



NICERC[™]
AN ACADEMIC DIVISION OF THE
CYBER INNOVATION CENTER



Cyber Society

Notes:

Lesson Objectives

Students will:

- Evaluate, choose and defend their choice of science activities
- Identify pros and cons of crowdsourcing information for Citizen Science
- Practice completing an online data collection activity
- Demonstrate the ability to work together in small group discussion and data collection

Common Core Standards

- EXPECTATION 1.1 The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science. INDICATOR 1.1.2 The student will modify or affirm scientific ideas according to accumulated evidence.
- EXPECTATION 1.4 The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication. INDICATOR 1.4.3 The student will use experimental data from various investigators to validate results. INDICATOR 1.5.8 The student will describe similarities and differences when explaining concepts and/or principles.

Lesson Skills

- Application
- Analyzation
- Critical Thinking
- Appraising

This material is based upon work supported by the U.S. Department of Homeland Security under Grant Award Number, 2013-PD-127-000001, Modification #2.



Lesson Materials

Web sites

- <http://scistarter.com/>
- <http://scistarter.com/blog/2014/01/top-13-citizen-science-projects-2013/#sthash.W8o9wmPr.IEQM1dby>.
- <http://physicsbuzz.physicscentral.com/2013/08/citizen-science-testing-fairness-of-us.html?m=1>
- <http://www.penguinscience.com/index.php>
- <http://www.sciencechannel.com/creatures/sci-spy-pictures.htm>
- <http://www.labinthewild.org/>
- <http://www.citizensort.org/web.php/forgottenisland>

Materials

- Variety of US State Quarters collected ahead of time
- Access to the internet for the class as a whole or small student groups

SUMMARY

STEM activities are sought not only for classroom lessons but also for after-school clubs, science fair ideas and even Family Science Night sessions at some schools. The following lesson can be adapted and utilized for any of these and offers an introduction to readily available online projects and research games that individual students, groups and families can participate in. Some of the activities require very little time and no cost. Some are indoors and some out. Many do involve the use of smart phones or tablets but a large number do not. What they all have in common is the concept of crowdsourcing and the increased access to data gathering provided by people networked through their smart phones and computers.

LESSON CONTENT

1. The introduction of the concept of Citizen Science can be done either as a homework assignment or at the beginning of the class lesson. If the teacher has a flipped classroom, then the introductory PowerPoint lends itself easily to a Screencast that can be recorded for students to watch and listen. If done for homework, this will allow time in class to move directly to discussion and then the on line activity. Introductory PowerPoint
2. The Introductory PowerPoint includes 3 questions that each student answers once they have chosen the Citizen Science project they find most appealing from the Scistarter Blog -13 Top Projects for 2013. The teacher determines how they would like students to answer - on loose-leaf, in a notebook or on a computer document. These answers are brought to class and will be used to begin the lesson.
3. Students are paired or in 3s and asked to share the project they chose and why for about 5 minutes.



4. Distribute an index card and ask the small pairings to write what they think would be the benefits of crowdsourcing for citizen science projects on one side and problems they would anticipate on the other for about 8 minutes. Be sure they have included:
 - i. i. Data collected from areas that researchers could not reach
 - ii. ii. Less expensive
 - iii. iii. Larger quantity of data
 - iv. iv. Greater potential variety
 - v. v. Risk of inaccurate data
 - vi. vi. Misunderstanding about how to collect data
 - vii. vii. Language or cultural barriers

The teacher is circulating amongst the pairings during these two previous steps to help encourage discussion or comment on points made.

5. On the overhead or board, make a quick list of Pros and Cons generated by the students.
6. The teacher will have chosen an online project that best supports the science curricular topic for the lesson. Refer to the Resources above for aid in selecting a Citizen Science project. For the purposes of this specific lesson, a short project called Test The Fairness of the US State Quarters was chosen which works well for a physical science or physics class. This was selected because it can be completed quickly in one class period.
7. There are two possible options for completing the activity at <http://physicsbuzz.physicscentral.com/2013/08/citizen-science-testing-fairness-of-us.html?m=1> You may project the website with the directions and have students read the directions out loud; have them record their data in small groups and then submit the data together on the projected computer, or Have each small group log onto the site individually to read and follow the directions, record and submit data.
8. When students have completed the coin flipping and submitted the data, the teacher may want to reinforce cause and effect in relationship to their results. Then return to the list of Pros and Cons that were posted and see which ones might apply to this specific Citizen Science activity.
9. Ask how the use of the internet has changed the way data can be collected for scientific study.
10. Ask if crowdsourcing and the concept of Citizen Science be utilized in any other area of study? Citizen Historians are using networking to share data from old sea captains journals and journals from World War soldiers to gather information. Many people are involved in interpretation of photos taken from satellites to determine geographic changes as well as changes that may be related to global climate change. Advertising agencies are using crowdsourcing research to determine the most lucrative changes to make in products and they way they are advertised.
11. Extension, if time permits: The final 2 resources linked above are for sites that utilize gaming to gather data and these are often very appealing to students. Share these links. This could also be a follow up homework assignment as well.

RELATED LESSONS

- Cyber Communities - History of the Networked Society