WITH CITIZEN SCIENCE

February 4, 2025

PARTNERS & PRESENTERS

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ASU
Arizona State University

collaborative
summer library program

NGCP
National Girls Collaborative Project

STAR net
Science-Technology Activities & Resources For Libraries

GORDON AND BETTY MOORE FOUNDATION

INSTITUTE of Museum and Library SERVICES

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A Word from our Partners

collaborative summer library program™

Cathy Lancaster, Library of Michigan
Past-President of CSLP

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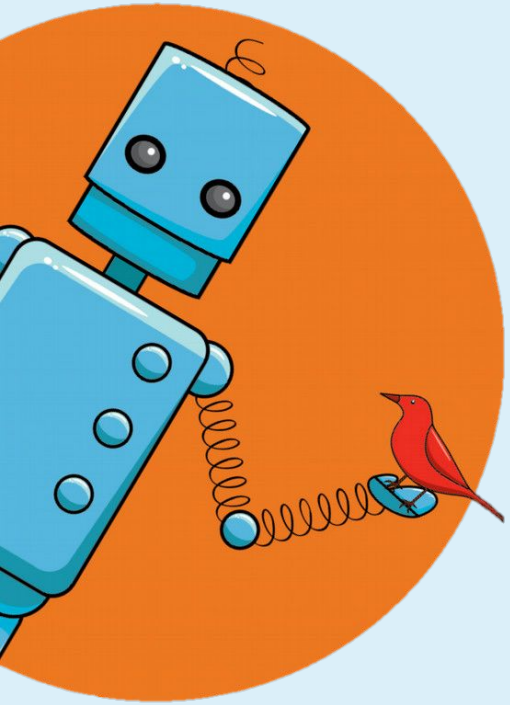

Citizen Science 101

Also called community science, participatory science, crowdsourced research.

Poll: How familiar are you with citizen science?

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What is citizen science?

A global movement that enables people from all walks of life to contribute to real scientific research in collaboration with scientists.

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Citizen Science can involve...

Observing	Biodiversity, Night Sky
Monitoring	Wild Life, Pollinator Activity, Bird Migration
Measuring	Water Quality, Light Pollution, Marine Debris
Analyzing	Videos and Images online
Collecting	Photos and Samples

in your backyard, while exploring your interests, through your hobbies, with your family, and more!

Because of citizen scientists ...

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- We know the **human belly buttons contain 50+ species of bacteria**
- **3.5 months of lab-equivalent research was completed** in one weekend through 2,566 hours of volunteer participation
- **Hundreds of exoplanets have been discovered** , including “Percival,” an exoplanet in a habitable zone
- **126 birds species identified as “lost to science”**
- We’ve discovered that some **invasive ants spread by hitchhiking**

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The Difference Between STEM Programs and Citizen Science

STEM programs **teach** people about science/STEM topics.

Citizen/Community Science projects also **engage people in collecting and sharing observations and data** to accelerate research! People *AND* scientists learn!

Benefits to Science & Society

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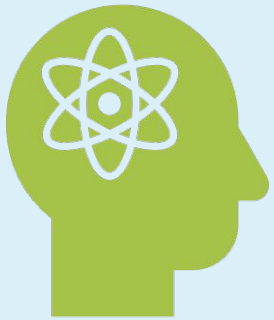
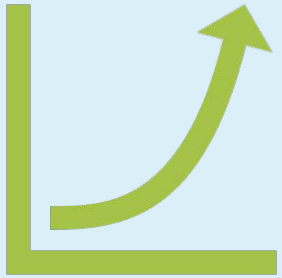
Broadens the scope of who can contribute to science.

Enables people to engage in data collection, analysis, and interpretation.



Empowers lifelong learning about science and nature.



Accelerates important research and discovery.

Which of these activities is citizen science? There may be more than one answer.

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A Take a photo of a plant during a nature hike and upload to *INaturalist*

B Organize a beach clean up

C Plant a pollinator garden to increase pollinator activity

D Test your local tap water and report findings to *Crowd the Tap*

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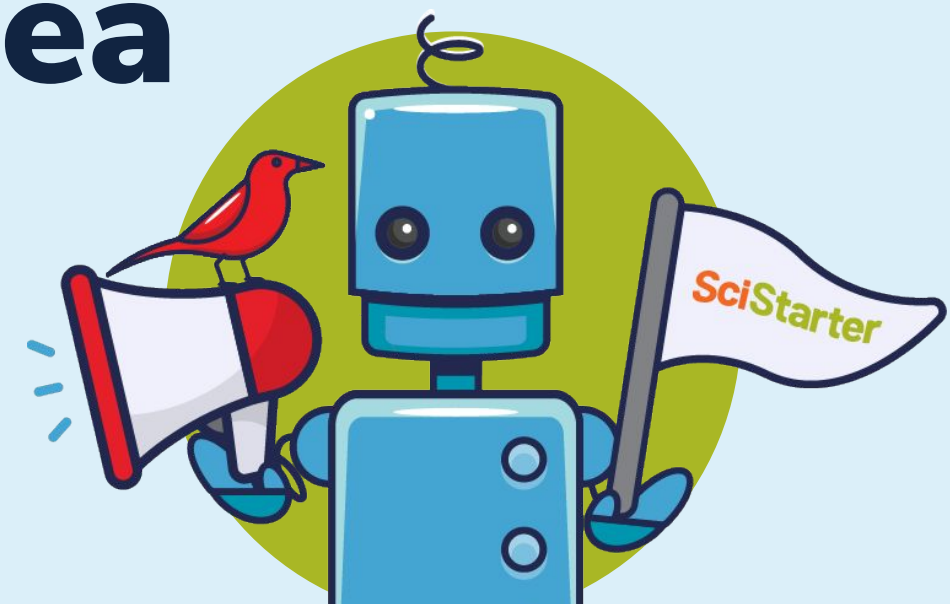
Citizen Science & STEAM Activities from Space to Sea



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Art is a Bridge for Scientific Exploration and Community Building

- Art-Science Fusion Events
- Community Art & Maker Projects
- Advocacy Posters and Campaigns
- Storytelling and Data Visualization

Connecting citizen science to art can create powerful interdisciplinary opportunities to engage audiences, inspire creativity, and deepen understanding.

Globe at Night: Measure Light Pollution

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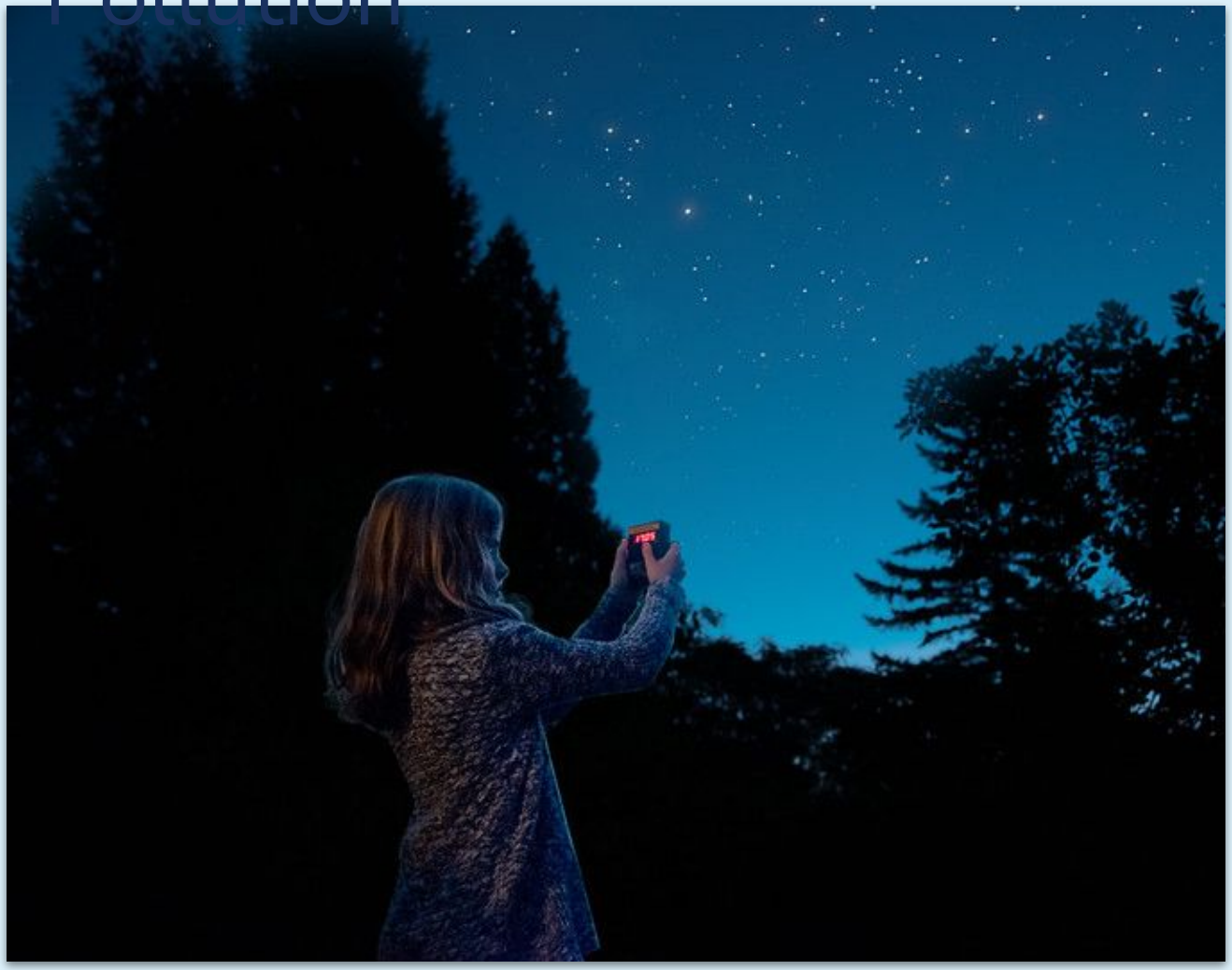

- International citizen-science campaign to raise public awareness of the impact of light pollution
- Participants measure & submit their night sky brightness observations

Globe at Night: Measure Light Pollution

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- Go outside during campaign dates. *The Moon should not be up*.
- Use the app to select a constellation and your location
- Observe and match to the star chart that's closest to what you see
- Or take light meter measurement
- Submit your data

