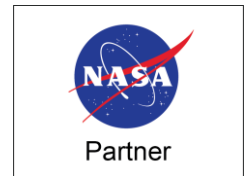




Educator Training

June 20, 2023



STAR Net Facilitators

Claire Ratcliffe Adams (she/her)

Education Associate

Dillon Connelly (he/they)

Education Specialist





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Twin Cities PBS | SciGirls

ST. Paul, Minnesota



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Twin Cities PBS | SciGirls

ST. Paul, Minnesota

NIFTY Educator Training

Agenda

- Welcome!
- Activity!
- Project Overview
- SciGirls Strategies
- Activity!
- Using Role Models in Programs
- Next Steps
- Questions
- Post-Training Evaluation Survey



ICEBREAKER!

What is your favorite STEM factoid?

Let's Do An Activity!

Dillon Connelly
Space Science Institute

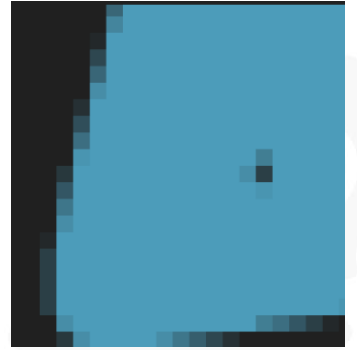
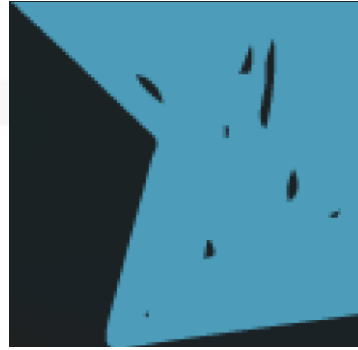
Passion for Pixels

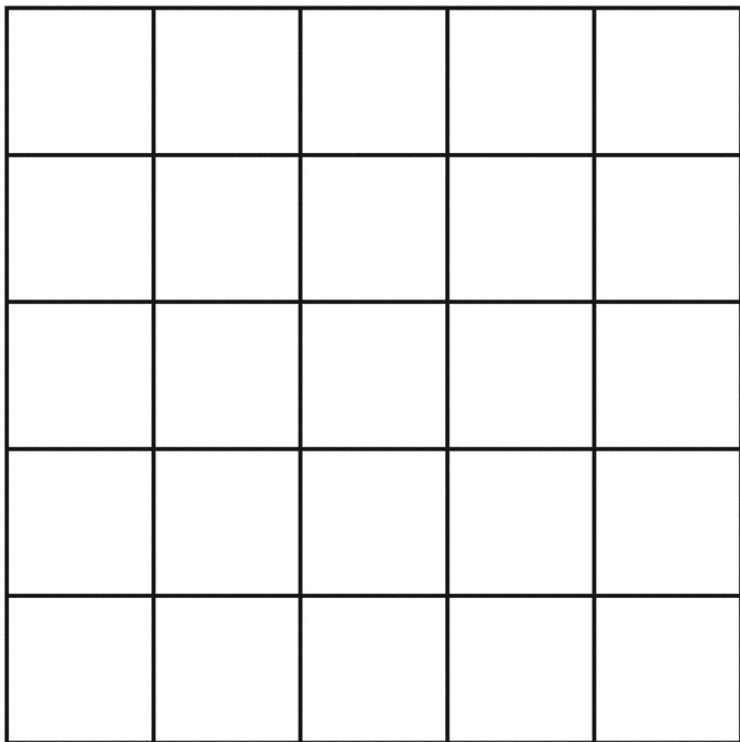
- Explore binary coding by “transmitting” a picture from yourself to a partner
- Materials
 - Two paper grids (paper grids or hand-drawn grids)
 - Writing instrument



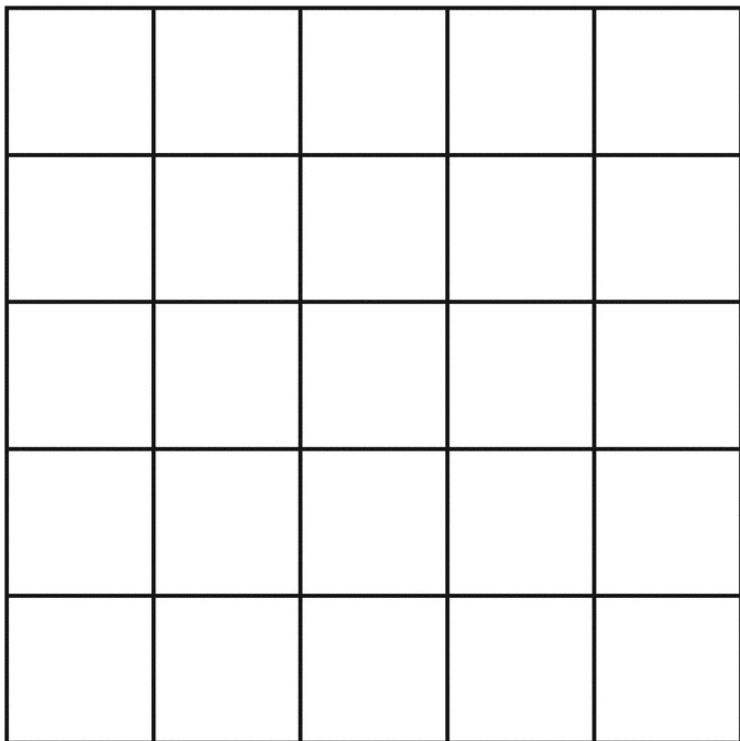
Passion for Pixels

- Digital images are made of **picture elements** (pixels)
- The ratio of pixels to area of the image determines the resolution (clarity) of the image
- 300 dpi – printed images
- 72 dpi – digital images



