

NOT ALL WHO WANDER: VR FOR SENIORS AND MORE

AGES

Adult

Multigenerational



Image source: Shutterstock

PROGRAM DESCRIPTION

Take VR goggles to nursing homes and assisted living facilities to give residents a chance to explore the world, even if they can't travel. With VR, they can play travel games, visit amazing real-world places, or revisit locations that hold important memories, such as the home where they grew up. Alternatively, coordinate a field trip to bring seniors to a multigenerational program at your library. You can also cast VR experiences onto a screen so even those who aren't comfortable trying it out can watch someone else's VR wanderings (makes a great conversation starter!). Suggested runtime: 60–90 minutes.

MATERIALS AND PREPARATION

Materials:

- Liability waivers
- VR headsets
- Laptop & projector for casting
- Disinfectant wipes

To minimize risk:

- Designate a “traveler's chair,” or an area from which you remove any tripping hazards.
- Have a dedicated volunteer for every person using a VR headset.
- Give people the option to watch others' VR experiences instead of trying it themselves.
- Warn people about potential side-effects: dizziness, nausea, loss of balance, etc. People are likely to know if they're sensitive to these things and opt out.

VR headsets:

- Meta Quest headsets work well because they don't require a computer or gaming system. If your library doesn't own any, try borrowing some from staff of patrons.
- Nursing homes can request a free trial of Rendeever headsets.

Software:

- For Meta Quest, consider beginner-friendly games like Wander, Ocean

TIP:

Assisted living facilities can request Rendeever headsets—VR designed specifically for seniors—for a free 30-day trial. Consider partnering with your local senior center to acquire these for their residents, whether for temporary or long-term use.

TIP:

Liability releases are required for this program. Injuries can happen, especially for people who aren't used to video games and VR.

TIP:

If patrons worry about lending you expensive equipment, invite them to join the program as volunteers!

GAME/ACTIVITY | OUTREACH

Rift, Other Sight, Real VR Fishing, Oculus Mini Golf, and Horizon Venues.

Preparation:

- Play with the software ahead of time so you know how to operate it.
- Plan some “trips” in case someone doesn’t know where they want to visit.
- Practice casting the headset to another device, like a smart TV, tablet, or projector.

More Ideas for Senior Programming:

- Consider programs in which you set up a table during lunch and let seniors drop in to do a project.
- Don’t forget about kid and teen programs that could be adapted. Seniors might love to try out simple STEM projects.
- A summer book club could include a few different meetings (with LP and audiobooks depending on the needs of the group).
- Trivia games with prizes are fun and easy one-off programs.
- You can bring seniors to your library! Instead of coordinating a field trip with your patrons, contact the events coordinator at a senior center.
- Do you have someone at your library who helps patrons with their cell phones, tablets, and laptops? Take them to a senior center and offer one-on-one sessions.
- A mini storywalk can be set up in their center or on the center grounds.
- Teach seniors how to use your ebook and audiobook platform(s).
- If your library loans museum passes, explain how to borrow them.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

You will need to create safe space for VR travelers, whether in a dedicated chair or an area cleared of tripping hazards. You will also need one volunteer to assist every VR headset in use, both to help with operation and to ensure safety during use.

RESOURCES

Web

Rendever (VR for seniors): <https://www.rendever.com/>

VR tips from Sonida Senior Living: <https://bit.ly/3NS8o3H>

Toolkit for older adults from ALA: <https://bit.ly/3PD1Elu>

Books

Adult VR Nonfiction

Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do (2018) by Jeremy Bailenson.

Reality+ (2022) by David J. Chalmers

VR Fiction

The Double Life of Danny Day (2021) by Mike Thayer (middle grade)

Last Gamer Standing (2021) by Katie Zhao (middle grade)

Game Over (2022) by M.C. Ross (middle grade)

Glitch: A Graphic Novel (2019) by Sarah Graley (middle grade)

Glitch (2020) by Laura Martin (middle grade)

Click’d (series) (2019-20) by Tamara Ireland Stone (middle grade)

Otherworld (2018) by Jason Segel and Kirsten Miller (YA)

BIRD WATCH QUEST

AGES

Children 5–8

PROGRAM DESCRIPTION

This program is an in-library bird scavenger hunt for budding twitchers! Hang photos of individual birds throughout the library, each with a QR code that links to the sound that bird makes. Children receive small birding journals in which they identify the birds they find. This program can be passive or require engagement throughout the summer (i.e., you can “release” a new bird every week). Children will love learning about the birds they see in their own neighborhood. Suggested runtime: Passive.



Image source: CSLP

MATERIALS AND PREPARATION

Materials:

- Printed birding journals (1 per participant)
- Printed photos of birds (to hang)
- Generated QR codes for bird sounds, added to each bird
- Clipboards (optional)
- Crayons or colored pencils (optional)
- Prizes

Preparation, if making your own booklet:

- Research birds and choose a few that are local to your area.
- Create and print birding journals with a checkbox for each bird.
- Decide whether to “release” one bird per week or all at once.
- Create a QR code that links to the sound of each bird.
- Print photographs of the birds you want to use for your quest (with QR codes).
- Hang them up on your chosen schedule.
- When ready, invite patrons to join your library’s Bird Watch Quest. Give fun hints.
- Give rewards to those who finish the quest by identifying all the birds.

RESOURCES

Web

“50 Birds, 50 States” videos from *National Geographic Kids*:
<https://bit.ly/44s3Bvx>

TIP:

Provide rewards for those who complete the quest! Think bird whistles, bird stickers, binoculars, etc.

ADAPTATION:

For tweens, omit the bird IDs from the birding journals, and set out bird books for them to ID the birds on their own.

TIP:

Create a display of bird field guides and bird-themed books that participants can use for further exploration.

GAME/ACTIVITY | PASSIVE | LOW COST

“Birds” from National Geographic Kids: <https://bit.ly/43kwpoR>

Birdwatching cams from All About Birds (The Cornell Lab): <https://bit.ly/3psrK6g>

“Audubon for Kids” from Audubon: <https://bit.ly/3NSPjyx>

Books

Picture Books

Bird Watch: What Will You Find? (Backyard Explorer) (2020) by Storey Publishing and illustrated by Oana Befort

Emperor Penguin (Young Zoologist) (2022) by Dr. Michelle LaRue and illustrated by Pham Quang Phuc

A Peek at Beaks: Tools Birds Use (2021) by Sara Levine and illustrated by Kate Slater

Feathers Together (2022) by Caron Levis and illustrated by Charles Santoso

A Garden to Save the Birds (2021) by Wendy McClure and illustrated by Beatriz Mayumi

Harriet’s Ruffled Feathers: The Woman Who Saved Millions of Birds (2022) by Joy McCullough and illustrated by Romina Galotta

A Warbler’s Journey (2022) by Scott Weidensaul and illustrated by Nancy Lane

Early Readers and Middle Grade

The Extraordinary World of Birds (2022) by David Lindo and illustrated by Clair McElfatrick (early reader)

The Atlas of Amazing Birds (2019) by Matt Sewell (early reader)

How to Feed Backyard Birds (2022) by Chris Earley (middle grade)

The Puffin Keeper (2022) by Michael Morpurgo and illustrated by Benji Davies (middle grade)

Printables

Birding Journal (in English and Spanish)



BIRDING JOURNAL



☐ Listen!

2.



American Goldfinch

11.



☐ Listen!

10.



American Robin

3.



☐ Listen!

4.



Blue Jay

9.



☐ Listen!

8.



Northern Mockingbird

5.



☐ Listen!

6.



Mourning Dove

7.



DIARIO DE OBSERVACIÓN DE AVES



☐ ¡escucha!

2.



Jilguero americano

11.



☐ ¡escucha!

10.



Petirrojo americano

3.



☐ ¡escucha!

4.



Arrendajo azul

9.



☐ ¡escucha!

8.



Sinsonte nortño

5.



☐ ¡escucha!

6.



Paloma de luto

7.

GEODE GEOLOGIST

AGES

Children 7+

Tweens 9–12

PROGRAM DESCRIPTION

Round hounds unite! What's inside a geode? How do they form? Most importantly, how do you split them open? This program teaches basic geode geology, then lets children explore various types of rocks. Geodes are great for take-and-make kits. The rock identification portion of the program can also be passive: Simply set out a rock ID kit in the children's area of the library. See Resources for some basic science experience in rock identification. Suggested runtime: 45 minutes for a story and geode-smashing.



Image source: Shutterstock

MATERIALS AND PREPARATION

Materials:

- Bulk geodes
- Hammers
- Paper bags
- Goggles
- Rock ID kits

Questions to Answer

How do geodes form?

Geodes form when rocks contain pockets of air, which occur after volcanic eruptions when lava cools around air bubbles. Water seeps into these pockets, and when it evaporates it leaves minerals behind. Over thousands of years, crystals eventually fill the cavity. The largest geodes can take a million years to grow! The larger the crystals, the older the geode.

Why are geodes different colors?

Different minerals are different colors! Iron makes red or purple crystals, titanium makes blue crystals, nickel or chromium make green crystals, and manganese makes pink crystals.

What kind of rock is inside my geode?

Most geodes contain quartz or amethyst crystals, but some have agate, chalcedony, or jasper. Still others have calcite, dolomite, or celestite.

ADAPTATION:

Younger children can sort rocks by color, texture, and size, but make sure all rocks are large enough to not be a choking hazard.

TIP:

Amazon offers a variety of inexpensive rock ID kits that encourage kids to explore and sort rocks and minerals. Consider kits from National Geographic.

TIP:

Take the geodes outside. Place each geode in a paper bag and lay it on cement before smashing it with a hammer (this prevents chunks of rock from flying everywhere). Provide safety goggles for extra protection.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Depending on age and number of participants, supervision may be needed at each station.

RESOURCES

Web

“Geology Rocks!” from StarNet Libraries: <https://bit.ly/46pQpJb>

Printable rock and mineral ID charts from Mini Me Geology:

<https://bit.ly/44iUmgQ>

“Identifying Rocks and Minerals” from Education.com: <https://bit.ly/44aMVsm>

“How to Easily Identify Rocks and Minerals” from Instructables:

<https://bit.ly/3Jze544>

“Rock Tests 101” from Instructables: <https://bit.ly/3Xyzsbm>

“The Rock Key” from Nevada Bureau of Mines and Geology:

<https://bit.ly/3XslO8N>

Books

Picture Books

I’m Trying to Love Rocks (2020) by Bethany Barton

What Can You Do with a Rock? (2021) by Pat Zietlow Miller and illustrated by Katie Kath

Old Rock (Is Not Boring) (2020) by Deb Pilutti

A Rock Can Be... (2015) by Laura Purdie Salas and illustrated by Violeta Dabija

A Rock Is Lively (2015) by Dianna Hutts Aston and illustrated by Sylvia Long

The Street Beneath My Feet (2017) by Charlotte Guillain and illustrated by Yuval Zommer

Printables

Rock Data Chart (in English and Spanish)

TIP:

Create a display of rock and geology books from your children’s nonfiction collection.



ROCK DATA

Name _____

Color	
Hardness	
Streak	
Luster	
Density	
Notes:	

Name _____

Color	
Hardness	
Streak	
Luster	
Density	
Notes:	



DATOS DE ROCA

Nobre _____

Color	
Dureza	
Racha	
Lustre	
Densidad	
Notas:	

Nobre _____

Color	
Dureza	
Racha	
Lustre	
Densidad	
Notas:	

THE FUNGUS AMONG US: OYSTER MUSHROOMS IN CUP

AGES

Teens 13–18

Adults

PROGRAM DESCRIPTION

Did you know you can grow delicious oyster mushrooms in just about any household container (including plastic bags)?