Kit-Building Guide Available

Create your Own Constellation

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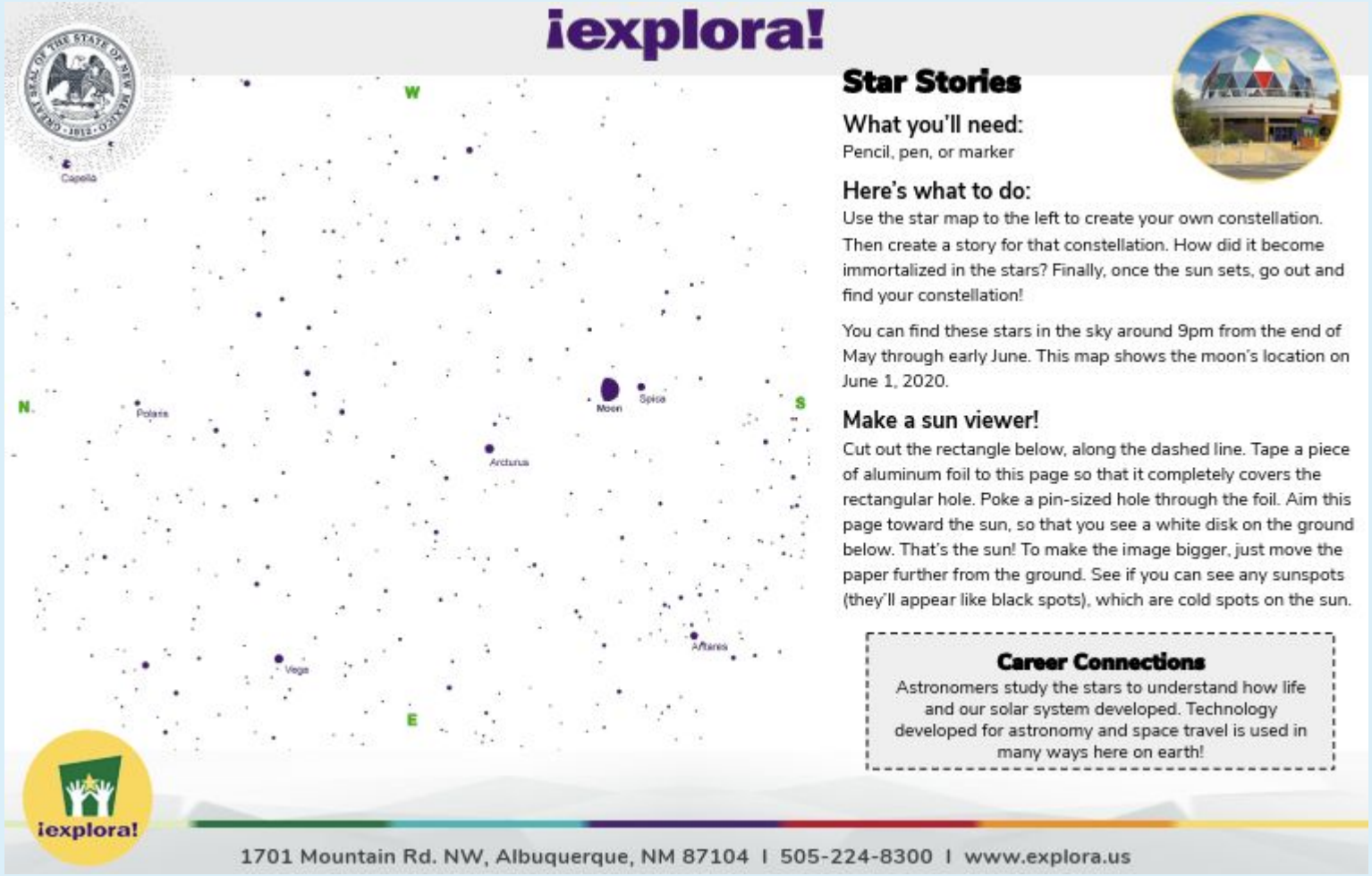

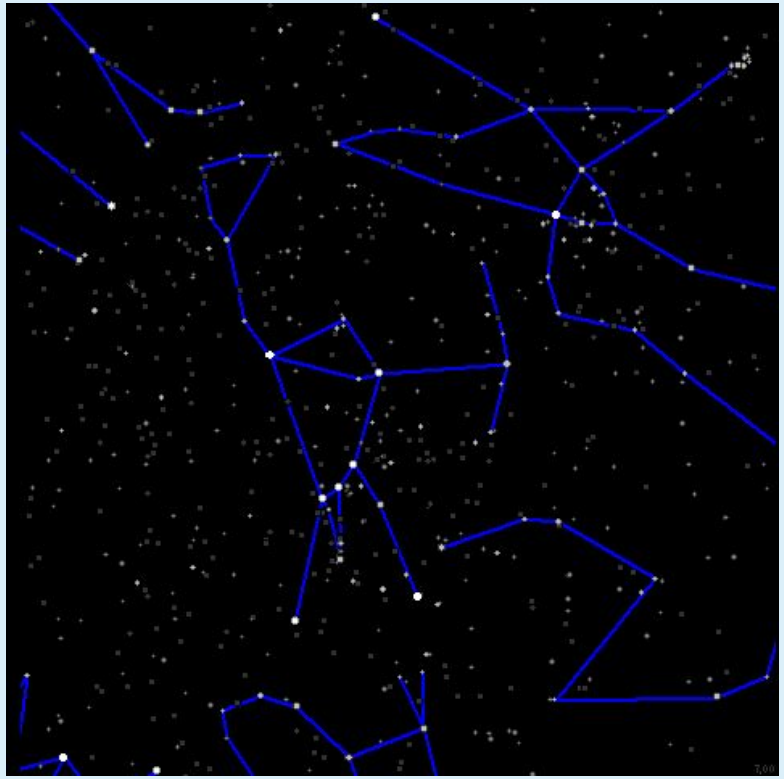

STEM ACTIVITY Clearinghouse

EZIE Mag: Monitor Earth's magnetic field

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- Team up with Johns Hopkins Applied Physics Lab on NASA's EZIE Mission to ground truth magnetic field measurements
- Participants use a science-grade magnetometer to measure electrical currents & submit data

EZIE Mag: Monitor Earth's magnetic field

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- Apply for an EZIE Magnetometer
- Invite your community to learn about the Earth's magnetic field and demonstrate the use of a magnetometer.
- Follow instructions for placement outside
- Take measurements at least twice a month and submit data to the projects

Free while supplies last. Apply now!

Aurora Chalk Art

Create your own artwork inspired by the northern lights!

Materials Needed:

Aurora stencil (or draw your own), black paper, colored chalk, scissors.
Optional: Tissues.

Instructions:

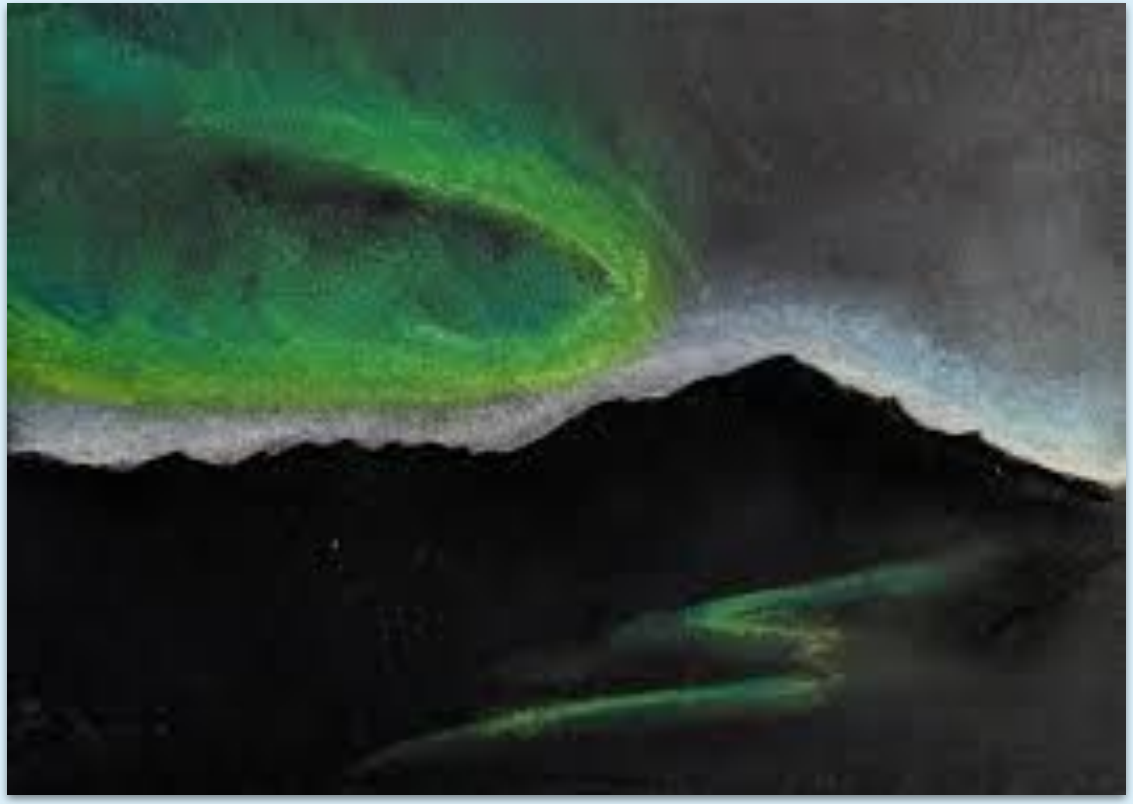
Step 1: Cut out the aurora stencil. If making your own, cut a strip of white paper or cardstock in a wavy aurora shape.

Step 2: Color the top edge of the stencil with colored chalk.

Step 3: Place the colored stencil on your black paper, chalk side up. Smudge the chalk onto the black paper using your finger or a tissue.

Step 4: Repeat using different colors to fill the sky with the colors of the aurora.

Step 5: Add a cabin, trees, campfires, or other things you might see under the northern lights. Be creative!



