# Programming for citizen science across barriers

Opportunities for school, public, and academic libraries

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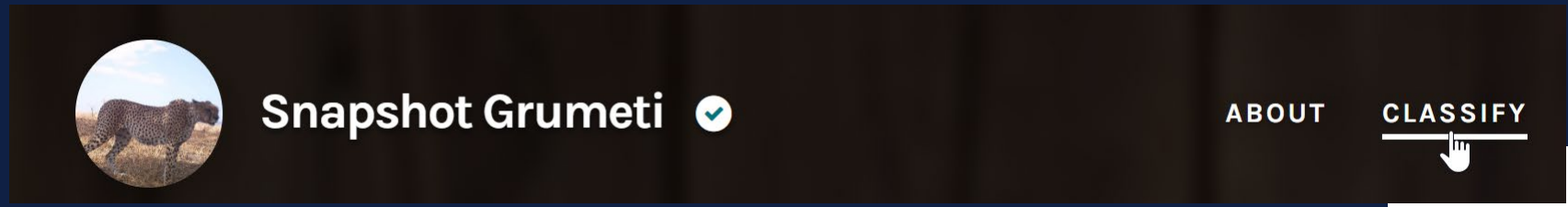
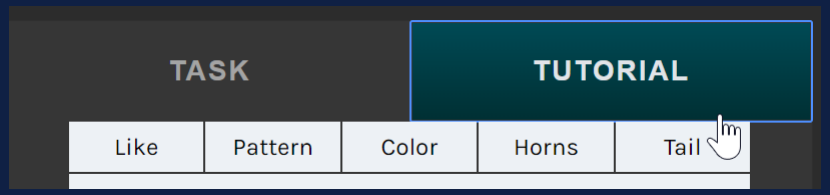
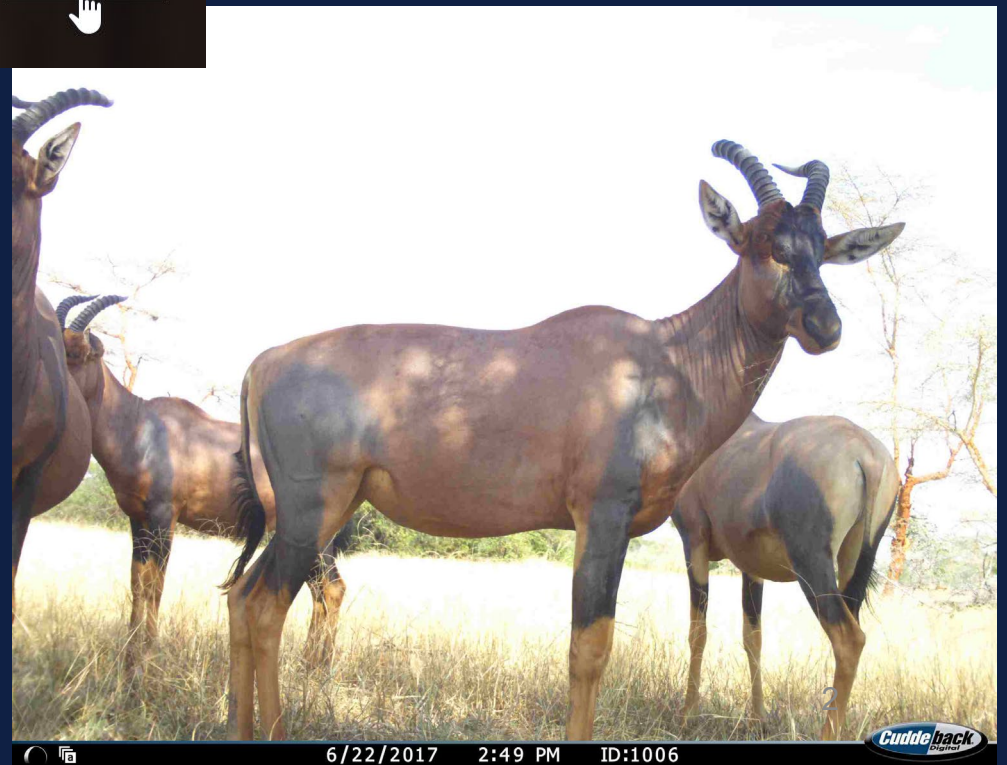
# Welcome to the Zooniverse!