In this program, patrons create mini mushrooms farms using straw pellet or toilet paper substrate. The bags need to sit for 2–3 weeks before you see fruiting mycelium, so let patrons take their cups home, take notes on growing conditions, and report back. Consider holding a follow-up session (or creating a bulletin board) for patrons to report on how their mushrooms are doing, share photos, and troubleshoot. This also makes a great take-and-make kit. Suggested runtime: 45 minutes to assemble the cups.

MATERIALS AND PREPARATION

Materials: See Printables

Preparation:

- Make a test batch so you know how to help troubleshoot.
- Gather supplies and make kits.
- Print handouts to include with each kit (see Printables)
- Create a bulletin board for patrons to submit photos of their mushrooms (optional).

Oyster mushrooms come in many varieties, so which do you choose? In terms of fruiting speed, the grey dove oysters fruit the fastest, followed by Italian oyster mushrooms, followed by golden oyster mushrooms.

RESOURCES

Web

“How to Grow Mushrooms in a Bag” from Grocycle: <https://bit.ly/437Mz4F>

About oyster mushroom strains from Field & Forest: <https://bit.ly/435xX5T>

Toilet paper substrate instructions from Field & Forest: <https://bit.ly/3NxTw9n>

Printables

How to Grow Oyster Mushrooms



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA

TIP:

For more STEM activities, ask participants to track growth rate, temperature, and exposure to light.

TIP:

Try this experiment before the program to ensure that you can get them to grow and so you can provide tips for growing in your climate (e.g., adding more or less moisture).

HOW TO GROW OYSTER MUSHROOMS

MATERIALS

- Oyster mushroom grain spawn (online or from local growers)
- Substrate (straw pellets, unbleached toilet paper rolls, or coffee grounds)
- If using toilet paper, a pot of boiling water, tongs, and a drying rack
- Mushroom grow bags with filters
- Rubber bands or twist ties
- Labels
- Water
- A dark place to store bags at room temperature for a few weeks
- Water in a spray bottle



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA

INSTRUCTIONS

1. Mix mushroom spawn with the substrate:
 - a. For straw pellets, mix 1:5 ratio of mushroom spawn to pellets. Use 2x or more water than the weight of the substrate.
 - b. For toilet paper, first sterilize it by dipping the roll into boiling water until saturated, then let it drain. Once the roll is cool, remove the center cardboard core and put the roll in a mushroom grow bag. Fill the center of the roll with mushroom grain spawn.
2. Close the top of the grow bag above the filter using a rubber band or twist-tie.
3. Label the bag with the date and the oyster variety.
4. Place the bag in a dark, undisturbed area (like a closet), where the temperature is between 65–75°F.
5. Within 3 weeks, you should see white, fluffy mushroom mycelium on the substrate. Let it continue to grow for another 1–3 weeks.
6. When you are ready for the mushrooms to start fruiting, place the bag in your refrigerator for 48 hours (this simulates winter).
7. After 48 hours, remove the bag from the refrigerator and place it in a well-lit room. Open the top of the bag to let the air in, or cut x's on the sides of the bag.
8. Mist with water daily, being careful not to use so much water that it pools inside the bag.
9. In a few days, you will see tiny pins of mushrooms starting to develop. A week or two after that, you will have mushrooms ready to harvest!



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA

CÓMO CULTIVAR GÍRGOLA

MATERIALES

- Semillas de gírgola en grano (en línea o a través de cultivadores locales)
- Sustrato (bolitas de paja, rollos de papel higiénico sin blanquear o posos de café)
- Si se utiliza papel higiénico, olla con agua hirviendo, pinzas y una rejilla de
- secado
- Bolsas de cultivo para setas con filtros
- Gomas elásticas o bridas
- Etiquetas
- Agua
- Un lugar oscuro para guardar las bolsas a temperatura ambiente durante unas semanas
- Agua en un pulverizador

INSTRUCTIONS

1. Mezclar los hongos con el sustrato:
 - a. Para los gránulos de paja, mezcle una proporción de 1:5 de semillas de seta con gránulos. Utilice 2 veces o más agua que el peso del sustrato.
 - b. Para el papel higiénico, primero esterilícelo sumergiendo el rollo en agua hirviendo hasta que se sature y déjelo escurrir. Una vez que el rollo se enfríe, retire el núcleo central de cartón y coloque el rollo en una bolsa de cultivo de setas. Rellene el centro del rollo con semillas de setas.
2. Cierra la parte superior de la bolsa de cultivo por encima del filtro con una goma elástica o una brida
3. Etiquete la bolsa con la fecha y la variedad de ostra.
4. Coloque la bolsa en un lugar oscuro y tranquilo (como un armario), donde la temperatura esté entre 65–75°F.
5. Al cabo de 3 semanas, deberías ver micelio de seta blanco y esponjoso en el sustrato. Deja que siga creciendo durante 1–3 semanas más.
6. Cuando esté listo para que las setas empiecen a fructificar, coloque la bolsa en el frigorífico durante 48 horas (esto simula el invierno).
7. Transcurridas 48 horas, saca la bolsa del frigorífico y colócala en una habitación bien iluminada. Abra la parte superior de la bolsa para que entre el aire, o corte x en los laterales de la bolsa.
8. Rocíe con agua todos los días, teniendo cuidado de no utilizar tanta agua que se encharque dentro de la bolsa.
9. En unos días, verás cómo empiezan a desarrollarse pequeños brotes de setas. Una o dos semanas después, ¡tendrás setas listas para cosechar!



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA



Image source: Rebecca Ballard of Athens Regional Library System, Athens, GA

CITIZEN SCIENCE WITH SCISTARTER: EXPLORING BIODIVERSITY

AGES

Multigenerational

PROGRAM DESCRIPTION

This Citizen Science program encourages community members to get outside and observe biodiversity. Participants download the free iNaturalist app to start recording and submitting photographs of local plants and animals. They can also check out a kit that includes a set of clip-on lenses for smartphones, binoculars, and a journal for recording observations.

This could be a passive program all summer long, where participants who record observations get entered into a drawing for prizes, or it could be a day-long event at a local park or hiking trail. For the latter, consider inviting park rangers, wildlife preserve workers, biologists, community gardeners, etc. to be guest speakers or to set up tables for participants to make observations or ask questions. Suggested runtime: Passive.

All materials were developed by Arizona State University and SciStarter with support from the Institute for Museum and Library Services and the Moore Foundation. All materials are reprinted with permission. Want more Citizen Science? Sign up for the National Citizen and Community Science Library Network, which is supported by Arizona State University, SciStarter, and the National Girls Collaborative Project which to hang the finished artwork.

MATERIALS AND PREPARATION

Materials:

- iNaturalist (free app)
- SciStarter check-out kit with lenses, binoculars, and an observation journal
- A tablet or mobile phone (provided by participants)
- Prizes (optional)

Preparation:

- Order SciStarter kits that patrons can check out.
- Familiarize yourself with iNaturalist ahead of time.
- Make flyers or bookmarks with app information.
- Contact local science experts and enthusiasts.
- For in-person events, have water on hand for all participants.

TIP:

For bird-lovers, the board game Wingspan is a great addition to bird-watching programs.

ADAPTATION:

Younger children can be encouraged to make identifications right in their own backyards.

TIP:

If holding this event at a local park, check for accessibility beforehand and include that information when promoting the program.

GAME/ACTIVITY | STEM | PASSIVE | OUTDOORS

- Check on accessibility for all outdoor locations.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Solo-librarian friendly.

RESOURCES

Web

Exploring Biodiversity from SciStarter: <https://bit.ly/3PAfTgY>

iNaturalist: <https://www.inaturalist.org/>

A similar program from National Geographic: <https://bit.ly/3reREuw>

Books

What's the Point of Science? (2021) from DK (middle grade NF)

Biodiversity (2019) by Laura Perdew and illustrated by Tom Casteel (middle grade NF)

Biology for Curious Kids (2021) by Laura Baker and illustrated by Alex Foster (middle grade NF)

The Nature Explorer's Sketchbook (2020) by Jean Mackay

Braiding Sweetgrass for Young Adults (2022) by Robin Wall Kimmerer et al. (YA NF)

The Field Guide to Citizen Science (2020) by Darlene Cavalier et al. (adult NF)

Writing Wild (2020) by Kathryn Aalto and illustrated by Gisela Goppel (adult NF)

Printables

Exploring Biodiversity Activity Guide (reprinted with permission from SciStarter)

TIP:

For the Biodiversity Activity Guide in Spanish, see <https://bit.ly/3PBT3FH>



EXPLORING BIODIVERSITY

**Document and identify plants
and animals around you.**

Welcome!

We are thrilled that you have chosen to participate in citizen science!

The Exploring Biodiversity Kit is a great fit for both new and seasoned citizen scientists. Arizona State University and SciStarter, an online citizen science hub, have created the “Check It Out: Citizen Science at Your Library” program, thanks to generous support from the Institute for Museum and Library Services, the Moore Foundation and the National Library of Medicine. This program provides libraries with resources to build citizen science kits with specialized tools to help YOU participate in real scientific research.

To get started, visit SciStarter.org/library-kits where you’ll be guided through the steps to use your kit and register with SciStarter so you can submit your data.

We could not do this without you—thank you!

PLEASE NOTE: When returning the kit to the library, be sure to return it to the service/front desk and NOT the drop box.

QUESTIONS?

Email librarynetwork@scistarter.org.

EXPLORING BIODIVERSITY

Document and identify plants and animals around you.

Biodiversity is an important marker for an ecosystem's health. Healthy ecosystems ensure natural sustainability for all life forms and can better withstand and recover from a variety of disasters.

Use your smartphone and clip-on lenses to take and share detailed pictures of nature and help create a living record of life on Earth. By recording and sharing your observations on iNaturalist, you'll create research-quality data for scientists working to better understand and protect nature. You can also connect with people who can identify the species you spot!



Western Side-blotched Lizard

KIT DETAILS

Kit components will vary based on your library's selections. This kit likely contains a **clip-on lens set** for smartphone to help you take detailed pictures of plants and animals; a **journal** where you can sketch nature and ask questions/share ideas with community members; and a **field guide** to identify local plants and/or animals.

PREPARE

Review the instructions on SciStarter.org/library-kits. Select the "Exploring Biodiversity" kit page, view the video and review the step-by-step instructions.

Create your free SciStarter account, then **click "Participate"** to be directed to the iNaturalist website and free app. This will open in a new tab.

Download the iNaturalist app or use the desktop/tablet version to create your free iNaturalist account and jot down your iNaturalist username.

Connect your SciStarter and iNaturalist accounts.

Return to the SciStarter tab and click on your Profile, and then Info & Settings page. Scroll down to "iNaturalist integration," enter your iNat username (case sensitive) and click "Save." This will ensure that your participation in iNaturalist is credited to your SciStarter Dashboard.