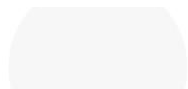
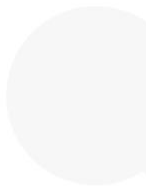
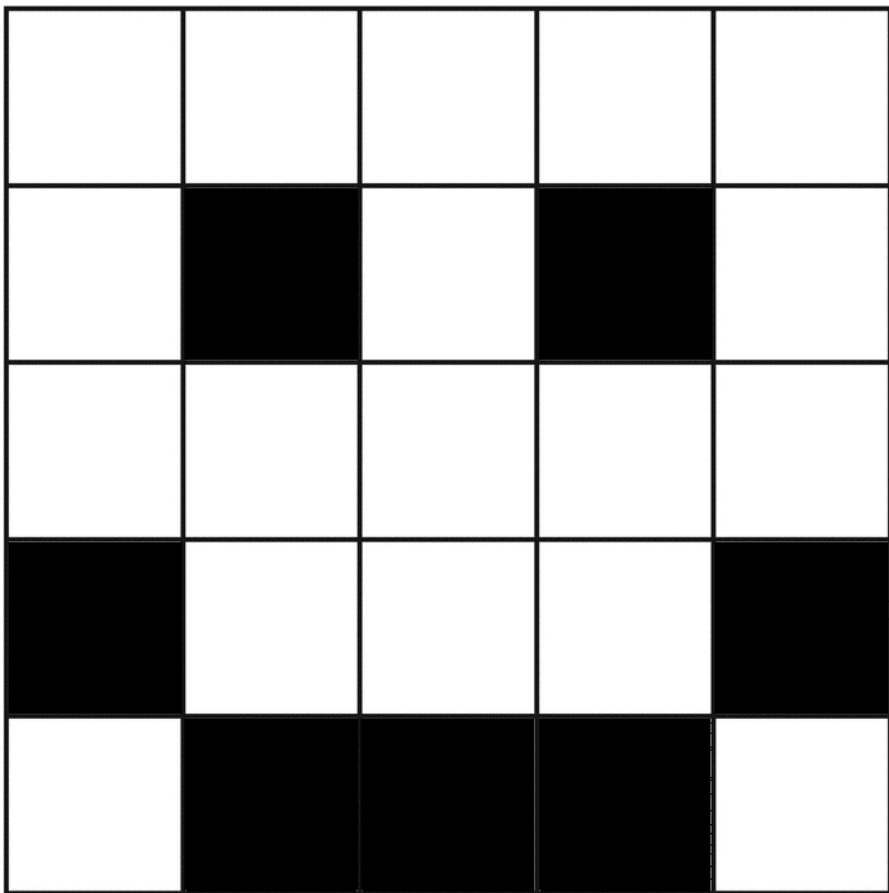


- Pick a “transmitter” and “receiver”
- The transmitter tells the receiver the image in binary code
- “0” for empty square
- “1” for filled square
- This is binary coding!



Important tips

- Determine order of transmission
- Left to right? Right to left?
- Does a new line start on the same side you began on or wrap around?



0	0	0	0	0
0	1	0	1	0
0	0	0	0	0
1	0	0	0	1
0	1	1	1	0

NIFTY Project Overview

NASA Inspires Futures for Tomorrow's Youth


The NIFTY project goal is to connect NASA STEM role models with youth-serving STEM programs for underrepresented youth (ages 9-14) in STEM, with a critical focus on girls and other historically excluded genders in STEM, which includes cis girls, trans youth, gender non-conforming, and/or non-binary youth, youth of color, and their families.

The NIFTY project is funded by NASA Science Activation.

SciGirls



NIFTY Program Requirements

- Attend the SciGirls Strategies Training 
- Must run a NASA-themed STEM program between July 1, 2023 and October 31, 2023 with the following:
 - 10 hours of programming
 - At least 10 middle-school aged youth
 - Include a visit (virtual or in person) with at least one NASA STEM Role Model
 - Evaluation Surveys
 - Post-training survey
 - Post-program survey
 - Distribute family and youth surveys

The SciGirls
Strategies:
How to Engage Girls in
STEM



The Big Idea



Media and education
that changes the way
girls see STEM and
the world sees girls.

Our Approach

- On TV
 - national PBS Kids series
- Online
 - PBS Kids website
- On the Ground
 - activities and professional development



On TV

- Check your local PBS listings OR watch full episodes online
 - Features *real* girls doing STEM investigations they're passionate about
 - Highlights the science and engineering processes
 - Features *real* women STEM professionals



PBS LearningMedia

SciGirls



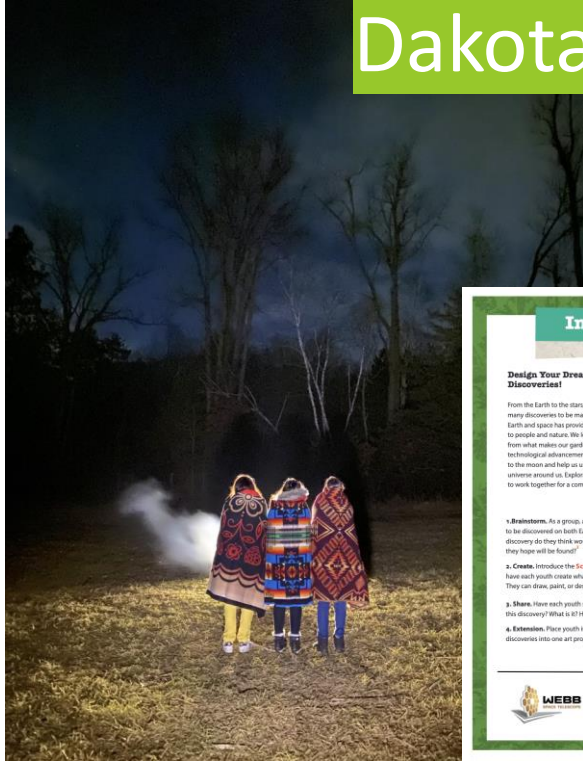
tpt

TWIN
CITIES
PBS

New Episodes & Activities!

SciGirls in Space

Dakota Stars & Making Space



Imagination Station

Design Your Dream Discoveries!

From the Earth to the stars, there are still many discoveries to be made. Exploration of Earth and space has provided many benefits to people and nations. We learn everything from what makes our gardens grow to technological advancements that take us to the moon and help us understand the universe around us. Exploration also allows us to work together for a common goal.

- Brainstorm.** As a group, ask youth what they think is left to be discovered on both Earth and in space. What potential discovery do they think would best help the planet? What do they hope will be found?
- Create.** Introduce the **SciGirls Challenge**: Through art, have each youth create what they hope will be discovered. They can draw, paint, or design on tape.
- Share.** Have each youth show what they created. Where is this discovery? What is it? How and what will help?
- Extension.** Place youth into small groups to combine their discoveries into one art project!