http://go.uncg.edu/snapshot





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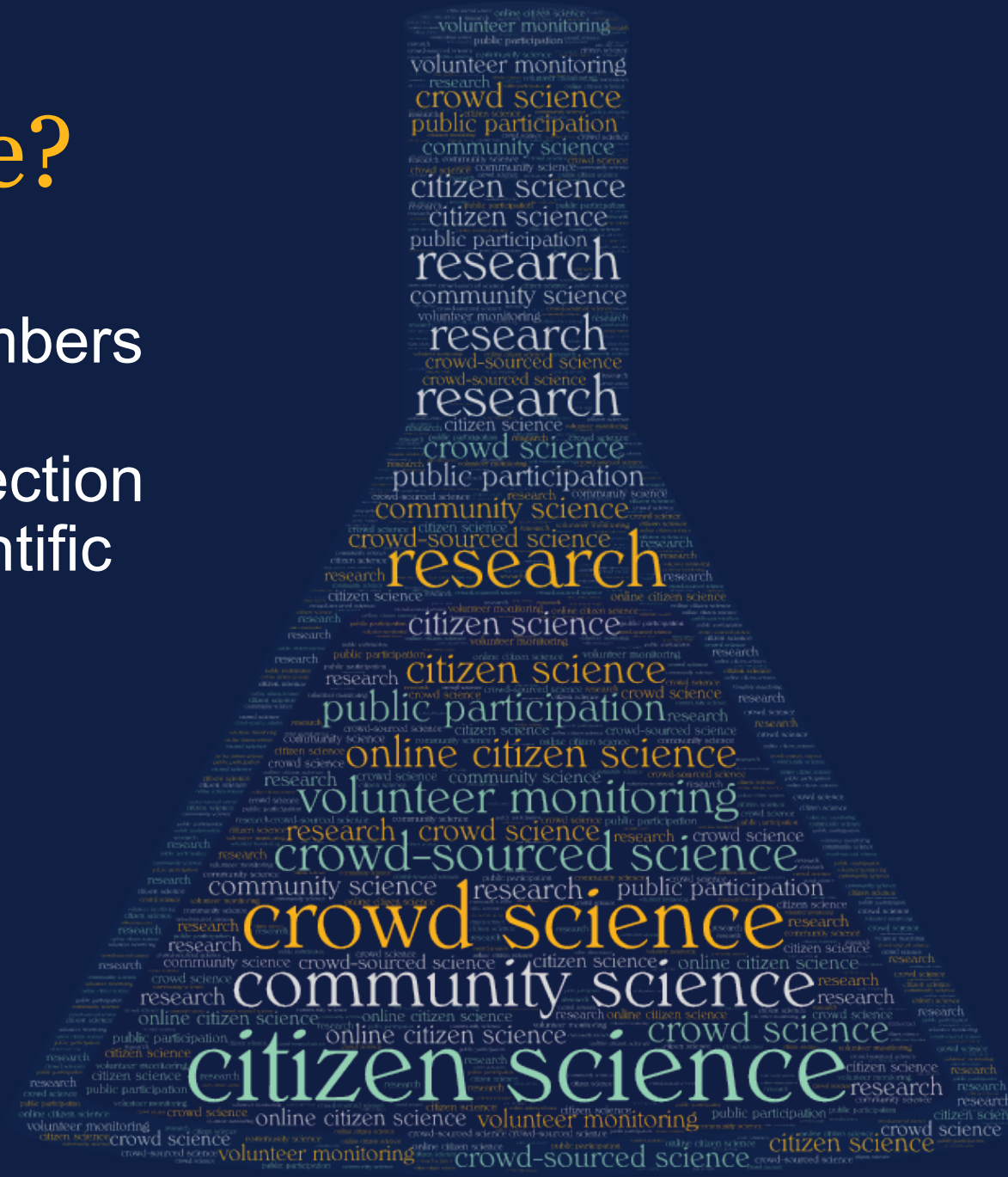
# What is citizen science?

Scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions (Oxford English Dictionary).

Public participation in scientific research

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A very brief

# History of Citizen Science


Lighthouse keepers collect data about bird strikes for scientists

National Audubon Society starts annual Christmas Bird Count

Public Participation in Ornithology (Cornell Lab)

National Weather Service Cooperative Observer Program begins

NSF's Public Understanding of Science Program

Bonney, R., et al. 2009. Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. A CAISE Inquiry Group Report. Washington, D.C.: Center for Advancement of Informal Science Education (CAISE).

# Citizen Science Contributions

- Scientific Research
- Education (Science Literacy)
- Community Engagement

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Image used with permission from The North Carolina Arboretum
Researcher image: Pixabay CC0 license

# Citizen Science Contributions

- Scientific Research

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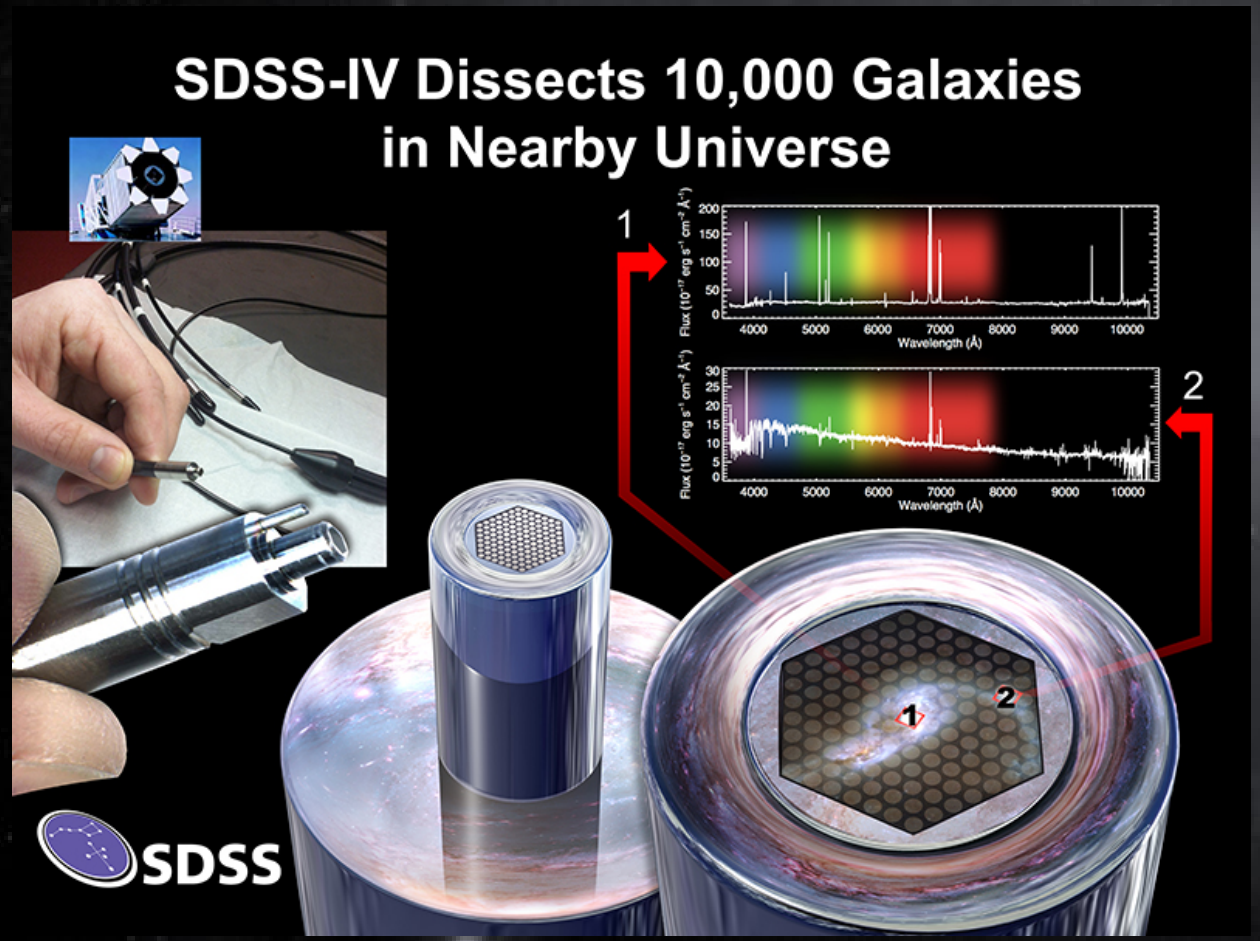
Image by Gerd Altmann from Pixabay