Before you start making and sharing pictures of nature, take a moment to review iNaturalist's tips on making good observations: inaturalist.org/pages/getting+started

(Continued on reverse)

Who you are

You'll need to make an **iNaturalist account** and please only post your own personal observations

Where you saw it

Record both the coordinates of the encounter as well as their accuracy. You can obscure the location from the public

What you saw

Choose a group of organisms like **butterflies** or better yet a specific organism like the **Monarch butterfly**. If you provide evidence you can leave this blank and the **community** can help

When you saw it

Record the date of your encounter, not the date you post it to iNaturalist

Evidence of what you saw

By including evidence like a **photo** or **sound**, the community can help add, improve, or confirm the identification of the organism you encountered. Help the community by taking clear well framed photos, by including multiple photos from different angles



Credit: iNaturalist

PARTICIPATE

Take the clip-on lenses with you outside and experiment with the range of lens on your smartphone.

Capture photos of small things using the macro lens. To use this lens you need to be about an inch from your subject (use caution if you're allergic to bees, other insects or poison ivy, etc.). Capture photos of things that are far away using the zoom lens.

Open the iNaturalist app, login and then tap "Observe" to start sharing your observations. On the iNaturalist website, you'll click "Upload" to get started. When you share an observation of biodiversity on iNaturalist, be prepared to share the following data as illustrated in the above image from iNaturalist.

You'll be notified when other members of iNaturalist (including scientists!) use and/or identify the observation you shared!

Tip: For users 12 years old or younger, use Seek by iNaturalist which doesn't post observations to the global database but does offer species identification and nature journaling!

Thank you for participating in citizen science!

When it's time to return the kit to your library, check to make sure all items are back in the kit.

LOOKING FOR MORE?

Find more projects on your SciStarter Dashboard: [SciStarter.org/Dashboard](https://www.scistarter.org/Dashboard)

KIT MATERIALS



GAME/ACTIVITY | STEM | PASSIVE | OUTDOORS

CITIZEN SCIENCE WITH SCISTARTER: ZOMBEE HUNTING

IMPORTANT:

This experiment isn't for anyone with allergies to bees or wasps! Be sure to put a warning sticker on the kit.

AGES

Multigenerational

PROGRAM DESCRIPTION

Enlist your patrons in Citizen Science! In this program, patrons check-out a collection kit to try to catch a bee in their neighborhood. If the bee is infected with the zombie fly, it will die, and zombie fly larvae will emerge within 5–14 days. This is a great passive program, or you can combine it with bee-themed crafts or gardening tips. Suggested runtime: Passive.

All materials were developed by Arizona State University and SciStarter with support from the Institute for Museum and Library Services and the Moore Foundation. All materials are reprinted with permission. Want more Citizen Science? Sign up for the National Citizen and Community Science Library Network, which is supported by Arizona State University, SciStarter, and the National Girls Collaborative Project.

MATERIALS AND PREPARATION

Recommended kit check-out length: Two weeks. Once patrons catch a bee with the trap, they transfer the bee to another container, such as a jar or a plastic container with a lid. While the zombie fly larvae can take 5–14 days to appear after a bee dies, and adult flies take another 15–28 days to develop, the collection traps are not needed for that entire length of time.

Steps for patrons:

1. Check out a collection kit from the library.
2. Create SciStarter account.
3. Hang the light trap included in the ZomBee collection kit.
4. Once a bee is captured and transferred to a new container, return your collection kit the library.
5. Observe and photograph the captured bee, as well as any larvae and pupae that emerge from the bee if it dies. Share your data on SciStarter (even if you don't catch any bees).
6. Check out similar projects from SciStarter.
7. Complete the Citizen Science Feedback Survey.

RESOURCES

Web

ZomBee Hunting from SciStarter: <https://bit.ly/46qL6t3>

Printables

ZomBee Hunting Activity Guide (reprinted with permission from SciStarter)



ZOMBEE HUNTING

**Is the Zombie Fly attacking bees
in your neighborhood?**

ZOMBEE HUNTING

Is the Zombie Fly attacking bees in your neighborhood?

Honeybees are being infected by the Zombie Fly, which lays eggs in bees, causing them to behave like moths! The infected bees leave their hives at night in search of lights, where they get stranded and die. The ZomBee Watch project needs your help to safely record and report where the Zombie Fly is infecting and killing bees.

ZomBee Watch is a research project to track the Zombie fly, *Apocephalus borealis*, and where honeybees are being infected in North America. Bees are among the most important creatures on Earth to humans. These insects pollinate over 80% of all flowering plants, including 70 of the top 100 human food crops. Unfortunately, bee populations are on the decline. This project will help determine if the Zombie Fly parasite could be to blame. Your contributions will help create a first-of-its-kind national map of infected bees.



KIT DETAILS

Kit components will vary based on your library's selections. This kit likely contains the following materials:

ZomBee Light Trap (16.9 oz water bottle, battery-powered LED light) to trap bees; **Clear glass or plastic jar or resealable plastic container** for honeybees found stranded or in light trap. *You may also need a **Smartphone, tablet, or digital camera** (not included) to upload photos of bees, larvae or ZomBee flies if found during your observation.*

Instruction guide - You'll use these materials, and the instructions on SciStarter to hang your trap out at night, share observations and data for the ZomBee Watch Project. The data is used by scientists to help learn about the timing and frequency of infection in an area. Photos of infected bees document the organisms that have been sampled.

PLAN

Before hanging up your trap, make sure the light bulb is working. Contact your lending library if a replacement is needed. If you have found stranded bees in the past, place the light bulb trap in the same area. If you know a beekeeper, ask if they will place the traps near their hives. It's important that the beekeeper observes the trap and collects any trapped bees.



When doing this project, please use caution if you're allergic to bees, other insects, or poison ivy,

ZOMBEE HUNTING

Is the Zombie Fly attacking bees in your neighborhood?

PREPARE

Review the instructions on [SciStarter.org/library-kits](https://scistarter.org/library-kits). Select the “ZomBee Hunting” kit page, view the video, and review the step-by-step instructions. Bookmark the webpage to find it more easily in the future.

Create your free **SciStarter account** and write down the email address you used to create your account (you'll need it to earn credit for your data contributions to ZomBee Hunting).

After you've reviewed the instructions, [click “Participate”](#) to be directed to the ZomBee Hunting website's “Submit Your Data to ZomBee Watch” page.

PARTICIPATE

You can scope out locations for your trap by looking for honeybees flying around lights at night, or bees that are stranded under porch or streetlights during the day. While not finding bees in your trap after several days may be an indicator the ZomBee fly is not present in your area, the trap location, and trap timing could be a factor in trapping bees. Both the presence and absence of the bee, as well as the location and environmental factors are all important notes to make to your observation submission.

It's important to handle honeybees safely. Weak and dying bees can still sting you. Place the trap away from any original light sources where dead or struggling bees have been observed. Make sure porch lights are off while the trap light is on.

If you find a stranded honeybee near a light or in the trap, carefully transfer the bee to a holding container (clear jars with lids, or resealable plastic food containers will work). Keep the container out of the sun. Infected honeybees are not healthy and die quickly. Storage temperature of the sample could affect how quickly the fly larvae and adult flies will appear.

Periodically check the samples:

- 5-14 days for fly larvae (maggots)
- 15-28 additional days for adult flies

Take a clear picture of the collected honeybee as soon as possible. Continue taking pictures of honeybee samples as pupae and ZomBee flies emerge.

When you are ready to add the data to the website, return to the SciStarter page: [SciStarter.org/library-kits/zombie-watch](https://scistarter.org/library-kits/zombie-watch). Click “Participate” to be redirected to the ZomBee Watch form website to input data, and upload photos.

Thank you for participating in citizen science!

Check that all items are in the kit before you return it to the library.

Questions?

Email: librarynetwork@scistarter.org

LOOKING FOR MORE?

Find more projects on your SciStarter Dashboard: [SciStarter.org/dashboard](https://scistarter.org/dashboard)

KIT MATERIALS



COMPETING ROBOTS

AGES

Children 5–8

Tween 9–12

PROGRAM DESCRIPTION

Robot adventure competitions, anyone? This program points you to instructions for making two simple robots. The first—and simplest—is a DIY hexbug nano made out of the head of a toothbrush. Once constructed, children create race tracks out of recyclables to hold hexbug races. The second is a more complex—but still relatively simple—scribble bot. Once constructed, hold scribble bot art contests. This program can also be adapted in many ways. In a more involved program, children build their own robots out of found materials and/or recyclables, then attach a motor to see how their robot moves (these unique robots also make for excellent library displays; inventors name their robots and write where the robot will go on its next adventure). Be sure to have volunteers on hand to help with the tech. Suggested runtime: 60–90 minutes.

MATERIALS AND PREPARATION

For DIY Hexbug Nanos

Materials for each hexbug:

- Toothbrush head
- Vibrating motor with attached leads
- Cell batteries (size 2032)
- Glue dots (2)
- Rainbow loom rubber bands (2)

Preparation:

- Buy inexpensive toothbrushes in bulk; saw their heads off
- Order supplies
- Make a test robot to show as an example!
- See Resources for detailed instructions.

For Doodle Bots

Materials:

- Recycled round containers (any kind)
- Hot glue gun and glue sticks
- Extra glue sticks or erasers (for offset weight)
- Masking tape
- Markers
- AA battery

TIP:

For robot assembly kits that include all the parts, check out Kidz Robotix or Green Science from 4M, or a DC motors kit.

ADAPTATION:

Consider a maker faire event, where local engineers, inventors, or crafts people talk about what they make and how they make it.

TIP:

For the most basic moving robot, you'll need a mini DC motor with +/- leads that attach to a battery, plus a way to attach the motor to the body of the robot. Mini DC motors are relatively inexpensive; they come in vibrating and revolving versions.

TIP:

If running a more complex program in which children take apart found materials, require gloves and safety goggles..

WARNING:

Cell batteries and rubber bands are a choking hazard. If younger children are present, extra monitoring is required.

ARTS & CRAFTS | STEM

- AA battery holder
- Wire
- DC motor
- Switch
- Googly eyes and pipe cleaners (optional)

See Resources for detailed instructions.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

A room with tables and chairs.

RESOURCES

Web

“DIY Hexbug Nano” from *Crafting a Green World*: <https://bit.ly/442gqNd>

How to Make an Art Bot from *Makerspaces.com*: <https://bit.ly/3PxTtx3>

“Scribble Bots: Make Your Own Drawing Robot” from Questacon on YouTube: <https://bit.ly/3PwwXVf>

“How to Build Coffee Bots” from *Make Magazine*: <https://bit.ly/3NThzRu>

Robot Books

Robo-Motion: Robots that Move Like Animals (2021) by Linda Zajac (early reader NF)

Henry Heckelbeck Builds a Robot (2022) by Wanda Coven and illustrated by Priscilla Burris (early reader F)

Becoming Bionic and Other Ways Science Is Making Us Super (2023) by Heather Camelot (middle grade NF)

The Brainiac's Book of Robots and AI (2023) by Paul Virr and illustrated by Harriet Russell (middle grade NF)

Bots! Robotics Engineering (Build It Yourself) (2019) by Kathy Ceceri and illustrated by Lena Chandhok (middle grade NF)

Totally Real Tech That Will Change Life as You Know It (2022) by Stephanie Warren Drimmer (middle grade NF)

TIP:

CSLP programming is not tied to specific books. If your budget is limited, search your current collection for books—old and new—that fit a robot theme!