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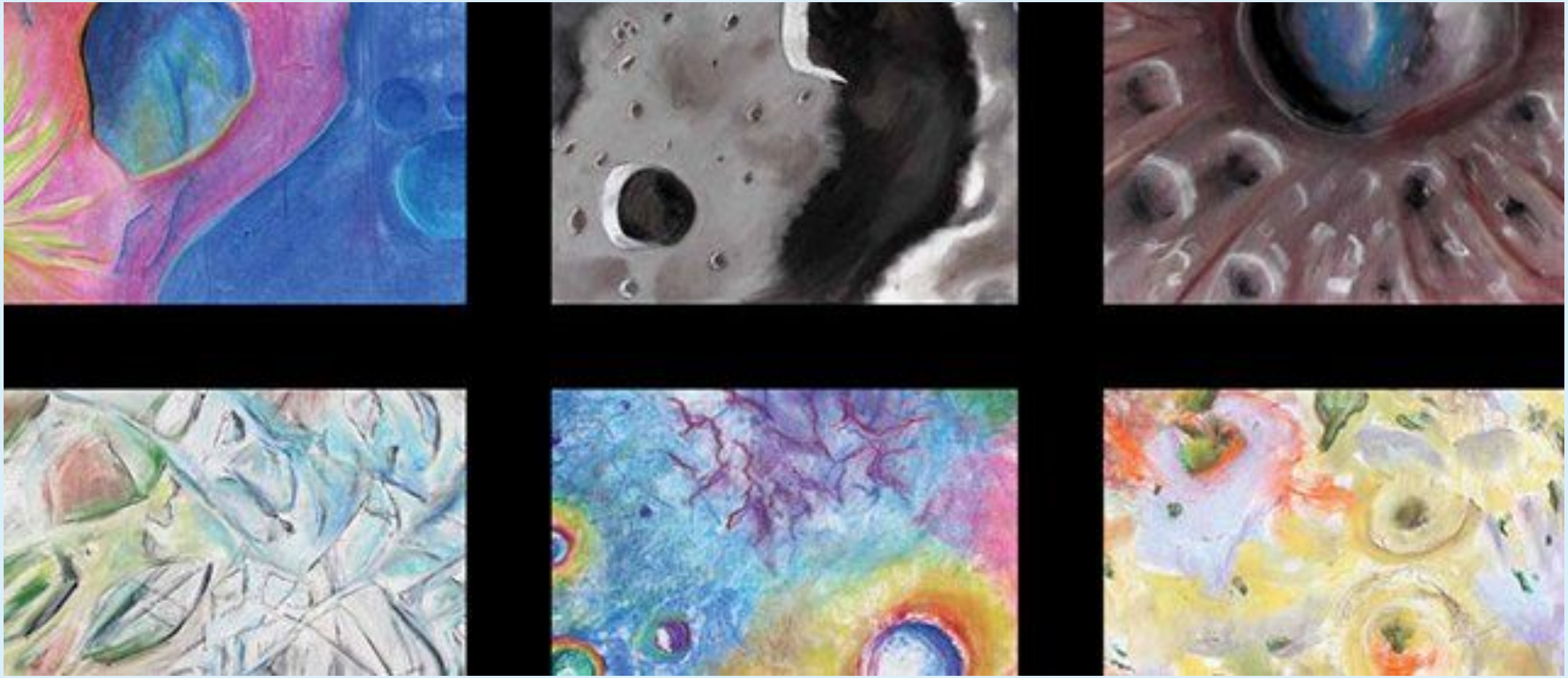
Art and the Cosmic Connection



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- NASA Images
- Pastels
- Blending tools (Qtips, erasers, paper)
- Baby wipes
- Setting spray

STEM ACTIVITY Clearinghouse

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Elements of Art and their Geology Matches

- **Circle:** impact feature or crater
- **Blobs:** volcanic processes or surface liquid (rivers and seas)
- **Straight Lines:** tectonic activity
- **Squiggly Lines:** forces of erosion
- **Color:** different frequencies of the electromagnetic spectrum
- **Value** (contrast of light and dark): albeto/reflectivity of a surface
- **Texture:** tactile quality of the surface

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Land & Air

NASA's GLOBE Observer: 4 Choices

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- GLOBE Observer is a set of 4 projects (protocols) to supplement satellite data on Earth's ground conditions.
- Collect data on land cover, clouds, tree size, and mosquito populations to help NASA predict weather patterns, understand biomass, predict spread of mosquito-borne illness

NASA's GLOBE Observer: 4 Choices

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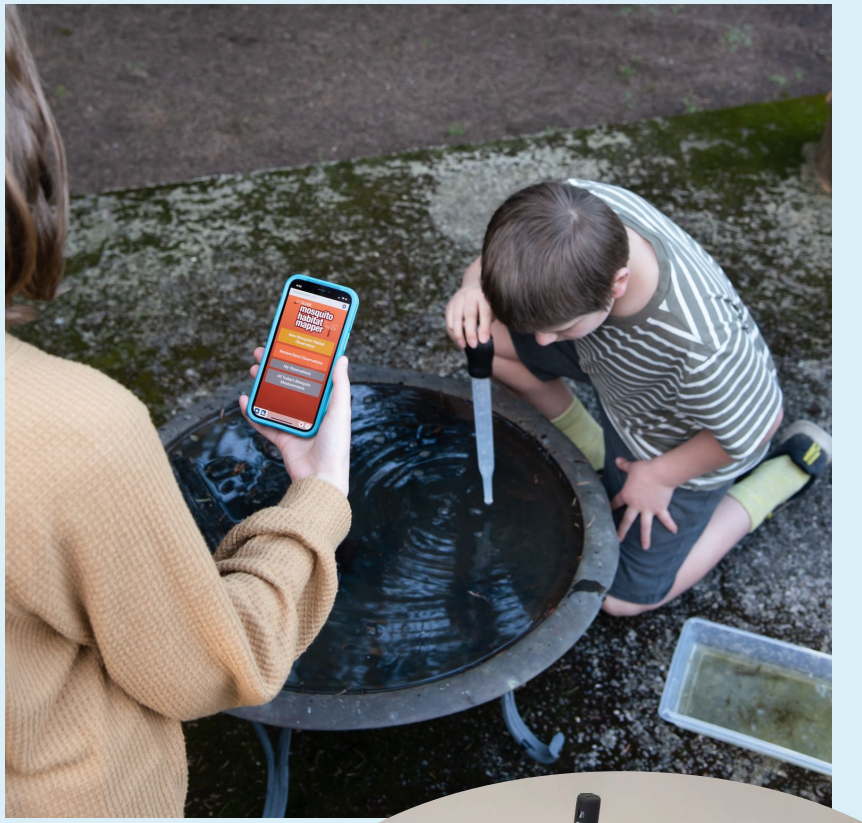
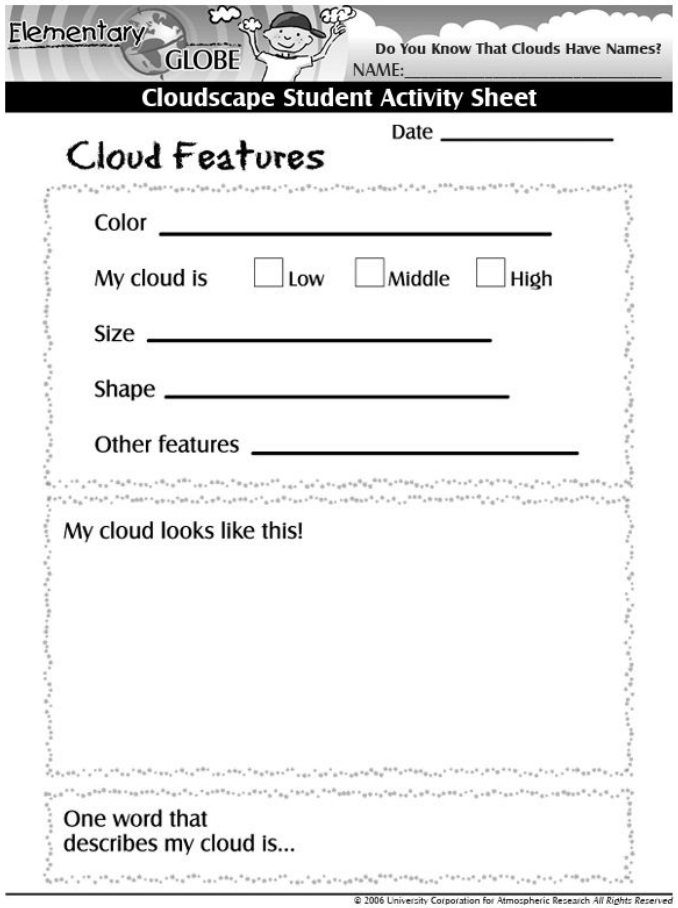
- Choose a protocol: Trees, Clouds, Land Cover, or Mosquito Mapper
- Follow instructions for the protocol. In some protocols, this requires some extra materials
- Take measurements and submit the data, all done in the app.



Kit-Building Guide Available for Mosquito Mapper

Cloudscape



Elementary GLOBE

Do You Know That Clouds Have Names?

NAME: _____

Cloudscape Student Activity Sheet

Date _____

Cloud Features

Color _____

My cloud is ☐ Low ☐ Middle ☐ High

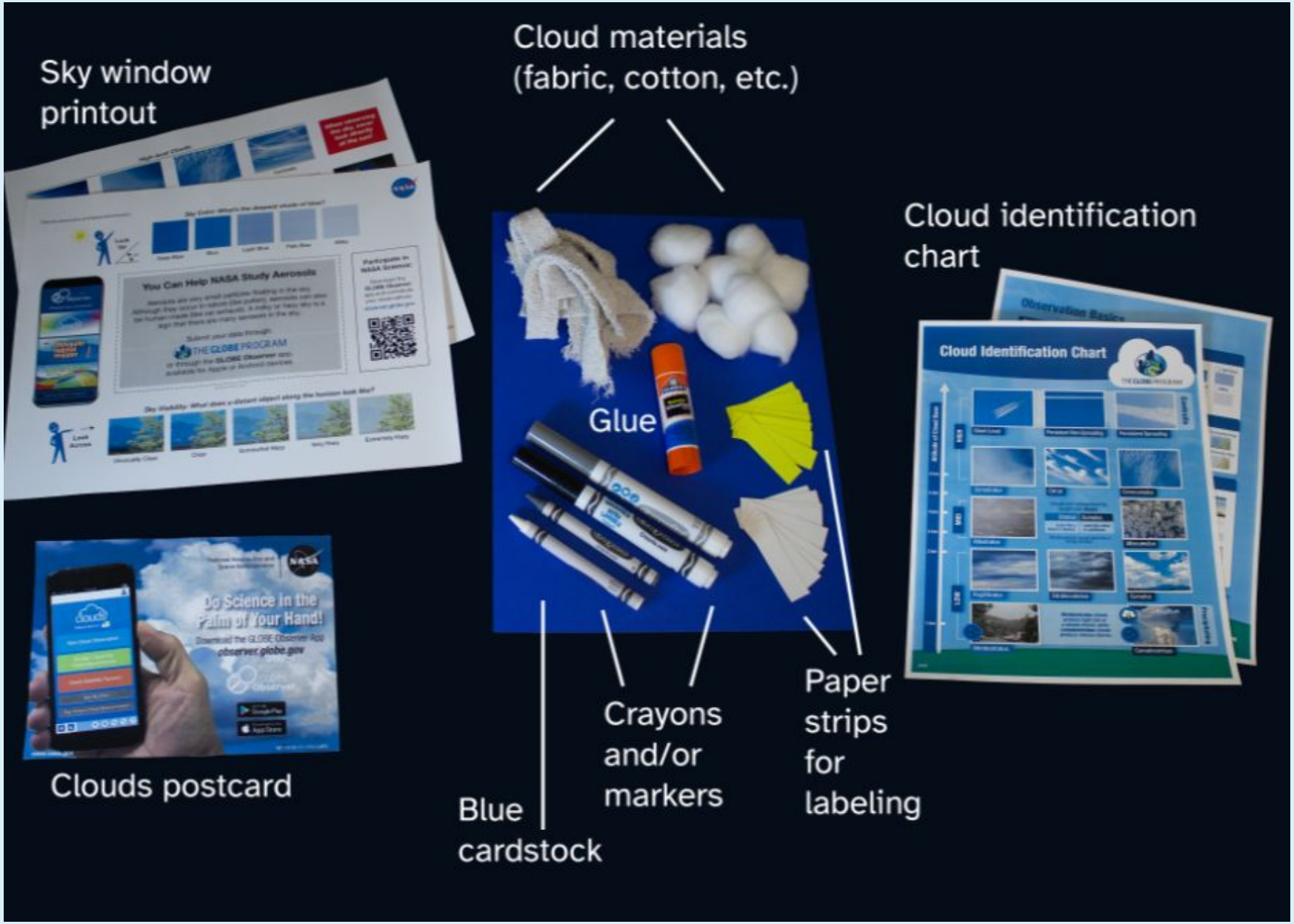
Size _____

Shape _____

Other features _____

My cloud looks like this!