You'll Need
(per small group)
45 minutes

- paper
- pencils, markers, or other drawing utensils
- string, yarn
- decorative elements: beads, pipe cleaners, tissue paper, cloth, etc.
- play dough
- scissors
- tape



Watch SciGirls observe the stars and create art on [Dakota Stars](#)

WEBB NASA's James Webb Space Telescope, or Webb, is the biggest and most powerful space telescope ever launched. Launched on December 25, 2021, it will change the stars and show us the universe like we never imagined! Follow along on the journey at www.nasa.gov

SciGirls For more activities, visit [scigirls.org](https://www.scigirls.org)

tpt For more activities, visit [tpt.org](https://www.tpt.org)

NASA For more activities, visit [nasa.gov](https://www.nasa.gov)

Mission Patch Party

Design a Mission Patch for Your Group!

Did you know that all NASA teams and missions design their own mission patch? They work together to design a patch like a logo that will represent them for the duration of their mission—this includes astronauts working on Human spaceflight missions and teams working on robotic missions, with science and exploration goals. Mission patches are created by the group and create a sense of belonging. They incorporate names, designs, mascots, and can be a variety of shapes: round, oval, triangular, octagonal, etc.

- Brainstorm.** In each small group, brainstorm some things that are important to your group. *Examples include: school mascot, class/club theme, industry team, afterschool science club, Girl Scout troop, something the members all have in common.
- Create.** Introduce the **SciGirls Challenge**: As a small group, brainstorm design ideas and make sketches to create your own mission patch. *Decide on a final design. Optional: Have youth write a short description of what each of the elements in their patch means.
- Share.** Have each small group present their patch to the larger group. What is the patch's theme? Why did they choose the design elements for their mission patch?

You'll Need
(per small group)
45 minutes

- internet access for researching
- paper
- pencils, markers
- digital tools for design (optional)



Watch SciGirls make their own mission patch in [Making Space](#)

This activity is based off NASA's Mission Patch and Dime activity, an extension of their [Constellation Constellation: Hands-on Mathematics and Science Discovery Student Guide](#). The activities in this patch are designed to engage students in hands-on inquiry-based science while programming robots.

SciGirls For more activities, visit [scigirls.org](https://www.scigirls.org)

tpt For more activities, visit [tpt.org](https://www.tpt.org)

NASA For more activities, visit [nasa.gov](https://www.nasa.gov)

Online

pbskids.org/scigirls



Mobile friendly
website for kids!

SciGirls



Online





SciGirls Strategies: How to Engage Girls in STEM!

Learn about the latest strategies to engage girls in STEM!

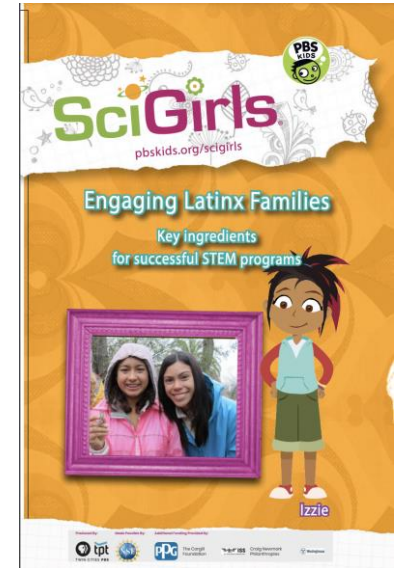
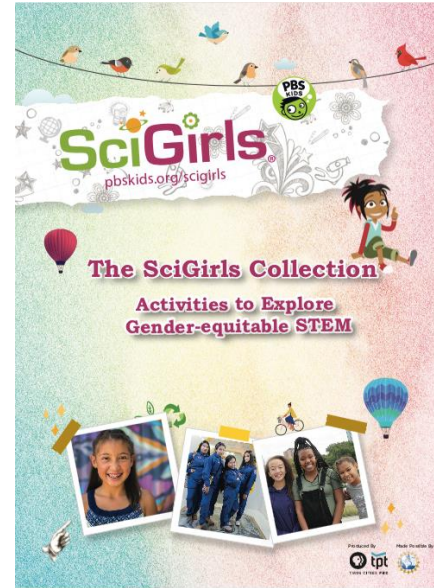
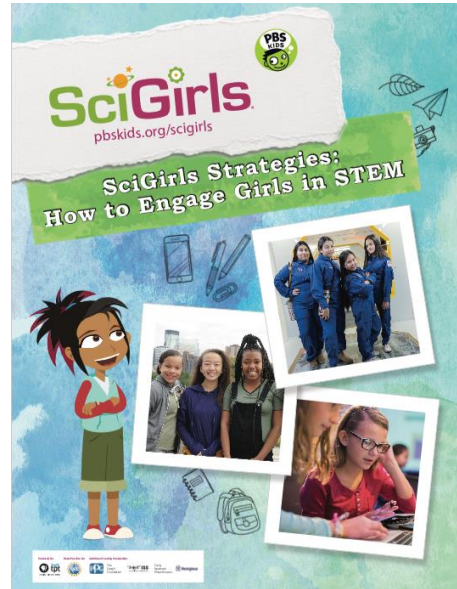
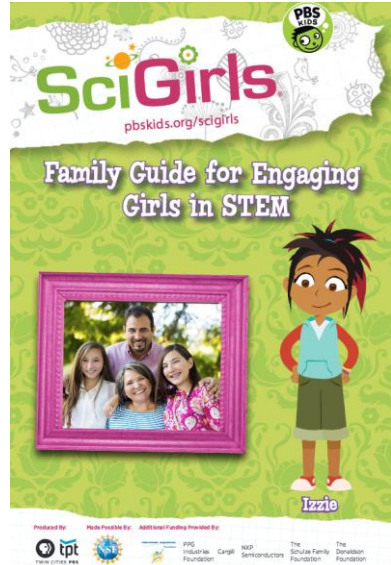
FEATURED VIDEOS

FEATURED ACTIVITIES

RESOURCES EN ESPAÑOL



On The Ground



Let's look at the data!