BUILDING VIRTUAL WORLDS

AGES

Tweens 9–12

Teens 13–18



Image source: Shutterstock

PROGRAM DESCRIPTION

Calling all dreamers and gamers! In this program, tweens or teens build digital 2- or 3-D worlds. Choose a specific game or platform, or let participants choose their favorite (if they're already familiar with one). Participants imagine their dream bedroom, house, or neighborhood, or recreate an adventure scene from their favorite book or movie. They can also go big to create imagined cities, nations, and worlds, but a smaller-scale map typically works better within library time constraints. Here are some virtual games and map-making tools to consider:

- **Minecraft:** Challenge tweens to world-building at any scale (real or imagined). See Resources for activity idea from Minecraft Education. Minecraft comes in both desktop and mobile versions, and works well for mixed age groups.
- **The SimCity BuildIt app:** Another great world-building game with interactive gameplay. SimCity BuildIt requires that participants have devices, although it can also be played on a desktop if an Android emulator, such as LDPlayer, is installed.
- **Inkarnate.com:** A web app that's lets you use your imagination to make beautifully illustrated 2D fantasy maps at any scale.
- **ArcGIS Story Maps:** A desktop place-based storytelling tool from Esri Canada.
- **EdrawMax:** Free customizable 3-D directional maps (subscription option for more features). The software must be download and installed on a desktop.

Suggested runtime: 60–90 minutes.

MATERIALS AND PREPARATION

Materials:

- Computers or devices with your chosen software installed

Preparation:

- Familiarize yourself with the program you want to use.
- Put out a call for teen gamers familiar with the software.
- Consider offering incentives for teen volunteers.
- Sort out tech requirements. How many backup computer stations or devices do you need to have on hand?

TIP:

Challenge participants to build a SIM of your public library with new design elements, such as a tween/teen room, gaming room, makerspace, extra floors, etc.

TIP:

Consider running a program both for tweens and teens together. Teens show off their gaming skills and help troubleshoot, and tweens get to learn from teens, which they love.

ADAPTATION:

For a more teen-focused program, incorporate more complex information about GIS mapping, remote sensing, and spatial analysis. Consider making Story Maps using ArcGIS desktop software, which use GIS data based on a series of events, such as important events from a life, story, or sporting event.

GAME/ACTIVITY | STEM | LOW COST

- Require sign-ups so everyone gets access to the tech they need.

Tips for running a Minecraft program:

- Purchase a dedicated java server, and create a unique library account to play on.
- Be willing to kick people out if they don't follow the rules.
- Suggest rules of play for a Minecraft:
- Participants can only play on the library's dedicated server and devices.
- Do not spawn (it lags the server).
- Do not destroy something someone else created.
- Everyone starts off in creative mode (but you can allow survival mode).
- No food or drink.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

A dedicated indoor space with tables and chairs, or a computer lab, is ideal.

RESOURCES

Web

Middle grade video game books: <https://bit.ly/44s6lsP>

"Mapping Our World" from *Minecraft Education*: <https://bit.ly/3NvOhqS>

"Story Setting" from *Minecraft Education*: <https://bit.ly/436l1eX>

SimCity BuildIt: <https://bit.ly/3NUG00H>

Inkarnate: [Inkarnate.com](https://inkarnate.com)

"Get to Know ArcGIS StoryMaps" from Esri: <https://bit.ly/3PBW8Wh>

"Maps & Map Tools" from *D&D Compendium*: <https://bit.ly/3rdE0I7>

"3D Directional Map Template" from EdrawMax: <https://bit.ly/436MNCr>

"Mapping Software for K-12 Instruction" (free) from Esri.com:
<https://bit.ly/433Tege>

Board Games to Consider

Continent Race Geography Learning Game

Ravensburger Labyrinth Family Board Game

Crew: The Quest for Planet Nine

Geografika World Map Game by UnikPla

Books

Amazing Minecraft Bite-Size Builds (2022) from Mojang Synergies AB
(middle grade NF)

Maps: Deluxe Edition (2020) by Aleksandra and Daniel Mizieliński (middle grade NF)

Explorapedia: Amazing Explorers of the World and Their Journeys of Discovery (2022) by Emma Marriott and Michelle Pereira (middle grade NF)

The Writer's Map: An Atlas of Imaginary Lands (2018), edited by Huw Lewis-Jones (adult F)

TIP:

Enlist older children/teens to help run the program and teach the librarian how Minecraft works.

TIP:

For nation-building games (for older teens), consider *Nation States* (www.nationstates.net) or *Politics & War* (www.politicsandwar.com).

TIP:

For more GIS books, check out Esri Press: <https://bit.ly/3CTyBJ1>

ADVENTURE SELFIE PHOTO EDITING CONTEST

AGES

Tweens 9–12

Teens 13–18

PROGRAM DESCRIPTION

Tweens and teens edit their best selfies into adventurous backgrounds. **They do NOT take actual adventure selfies (these can be dangerous), so please make sure they know that real adventure selfies will not be accepted.** You can use various photo editing software — both paid and free — to remove backgrounds and add layers. Whatever software you use, it is typically done in two general steps: 1) remove the background from the selfie; 2) add an adventure photo as a new layer underneath. Give teens the option to display their photos on a bulletin board. Either have participants vote at the end of the activity or, for a summer-long passive program, ask local volunteers to judge the contest according to specific categories. Suggested runtime: 60 minutes.

MATERIALS AND PREPARATION

Preparation:

- Create a library account for Adobe Express or Shutterstock. Create, and edit a sample photo so you can help troubleshoot.
- Decide on contest rules, theme, length, and deadline.
- Print instructions for photo editing as well as contest rules.
- Have a device ready to take photos if participants don't have their own.
- Create an in-library display and voting station for the submitted photos (optional).
- Gather prizes for contest winners!

Use Adobe Express:

1. Create a free account and log in to Adobe Express.
2. At the bottom of the home screen, under “Try a quick action,” click “Remove background.”
3. Upload your selfie. After the background is removed, click “Customize”
4. In the lefthand bar of the editor, click “Photos,” then “Upload Photo” to

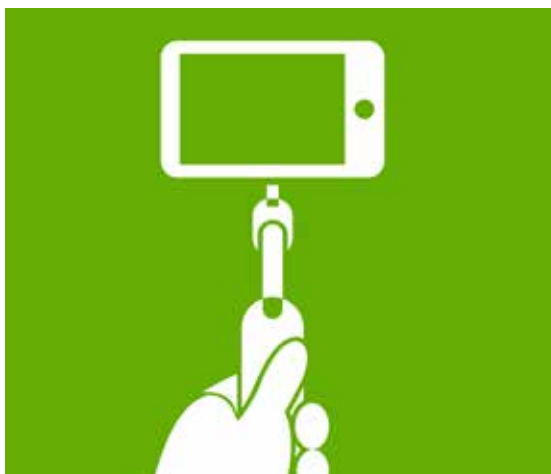


Image source: Shutterstock

TIP:

Set up a green screen in the library where teens can take selfies with clean backgrounds. Tape green paper to the wall in a tile-like grid (it doesn't have to be perfectly smooth to work).

TIP:

Tech-savvy teens may want to use more advanced design programs, such as Photoshop or free Photoshop-like programs such as GIMP or Paint. Try to have an expert on hand to help troubleshoot.

ADAPTATION:

Instead of adventure photos, make Instagram frames and filters using the AR Filter app.

ADAPTATION:

For an online program, post the adventure selfies to the library's social media account or create a gallery of submissions (permission forms required).

GAME/ACTIVITY | STEM | LOW COST

upload your adventure background

5. You should now see a stack of layers. Drag your selfie photo to the top.
6. Resize the images on both layers to your desired layout.
7. When finished, click “Download” to the right on the top sidebar.

Use Shutterstock Create:

1. Create an account and log in to Shutterstock Create.
2. Click “Uploads” in the righthand sidebar, and upload a selfie.
3. Click “Remove Background” at the top of the screen.
4. Touch up with the “Erase” tool at the top of the screen if necessary.
5. Click the pages icon at the far bottom right of the screen to add a new layer.
6. Add the adventure background as a layer.
7. On the selfie layer, move yourself into the best spot in the photo.
8. Click “Download” at the top of the screen.

Voting categories to consider:

- Most creative
- Most realistic
- Most mysterious
- Most unexpected
- Goofiest
- Best local adventure
- Best international adventure
- Best supporting character

UNIQUE SPACE AND PERSONNEL NEEDS

Solo librarian-friendly

RESOURCES

Web

Adobe Express: <https://express.adobe.com>

Shutterstock Create: <https://bit.ly/3XD0tc7>

Books

Photo Adventures: How to Bend Reality with Photography (2019) by Jan van Holleben (early reader NF)

Extraordinary Women with Cameras (2022) by Vanessa Perez and Darcy Reed (middle grade NF)

Photographic: The Life of Graciela Iturbide (2018) by Isabel Quintero and illustrated by Zeke Peña (graphic novel) (YA NF)

National Geographic Photo Basics (2019) by Joel Sartore (adult NF)

TIP:

Patrons can also set up their own Adobe Express accounts, as a credit card is not required.

TIP:

If you sign up for a free Shutterstock trial so participants can edit their photos, be sure to cancel before 30 days so your credit card doesn't get charged.

TIP:

For in-person programs, ask tweens and teens to share their favorite photo-editing programs. Let them help each other with tech.

TIP:

For adventure photos in the public domain, try Pixabay or Pexels. They can also use photos from their own camera rolls.

TIP:

Do Ink, a user-friendly green screen app (\$5) is another great option to install on a library iPad. www.doink.com

KNOT YOUR AVERAGE ADVENTURE

AGES

Multigenerational

PROGRAM DESCRIPTION

From sailing to rock climbing, knots are an integral part of any adventure. But did you know you can make fun knot puzzles as well? Set up stations throughout the room, and put instructions for tying a different knot (or solving a particular knot puzzle) at each station. Stations could emphasize different uses (safety, art, pulleys) or materials (rope, twine, string), or you could group stations by difficulty. This program also includes several detailed puzzle ideas. Consider running competitive knot-tying or puzzle-solving races or relays, and give out prizes. Suggested runtime: 60–90 minutes.

MATERIALS AND PREPARATION

Materials knot tying:

- Rope cut into different lengths
- A lighter (to melt the ends of nylon rope)
- Duct tape (to secure the ends of cotton or twine rope)
- For a half hitch or noose knot station, a post or an upturned table leg
- For a pulley station, a 2x4, two chairs, a pulley, and a stack of books
- For tug-of-war station, long ropes with different kinds of knots.

Preparation for knot-tying stations:

- Choose which knots to demonstrate and practice them
- Gather examples of how the knots are used
- Set up and test all stations
- Create instructions for every station
- Create a take-home handout (optional)

See Printables for step-by-step knot puzzles.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Larger groups will need several volunteers to help troubleshoot knot tying.

ADAPTATION:

Create take-and-make kits for simple knot-tying projects, such as a macrame keychains or paracord bracelets.

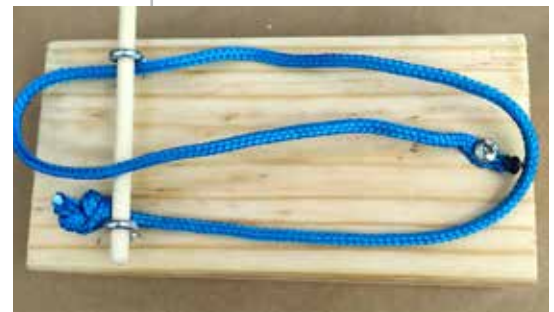


Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ



Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ



Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ

RESOURCES

Web

“Tie Essential Scouting Knots” from Scouting Magazine: <https://bit.ly/3XAeGbt>

Bead puzzle from *Instructables*: <https://bit.ly/44l5Jol>

Diamond knot puzzle from CbyS Paracord on YouTube: <https://bit.ly/3CRa9rx>

Two rings puzzle from Paracord Planet on YouTube: <https://bit.ly/3NAIAJ4>

Books

Knots for Kids (2022) by Buck Tilton and illustrated by Christine Connors
(middle grade NF)

Printables

Bead Puzzle

Diamond Knot Puzzle

Two Rings Puzzle

ADAPTATION:

Make it a craft program where everyone makes a rope puzzle to take home. Show everyone how to make the same one, or if you have enough volunteers, give participants a few to choose from.

