

summer activity guide

Invention & Imagination

ages
13-15



About the Summer Activity Guides

Summers are for fun and engaged learning. In 2020 as the impact of the pandemic is widely felt, summer opportunities will be different for young people, families, and afterschool and summer program staff. The Summer Activity Guides were developed to help engage youth with supportive adults in a range of places.

The activities and resources in the Summer Activity Guides are intentionally designed to support youth-serving summer programs in driving consistent engagement and providing ongoing opportunities for youth skill-building and emotional well-being. In addition to the activities for youth, supplemental materials will be available to support professional development and enhance family engagement.

The Guides include 150 original activities and challenges organized by four different age groups (5-9) (10-12) (13-15) (16-18). The activities are adaptable for in-person and virtual instruction, or a hybrid of both, as well as sent as take-home packets.

All activities should be safely executed and aligned with state and local health guidelines.



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Botanical Journal

CHALLENGE DESCRIPTION

In this STEAM challenge, teens will keep an illustration journal of various plants they see in and around their community. As part of the 'Invention & Imagination' unit, this challenge is designed to help teens learn about the different types of plants that grow in their community. This challenge supports the development of creativity, critical thinking, and problem-solving skills.

SUPPLIES

- A journal, notebook, or loose-leaf paper
- Pen or pencil
- Markers, colored pencils, or crayons

STEPS

- Nature is all around us! Have you ever stopped to look at the different trees, plants, and flowers that are in your neighborhood?
- In this challenge you will keep a botanical illustration journal where you will draw pictures of the different plants you see around your community.
- Take about 30 minutes to walk around your community with your journal and a pen or pencil.
- Whenever you see a new plant, tree, or flower, draw a picture of it in your journal and write down any identifying characteristics (leaf shape, flower color, size, smell, etc.)
 - If you'd like, you can also add color to your illustrations for more detail
- After you have finished your walk, try to identify the plants you found using the following website:
<https://gobotany.nativeplanttrust.org/simple/>
- Once you've identified the plants, answer the following questions in your journal:
 - What is this plant called?
 - Is this plant native to your area?
 - What is unique about this plant?
- Continue your botanical journal walks every day for at least a week (feel free to extend this over a couple of weeks if you'd like!)



ADAPTATIONS

- Teens can also take pictures of the various plants they find and create a digital journal using a Word document.
- If facilitating in-person, teens can work together by walking in the community and researching the plants as a group.
- If teens cannot go outside, they can research plants that are native to their area to complete this challenge.

EXTENSIONS

- You can extend this challenge by going to a different community to see how the plants differ in that area.
- Don't have a journal or notebook? Make your own! Staple or tie together loose-leaf paper and create a cover for your journal that you can decorate.
- Explore how the plant species you observed impact your community. Are they invasive? Are they pollinators? Are they edible?
- This challenge can also be done with animals! Keep an illustration journal of the different animals you see around your community, such as birds, squirrels, or deer.

CREDITS

- Image from teksomolika

String Art

ACTIVITY DESCRIPTION

In this art activity, teens will create decorative string art from their chosen template. As part of the 'Invention & Imagination' unit, this activity supports the development of creativity, self-expression, problem solving, and creative inquiry.

SUPPLIES

- Cork board, foam board, or wood board
- Pushpins, toothpicks, or nails
- Hammer (if using nails)
- Colorful string, yarn, or thread

STEPS

- In this activity you will create string art based on a template or design of your choosing.
- Select a template that you would like to use for your design, such as a heart or letter.
 - If you need inspiration, check out these templates:
<https://www.thesprucecrafts.com/diy-string-art-patterns-4584346>
- Stick your pins into your board following the design of your selected template.
 - Pins will serve as the corners of the shape, and string will create the lines.
- Tie string around the pins, then loop the string around other pins to create the lines of your design. Use various colors of string to enhance your design.
 - You can make heavier lines by wrapping string around the same pins multiple times.
- Use string to tie, loop, or zigzag on pins until all pins have been looped with string and your design is complete.
- Tie off the ends of your string.

ADAPTATIONS

- If facilitating virtually or digitally, create a sample string art to show teens as an example.
- If facilitating virtually, create a time for teens to share their string art creations with one another.