Research/Rationale

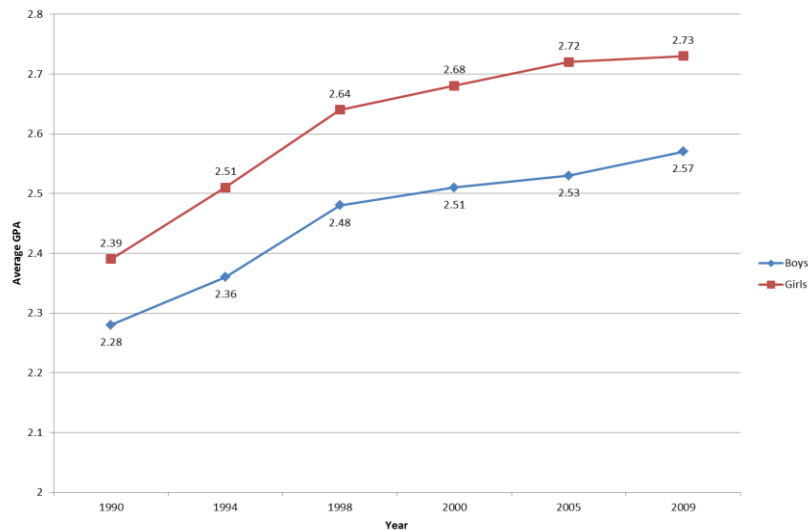
Let's review and discuss the following graphs.