TIP:

The knot puzzles have to be assembled in the exact right order. It may take more than one try to assemble them, so be patient.

TIP:

Puzzle size can be scaled smaller or larger. Just remember to adjust the rope/string length accordingly.

TIP:

You can also buy inexpensive rope puzzle kits on Amazon.

BEAD PUZZLE

MATERIALS

- Reused flat material, such as cardboard or plastic
- Ruler
- Pencil
- At least 24 inches of yarn or string
- A hole punch
- A pony bead

INSTRUCTIONS

1. Make a flat rectangle that is 1 by 5 inches. Round the edges if they are too sharp.
2. Lay the rectangle vertical and punch two centered holes: One inch from the top, and one inch from the bottom.
3. Fold the string in half and thread the two ends into a pony bead. Tie a knot to secure the bead to the string.

4. Thread the looped end front to back through the bottom hole.
5. Now thread the same looped end from front to back through the top hole.
6. Now thread the same looped end back through the bottom hole from back to front.
7. Loop the end over the bead, then pull the beaded end taut against the hole.
8. Pull the secured loop backwards into the first hole to finish assembling. The puzzle is now ready to solve.

PUZZLE GOAL:

Extract the bead and string from the rectangle.

SOLUTION:

Reverse the order of the puzzle assembly to solve it.



Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ

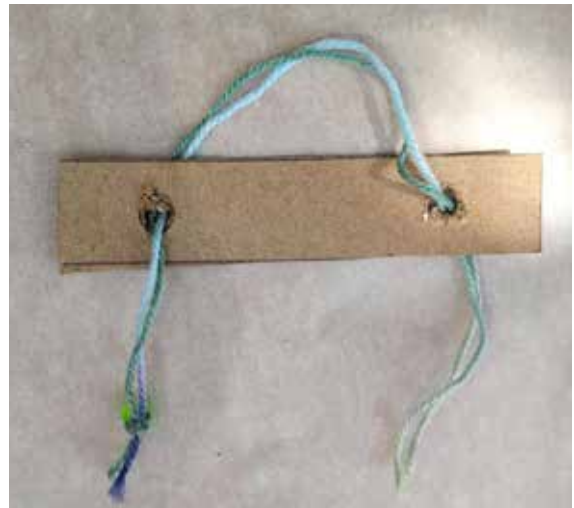


Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ



Image source: Yun-Yi Lin of Princeton Public Library, Princeton, NJ

DIAMOND KNOT PUZZLE

MATERIALS

- 6-inch length of 2x4
- Ruler or measuring tape
- Pencil
- 2 eye screws, with holes big enough for chopstick or doweling
- A $\frac{3}{4}$ inch or shorter regular screw or an eye screw
- 24–26 inches of paracord
- Power drill and drill bits
- 1 chopstick or piece of doweling
- Optional: Sandpaper, matches or lighter, hacksaw

INSTRUCTIONS

1. Arrange the wood vertically.
2. Measure $\frac{1}{2}$ inch below the top and draw a line. Then mark the line $\frac{1}{2}$ inch from each edge. You will have two marks for drilling.
3. On the bottom, mark one spot 1 inch from the bottom in the middle of the width.
4. Pre-drill the three holes.
5. Twist an eye screw into each of the two top holes, with the eyes facing each other.
6. Use the paracord to follow STEP-BY-STEP DIAMOND KNOTS on the next page.
7. Trim and burn the end of the paracord to melt it and keep it from unraveling
8. Use a screw to secure the unknotted end of the rope to the bottom hole.

TO ASSEMBLE

1. Thread the chopstick through two eye screws. Place the knot side of the rope under the threaded chopstick with the knot away from the bottom. Pull the knot towards the chopstick to check that the knot does not slip through. Saw off the excess chopstick.

2. Move the paracord outside of the chopstick (you may need to remove and rethread one end of the chopstick to release). Follow the pictures in DIAMOND KNOT PUZZLE ASSEMBLY to prepare the puzzle (steps 11–13).
3. Fold the paracord in half and feed the middle under the chopstick in position.
4. Thread the knot over the chopstick, through and under the middle loop.
5. Grab the three strands of rope and gently pull them towards the secured end of the rope, bringing the knot closer to the chopstick while pulling the intersecting loops underneath the chopstick.
6. Once the puzzle is assembled, adjust the rope so it lays evenly along the wood.

PUZZLE GOAL:

Without moving the doweling itself, move the knot to the other side of the doweling.

SOLUTION:

See DIAMOND KNOT PUZZLE SOLUTION



STEP-BY-STEP DIAMOND KNOTS

1.



2.



3.



4.



5.



6.



7.

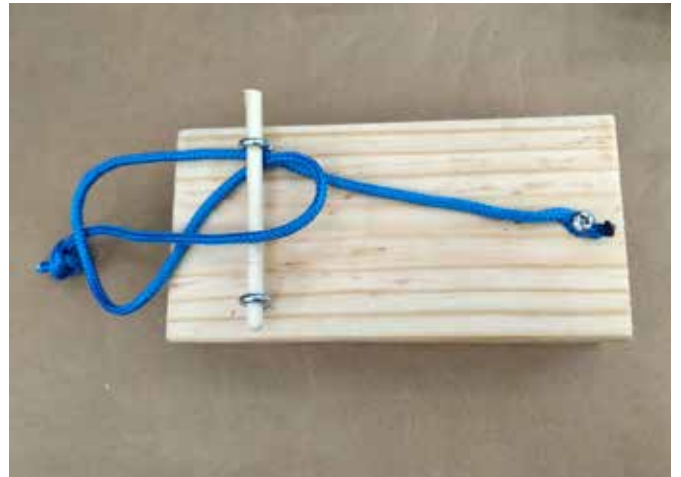


DIAMOND KNOT PUZZLE ASSEMBLY

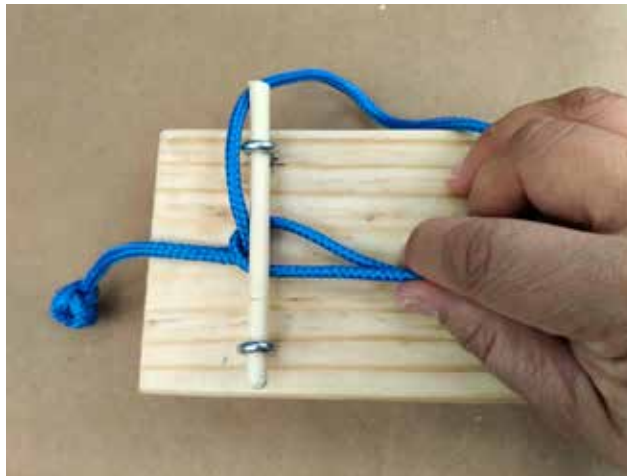
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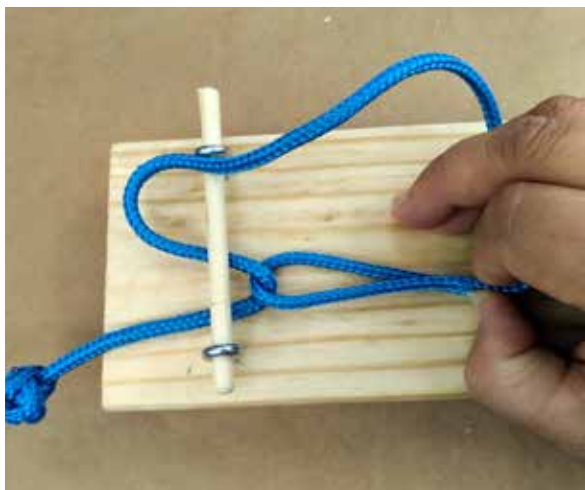
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3.



4.

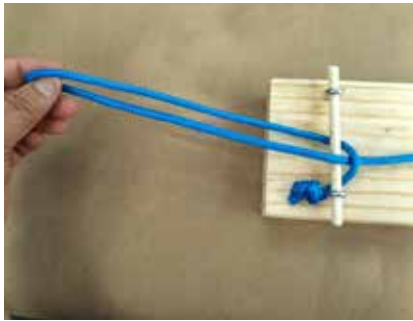


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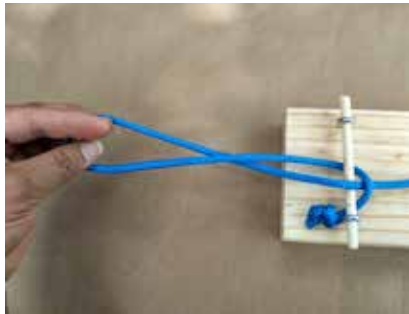


DIAMOND KNOT PUZZLE SOLUTION

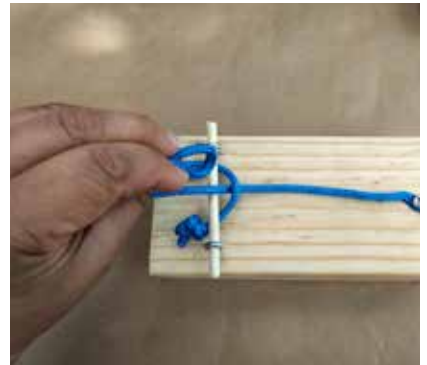
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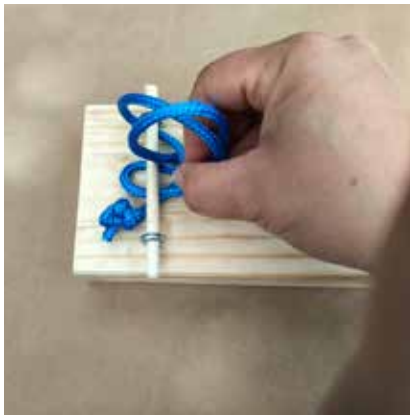
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3.



4.



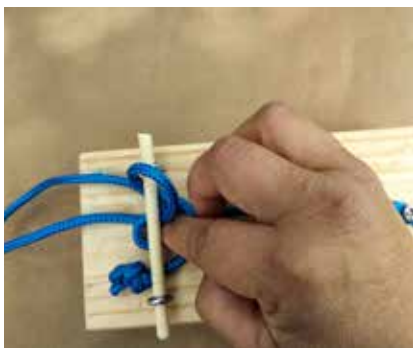
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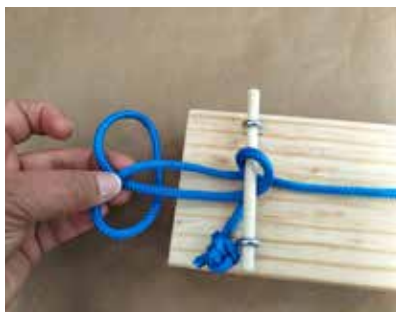
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7.



