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

VIRTUAL CONFERENCE ON DATA LITERACY

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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Door Prize: 6 Months of Easel.ly Pro

SCECHs

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More information:
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New in 2017!
For those needing certificates …

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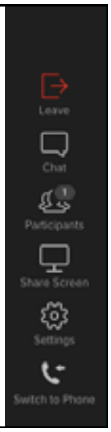
http://dataliteracy.si.umich.edu/conference

#4tdl

Join us in the chat!

Where are you from?



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VIRTUAL CONFERENCE
DATA LITERACY


NEW ARRIVAL
ANYONE INEXORABLE AT SPEED
?
VIRTUAL CONFERENCE
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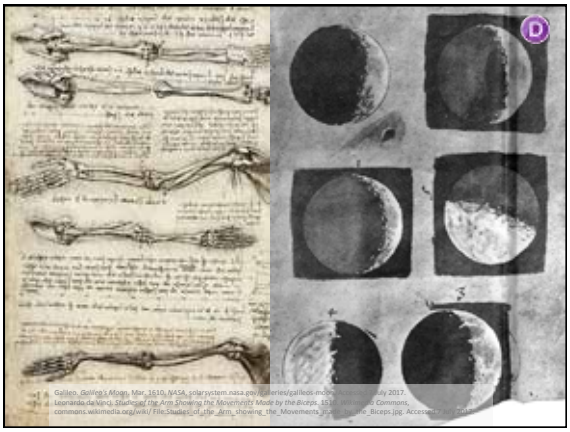

Galileo, Galileo's Moon, Mar. 1610, NASA, solarsystem.nasa.gov/galleries/galileos-moon. Accessed 18 July 2017.
Leonardo da Vinci, Studies of the Arm Showing the Movements of the Biceps, pd, via Wikimedia Commons, commons.wikimedia.org/wiki/File:Studies_of_the_Arm_showing_the_Movements_of_the_Biceps.jpg. Accessed 18 July 2017.

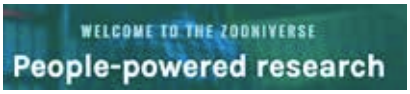

Centralized labs funded by large corporations and government

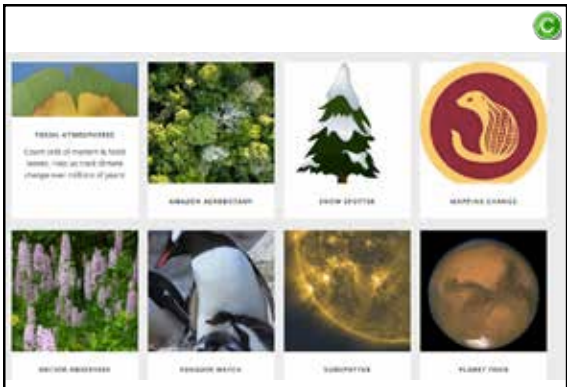

Drosophila Muller F elements maintain a distinct set of genomic properties over 40 million years of evolution


Liftoff of Alan Shepard's Freedom 7 Mission. NASA, www.nasa.gov/image-feature/liftoff-of-alan-shepards-freedom-7-mission. Accessed 18 July 2017.
Liftoff of Alan Shepard's Freedom 7 Mission
HIDDEN FIGURES

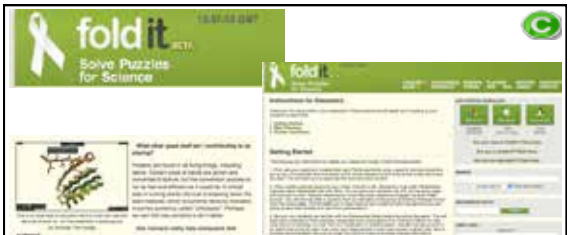
School students attempt a simple titration experiment at a UCL Chemistry open day. 19 Sept. 2012. *Flickr*, www.flickr.com/photos/93636241@N07/8559902400.

Huh? Projects?





Zooniverse



http://fold.it/portal/info/about

It's not just Science! – Citizen Humanities

Zooniverse.org

Meet Your Mites

Citizen scientists

Since 2013, we have been peering into pores and scraping faces in the name of science! Participants have been offering up 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/

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

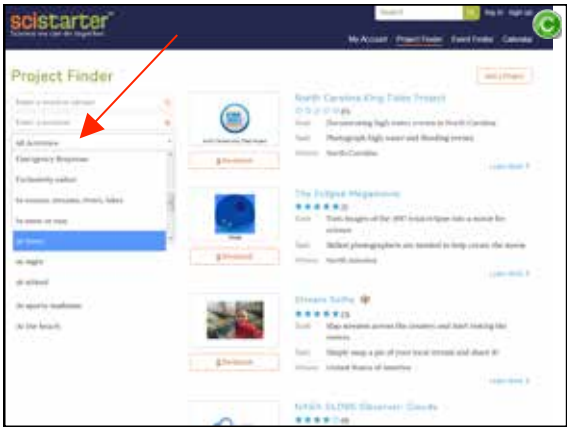
Image Quest

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.