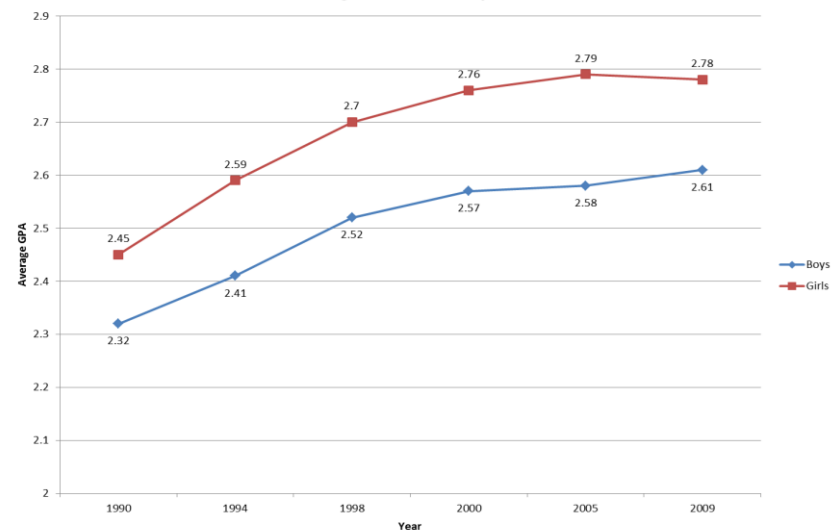
Rationale

GPA's in Math and Science

Grade Point Average in Mathematics, by Gender, 1990-2009

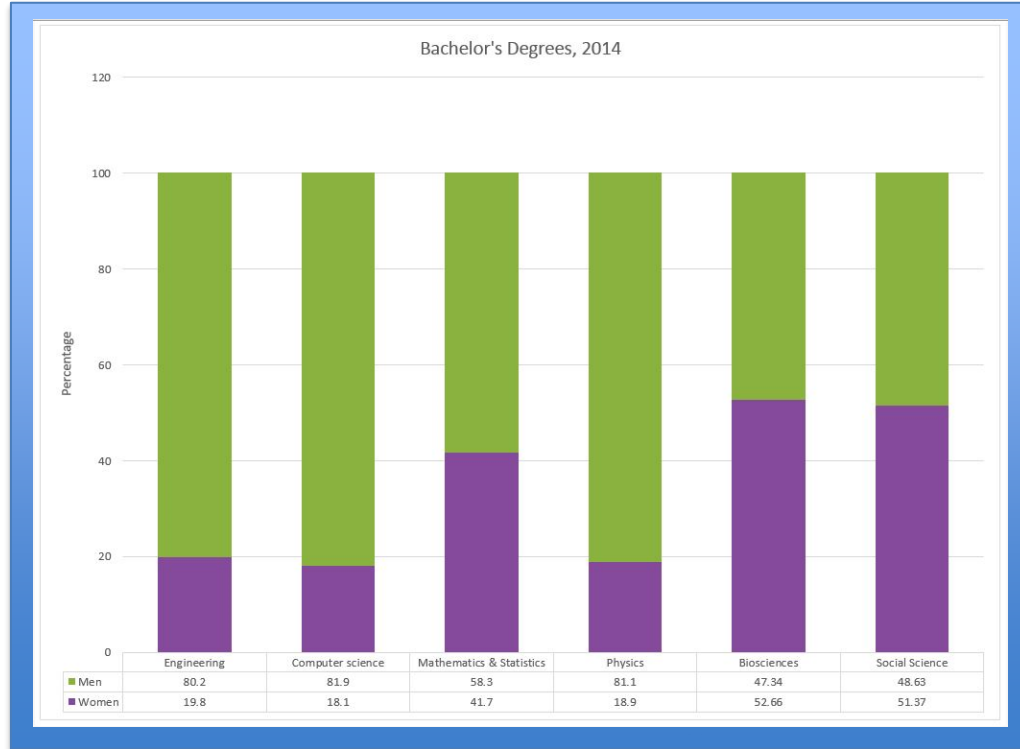


Grade Point Average in Science, by Gender, 1990-2009



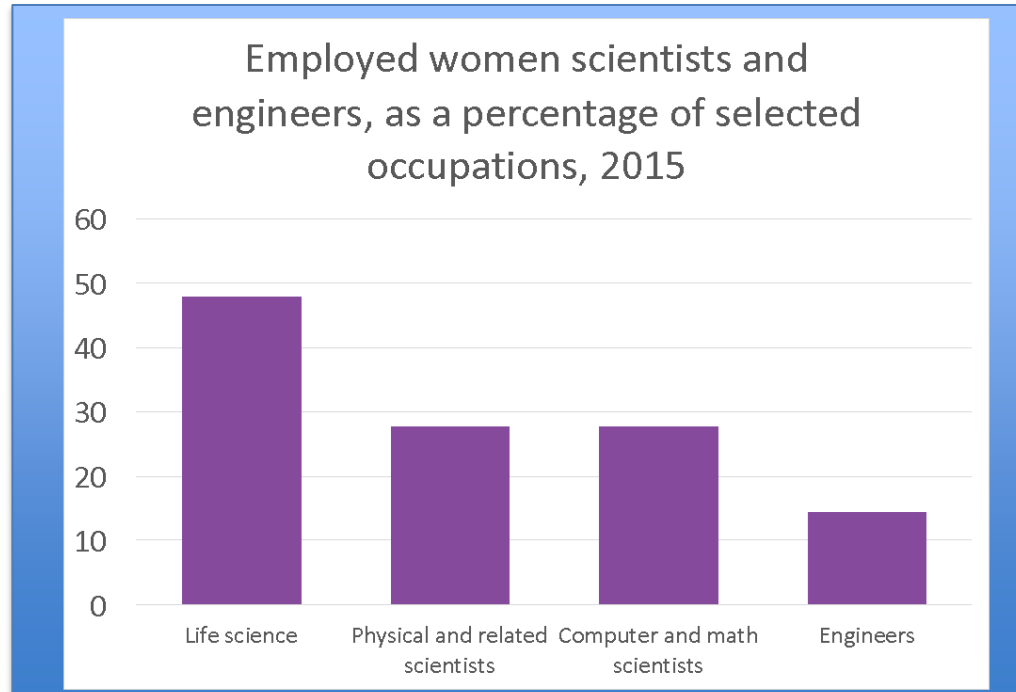
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (HSTS), various years, 1990-2009.

Rationale



Bachelor's
Degrees

Rationale



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2014.

Rationale

- Boys and girls do not display a significant difference in their **abilities** in STEM. The cause is social and environmental.
- Differences consistently appear in girls' **interest** and **confidence** in STEM subjects, starting at a very young age.
- These differences can be linked to a **negative self-perception**, enhanced by stereotypes.



Framing the SciGirls Strategies

STEM for all learning environment and culturally responsive teaching practices frame all of the *SciGirls Strategies*.



STEM for All Learning Environment

Brainstorm:

What creates the least welcoming STEM learning environment?

- Physical space
- Behaviors/interactions of people



STEM for All Learning Environment

- Create a warm and well decorated space that fosters cooperation and acceptance
- Learn about youth's needs
- Practice and encourage active listening
- Use icebreakers
- Create an atmosphere of mutual respect
- Provide opportunities for youth to voice their opinions and feel accepted



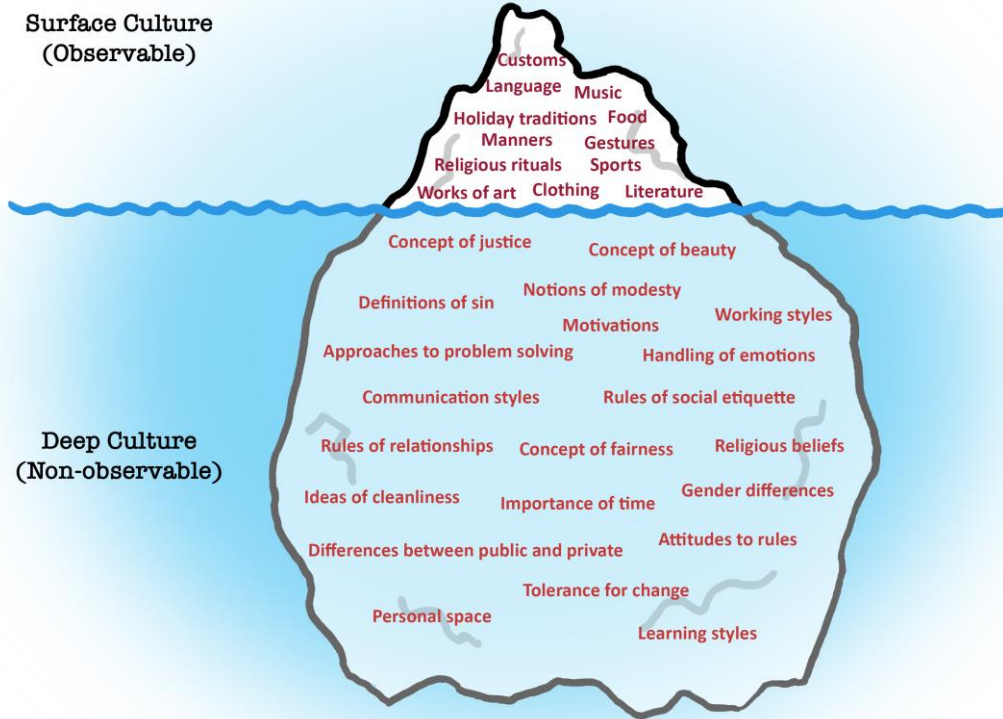
Culturally Responsive Teaching

Lifelong process of using *cultural knowledge, prior experiences, and performance styles* of diverse students to make learning more appropriate and effective for students.



Culturally Responsive Teaching

Surface Culture
(Observable)



Deep Culture
(Non-observable)

SciGirls Strategies: How to Engage Girls in STEM

The *SciGirls* approach is rooted in research about how to engage girls in STEM. A quarter of a century of studies have converged on a set of strategies that work, and they have become the framework for *SciGirls*.

- 1 **Connect STEM experiences to girls' lives.**
- 2 **Support girls using STEM practices.**
- 3 **Empower girls to embrace struggles.**
- 4 **Encourage girls to challenge STEM stereotypes.**
- 5 **Emphasize that STEM is collaborative and community-oriented.**
- 6 **Interact with diverse STEM role models & mentors.**

Small Group Discussion

1. Take a look at the SciGirls Strategies Postcard.
2. Choose 1 – 2 strategies that catch your attention.
3. Discuss your strategy(s): do you agree with it? Have you used it in your space? How could it affect youth in your programs or in your life?



1. Connect STEM Experiences to their lives

- Allow youth to explore issues or topics they care about and that impact their lives, families, or communities to help them see the relevancy of STEM.
- Include posters, materials, and examples that reference girls' communities and experiences; for instance, posters of STEM professionals who mirror the girls.
- Allow time for reflection. You might ask them to write in a journal or talk with each other about connections to their lives.