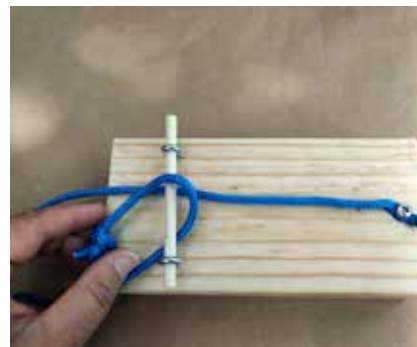
8.



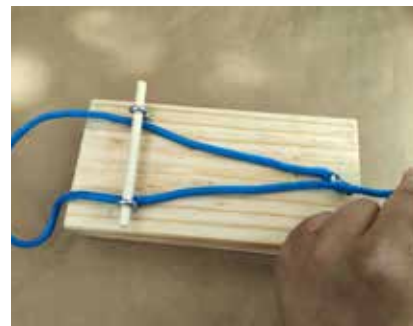
9.



10.



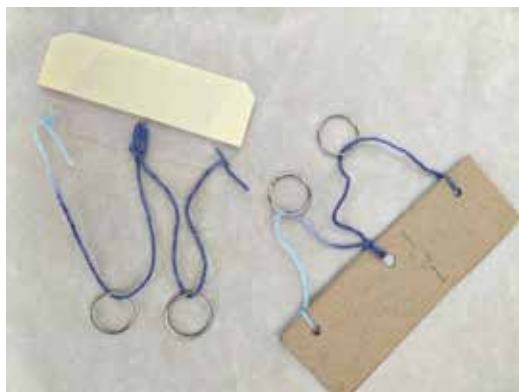
11.



TWO RINGS PUZZLE

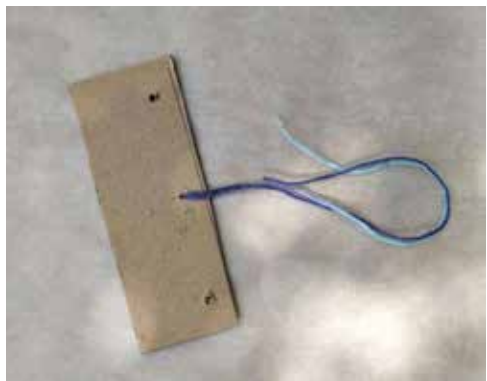
MATERIALS

- Reusable flat material, such as cardboard or plastic
- Ruler
- Pencil
- At least 24 inches of yarn or string
- Hole punch
- 2 keyrings or washers



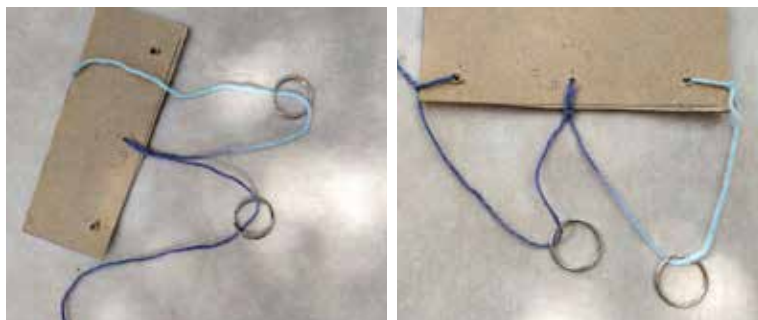
INSTRUCTIONS

1. Create a 2x6-inch rectangle, rounding the edges if desired.
2. Lay the rectangle horizontal and draw a horizontal line one inch from the bottom. Punch three holes along this line: One inch from the left, one inch from the right, and one in the middle
3. Fold the yarn or string in half and thread the middle of the yarn into the middle hole going from front to back. Turn the loop towards the bottom and front. Then pull the ends through the middle loop from top to bottom, make any adjustments necessary so you have equal lengths of rope on each side.



Step3

4. Thread the left side of the loose yarn through one ring, through the left hole, and tie the end into a knot onto itself. Do the same for the right. You have assembled the puzzle.



Step 4

PUZZLE GOAL:

Move the rings so they are on the same side.

SOLUTION:

Follow these instructions for the solution:

1. Pull the middle loop towards the front, loosening it so that the knot in the middle is wide enough to fit a ring through. Select a ring to move to the other side.
2. Lead the moving ring towards the loose middle and push the ring from back to front of the middle loop following the string's path towards the other side. Do not adjust the other side of the yarn or string yet. Move the ring and just enough yarn or string for the ring to go through the middle loop.
3. Gently pull the two threads towards the front, and pull the middle loop through the middle hole from the back to the front. The middle loop is now in the front.



BUBBLEPALOOZA

AGES

Children 5–8

PROGRAM DESCRIPTION

An outdoor bubble party! Children explore how bubbles form, as well as how make bubble solutions and bubble wands. For an indoor program, children can make bubble paintings; when the paintings dry, have them draw creatures who might live inside the bubbles. Add a bubble machine to ensure bubble continuity. To age up for tweens, turn this into a STEM program in which they construct giant bubble wands to see who can leverage surface tension to blow the biggest bubble (see Resources). Suggested runtime: 60 minutes.

MATERIALS AND PREPARATION

Bubble Painting

Materials:

- White construction paper
- Washable project paint
- Plastic cups / containers
- Paper or plastic straws
- Dish soap (clear works best)
- Stirring sticks, popsicle sticks or plastic spoons
- Table cloths or newspaper (to cover work surfaces)

Instructions:

1. Create paint solution with a 3-1-1 ratio when mixing (3 parts paint, 1 part water, 1 part dish soap) You may have to adjust this depending on the concentration of the dish soap, the type of paint you use, and the type of container you choose. Keep the amount of water used on the lower side so the paint color will keep its concentration. Mix the solution well right before using.
2. Give each child a piece of white construction paper and a straw. Have them blow bubbles into the solution (as many or as few as they wish). Catch the bubbles with the white piece of paper. They can do this randomly for a more abstract painting or have them draw a picture and try to catch the bubbles in a specific spot.

Types of DIY Bubble Wands

Pipe Cleaners (Preschool and Up)

- Bend tips into any closed shape
- Optionally, provide cookie cutters to mold shapes

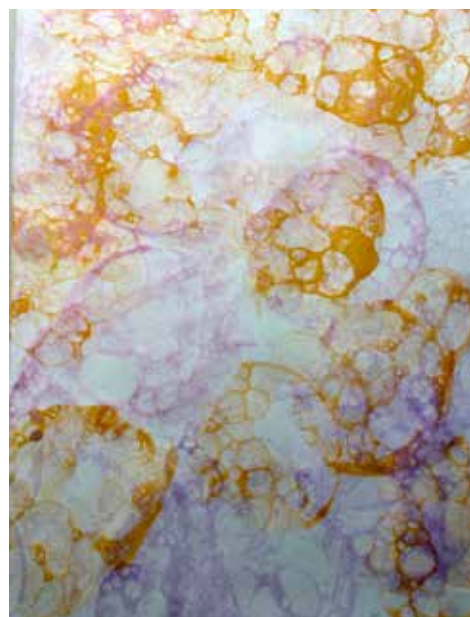


Image source: Azita Frattarelli of Riverview Veterans Memorial Library, Riverview, MI

ADAPTATION:

For a take-and-make program, include pipe cleaners and small bottles of bubble solution.

TIP:

Set big buckets of bubble solution on a tarp so drips don't kill the grass (and remember to dump the leftover bubble solution inside or in an outdoor drain).



Image source: Azita Frattarelli of Riverview Veterans Memorial Library, Riverview, MI

GAME/ACTIVITY | STEM | OUTDOORS

Plastic Funnels (Preschool and Up)

- Dip wide end in solution and blow through the narrow end

Straws (Preschool and Up)

- Dip one end to make numerous tiny bubbles
- Plastic cups (preschool and up)
- Poke hole in bottom
- Dip open end in solution and blow through the hole

Water Bottles (School Age and Up)

- Cut off the bottom end cover it with a washcloth (or sock) held in place by a rubber band
- Children dip the washcloth end and blow through the “drinking” end to make long snake bubbles

Wire (Twins and Up)

- Bend wire into a circle, with beads for decoration
- would require safety gloves for handling wire
- Giant bubble wands (twins and up)
- Two pieces of doweling with twine between them

Easy Bubble Solutions

Using glycerin:

- 1 gallon water
- 2/3 cup of dish soap
- 3 tbsp glycerin

Using sugar:

- 1/2 cup dish soap
- 1/2 cup granulated sugar
- 2 cups water

Preparation:

- Decide on which wands to make (based on age).
- Gather materials for your chosen wands.
- Precut dowels for giant bubble wands (if using).
- Premix some bubble solution.
- Gather mixing bowls and supplies if children will mix their own.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Outdoors. Volunteers are needed to help mix the bubble solution and monitor for safety.

RESOURCES

Web

“Paint with Bubbles Three Ways” from Artful Kids: <https://bit.ly/44qoFCi>

“Bubble Science Experiments for Kids” from Little Bins, Little Hands: <https://bit.ly/3r6Ur9e>

TIP:

Have volunteers on hand to make sure children blowing into the solution, not sucking on the straw.

TIP:

Bubble solution gets better the longer it sits, so make a batch a few days in advance.

TIP:

If the bubble solution is too weak for giant bubbles, try adding cornstarch or baking powder.

TIP:

Challenge children to blow bubbles inside other bubbles by poking a straw gently through a bigger bubble and blowing another one.

“Build the Best Bubble Wand” from Scientific American: <https://bit.ly/44mK1k1>

“Science of Bubbles” printable from Illinois Extension: <https://bit.ly/444iF2m>

Books

Bubble Picture Books

Big Bag Bubble (2017) by Adam Rubin and illustrated by Daniel Salmieri

Bubbles...UP! (2021) by Jacqueline Davies and illustrated by Sonia Sánchez

Too Many Bubbles (2021) by Christine Peck and Mags DeRoma

Bubbles (Narwhal and Jelly Board Book) (2021) by Ben Clanton

ROLLER COASTER FUN

AGES

Children 5–8

Multigenerational

PROGRAM DESCRIPTION

Build excitement for your local county fair by holding a roller coaster build! Challenge children and/or families to see who can make the tallest, most fantastical, most realistic, scariest, and/or most unexpected roller coaster that is capable of depositing a ping-pong ball in a bowl. A great way to use recycled materials and miscellaneous building supplies. Increase the engineering challenge for older children. Suggested runtime: 60 minutes.

MATERIALS AND PREPARATION

For Straw Roller Coasters

Materials:

- Straws
- Cardboard base (1 for each group)
- Low-temp glue gun (and glue sticks)
- Ping pong balls and plastic bowls

OR

- An assortment of recyclables, craft supplies, and tape

The straw roller coaster works best for a multigenerational program in which children partner with a teen or other family member who can use the glue gun. Alternatively, get low-temp glue guns or use duct tape.

During the program:

- Divide up supplies.
- Ask groups to draw a plan before gluing down straws.
- They are essentially constructing ramps that deposit a ping pong ball into a bowl.

UNIQUE SPACE AND/OR PERSONNEL NEEDS

A large programming space, unless you impose a size limit on the roller coasters.

TIP:

If you hold this after the county fair, hold a conversation around everyone's favorite rides, games, and/or exhibits.

TIP:

Play some virtual roller coasters for inspiration!