Image Quest

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.

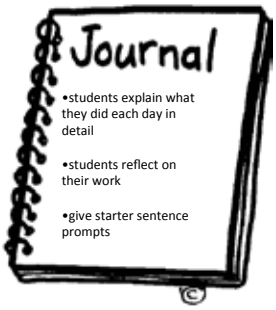
Idea: create a class timeline, map, or discussion board for daily entries

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.



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:

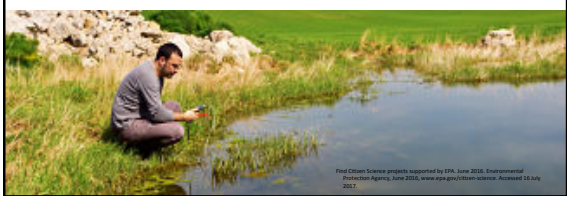
TIME : How do I fit this into my busy classroom?

LOCATION: Where do I find a project?

PROCESS: One project? Individual projects?

ASSESSMENT: Accountability and Learning

Finding the right project . . .



Find Citizen Science projects supported by EPA. June 2016. Environmental Protection Agency, June 2016, www.epa.gov/citizen-science. Accessed 16 July 2017.

The "Reference interview" What are the teacher's priorities?

- Curricular topic v. enrichment
- Standards: Content v. Process
- Science or activism? (Jane)
- Concept or methodology? (History)
- Amount of time to give?
- Whole-class or individual?

High school science classroom. Photography. *Britannica ImageQuest*, Encyclopædia Britannica, 25 May 2016. quest.eb.com/search/139_1068760/1/139_1068760?sid=. Accessed 19 Jul 2017.

The eight practices of scientists:

- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

From NRC, A Framework for K-12 Science Education , 2012

Identify size and locale

- Design your own project or find one already collecting data?
- Do you want to participate in a local, regional, national, or international project? Scale, number of volunteers, and the size of the data set will vary.

Physical World Map; Robinson projection; Standard parallels. 1 Apr. 2004. *CIA Factbook*, Wikimedia Foundation

How will students participate?

- Has this project worked with high school students before?
- How much redundancy is in place? Could your students "ruin" the study?
- Are they simply collecting data or can they analyze or interpret?
- Can they ask questions of the researchers?

High school students in Calgary. Photograph. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

What is your role as an educator?

- What scaffolding is needed to prepare students?

Enroll yourself & try it!

Preparation needed?

- Are there videos, online tutorials, and other teaching resources available?
- Are the lead scientists available for your questions?
- Background on the project?

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.

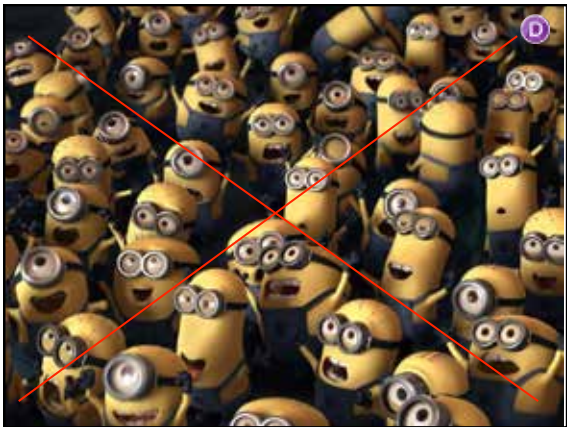
NEXT GENERATION SCIENCE STANDARDS
For States, By States

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

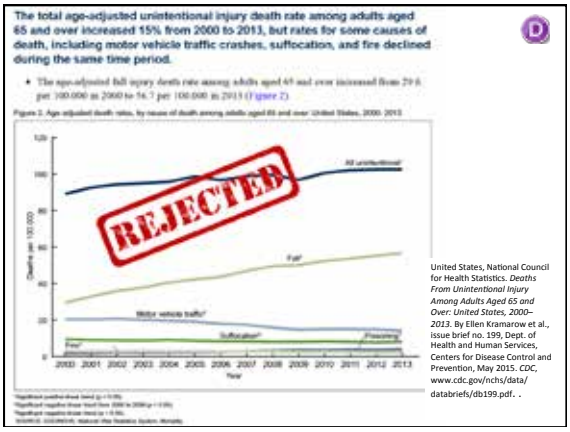
http://robdunnlab.com/

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

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.



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. 199, Dept. of Health and Human Services, Centers for Disease Control and Prevention, May 2015. *CDC*, www.cdc.gov/nchs/data/databriefs/db199.pdf. .

"How To: Step by Step." *Federal Crowdsourcing and Citizen ScienceToolkit*, 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:

susans@harker.org

chwms@mac.com

debbie@abilock.com

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

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