions and planning inquiries
- Applying disciplinary tools and concepts
- Evaluating sources and using evidence
- Communicating conclusions & taking action

Logo. <https://www.socialstudies.org/c3>, National Council for the Social Studies, www.socialstudies.org/c3. Accessed 16 July 2017.



Wacky, authentic citizen science biodiversity projects

Armpit Microbes	Meet Your Mites
Arthropods of Our Homes	School of Ants
Belly Button Biodiversity	Showerhead Microbiome Project
Camel Cricket Census	Sourdough Project
Cat Tracker	Urban Buzz
Invisible Life	Wild Life of Our Homes
Life of Pants	

<http://robdunnlab.com/>

The (Potentially) Surprising Consequences of Wearing Clothes



"The Life of Pants (and Shirts)." Rob Dunn Lab, North Carolina State U, robdunnlab.com/projects/the-life-of-pants/, Accessed 7 July 2017.

If you would like to be one of those people, here is what you need to do:

ROB DUNN LAB

Publications

Molecular analysis of environmental plant DNA in homes that across the United States

April 14, 2014

Current political climate? Future unclear...

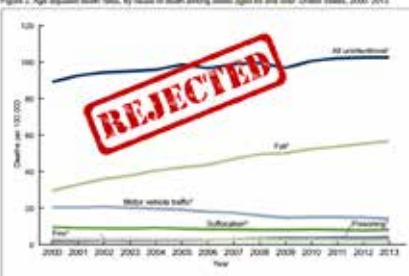
- Government budget cuts may **stimulate consolidation** of small citizen science projects but...
- Low-cost instruments and technologies developed in citizen science may lead to an **increase locally-developed** school science projects but...



Cavalier, Darlene. Interview. 27 June 2017.

The total age-adjusted unintentional injury death rate among adults aged 65 and over increased 15% from 2000 to 2013, but rates for some causes of death, including motor vehicle traffic crashes, suffocation, and fire declined during the same time period.

* The age-adjusted fall injury death rate among adults aged 65 and over increased from 29.6 per 100,000 in 2000 to 54.7 per 100,000 in 2013 (Figure 2).



United States, National Council for Health Statistics. Deaths From Unintentional Injury Among Adults Aged 65 and Over: United States, 2000–2013. By Ellen Kramarow et al., issue brief no. 159, Dept. of Health and Human Services, Centers for Disease Control and Prevention, May 2015. CDC, www.cdc.gov/nchs/data/databriefs/db159.pdf.

Federal Crowdsourcing and Citizen Science Toolkit

How To: Step by Step

This toolkit covers five basic, five-step steps for planning, designing and carrying out an expedition of citizen science project (adapted from Bentley et al. (2005). Citizen Science: A Collaborative Tool for Expanding Scientific Knowledge and Inquiry, Libera's eInfluence (REY) 077 004). At each step, you'll find a list of tips you can use to keep your project on track.

The steps are in sequence, but each is also independent. Each gives you resources to help answer your specific questions.

Begin with the first project step — Scope Out Your Problem. Need inspiration? Check out Case Studies for real success stories.

Scope Out Your Problem

Design a Project

Build a Community

Manage Your Data

Sustain and Improve

Last updated: Feb 27, 2016

"How To: Step by Step." Federal Crowdsourcing and Citizen Science Toolkit, USA.gov, 23 Feb. 2016, crowdsourcing-toolkit.sites.usa.gov/howto/.



Recap:

1. Engaging, exhilarating
2. Real world science from a desktop, anywhere
3. Inquiry goal can be met across all subjects
4. Civic purpose
5. Low barrier to entry

Source List:
<http://goo.gl/YTu6B3>

Questions?

Presenters:

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chwms@mac.com

debbie@abilock.com



Please take the evaluation
 (link in chat)
 to be entered for door prizes!