Image source: Shutterstock

RESOURCES

Web

“Virtual Roller Coasters” from SiParent: <https://bit.ly/46qP6K5>

“Roller Coaster Family Challenge” from StarNet: <https://bit.ly/3r9yQx3>

“Engineering Project for Kids: Build a Straw Roller Coaster” from *Frugal Fun for Boys and Girls*: <https://bit.ly/3JCe8w4>

“Straw Roller Coaster STEM Challenge” from Sarah Dees on YouTube: <https://bit.ly/3JEEQ78>

Books

Ride, Roll, Run: Time for Fun! (2022) by Valerie Bolling and illustrated by Sabrena Khadija (picture book NF)

Build a Roller Coaster!: And More Engineering Challenges (2020) by Megan Borgert-Spaniol (early reader NF)

The Pigeon Will Ride the Roller Coaster! (2022) (Pigeon) by Mo Willems (early reader F)

The Biggest Roller Coaster (Fox Tails) (2020) by Tina Kügler (early reader F)

Kit and Kaboodle Ride a Roller Coaster (Highlights Puzzle Readers) (2021) by Michelle Portice and illustrated by Mitch Mortimer (early reader F)

How to Code a Roller Coaster (2019) by Josh Funk and Sara Palacios (early reader F)

How to Design the World's Best Roller Coaster (2019) by Paul Mason (middle grade NF)

SOLAR OVEN RECIPE CONTEST

AGES

Tweens 9–12

Teens 13–18

PROGRAM DESCRIPTION

What if you have an acute need for homemade cookies while you're on an adventure, but there's no oven nearby? Create a solar oven out of a pizza box! After construction, participants take them home and test out some recipes. S'mores? Toast? Hold a contest to see who can make the most adventurous snacks using their DIY solar oven. Suggested runtime: 60–90 minutes for oven construction.

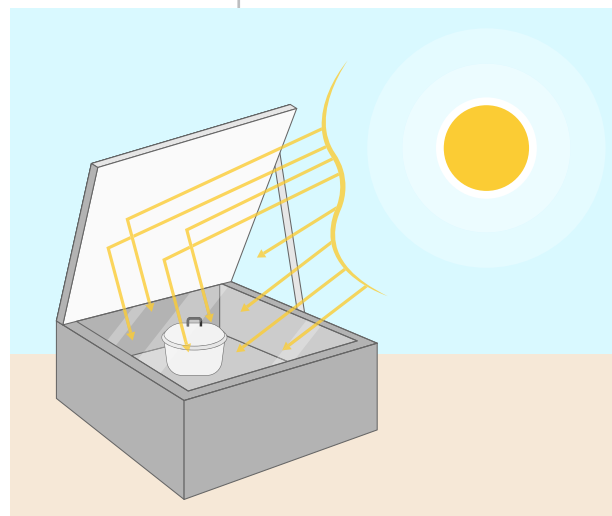


Image source: Shutterstock

MATERIALS AND PREPARATION

Materials for each solar oven:

- Pizza box
- Scissors or utility knives
- Clear plastic, such as document sleeves or cling film
- Duct tape, masking tape, or scotch tape
- Tinfoil
- Old newspapers
- Black construction paper
- Small aluminum dish
- Skewers
- Rubber bands and small thermometer (optional)

To make:

- Trace a square on the top of the pizza box 2 inches smaller than the box on all sides
- Cut the square on 3 sides: left, right, and bottom; and lightly score the top side.
- On the back of the lid, tape clear plastic to make a window underneath the flap you just cut.
- Cover the inside of the pizza box and the underside of the flap with tin foil.
- Tape black paper to the bottom of the pizza box.
- Roll up old newspaper, cinch with rubber bands, and line all four sides of the pizza box for insulation.
- To operate, place food in an aluminum dish to bake under the plastic window.

ARTS & CRAFTS | GAME/ACTIVITY | STEM

- Close the pizza box, and prop open the flap with a skewer.
- Be sure to orient the oven towards the sun!

RESOURCES

Web

Solar s'mores from NASA *Climate Kids*: <https://climatekids.nasa.gov/smares/>
"How to Make a Solar Oven" from *Science Sparks*: <https://bit.ly/3pmzc2S>

GLOW-IN-THE-DARK ADVENTUREMOBILE CONTEST

AGES

Children 5–8

Tweens 9–12



Image source: Shutterstock

PROGRAM DESCRIPTION

Children design adventuremobiles out of recycled materials, and at least one element of the adventuremobile must glow in the dark. You could focus on rockets, UFOs, ground vehicles, submarines, or leave the theme wide open. Require children to name their adventuremobile and write a description of its function. This program can be run in person over several days, or make it passive by maintaining a recycling building station in the library. Offer to store incomplete adventuremobiles to keep them safe between building sessions. After the entries are in, hold a live voting party so voters can see the glow-in-the-dark elements. Suggested runtime: 45–60 minutes for a voting party.

MATERIALS AND PREPARATION

Materials:

- Recycled materials
- Glow-in-the dark elements (stickers, paint, glow sticks, reflective tape, etc.)
- Miscellaneous craft supplies
- Safety scissors
- Glue, glue sticks, and tape
- Entry numbers and labels
- Printed ballots and pencils
- Blank description cards
- Ballot box
- Display space for completed adventuremobiles
- Storage space for adventuremobiles-in-progress (or to hide before voting)
- Prizes

Preparation:

- Decide on contest requirements (e.g., theme, size limit, voting categories by age)
- Make flyers with contest information, deadline, and date of the voting party
- Organize the space to display contest entries (and store them before voting)
- Print number display card tents (one per entry)
- Print ballots
- Prep ballot box
- Organize space to display contest entries

ARTS & CRAFTS | DECORATION/DISPLAY | PASSIVE | STEM

UNIQUE SPACE AND/OR PERSONNEL NEEDS

You will need a display space and personnel to keep track of submissions and display the entries. You might also need a table-top building station in the library.

RESOURCES

Web

“US Submarines Poster” from Naval Submarine League: <https://bit.ly/3CSojc1>

“Rockets of the World” from World Economic Forum: <https://bit.ly/433LnPU>

Books

Rocket Science: A Beginner’s Guide to the Fundamentals of Spaceflight (2020) by Andrew Radar and illustrated by Galen Frazer (middle grade NF)

Awesome Construction Activities for Kids (2021) by Akyiaa Morrison (middle grade NF)

Upcycle It: Crafts for Kids (2022) by Jennifer Perkins (middle grade NF)

Planet Omar: Ultimate Rocket Blast (2023) by Zanib Mian and illustrated by Kyan Cheng (middle grade F)

My Life as an Ice Cream Sandwich (2019) by Ibi Zoboi (middle grade F)

Printables

Recycled Adventuremobile Ballots (in English and Spanish)

Recycled Adventuremobile Entry Form (in English and Spanish)

**GLOW-IN-THE DARK RECYCLED
ADVENTUREMOBILE BALLOT**

Write the number of the adventuremobile
you like best here: _____

Please vote only once. Thank you!

The winner will be announced on _____

**GLOW-IN-THE DARK RECYCLED
ADVENTUREMOBILE BALLOT**

Write the number of the adventuremobile
you like best here: _____

Please vote only once. Thank you!

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ADVENTUREMOBILE BALLOT**

Write the number of the adventuremobile
you like best here: _____

Please vote only once. Thank you!

The winner will be announced on _____

**GLOW-IN-THE DARK RECYCLED
ADVENTUREMOBILE BALLOT**

Write the number of the adventuremobile
you like best here: _____

Please vote only once. Thank you!

The winner will be announced on _____

**BOLETA PARA EL CONCURSO DE
VEHÍCULOS DE AVENTURA RECICLADOS
QUE BRILLAN EN LA OSCURIDAD**

Escribe aquí el número del motoaventura
que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

**BOLETA PARA EL CONCURSO DE
VEHÍCULOS DE AVENTURA RECICLADOS
QUE BRILLAN EN LA OSCURIDAD**

Escribe aquí el número del motoaventura
que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

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El ganador _____

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Escribe aquí el número del motoaventura
que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

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VEHÍCULOS DE AVENTURA RECICLADOS
QUE BRILLAN EN LA OSCURIDAD**

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que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

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Escribe aquí el número del motoaventura
que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

**BOLETA PARA EL CONCURSO DE
VEHÍCULOS DE AVENTURA RECICLADOS
QUE BRILLAN EN LA OSCURIDAD**

Escribe aquí el número del motoaventura
que más te guste: _____

Por favor vota solo una vez. ¡Gracias!

El ganador _____

GLOW-IN-THE DARK RECYCLED ADVENTUREMOBILE ENTRY FORM

Full name: _____

Age: _____

Phone number: _____

Adventuremobile Name: _____

Where does it glow in the dark? _____

GLOW-IN-THE DARK RECYCLED ADVENTUREMOBILE ENTRY FORM

Full name: _____

Age: _____

Phone number: _____

Adventuremobile Name: _____

Where does it glow in the dark? _____

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Full name: _____

Age: _____

Phone number: _____

Adventuremobile Name: _____

Where does it glow in the dark? _____

**FORMULARIO DE PARTICIPACIÓN EN EL CONCURSO
DE VEHÍCULOS DE AVENTURA RECICLADOS QUE
BRILLAN EN LA OSCURIDAD**

Nombre completo: _____

Edad: _____

Número de teléfono: _____

Nombre del móvil de aventura: _____

¿Dónde brilla en la oscuridad? _____

**FORMULARIO DE PARTICIPACIÓN EN EL CONCURSO
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¿Dónde brilla en la oscuridad? _____

SCIENCE ADVENTURE: PAPER CIRCUIT ART

AGES

Tweens 9–12

PROGRAM DESCRIPTION

Combine art and science to make your work shine! In this program, tweens make LED paper circuits to light up their artwork. This program can be tweaked to fit any theme, but for “in the dark,” consider centering the program around nighttime, space, fireflies, or deep ocean. Tip: The artwork doesn’t have to be flat! Greeting cards and origami also work well. Suggested runtime: 45–60 minutes.

MATERIALS AND PREPARATION

Materials:

- 5mm LED lights-assorted colors
- ¼-inch double-sided conductive copper tape with adhesive (four 6-inch strips per participant)
- CR2032 coin cell (3V) batteries (one per participant)
- Cardstock
- Pencils
- Various art supplies
- Foam double-sided tape
- Hair dryer

Preparation:

- Gather supplies and make a sample circuit.
- Prepare a basic overview of circuits and how they work.
- The simplest way to make a circuit is to take an LED light and a CR2032 3V battery; touch the long end of the light to the positive side of the battery and the short side to the negative side of the battery.

During the program:

- Give an overview of circuits.
- Give each participant an LED light and a battery to test.
- Show some examples of paper circuit artwork (2- and 3-D).
- Give participants time to create their art
- When the art is complete, poke a small hole where the LED light will go.
- Put the LED light through the hole and spread the prongs so they are flat against the paper. Note: The longer prong is the positive side; the shorter prong is the negative side. (See Printables for circuit diagram)
- Cut one 6-inch piece of copper tape in half. Attach one 3-inch piece to



Image source: Sara Ebersole of the Orange County Library System-Hiawasse Branch in Orlando, FL

ADAPTATION:

Also makes a great family program.

TIP:

If using paint, a hair dryer speeds up the drying process.

TIP:

Remove the backing from the copper tape 2 inches at a time to prevent it from tangling.

STEM | ARTS & CRAFTS

the short prong and run the tape perpendicular to the prong.