EXTENSIONS

- Looking for something harder? Try writing full words or your name using string art.
- Make a parabolic curve using string art by positioning the pins on perpendicular axes at equal distances apart, in the shape of a plus sign. Connect a string from the X-(horizontal) axis pin closest to where the axes meet, to the pin furthest away on the Y-(vertical) axis. Connect the pin next to the first pin on the X-axis to the pin second farthest away on the Y-axis. Repeat this pattern until you have created your parabolic curve.
 - For more detailed instructions, visit <https://mathcraft.wonderhowto.com/how-to/create-parabolic-curves-using-straight-lines-0131301/>

QUESTIONS FOR DISCUSSION

- What did you learn from this activity?
- Was it hard to create your design? Why or why not?
- Did you make any mistakes? How did you fix those mistakes?

Paper Airplanes

ACTIVITY DESCRIPTION

In this STEM activity, teens will design paper airplanes and see how far they can make their airplane fly. As part of the 'Invention & Imagination' unit, this activity supports the development of analyzing situations, solving problems, creativity, design thinking, and critical thinking.

SUPPLIES

- Paper
- Ruler or measuring tape
- Scissors (optional)
- Tape (optional)

STEPS

- In this activity, you will design a paper airplane with the goal of making it fly as far as possible.
- Using a piece of paper, design your airplane!
 - Keep in mind different design elements such as body shape, wing size and shape, fin size and shape, weight, etc.
- Once you have your design finalized, test your airplane.
- Using a ruler or measuring tape, measure how far your airplane traveled.
- Consider the following questions:
 - Did the airplane fly how you wanted?
 - Does it travel as far as you wanted?
 - How can you change the design to make it travel farther?
- Based on this assessment, make any necessary changes to your airplane design until you are satisfied with how far it travels.
- Make sure to measure and take note of how far your airplane traveled on its farthest flight!

EXTENSIONS

- Decorate your airplane with a fun design.
- Make it a competition! Write down how far your airplane traveled and see how it compares to your peers' airplanes. Whoever's airplane travels the farthest is the champion!
 - Calculate the average and median flight distances for everyone's airplanes.
- Research famous aerospace engineers such as the Wright Brothers, Leonardo da Vinci, Mae Jemison, or Charles W. Chappelle. What were their inventions? How have they influenced today's air travel?



ADAPTATIONS

- If teens do not have a measuring tape or ruler, some cellphones have a measuring function.
- If facilitating virtually, create a time for teens to share their airplane designs with one another.

QUESTIONS FOR DISCUSSION

- What did you learn from this activity?
- Was it better for the airplane to be lighter or heavier? Why?
- Was it better for the airplane to have larger or smaller wings? Why?
- Was it better for the airplane to have larger or smaller fins? Why?
- Was your overall design successful? What worked? What didn't work?
- What was it like to create a prototype of your design and continue to test/retest?

Float My Boat

ACTIVITY DESCRIPTION

In this STEM activity, teens will design and create a boat out of household objects with the goal of making it float and hold as much weight as possible. As part of the 'Invention & Imagination' unit, this activity supports the development of analyzing situations, solving problems, creativity, design thinking, and critical thinking.

SUPPLIES

- Any materials found around the home, such as tape, plastic wrap, paper or foam cups, foil, straws, popsicle sticks, glue, etc.
- A tub or sink filled with water
- Coins or other small objects to use as weights

STEPS

- In this activity, you will design and create a boat that can float and hold as much weight as possible.
- Collect all the materials that you will need to build your boat.
- Design and build a boat that will float and hold weight.
- Once your boat is ready, fill a tub or sink with water.
- Place your boat in the water, and ensure it floats for at least 30 seconds before adding any weights.
 - If your boat does not float for 30 seconds, reassess your design and make any necessary modifications to ensure it can float.
- Once your boat is floating, begin adding coins or other weights to your boat.
 - See how many coins you can add to your boat without it sinking or tipping over.
 - If your boat cannot hold at least 10 coins without sinking, reassess your design and make any necessary modifications to ensure it can hold enough weight.
- Take note of how many coins your boat was able to hold while staying afloat!

ADAPTATIONS

- If facilitating virtually, create a time for teens to share their boat designs with one another.



EXTENSIONS

- Decorate your boat with a fun design or give it a name.
- Make it a competition! Write down how many pennies your boat held and see how it compares to your peers' boats. Whoever's boat carried the most pennies is the champion!
- Research famous nautical engineers such as Robert Fulton, Thomas Andrews, or Victoria Drummond. What were their inventions? How have they influenced today's ships?