2. Support girls using STEM practices.

- Engage girls in hands-on, inquiry-based STEM experiences that incorporate practices used by STEM professionals
- STEM Practices: asking questions and identifying problems, planning investigations, making predictions, building and testing models or prototypes, analyzing data and constructing explanations, and sharing results and solutions



3. Empower girls to embrace struggle.

- Working through problems and having experiments fail is a normal part of the scientific and engineering process.
- Provide time and space for to grapple with and process ideas before stepping in to provide support and direction.
- Ask questions that get at the process of learning rather than a finished product
- Provide feedback on things they can control—such as *process, strategy, behavior*



4. Encourage girls to challenge stereotypes

- Provide examples of what STEM looks like for professionals. Help girls understand the stereotypical STEM professional is not what many people experience in their own work lives.
- Incorporate materials, images, and content that counter stereotypes about who does STEM.
- Provide opportunities for girls to work together, support each other, and connect with STEM-minded peers.
- Point out that doing STEM and being a STEM person does not contradict how girls see themselves or their aspirations for the future.



5. Emphasize that STEM is collaborative, social, and community-oriented.

- Provide opportunities for girls to collaborate successfully and help them understand the benefits of collaboration.
- Give girls ownership in the process by designing meaningful team roles that are intellectually engaging and provide opportunities for each girl to contribute to the learning process.
- Help girls get to know each other, make connections, and feel comfortable sharing their ideas.
- Share examples of how STEM offers opportunities to work with others, help others, and give back to the community.



6. Interact with diverse STEM role models and mentors

- Incorporate role models who are supportive, engaging, and relatable who mirror the diversity in your population.
- Encourage role models to describe their career path, what their work looks like and how their work benefits others. Ask them to talk about their personal lives as well, including their hobbies, interests, pets, and families.
- Provide opportunities for girls to engage with different types of role models like STEM professionals, educators, parents, and near peers (high school or college students).



FabFems Website

FabFems is an international, online, searchable directory of women STEM professionals interested in outreach to girls

Audience:

- Role Models
- Girl-Serving Programs
- Parents and Girls

www.fabfems.org



Take a quick break, and
then...

Let's Do An Activity!

Dillon Connelly
Space Science Institute

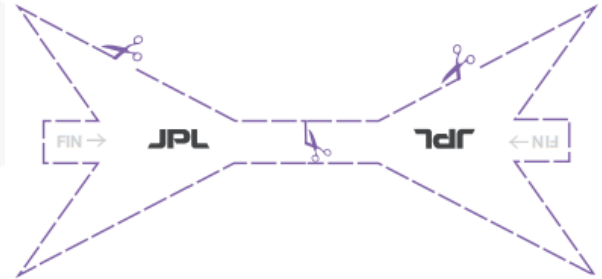
Soda Straw Rocket

- Create and test paper rockets by launching them from a straw
- Materials
 - Pencil
 - Scissors
 - Tape
 - Straw
 - Meter stick or measuring tape

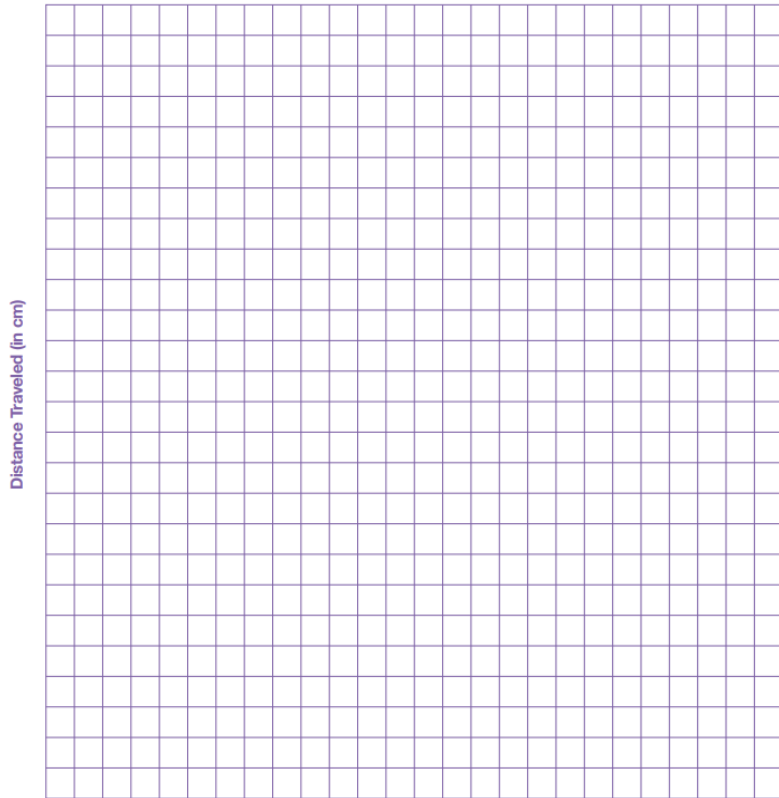


Soda Straw Rocket

- Measure length of rocket cone and test through multiple trials
- Compare flight distance across multiple cone lengths



Length of Nose Cone (in cm)	Distance Traveled (in cm)					Notes
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	



Length of Nose Cone (in cm)

Tips and extensions

- Move the pencil up and down the rocket to change cone length
- Make other changes
 - Multiple/different size fins
 - Paper clips to change weight balance
 - Different size/diameter pencils as rocket body guide
- Hold a design contest to see who makes the coolest looking rocket

SciGirls Strategies Debrief

Which strategies did you see in the activity?

Which strategies will be hardest to implement?



SciGirls Strategies: How to Engage Girls in STEM

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Role Model Strategies:
Encouraging Youth to Consider STEM Careers

1. Show diversity of people in STEM.
2. Make a personal connection to create an inclusive learning space.
3. Share your whole self.
4. Share your STEM journey.
5. Encourage learning from setbacks.
6. Communicate how your work impacts people, your community, and the world.
7. Show how STEM is creative and collaborative.
8. Provide resources for support and guidance.

Using Role Models in Programs

Role Model Visits

- Be sure to connect with your role model before they visit with your program!
 - Keep in mind this might be their first time talking to a youth group.
- Educators should read the *SciGirls Role Model Strategies* guide so they are familiar with role model best practices, too.
- Prepare your youth before the role model visit!
 - Tell them a little about the role model
 - Brainstorm questions they would like to ask!
- Families benefit from meeting role models too! Consider inviting your role model to attend the family event.

Role Model Visits

- Encourage interaction!
 - Invite your role model to participate in an activity with the youth or have them lead an activity!
 - Have the youth share their projects with the role model and invite feedback!
- If your role model is visiting virtually, keep these things in mind:
 - Be sure your role model can see all the youth in the program - it will be easier for them to interact if they can see each other's faces and read reactions!
 - Encourage your role model to share photos and use props, even if they are virtual!