One word that describes my cloud is...



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Build a Bug

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Build-A-Bug Library Facilitation Guide

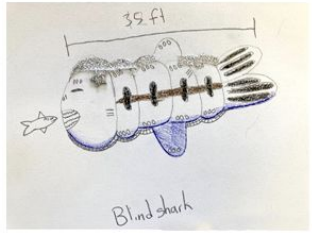
This guide was modified from USU Extension's water quality activity: Build-A-Bug

Activity Time: 10-30 minutes

Age Group: Ages 4 and up

What's the Point?

- Adaptations are unique characteristics that plants and animals have that help them survive in their environment.
- Aquatic animals have many different types of adaptations depending on how deep or shallow the water is where they live, how fast the water flows, what they eat, and how they can defend themselves against predators or other environmental hazards.
- Aquatic macroinvertebrates are small animals (*such as insects, mollusks, and worms*) that live in water.
- Some macroinvertebrates, such as leeches and snails, are very tolerant of pollution in water. Others, such as mayflies and stoneflies, are very sensitive to pollution and may move away or die from such waters. Identifying which species of macroinvertebrates are present in a body of water can help us understand if the water quality is poor or healthy.



Materials:

- Make a Macro-invertebrate Table Sign
- Photos of macroinvertebrates (pages 4-6 of Build-A-Bug)
- (*Optional*): your own model of a macroinvertebrate with three adaptations

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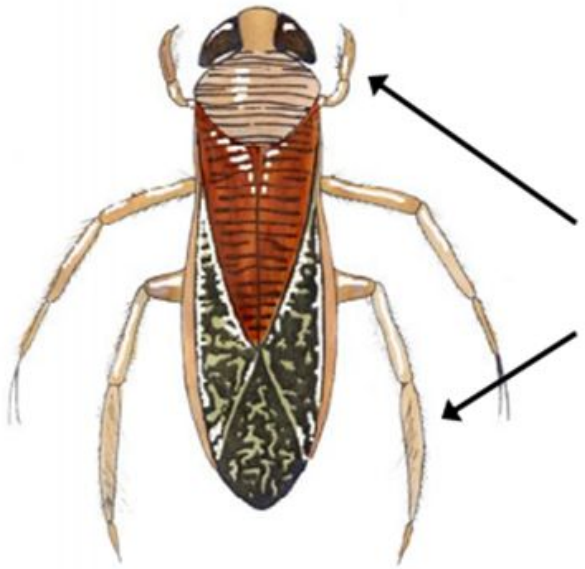
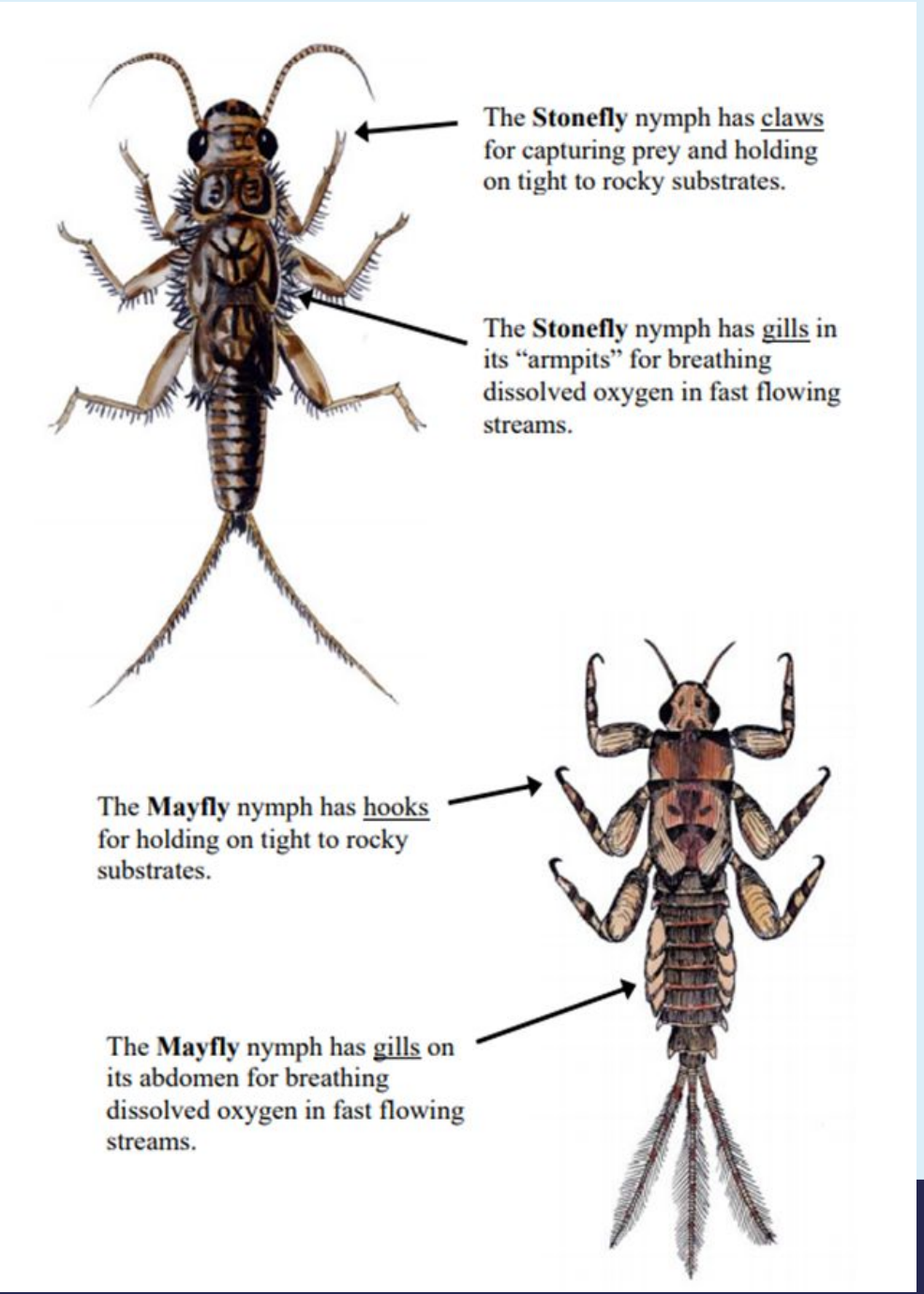


The **Water boatman** has paddle-like legs for swimming in slow moving water.

The **Dragonfly nymph** has claws on its legs for capturing prey and for climbing emergent vegetation.

Macro: big enough to see without a microscope.

Invertebrate: doesn't have a backbone.



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What are some adaptations a macroinvertebrate might need to live in the water?

Facilitation tip: ask probing questions
Why would it need that?
How does the adaptation help it survive?

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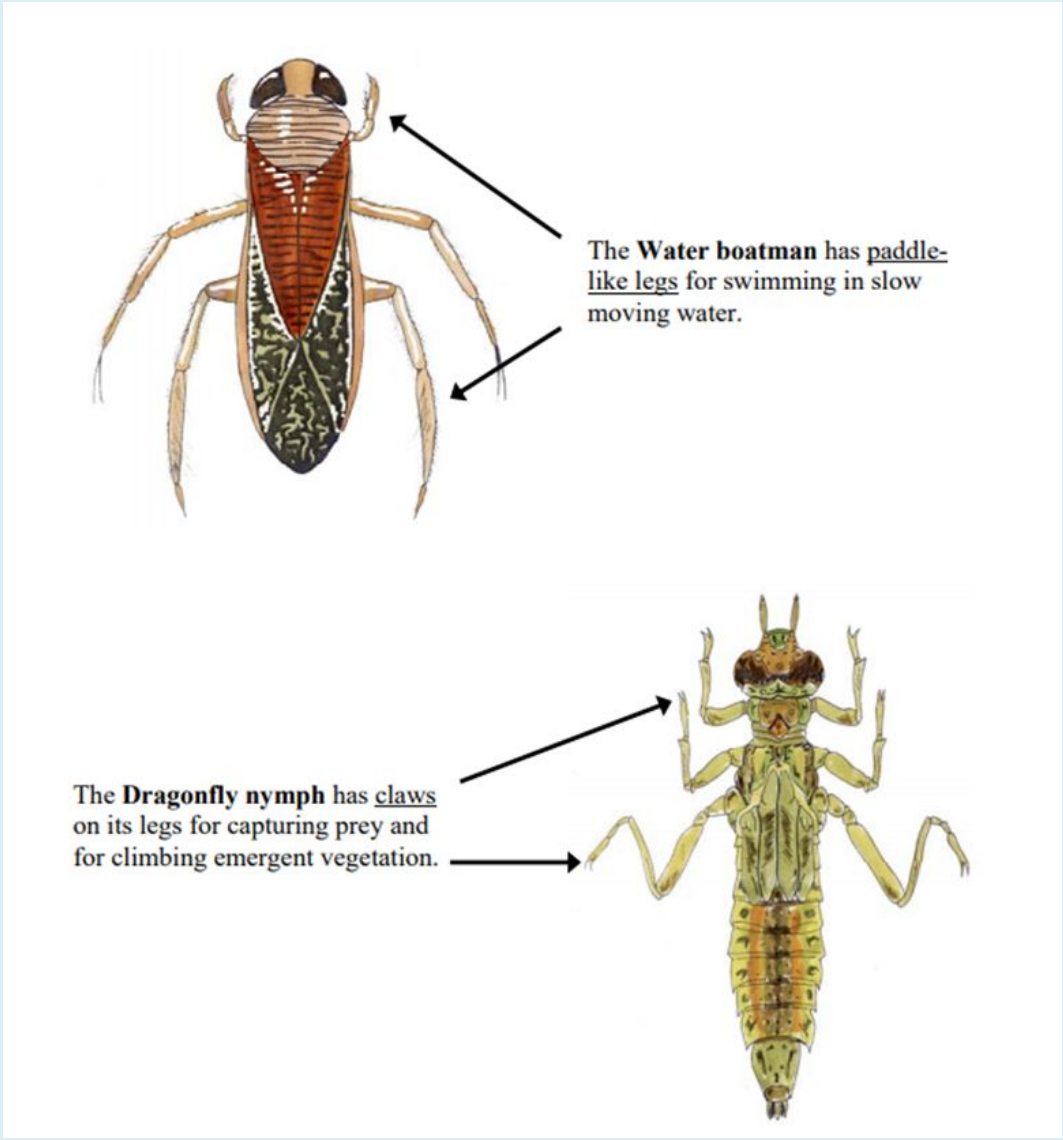

Water Quality Connections

Many macroinvertebrates can't live in polluted water. What does the biodiversity of macroinvertebrates tell us about the water quality?