- Add a 5-inch piece of copper tape at a 90-degree angle.
- Add another 6-inch piece of copper tape at a 90-degree angle.
- Using foam tape, place the coin battery negative side-down on the copper tape (see figure)
- Add the last 60-inch piece of copper tape at a 90-degree angle (over the coin cell battery)
- Add the last 3-inch piece of copper tape at a 90-degree angle, attaching it to the long prong.
- Flip the paper over. When you push on the bump (the foam bump), the LED should light up!



Image source: Sara Ebersole of the Orange County Library System-Hiawasse Branch in Orlando, FL

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Solo-librarian friendly. To help troubleshoot the circuits, add volunteers for larger groups.

RESOURCES

Web

“Paper Circuits” from PLIX: <https://bit.ly/3CVEHIV>

“How to Make Paper Circuits” from Science Buddies on YouTube: <https://bit.ly/3Py0bmH>

“Explaining an Electrical Circuit” from Region 10 ESC on YouTube: <https://bit.ly/44IKEKM>

Books

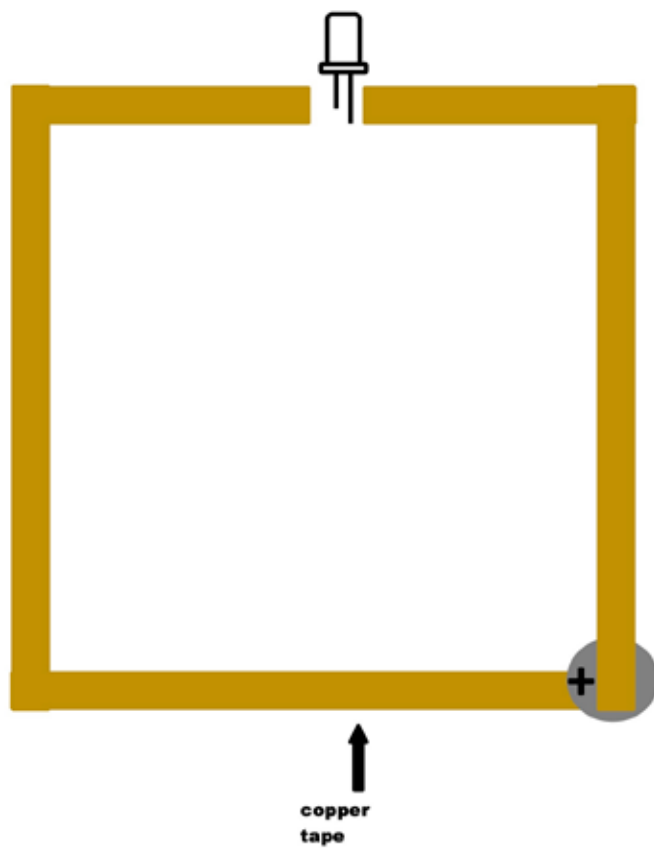
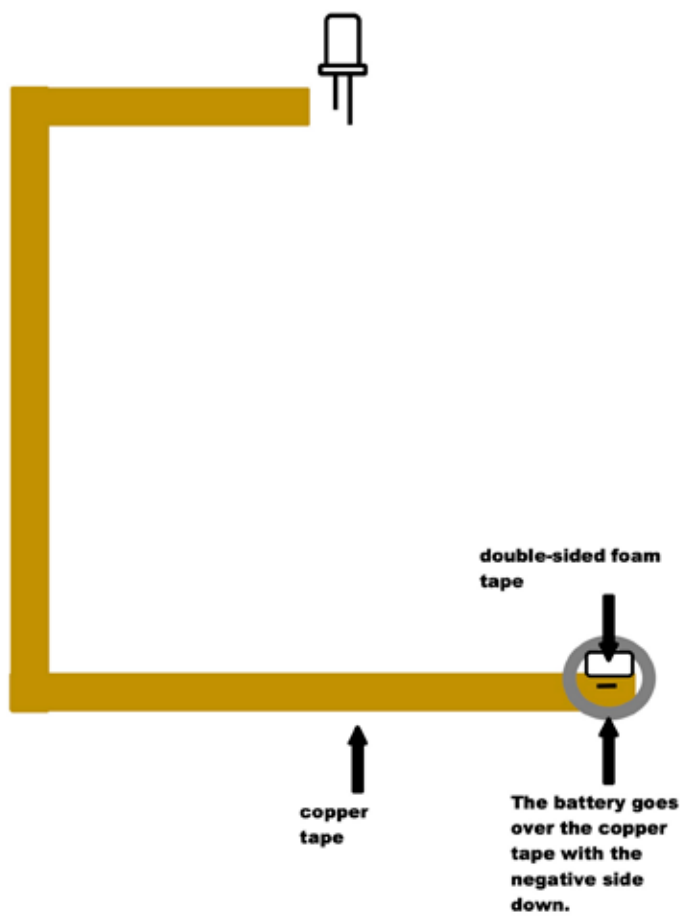
Making Simple Robots (2022) by Kathy Ceceri (middle grade NF)

Calling All Minds: How to Think and Create Like an Inventor (2018) by Temple Grandin (middle grade NF)

The Big Book of Makerspace Projects (2016) by Colleen Graves and Aaron Graves (YA NF)

Printables

Circuit Diagram



CITIZEN SCIENCE WITH SCISTARTER: MEASURING LIGHT IN THE NIGHT

AGES

Multigenerational

PROGRAM DESCRIPTION

Enlist your patrons in Citizen Science! In this program, patrons check out a light meter kit to measure the light in the night sky. Suggested runtime: Passive.

All materials were developed by Arizona State University and SciStarter with support from the Institute for Museum and Library Services and the Moore Foundation. All materials are reprinted with permission. Want more Citizen Science? Sign up for the National Citizen and Community Science Library Network, which is supported by Arizona State University, SciStarter, and the National Girls Collaborative Project.

MATERIALS AND PREPARATION

The check-out kits include:

- Sky quality meter-L (SQM-L, SQM)
- Red LED light flashlight
- Planisphere
- Printed data entry sheet
- Sky quality meter instructions

To prepare:

- Print multiple copies of the Globe at Night Data Sheet (to be replaced after each check-out)
- Print and laminate the Activity Guide (see Resources)

Steps for patrons:

1. Check out a collection kit from the library.
2. Create a SciStarter account.
3. Choose a clear night, and go outside more than an hour after sunset. Bring the kit with you!
4. Use the kit's LED flashlight when needed.
5. Use the planisphere to find a constellation.
6. On the Globe at Night data sheet, record the data, time, location, and weather conditions.
7. Press "power" on the Sky Quality Meter, and be sure to point it away from the moon and any street lights. The lower the number on the SQM, the higher the light pollution

8. Record the SQM's serial number and light magnitude number on the data sheet.
9. Turn off the SQM and flashlight, and return materials to the kit. Except for the data sheet, which you can keep.
10. Go to the Globe at Night website (<https://globeatnight.org/>) to enter the data from your data sheet. Be sure to include your SciStarter email so you get credit in your SciStarter dashboard!
11. Return your kit to the library
12. Complete the Citizen Science Feedback Survey.

RESOURCES

Web

Measuring Light in the Night from SciStarter: <https://bit.ly/3PJGU1s>

Printables

Measuring Light in the Night Activity Guide (reprinted with permission from SciStarter)

TIP:

For the Measuring Light in the Night Activity Guide in Spanish, see <https://bit.ly/441f992>



Emily Maletz / SciStarter

MEASURING LIGHT IN THE NIGHT

Help gather light pollution data.

MEASURING LIGHT IN THE NIGHT

Help gather light pollution data.

Light pollution is intrusive artificial (usually outdoor) light. Too much light pollution can wash out starlight in the night sky, interfere with astronomical research, disrupt ecosystems, have adverse health effects, and waste energy.

Globe at Night is an international citizen science project that involves the public in measuring and collecting night sky brightness observations to help scientists understand the impact of light pollution.



Public domain / Wikimedia Commons

KIT DETAILS

Kit components will vary based on your library's selections.

This kit likely contains the following materials:

Sky Quality Meter - L (SQM-L, SQM) - Hand-held meter for measuring sky brightness.

Red LED flashlight - Designed to help guide you to nighttime viewing areas without disrupting user night vision or nocturnal animals who are less sensitive than humans to the red range of light.

Planisphere - Rotating star finder (planisphere) to help you identify the constellation you'll need to find, based on the Globe at Night website's instructions.

Printed Data Entry Sheet - Record the date, location, constellation, Sky Quality Meter serial number and data and other data on this sheet to enter on the Globe at Night website later.

Sky Quality Meter Instructions - This helpful guide provides data context and troubleshooting tips.

SO WHAT?

You'll use these materials, the instructions on SciStarter and the web data entry form on Globe at Night to share your observations and data. The data is used by scientists to monitor levels of light pollution and help inform steps you can take to address the impacts of light pollution on local energy consumption, plants, wildlife, and human health.

PLAN

Choose a clear night when the moon is not up and when you can go outside more than an hour after sunset.

PREPARE

Review the instructions on SciStarter.org/library-kits. Select the “Measuring Light in the Night” kit page, view the video and review the step-by-step instructions. Be sure to review the Data Sheet and Sky Quality Meter instructions located in your kit.

Create your free **SciStarter** account and write down the email address you used to create your account (you’ll need it to earn credit for your data contributions to Globe at Night).

After you’ve reviewed the instructions, **click “Participate”** to be directed to the Globe at Night website’s “Report” page. Take note of the preferred dates to participate and constellations to observe.

PARTICIPATE

Remove the LED flashlight from the kit. Press it and use the red light to guide you outside if needed. Bring the kit with you, including the data worksheet and a pencil (use a pencil so you can use the data sheet multiple times).

Allow your eyes to adjust to the night sky, and then use the planisphere to find a constellation.

On the Globe at Night data sheet, write down the data, time and location. Make a note of the Constellation you’re observing and the sky conditions as outlined on the data sheet.

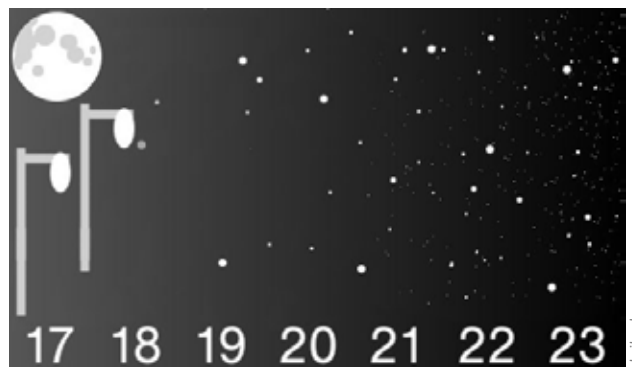
Jot down the email address you used to create your SciStarter account, where noted at the bottom of the sheet.

Press the power button on the Sky Quality Meter (don’t face it directly at light such as the moon or a street light; review the SQM printed instructions again if needed). The lower the number on the SQM, the higher the light pollution. Write the SQM’s serial number and light magnitude number on the data sheet.

When you’re ready to add data to Globe at Night, go to globeatnight.org/webapp and enter the data from your data sheet. Don’t forget to include your SciStarter email in the online Globe at Night data form to get credit for your contributions in your SciStarter Dashboard. On the Globe at Night website, you can also review data from around the world!

Thank you for participating in citizen science!

Turn off the SQM and LED light and return all the materials to the kit, except the data sheet, which you can keep. If you can, continue recording light pollution data while you have the kit and as weather permits.



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KIT MATERIALS