# Sloan Digital Sky Survey

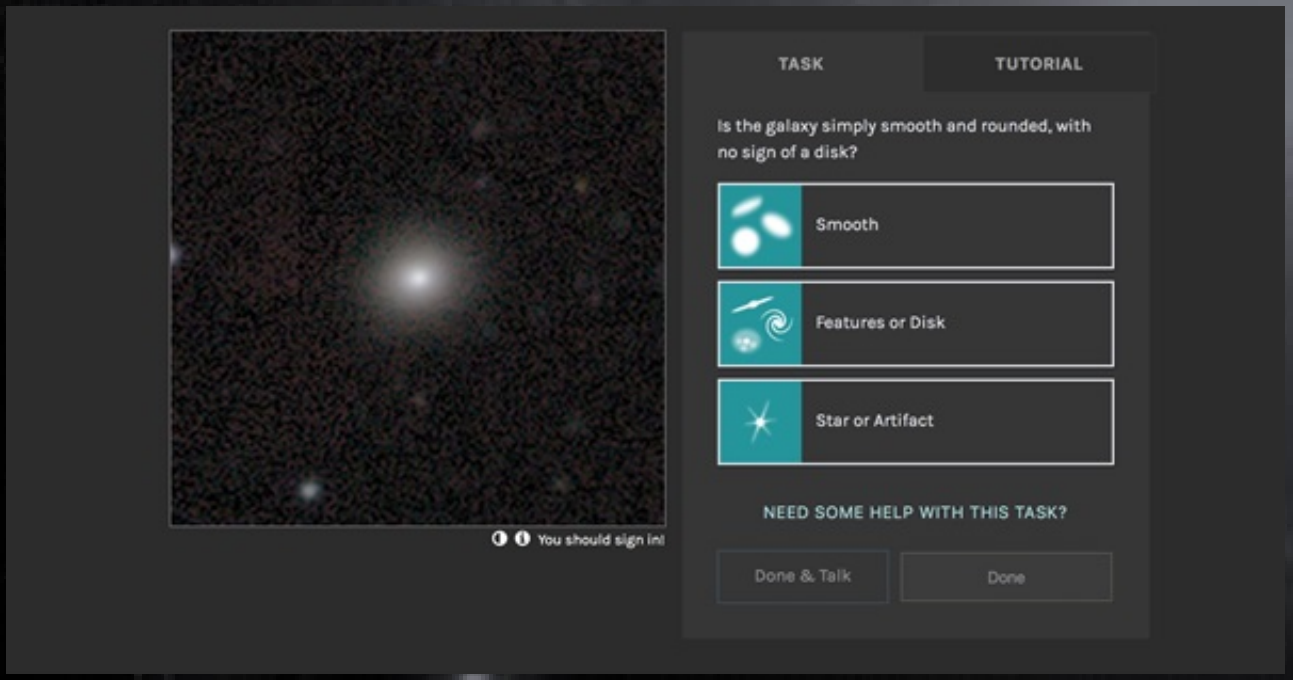



- Dark Energy Survey
  - 2.5 TB of data per night
  - Produced 1 petabyte (1,000 TB) of data
- Large Synoptic Survey Telescope will begin operations in 2022
  - Will collect 15-30 TB of data every night

