

Introduction to Citizen Science: Explorations in Educational Settings

Course Syllabus -Overview

Welcome to Chicago Botanic Garden's Citizen Science Academy! We are glad that you will be a part of our growing community of educators. This course is designed for educators (formal and informal) to assist them with the knowledge to engage their students or visitors in authentic research through successful implementation of national citizen science programs.

Involvement in citizen science provides your students or visitors with valuable experience collecting data and will give them the opportunity to make meaningful contributions to ongoing scientific research where scientists are very interested in the observations individuals across the county are making.

This professional development course presents an overview of citizen science (past, present, and future), highlighting five existing citizen science programs that are targeted towards educators. The course also provides detailed information on participation in these five programs, including how to make useful observations, suggestions for structuring group involvement, activities to engage your learners, as well as an opportunity to form a community with other educators within the Chicago Botanic Garden's Citizen Science Academy.

This is a self-directed course with suggested weekly Unit deadlines. Each Unit includes a combination of readings, videos, discussions, activities, and self-assessments. You will be completing this course in 30 days with a cohort of other educators.

Instructor Communication

Although this course is a self-directed course, there is an instructor monitoring the course and available for questions. To contact the Instructor, please email Jean Bryan (jbryan@chicagobotanic.org).

Course Objectives

After completing this course, you will be able to:

- Explain the historical and current practice of Citizen Science as part of your education and outreach in appropriate educational venues
- Fully participate in selected citizen science programs
- Successfully use selected citizen science programs as a part of your curriculum
- Engage your students in citizen science observations and activities
- Become part of the growing community of citizen science educators.

Course Materials

This course requires Internet connectivity and access to an Internet Browser (i.e. Internet Explorer, Firefox). The following software is also required:

- Adobe Reader, available free of charge at <http://get.adobe.com/reader/>
- Microsoft Word or other word processor capable of reading and writing .docx files

Continuing Education Units (C.E.U's)

Optional: Graduate-level Continuing Education credit is available through Colorado School of Mines. The cost of 2 credits is \$95. Application details will be made available during the first week of the course. Check with your school district PRIOR to signing up to determine applicability in your situation.

Requirements for Successful Course Completion

Successful completion is measured by your completion of all assignments, which includes taking both the pre- and post-assessments. You will need to earn 80% or higher on the post-assessment and 70% on the course overall to receive a completion certificate. Eligibility for the optional continuing education credits mentioned above requires an overall score of 80%.

Course Outline

Unit 1: Citizen Science: Past, Present, and Future

This Unit will share an overview of citizen science and discuss its unique position at the interface between science and education. It will highlight the rich history of citizen science and the role of nonprofessionals in scientific endeavors. The current state of citizen science, with a focus on programs and activities in the United States will follow. It also presents a brief history of the project and provides an overview of the significance of Citizen Science. Finally it introduces educators to the Chicago Botanic Garden's Citizen Science Academy.

Learning Objectives:

- Complete the pre-assessment.
- Gain an appreciation for the breadth and depth of Citizen Science
- Understand the history of Citizen Science
- Understand the role of Citizen Science as it supports scientific inquiry (scientist perspective)
- Understand the role of Citizen Science in engaging and empowering nonprofessionals to participate in authentic research (education perspective)
- Understand the diversity of participants in Citizen Science
- Share your initial ideas for implementing Citizen Science in your learning environment.

The anticipated commitment for this Unit is 3 - 4 hours.

Unit 2: Citizen Science in Educational Settings

This Unit will provide readings and activities for you to learn more about how citizen science can help reach educational goals in both formal and informal education settings. We will explore best practices that are associated with successful implementation. The connections between Citizen Science and educational standards (science, geog, math) will be explored. Case studies and testimonials will be used to highlight successful efforts.

Learning Objectives:

- Read about the growth of Citizen Science in educational settings
- Understand how Citizen Science supports education standards in science, geography, math, and more?

- Explore the challenges and opportunities associated with Citizen Science
- Develop appropriate approaches to addressing challenges and opportunities associated with Citizen Science
- Understand data collection (and analysis) protocols
- Learn about the data life cycle (or some such thing) as related to Citizen Science
- Understand the unique position of Citizen Science as an interface between science and education
- Evaluation and assessment strategies (to see if educational goals/outcomes are achieved)

The anticipated commitment for this Unit is 6 - 7 hours.

Unit 3: Getting to Know Five Citizen Science Projects

In this Unit, you will explore five Citizen Science projects that have been chosen for their relevance and utility in educational settings. You will visit the web sites, become familiar with the basics of the individual project protocols, learn about their learning resources and activities, and learn how to register and report data. You will also select two projects to explore in greater depth as preparation for Unit 4.

The five Citizen Science projects are:

- eBirds (Cornell Lab of Ornithology)
- Community Collaborative Rain, Hail and Snow – CoCoRHAS (Colorado State University)
- FrogWatch USA (Association of Zoos and Aquariums)
- Picture Post (University of New Hampshire)
- Project BudBurst (Chicago Botanic Garden)

Learning Objectives:

- Be able to discuss the various approaches to participation in different Citizen Science projects
- Consider the relevance of the five projects to your instructional setting
- Be able to discuss different protocols and explain their pros & cons in your educational setting
- Choose two projects for further exploration

The anticipated commitment for this Unit is 7- 8 hours.

Unit 4: Citizen Science Project Case Studies

In this Unit, you more fully explore your two chosen Citizen Science projects. You will go through the process of registering, learn how to implement the protocol(s), and report/contribute data. You will become familiar with all key aspects of the two chosen projects' web sites. You will also be asked to develop an activity that is specific to the educational group whom you work with (K-12 or informal). This activity will be tied to educational objectives for your school system, or informal education center. This activity will be shared in a public forum with others in your cohort to begin a dialog about your chosen Citizen Science implementation in various educational settings.

Learning Objectives:

- Effectively navigate the two chosen web sites, registering, collecting and submitting observations or measurements
- Effectively implement the protocols

- Describe equipment and materials needed (if any)
- Become familiar with handouts and data sheets
- Understand the time commitment (daily, weekly, seasonally)
- Discover what training is required to participate
- Discover the level of expertise is needed to participate
- Become familiar with registration and account set up procedures
- Understand the reporting processes
- Understand where the data is submitted and where to view the data results
- Submit a report/contribution or simulate such completion
- Begin to develop ideas on how to implement both projects in your educational setting
- Develop at least one activity suitable for your classroom & share it with your cohort.

The anticipated commitment for this Unit is 7- 8 hours.

Unit 5: Implementation in Formal and Informal Settings: Making a Lesson Plan

To round out the course, you will bring together all that you have learned in this course by developing a lesson sketch. This lesson sketch will explain in general terms how you will implement the two chosen projects in your educational setting. You will explain areas where the projects relate or overlap or otherwise integrated (e.g. precipitation and frogs; phenology observations and pictures; birds and plants), highlighting activities that are suitable for all age groups including elementary, middle and high school grade levels and adult participants.

Learning Objectives:

- Review the educational resources available on the project web sites
- Discuss in greater detail how you will implement your Citizen Science projects
- Develop a lesson sketch detailing how you will be using the projects in your educational setting
- Complete the post-assessment
- Complete the course survey.

The anticipated commitment for this Unit is 7- 8 hours.