QUESTAGAME: Pokémon go for Wildlife

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- QuestaGame is a free-to-play, outdoor mobile adventure game in which your find plants and animals, photograph, join quests, and challenges.
- Submit sightings of your local flora and fauna while also helping researchers record and protect your local biodiversity.

QUESTAGAME: Pokémon go for Wildlife

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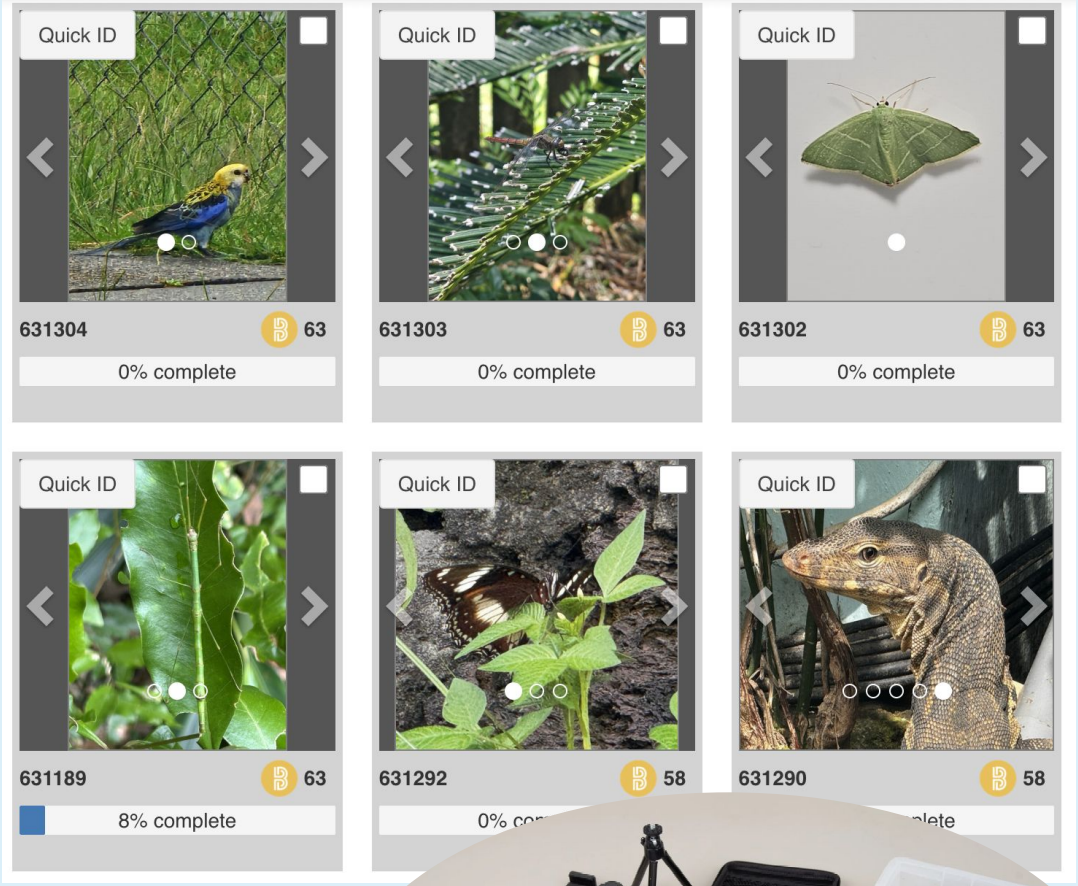
- Download the app and create an account (can also be done on web browser)
- Go outside and start documenting wildlife
- Gamified to earn badges, awards and more
- Help identify the observations made by others
- Submit your data



Related Kit-Building Guide Available (Exploring Biodiversity

Nature Journaling

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Activity 1

Season Seeking

PHENOMENAL PHENOLOGY

Observing plants and animals often involves noticing and recording seasonal changes over time. Every species moves through a series of life cycle stages that are related to environmental cues. The study of these life cycle stages is called phenology and the observable stages are called phenophases. Examples of phenophases include the breaking leaf buds on a plant; pollinator interaction with flowers; bird nest building; mammal hibernation; or butterfly emergence from a cocoon.

You'll Need: 1+ hours

- pencil
- markers or colored pencils
- journals, sketch pads, or drawing paper
- optional: SciGirls *Nature Nurture* journal
- optional: magnifying glasses, binoculars, plant and animal field guides

SMART START:

- For resources about leaves, flowers, and fruits, use the Nature's Notebook phenophase definition sheets (usanpn.org/nn/species_search), Botany and Phenophase Primers, local field guides, or someone knowledgeable about the natural history of your area.
- Find a spot that is accessible, whether it's a schoolyard, local botanical garden, arboretum, nature center, park, or wildlife refuge. Observations can start short (10 mins.) and can be made during a walk, hike, or while just sitting, looking, and listening.

Here's how:

1. Introduce phenology. Discuss phenophases and phenology. Have the girls brainstorm different phenophases and what time of year they appear. Is there a connection between when a phenophase occurs and what's happening in the environment?[6]

Nature's Notebook

Nature's Notebook is a citizen and professional science program for gathering observations of plant and animal phenology across the United States. Researchers, land managers, gardeners, and naturalists use these observations to understand how species are responding to climate changes and to make decisions on local, national and global scales to ensure the continued vitality of our environment.

nn.usa.npn.org

1-7 See **SciGirls Seven** strategies on page 3.

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Sea

FathomVerse: Explore & identify ocean life

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- FathomVerse is an immersive game where you'll encounter real scientific images collected by robots and researchers around the world.
- Look closely, and be the first to discover the ocean animals you find.

FathomVerse: Explore & identify ocean life

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- Watch the project walkthrough on Youtube and test out the project for yourself!
- Prepare attendees with instructions to download the mobile app on a personal device, or provide prepared devices like tablets.
- Consider creating a set of library accounts that can be used by participants who do not want to create an account.

Instant Wild: Conservation technology, camera trap imaging

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- Instant Wild brings you live images from cameras around the world.
- Tag the animals to help conservation research.

Instant Wild: Camera trap images

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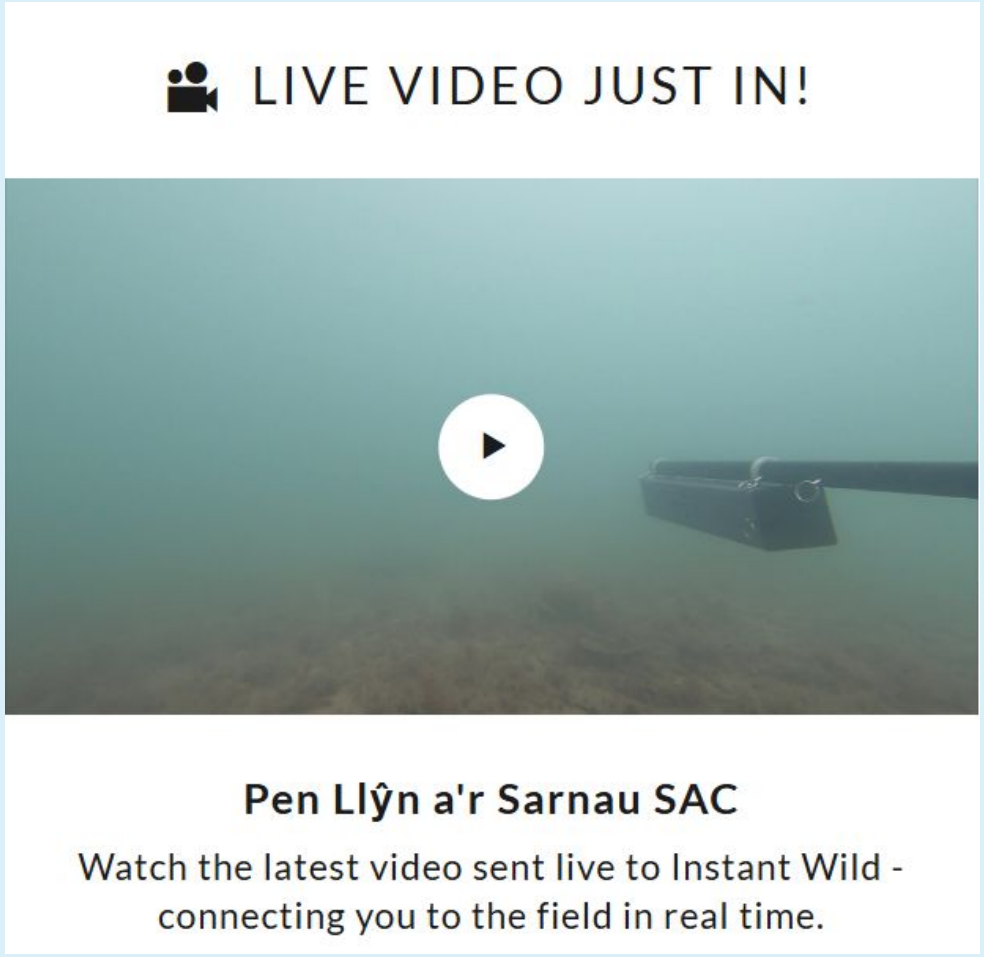
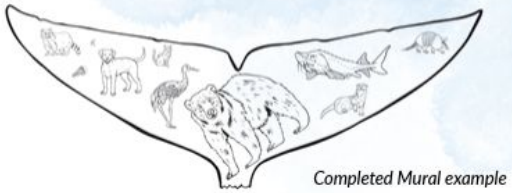
- Sign into an SciStarter-connected account or continue as a guest on the Instant Wild Platform
- Pick a project! Both underwater and land camera traps are available.
- Identify which species you see in the images and videos.