Project Website

<https://www.starnetlibraries.org/about/our-projects/nasa-inspires-futures-for-tomorrows-youth/>



STEM Activity Clearinghouse – NIFTY Collection

A collection of 23 hands-on STEM activities geared towards middle-school aged youth

[VIEW COLLECTION](#)



SciGirls Activities on PBS LearningMedia

Gender-equitable educational resources and hands-on STEM activities, as well as Role Model video profiles that can be used in NIFTY programs.

[VIEW ACTIVITIES](#)

STEM ACTIVITY

Clearinghouse

STAR★net

www.clearinghouse.starnetlibraries.org



VIEWED ITEMS



Diversión con Burbujas

¡Diviértate con Burbujas
de Explora...



Water Cycle Paper Craft

Patrons learn about how
the water...



UV Kid

In this activity, children
use common...

NEW ITEMS



Walk Through Time:
Water in the Four
Corners Region
Virtual Photo Gallery



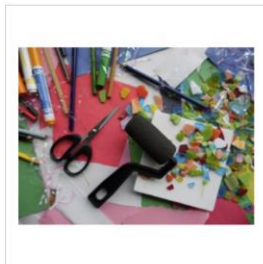
Browse and Filter All Activities

In the STEM Activity Clearinghouse, librarians and library staff can find high quality, vetted STEM activities that are appropriate for library use. STEM stands for Science, Technology, Engineering, and Math.

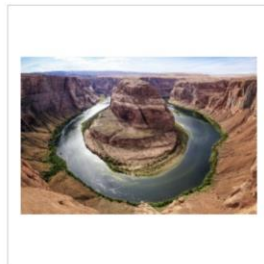
You can search by audience, content level, and difficulty, among others. You can also browse collections that we've curated just for you! Almost all the activities in the Clearinghouse have pictures or videos of real libraries doing these activities. Activities developed outside the STAR_Net Project will include tips and tricks for implementing in your library, and will link you back to the original source content so you can explore more.

FEATURED COLLECTIONS

[All Collections >](#)



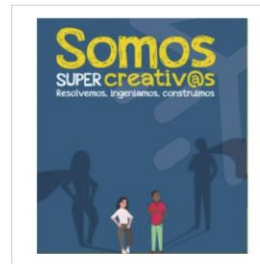
Take & Make



We Are Water



I'm Super



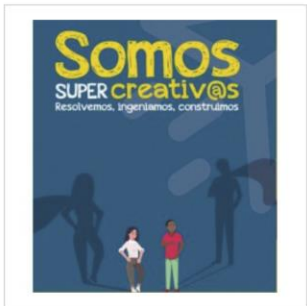
We're Super Creative



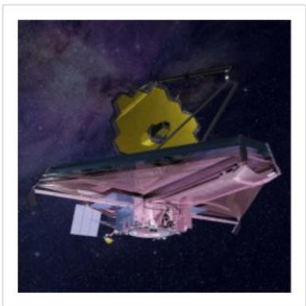
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I'm Super



We're Super Creative



Look Up! Explore Our Universe



Moon, Mars, and Beyond



Solar Eclipse Activities for Libraries



NASA Inspires Futures for Tomorrow's Youth



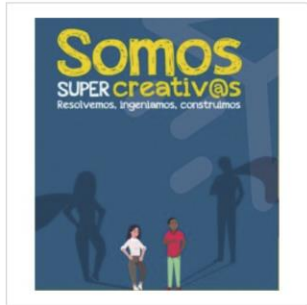
Discover Exoplanets



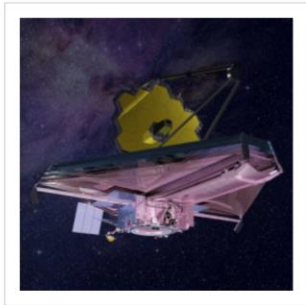
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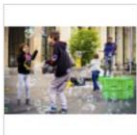


NASA Inspires Futures for Tomorrow's Youth



Discover Exoplanets

VIEWED ITEMS



Diversión con Burbujas

¡Diviértate con Burbujas de Explora...



Water Cycle Paper Craft

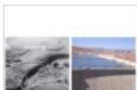
Patrons learn about how the water...



UV Kid

In this activity, children use common...

NEW ITEMS



Walk Through Time: Water in the Four Corners Region Virtual Photo Gallery



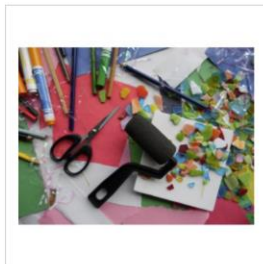
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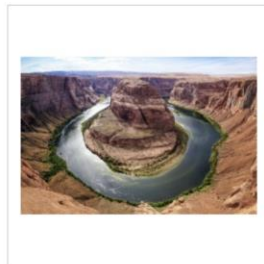
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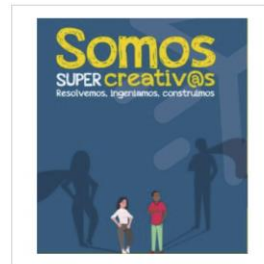
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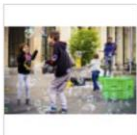


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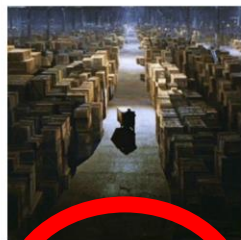
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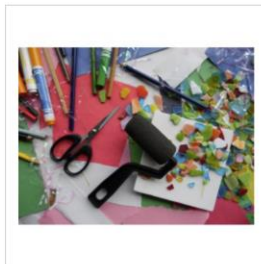
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In the STEM Activity Clearinghouse, librarians and library staff can find high quality, vetted STEM activities that are appropriate for library use. STEM stands for Science, Technology, Engineering, and Math.

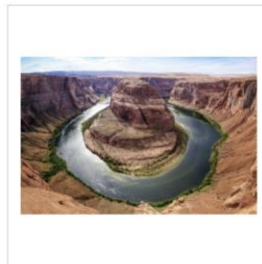
You can search by audience, content level, and difficulty, among others. You can also browse collections that we've curated just for you! Almost all the activities in the Clearinghouse have pictures or videos of real libraries doing these activities. Activities developed outside the STAR_Net Project will include tips and tricks for implementing in your library, and will link you back to the original source content so you can explore more.