QUESTIONS FOR DISCUSSION

- What did you learn from this activity?
- What did your boat look like? What were the main features of your design?
- Was your overall boat design successful? What worked? What didn't work?
- Would it have been helpful to have different materials? If so, what?
- How did the design of your boat compare to your peers' boats? What were the differences/similarities?

Design for My Community

ACTIVITY DESCRIPTION

In this STEM activity, teens will create an invention that helps to solve a problem they have identified in their community. This activity also builds on themes discussed in the 'Passion & Purpose' unit. As part of the 'Invention & Imagination' unit, this activity supports the development of analyzing situations, solving problems, perspective taking, and creativity.

SUPPLIES

- Any materials found around the home, such as tape, paper, pens, string, glue, clips, scissors, rubber bands, garbage bags, etc.

STEPS

- In this activity, you will think of a challenge or issue in your community. Think back to the community issue you identified in the 'Passion & Purpose' unit.
- Once you have your issue in mind, think of an invention that could help fix that problem. For example:
 - If you notice an issue with the environment, you could design something to keep your community clean such as a recycling center or robot trash collector.
 - If you notice an issue with accessibility for individuals with disabilities, you could design ramps to help people with wheelchairs navigate your community, or a system to communicate with people with vision or hearing impairments.
- Once you have decided upon your invention, write down what specific qualities the invention should have and what it should be able to do.
- Collect materials from around your home and build a prototype of your invention.
- Test your invention. Does it work how you wanted? Make any necessary improvements or changes.

ADAPTATIONS

- If teens do not have the necessary materials to build a prototype, they can draw a detailed image of their invention with a description or labeled parts instead.



EXTENSIONS

- Create a 'pitch' for your invention. Come up with a 2-minute presentation about what issue your invention addresses, how it works, and why it will make a difference. Record your pitch or present it for your peers.
- Keep it going! Think of different challenges in your community that could be improved and create new inventions to address these issues.

QUESTIONS FOR DISCUSSION

- What was the community issue you were trying to address? How did you come up with the idea for your invention?
- Was your invention successful? What worked? What didn't work?
- Have you ever created something like this before? What was it like to create a prototype of your invention?
- Is this invention something you would like to see implemented in your community? What could you do to make this creation a reality?
- How can you continue working to address your selected community issue?

CREDITS

- Image from tirachardz

The 50 State Afterschool Network



The Summer Activity Guide has been developed for the 50 State Afterschool Network with leadership from the Georgia Statewide Afterschool Network to engage and support children and youth nationwide.

In each state, the afterschool network is broadening opportunities for youth. Seeking equitable outcomes for underserved children to succeed in school and future jobs, a statewide afterschool network brings together cross-sector leaders with a common vision and coordinated strategy to advance quality afterschool and summer learning programs

Alabama Afterschool Community Network
Alaska Afterschool Network
Arizona Center for Afterschool Excellence
Arkansas Out of School Network
California AfterSchool Network
Colorado Afterschool Partnership
Connecticut After School Network
Delaware Afterschool Network
Florida Afterschool Network
Georgia Statewide Afterschool Network
Hawai'i Afterschool Alliance
Idaho Afterschool Network
Afterschool for Children and Teens Now (ACT Now) Coalition (IL)
Indiana Afterschool Network
Iowa Afterschool Alliance
Kansas Enrichment Network
Kentucky Out-of-School Alliance
Louisiana Center for Afterschool Learning
Maine Afterschool Network
Maryland Out of School Time Network
Massachusetts Afterschool Partnership
Michigan After-School Partnership
Ignite Afterschool (MN)
Missouri AfterSchool Network
Mississippi Statewide Afterschool Network
Montana Afterschool Alliance
Beyond School Bells (NE)

Nevada Afterschool Network
New Hampshire Afterschool Network
New Jersey School- Age Care Coalition
NMOST (New Mexico Out of School Time) Network
New York State Network for Youth Success
North Carolina Center for Afterschool Programs
North Dakota Afterschool Network
Ohio Afterschool Network
Oklahoma Partnership for Expanded Learning Opportunities
OregonASK
Pennsylvania Statewide Afterschool/Youth Development Network
Rhode Island Afterschool Network
South Carolina Afterschool Alliance
South Dakota Afterschool Network
Tennessee Afterschool Network
Texas Partnership for Out of School Time
Utah Afterschool Network
Vermont Afterschool, Inc.
Virginia Partnership for Out-of-School Time
Washington Expanded Learning Opportunities Network
West Virginia Statewide Afterschool Network
Wisconsin Afterschool Network
Wyoming Afterschool Alliance