FIN-TASTIC FUN!
BLUE WHALE TAIL MURAL ACTIVITY

Overview:

Blue whales are the largest animals ever to have lived. They can grow up to 100 feet long and weigh as much as 150 tons. Blue whales use their powerful tails to propel themselves across thousands of miles of ocean. In this activity, participants will be able to experience exactly how big a blue whale's tail can grow by working together to create a life-sized mural. This activity works well as a passive program or facilitated program.



Completed Mural example

Target Age:

Family, Multigenerational, Pre-K, Early Elementary, Upper Elementary, Tweens (*9-12*), Teens, Adults

Prep Time:

1 hour

Activity Duration:

20-40 minutes, passive

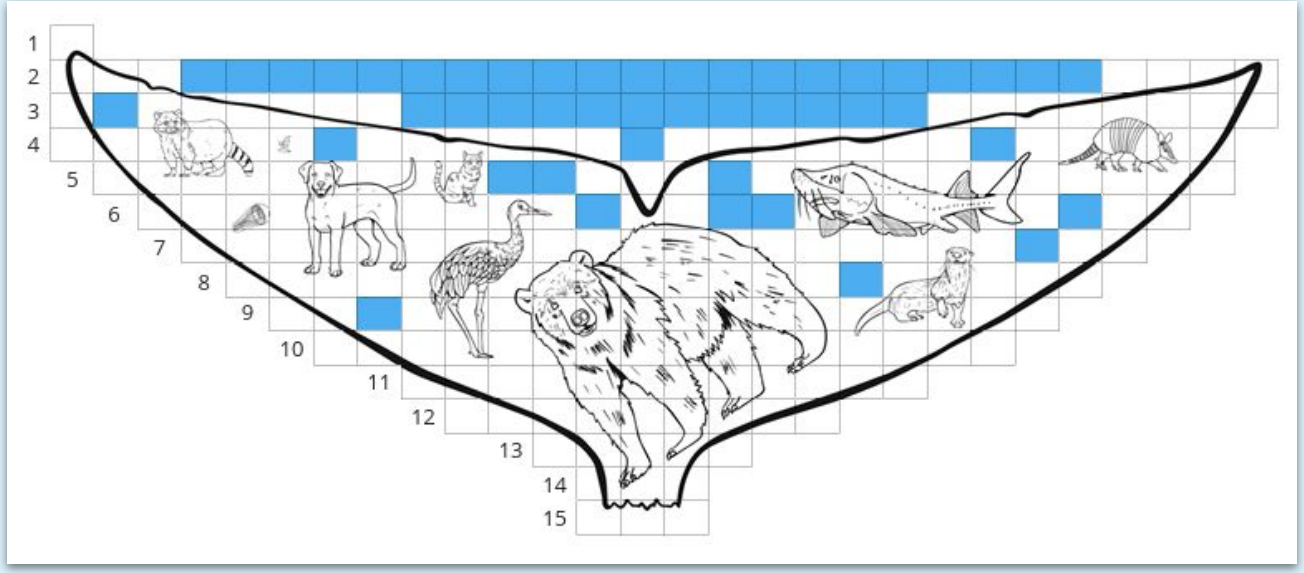
Perfect for:

Open space indoors, libraries, unused hallways

Materials and Set-Up:

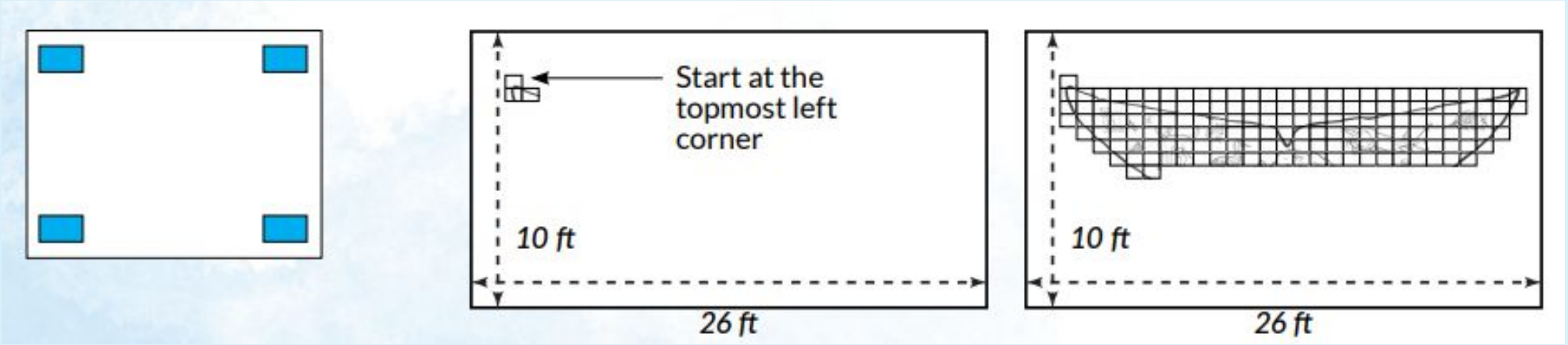
- Flat wall space of at least 26ftx10ft (*pick a space with room to place tables for coloring stations*)
- Printer
- 2 copies of the printed *blue whale tail mural*
- *Double-sided-tape*
  - Double-sided-tape works well so the sheets don't have to be taped up immediately. If double-sided tape doesn't work for your wall space you can try:
  - *Reusable adhesive (Blue Tack)*
  - *Painters tape*
- Crayons, markers, and/or colored pencils
- Layout instructions (*included in this activity guide*)

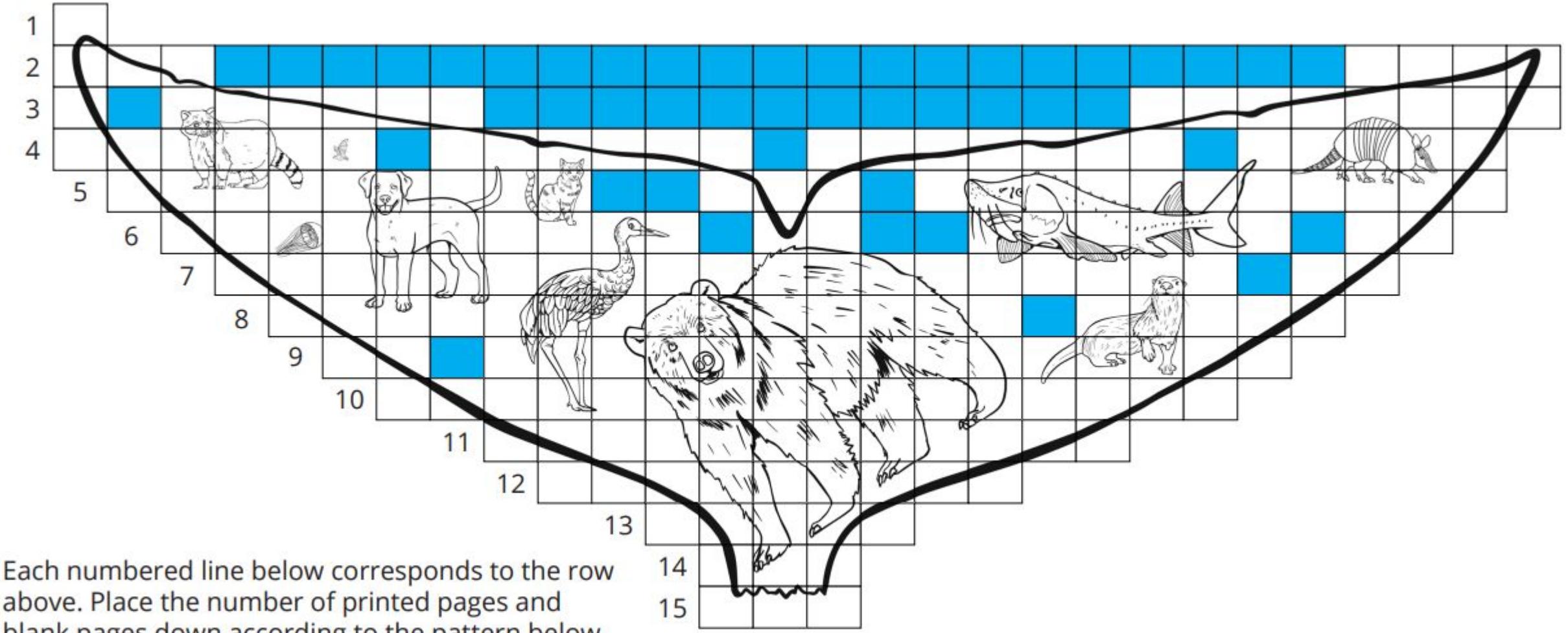
SK Films · hhmi Tangled Bank Studios · oceanic FILMS · NSF · California ScienCenter · STAR net



Materials and Set-Up:

- Flat wall space of at least 26ft x 10 ft
- Printer
- 2 copies of the Blue Whale tail mural
- Double-sided-tape
- Crayons, markers, and/or colored pencils
- Layout instructions included in the activity guide





Each numbered line below corresponds to the row above. Place the number of printed pages and blank pages down according to the pattern below. The blue rectangles represent the blank pages.

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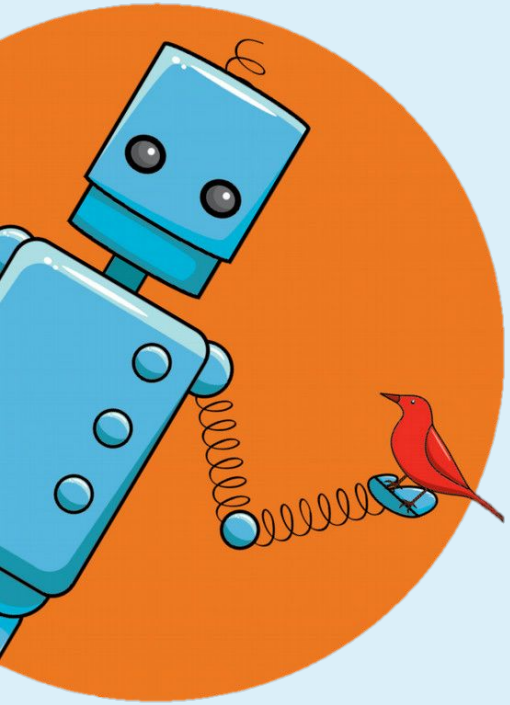

Resources to Help You!