FEATURED COLLECTIONS

[All Collections >](#)



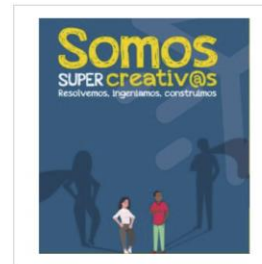
Take & Make



We Are Water



I'm Super



We're Super Creative

SORT

Age Group

- All Ages (10)
- Family (464)
- Infant (0-2) (1)
- Pre-K (81)
- Early Elementary (255)
- Upper Elementary (425)
- Tweens (9-12) (402)
-

Time to Complete Activity

- Under 10 minutes (21)
- 10-20 minutes (114)
- 20-40 minutes (206)
- 40 minutes to 1 hour (237)
- 1-2 hours (77)
- 2-4 hours (10)
- Long Duration (days to months) (27)

ACTIVITIES

There are 531 items.

Sort by Show per page

Showing 1 - 12 of 531 items

[← Previous](#) ... [Next >](#)

[Show all](#)



Can a Toaster Make Wind?

★★★★☆ 1 Review(s)

In this demo, patrons investigate the source of wind by using a toaster to heat air while they observe its effect on a small aluminum foil kite.

[Check It Out](#)

[How-to Video](#)

[Teacher's Guide](#)

Content Area

Earth Science

Age Group

Family
 Upper Elementary
 Tweens (9-12)
 Teens

Time to Complete Activity

Under 10 minutes

Cost associated with Activity Materials

\$0 ("found" items)

Difficulty Level (by content)

Medium

STEM Tools



Home Activities

SORT

Age Group

- All Ages (10)
- Family (464)
- Infant (0-2) (1)
- Pre-K (81)
- Early Elementary (255)
- Upper Elementary (425)
- Tweens (9-12) (402)

Time to Complete Activity

- Under 10 minutes (21)
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- 20-40 minutes (206)
- 40 minutes to 1 hour (237)
- 1-2 hours (77)
- 2-4 hours (10)
- Long Duration (days, months) (27)

ACTIVITIES

There are 531 items.

Sort by Show 12 per page

Showing 1 - 12 of 531 items

[← Previous](#)
 1 2 3 ... 45 [Next >](#)

[Show all](#)



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STEM Tools

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✓ Tweens

Time to Complete Activity

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- 2-4 hours (10)
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✓ Tweens
✓ One hour



Difficulty Level (by content)

- Easy (258)
- Medium (236)
- Rocket Scientist (21)

- ✓ Tweens
- ✓ One hour
- ✓ Easy



Additional Languages Available

Española / Spanish (37)

- ✓ Tweens
- ✓ One hour
- ✓ Easy
- ✓ Instructions in Spanish

Search



Home > Activities

SORT

ACTIVITIES > AGE GROUP TWEEENS-9-12 > TIME TO COMPLETE ACTIVITY 40-MINUTES-TO-1-HOUR > DIFFICULTY LEVEL (BY CONTENT) EASY > ADDITIONAL LANGUAGES AVAILABLE ESPANOLA-SPANISH

There are 14 items.

Age Group

- Family (14)
- Pre-K (1)
- Early Elementary (6)
- Upper Elementary (13)
- Tweens (9-12) (14)
- Teens (2)
- All Ages (0)

Time to Complete Activity

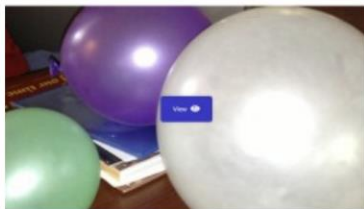
- 10-20 minutes (1)
- 20-40 minutes (4)
- 40 minutes to 1 hour (14)
- 1-2 hours (1)
- Under 10 minutes (0)
- 2-4 hours (0)
- Long Duration (days to months) (0)

Sort by -- Show 12 per page

Showing 1 - 12 of 14 items

< Previous 1 2 Next >

Show all



Globos Rebotantes

Deportes + Ingeniería = ¡Gran Diversión! La ingeniería en deportes se centra en el diseño, desarrollo y prueba de implementos deportivos, tales como las pelotas.

Check It Out

Age Group

Family
Upper Elementary
Tweens (9-12)

Time to Complete Activity

40 minutes to 1 hour

Cost associated with Activity

Materials
\$5-\$10

Difficulty Level (by content)

Easy

Additional Languages Available

Española / Spanish



View larger 



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Share



Google+



Pinterest



Send to a friend



Print

Diversión con Burbujas

¡Diviértate con Burbujas de Explora en casa!

Open Activity



Write a review

Age Group

Family
Early Elementary
Upper Elementary
Twens (9-12)

Time to Complete Activity

20-40 minutes
40 minutes to 1 hour

Cost associated with Activity Materials

\$5-\$10

Difficulty Level (by content)

Easy

Mess Level

High

Additional Languages Available

Española / Spanish

Report a broken link

Categorized Incorrectly? Let us know!

RELATED PROGRAMMING RESOURCES

RELATED PROGRAMMING RESOURCES

Hints for uses in your library	Patrons of all ages will love experimenting with bubbles! This activity is best done outside for easy cleanup.
Related Links	How to Make Bubbles The Science Behind Bubbles Science World: Bubbles Science World: Bubble Tricks
Originating Source	Explora
Related Books [Suggest a book]	Science Magic for Kids: 68 Simple and Safe Experiments by William R Wellnitz Bubble Fun by Neville Astley and Mark Baker Bubble Trouble by Tom Percival

REVIEWS

Be the first to write your review!

RELATED PROGRAMMING RESOURCES

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REVIEWS

Be the first to write your review!

WRITE A REVIEW



Diversión con Burbujas

¡Diviértate con Burbujas de Explora en casa!

Participants Enjoyed the Activity:



Participants Learned from This Activity:



Activity Instructions Were Clear and Easy to Follow:



Would Recommend:



Title: *

Next Steps

- Watch for emails from Julie
- Payments in July – sign/send agreements
- Communication with role models
- Run your programs!
- Post-program evaluation surveys

Questions?

Evaluation Survey

Dr. Hilarie B. Davis, TLC Inc.