# SDSS

2007 – Oxford graduate student

Spent 1 month classifying galaxies for 12 hours/day = 50,000




Launched Galaxy Zoo

70,000 classifications/hour the first days

50 million the first year

# Citizen Science Contributions

- Education (Science Literacy)

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“The public’s limited knowledge in science, technology, engineering, and math (STEM) is a problem for scientific progress.”

Creates a gap between the scientific consensus and public belief

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Funk C, Rainie L. Public and scientists’ views on science and society. Pew Research Centers Internet American Life Project 2015

# Projects are excellent for developing science-related skills:

- Identifying organisms
- Using measurement instruments
- Collecting field data
- Following protocols
- Process of research
- How scientific questions are asked and answered

# Citizen Science Contributions

- Community Engagement

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# Community Health Effects of Industrial Hog Operations (CHEIHO)

- Gained knowledge of community structure and environmental regulation.
- Learned that belonging to an organization allowed them to communicate more effectively with forest managers than if they worked alone.
- Gained knowledge of community dynamics and environmental regulation

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Bonney, R., et al. 2009. Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. A CAISE Inquiry Group Report. Washington, D.C.: Center for Advancement of Informal Science Education (CAISE).

# Behavior change as a result of participation

To avoid dependency which had developed previously, I avoid feeding them as often as I did.

I am very mindful of feeding them the correct foods

How they look after and feed the young as a community, not just parents.

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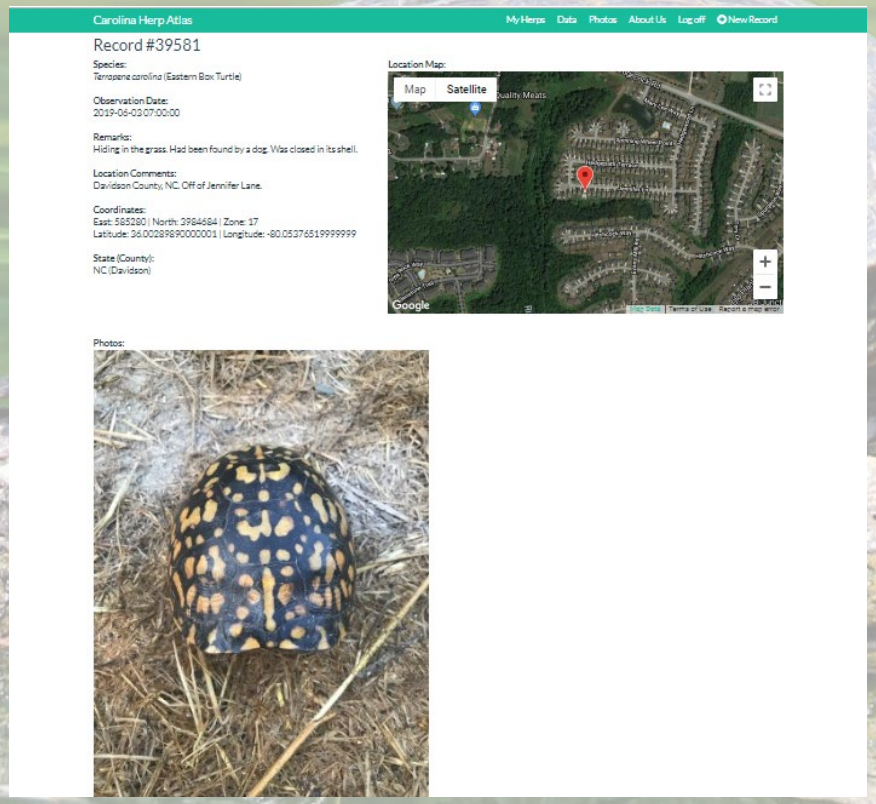
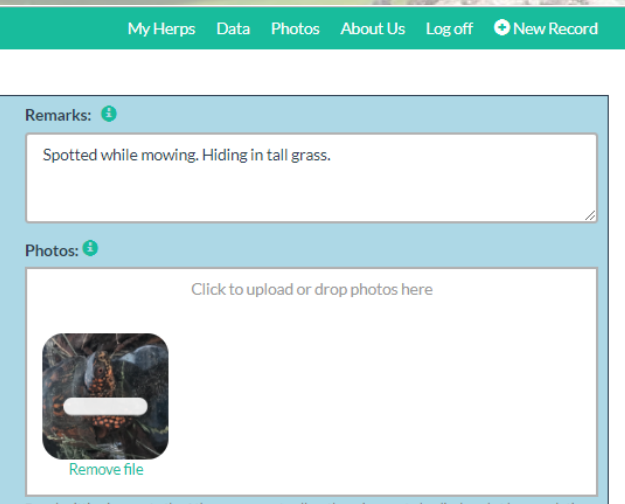
Roetman, Philip & Daniels, Christopher. (2011). The benefits of citizen science in research, education and community engagement.