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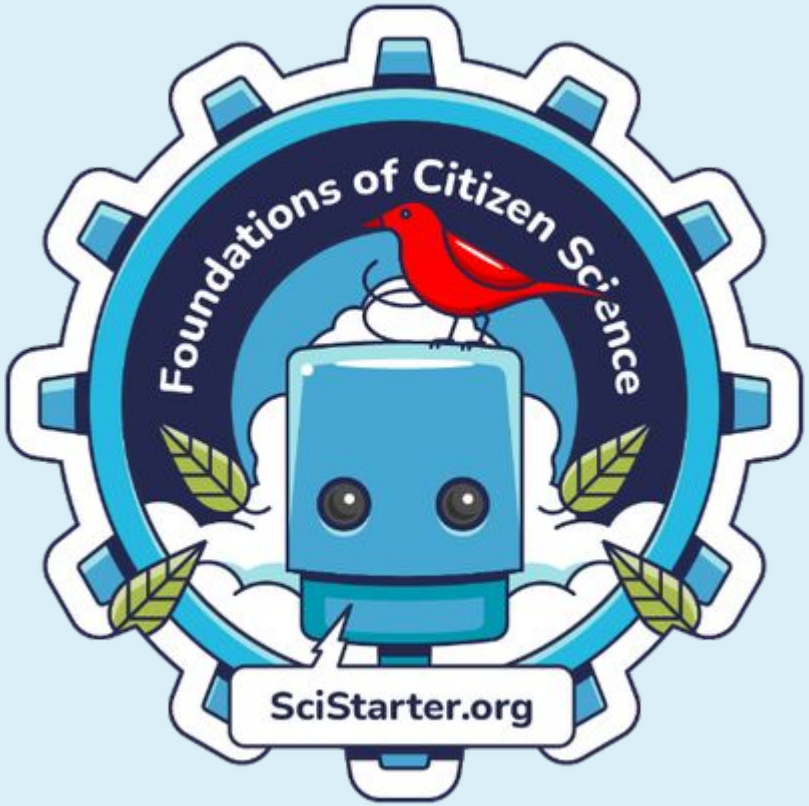
Online, Self-Guided Trainings

Build confidence and increase engagement and retention via online training, resources and support from SciStarter team members.



SciStarter.org/training

Try the Project Finder!

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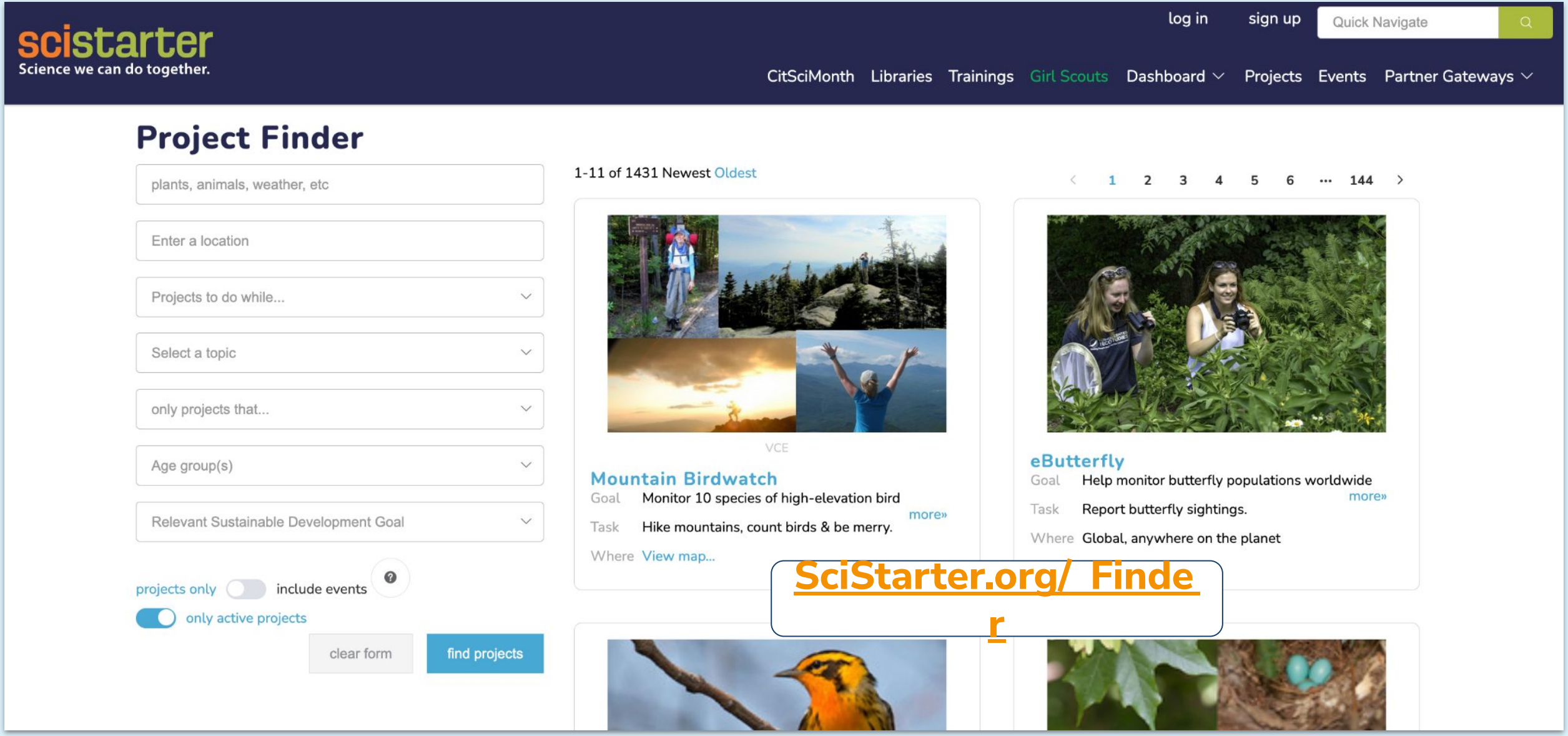

SciStarter.org/ Finder

Citizen and Community Science Library Network

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Join the Network!

SciStarter.org/go/library-network

Empower

Increase the capacity of libraries to become community hubs for citizen science

Support

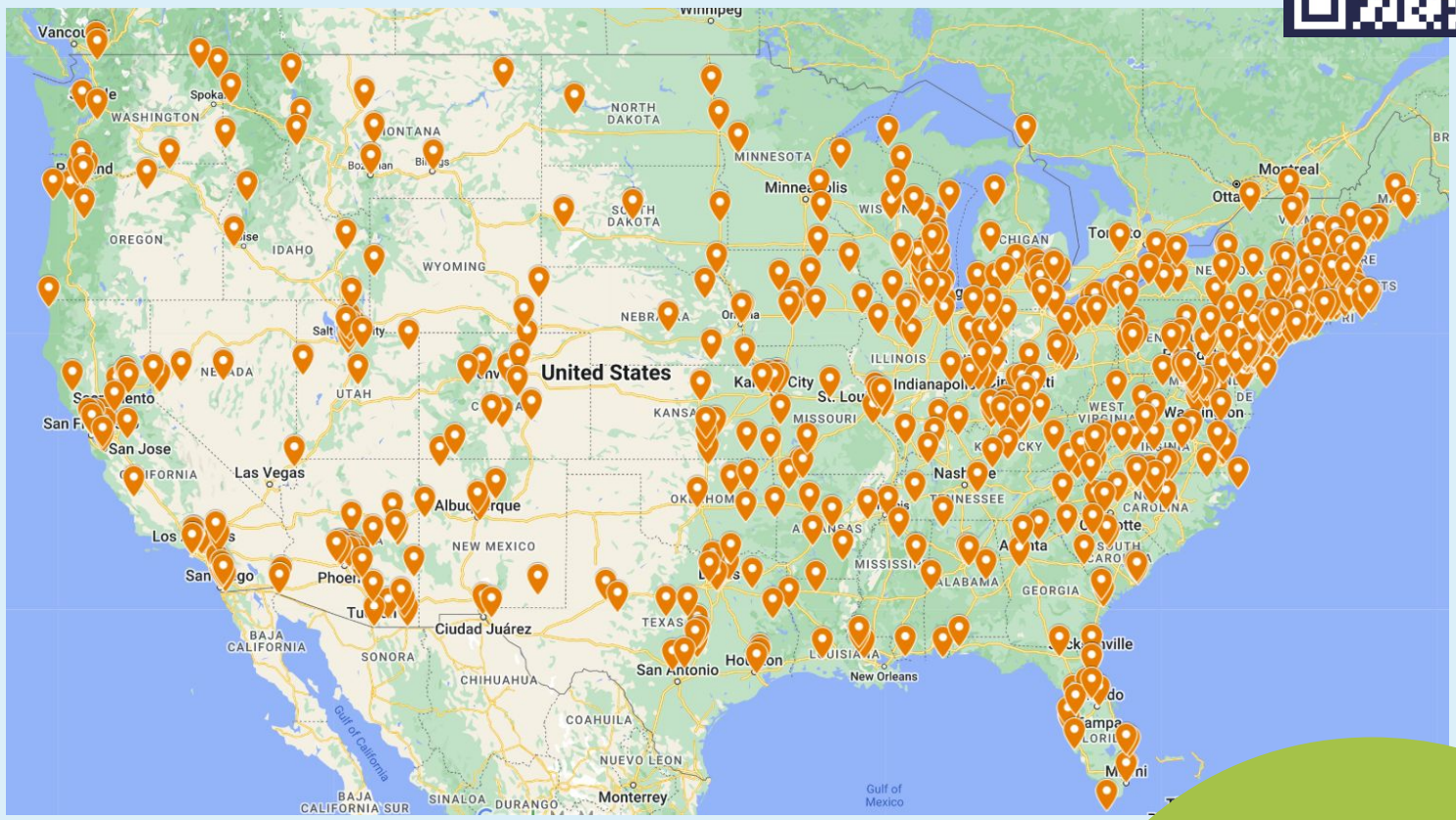
Support a community of libraries engaging their users in citizen science

Broaden

Broaden participation of diverse communities in citizen science

Accelerate

Accelerate and shape scientific research



Supported by IMLS, Moore Foundation, NLM, National Girls Collaborative, and others!

Now close to 1,000 libraries participating!

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SciStarter Ambassador

A selective program that provides free training and programming support to individuals from diverse backgrounds and experience levels who want to introduce SciStarter and citizen science at local organizations like their public library.

SciStarter
AMBASSADOR
for
CITIZEN SCIENCE

Currently recruiting for Cohort 4!
Applications due March 14

SciStarter.org/ambassadors

Public Directory

SciStarter
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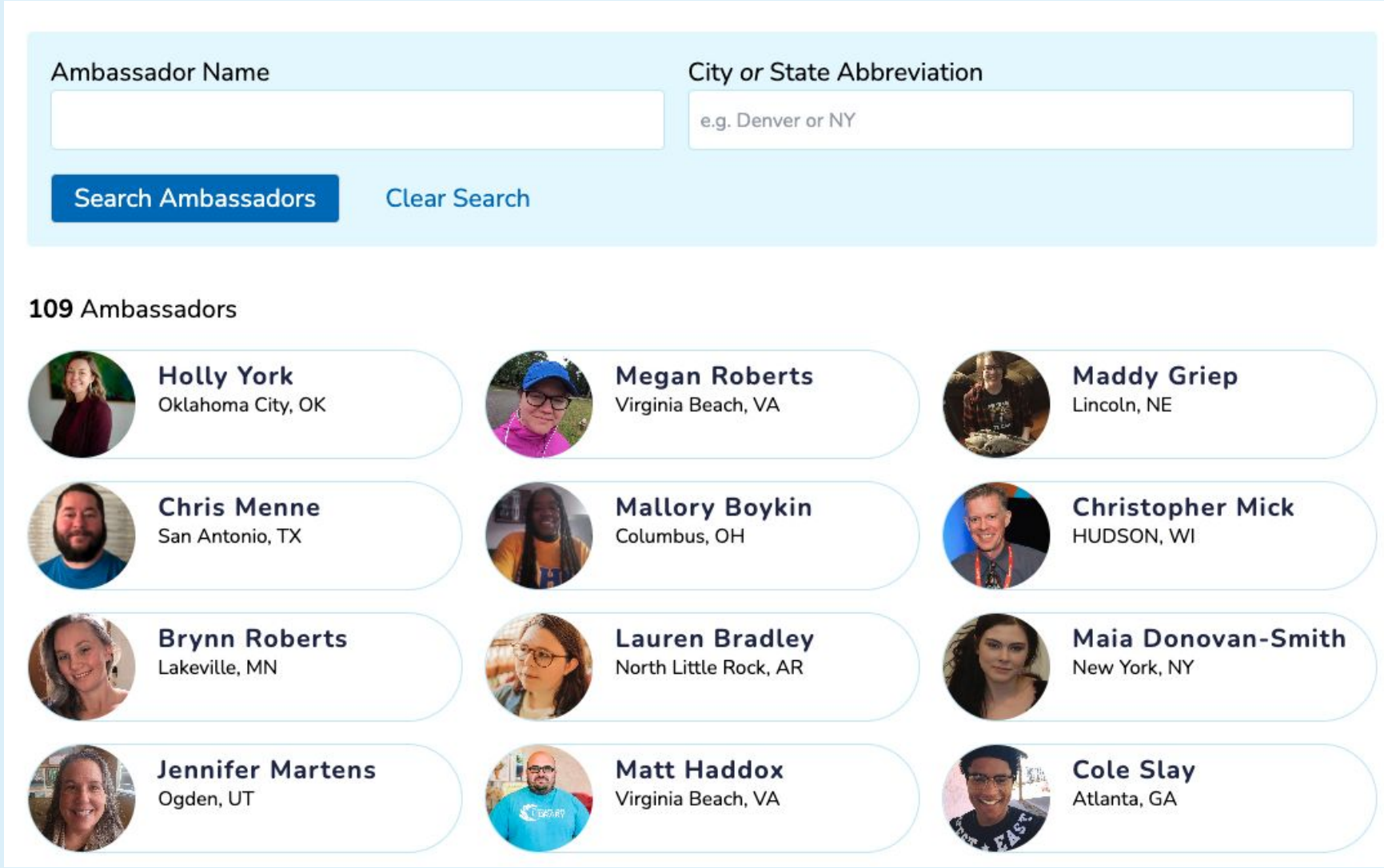
Our Ambassadors are...

- Library Staff
- Library Volunteers
- Homeschool Teachers
- Informal Educators
- College Professors
- Naturalists
- Cyber security professionals
- Girl Scout and Cub Scout Troop Leaders
... and more!



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Free, Open Resources for Libraries

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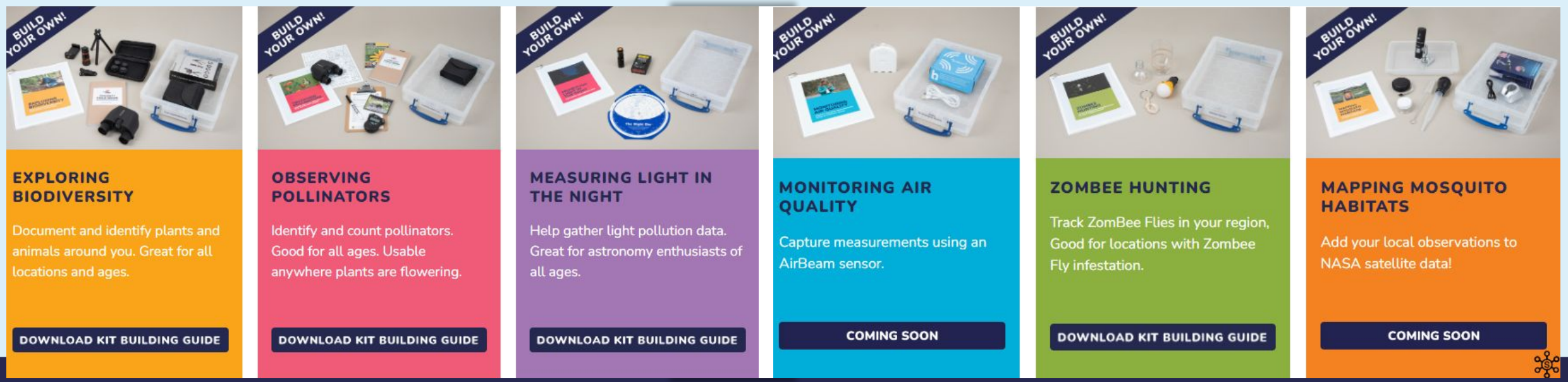
Kit-Building Guides for Library Staff



SciStarter.org/library-build-a-kit

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Search by:

- Age
- Theme
- Materials

STEM ACTIVITY Clearinghouse

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Poll: How likely are you to incorporate citizen science into your summer reading plans?

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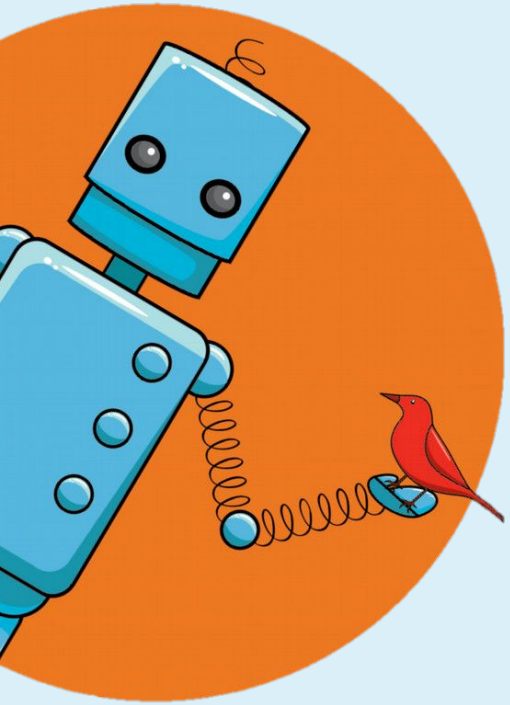

Citizen Science Month 2025

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ONE MILLION ACTS OF SCIENCE

CITIZEN SCIENCE MONTH

APRIL

Join us on March 5 at 11 AM PT / 2 PM ET for *Prepare for One Million Acts of Science at Your Library* webinar and planning session.

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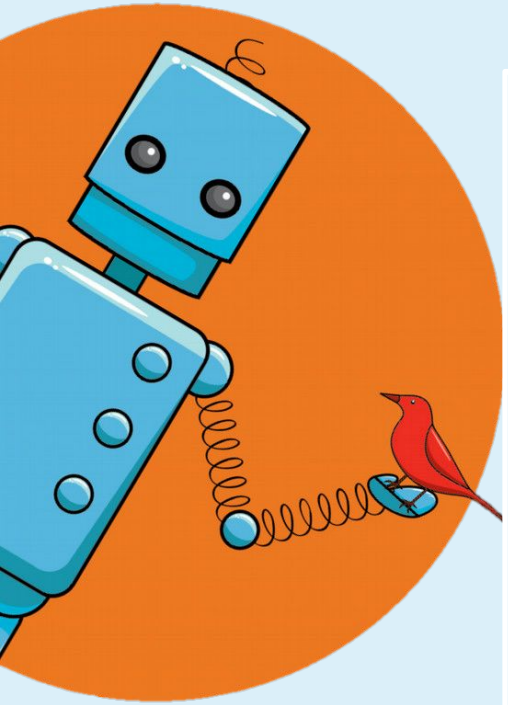
Questions?



Join us in April!

SciStarter.org/go/CSM25-facilitator-pledge

Join the Network!

SciStarter.org/go/library-network

FathomVerse Mini Program Guide

Background: FathomVerse is a fun, gamified citizen science project where you help train AI to recognize ocean animals using real scientific imagery.

Website:
https://scistarter.org/fathomverse

Age group: 14+ (*under 13 allowed with adult parent/guardian email)

Preparation:

1. Watch the project walkthrough on Youtube and test out the project for yourself!
2. Prepare attendees with instructions to download the mobile app on a personal device, or provide prepared devices.
3. Consider creating a set of library accounts that can be used by participants who do not want to create an account.

Program Agenda

- Welcome your audience, complete an icebreaker together on the topic of marine life.
- Introduce the concept of citizen science and how volunteers can help scientists by identifying and categorizing animals
- Explain where the project originated and what volunteers are being asked to do.
- Demonstrate how to play

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Instant Wild Mini Program Guide

Background: Instant wild is a collection of data from camera traps set up in ecosystems all over the world, including in underwater locations. Conservation researchers need our help to identify and quantify all the animals caught in the camera traps.

Website: https://scistarter.org/instant-wild

Age group: All ages when scaffolded appropriately, such as completing the project as a group instead of individually.

Event timing and location: 15 min +, indoors

Preparation:

1. Visit Instant Wild to become familiar with the program. Save the project to your SciStarter dashboard.
2. Upcoming event with Instant Wild and PocketLab on February 13th: Register here.
3. Accounts are optional. Consider creating a set of library accounts that can be used by participants to track impact.

Program Agenda

- Welcome your audience, complete an icebreaker together on the topic of marine life.
- Introduce the concept of citizen science and how volunteers can help scientists and conservationists by identifying and categorizing animals.
- Explain where the project originated and what volunteers are being asked to do.
- Present Instant Wild on a main screen

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