NORTH CAROLINA
Museum of Natural Sciences

# Neighborhood Box Turtle Watch

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# The North Carolina Arboretum


eco EXPLORE

NORTH CAROLINA'S
# CANDID CRITTERS

## HOW IT WORKS

1. Sign up at NCCandidCritters.org to reserve a space.
2. Receive an official invitation to participate.
3. Complete an online training course.
4. Borrow a camera trap (or buy one of your own — limited to certain brands).
5. Pick a site on public land or your own property and strap your camera to a tree.
6. In three weeks, retrieve the camera.
7. Identify the animals in your photos and upload the images to us. (Don't worry, we'll give you software and confirm your identifications).
8. Repeat as many times as you would like and return the borrowed camera when you are finished.

# Why libraries?

Informal Educators

Prime position to provide:

- education
- opportunities

Since communities are unique, no single template applies to all.

# Implementing Projects – K-12

**LESSON 4: EXOPLANET DETECTION** 53

In this lesson, students will first engage in an activity that offers an opportunity to use various methods of observation to identify an object without being able to directly observe it with their eyes. Next, students will be asked to research and present to the class one of the direct or indirect methods that scientists use to detect planets around distant stars. Detection methods covered include transit, Doppler, and direct imaging.

**Supplementary Materials**

- Stellar System Images 60
- Star Signage 61
- Detection Methods sheets 62
- Evaluate Other Systems homework 65

**LESSON 6: USING PLANET HUNTERS** 75

This lesson acquaints students with the Planet Hunters (www.planethunters.org) citizen science project by researching its goals, learning about the project's science, and participating in the search for exoplanets. Students will watch a video tutorial that explains how the Planet Hunters website works, engage in analyzing light curves and look for possible transits that might indicate the presence of exoplanets.

**Supplementary Materials**

- Planet Hunters Star I.D. Chart 80

**Lessons for Grades K-5**

**Aligned to the Standard Course of Study**

**Made for Teachers by Teachers**

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http://go.uncg.edu/nasa-ph-guide

# Implementing Projects - Public

## City Nature Challenge

- four-day event taking photos of plants and animals found in their communities
- Western North Carolina vs. Charlotte metro area vs. Triangle


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# Implementing Projects - Academic

Incorporate an authentic research experience into laboratory courses.

Help researchers set up projects to process data.

Image by Nikolay Georgiev from Pixabay

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# Resources

**Platforms**

- Citizenscience.gov
- Zooniverse.org
- inaturalist.org

**Local Projects**

- Box Turtle Watch
  - go.uncg.edu/boxturtle
- Candid Critters
  - nccandidcritters.org
- EcoExplore
  - ecoexplore.net