WELCOME

Stellar Hands-on STEM Learning Resources from STAR_Net

Playtime!

Try out the
materials
on your table

STAR net
Science-Technology Activities & Resources For Libraries

www.starnetlibraries.org

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STEM in Public Libraries MIG

Librarians who love STEM or are interested in STEM in your library: this is the MIG for you!

Connect with your fellow STEM librarians online:

- ALA Connect Group: http://connect.ala.org/node/250012
- STEM in Public Libraries Facebook Group
- STEMlibrarians.com

The STAR Library Education Network: 2.0

STAR*net*

Science-Technology Activities & Resources For Libraries

A Production of the *National Center for Interactive Learning* @ the Space Science Institute (**www.nc4il.org)**

Support from the National Science Foundation

NSF

LUNAR AND PLANETARY INSTITUTE

SPACE SCIENCE INSTITUTE

ALA American Library Association

Afterschool Alliance

www.starnetlibraries.org

Stellar Hands-on STEM Learning Resources from STAR_Net

- Passive Programming Resources
- Libraries and STEM: National Survey Results
- STAR_Net Resources
- More Hands-on Activities!

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Public Libraries & STEM: A National Survey Report 2015

Jim Hakala et al., Univ. of Colorado

Museum of Natural History
UNIVERSITY OF COLORADO **BOULDER**

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Purpose

The purpose of the survey was to connect with librarians to determine:

- **What STEM programming is currently in place? How do libraries approach and implement these programs?**
- **What challenges prevent libraries from incorporating more STEM programming?**
- **What kind of training and resources would be most helpful to librarians?**

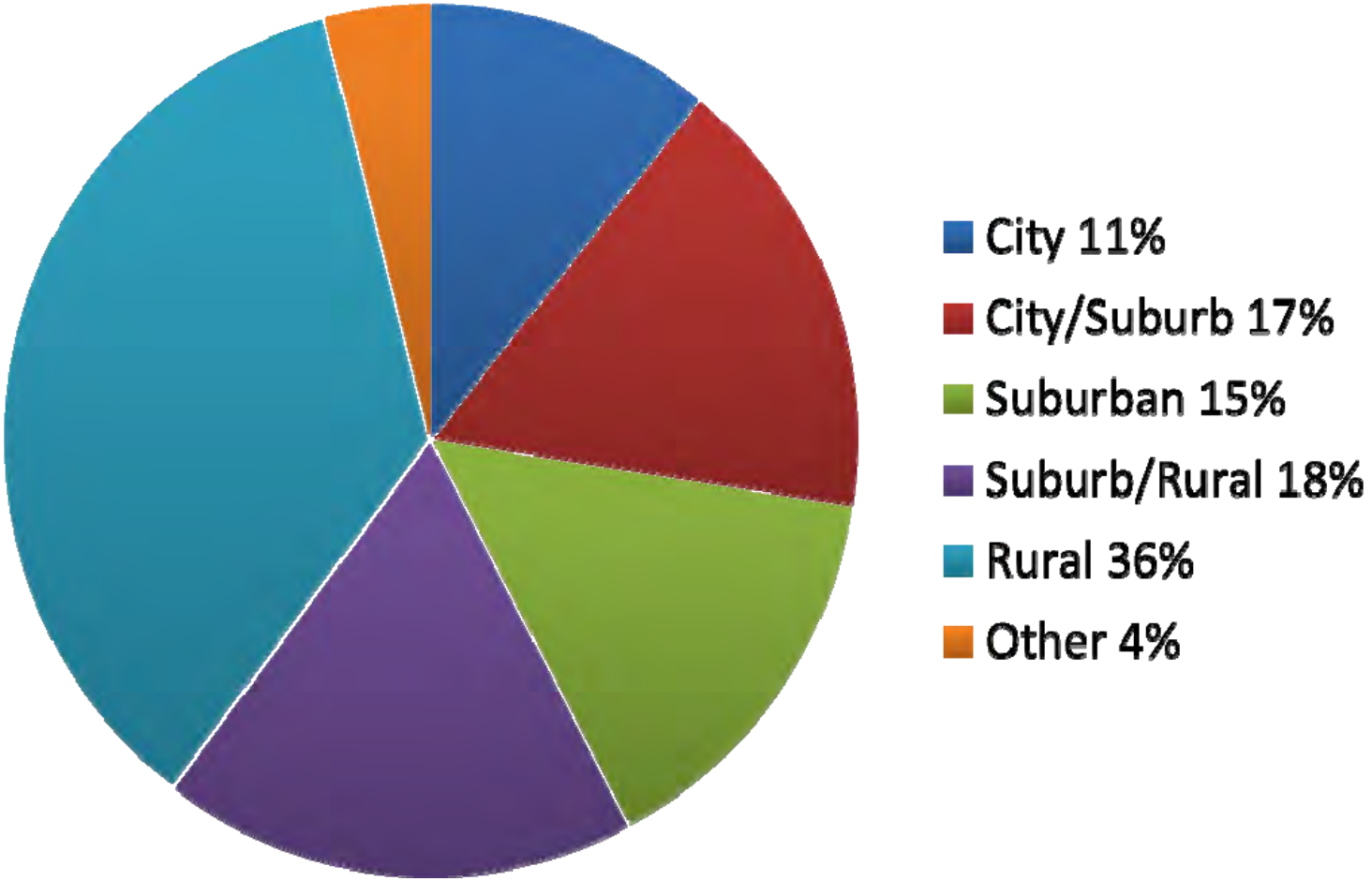
Additionally, we sought the following information from STEM professionals, for the purpose of establishing and maintaining a Community of Practice:

- **What factors influence and enhance the success of Communities of Practice?**

Results

- A total of **455 respondents** (66% of those who started the survey) completed the Library Professionals survey. A total of **72 respondents** (57% of those who started the survey) completed the STEM Professionals survey
- **23 librarians** were contacted by phone for open-ended interviews regarding what kinds of STEM-related resources libraries need

Respondents



How frequently do you offer STEM programming at your library?

#	Answer		Response	%
1	We tried it once		30	7%
2	Occasionally (2 or more times a year)		138	30%
3	Monthly		122	26%
4	Frequently (more than once per month)		135	29%
5	Summer only		36	8%
	Total		461	100%

STEM programming is offered somewhat frequently, often **integrated into existing literacy and arts programming** like hands-on investigations, art-based STEM projects, and STEM-related storytimes.

What general age levels do you target with STEM programming? Please check all that apply.

#	Answer		Response	%
1	Pre-K		271	57%
2	Elementary students		414	87%
3	Middle school students		305	64%
4	High school students		179	38%
5	Young adults		100	21%
6	Adults		108	23%
7	Seniors		49	10%
8	Mixed ages (Families)		171	36%
9	Other:		15	3%

Children aged **Pre-K through middle school** are the most common target audience.

STEM Program Staff

Who develops STEM programming at your library? Please check all that apply.

#	Answer		Response	%
1	Library staff		448	96%
2	Outside partner(s)		196	42%
3	Volunteer(s)		67	14%
4	Other:		19	4%

Who conducts STEM programs at your library? Please check all that apply.

#	Answer		Response	%
1	Library staff		437	93%
2	Outside partner(s)		243	52%
3	Volunteer(s)		101	22%
4	Other:		18	4%

Interview Results

Who They Are and What They Do

- 23 interviews, 14 with librarians from rural communities.
- Currently, these librarians work to **integrate STEM into existing programming**, like story times and summer reading.
- They also do LEGO, computer coding, robotics, and skill building activities.

What They Need

- **Packaged programs and sample program ideas**
- **How-to procedures** for programming
- **STEM training** for those without science backgrounds
- Resources for how to build **partnerships with STEM institutions**
- A **community of practice** through which they can speak to other librarians

Conclusions

1. **Rural Libraries:** a concentrated effort to reach these communities, especially through online resources.

2. **Library Programming:** Libraries' greatest needs are for packaged programming and STEM knowledge training.

3. **Collaboration:** Communities of practice would be an effective tool for collaboration, but they require sufficient time and an effective network for communication.

STAR_Net CoP Components

- **STEM Resource Clearinghouse** (for activities and programs and valuable resources)
- **Blogs** (share success stories)
- **Forums** (discuss promising practices)
- **Webinars/Conferences** (professional training)
- ***STAR_Net News*** (drives traffic)
- ***STEM@ My Library*** (Public Engagement Campaign – TBD)

Participate in the 2017 Eclipse!

- **On August 21, 2017, a total eclipse of the Sun will be visible in the Continental U.S.**

- Sign up to receive eclipse program planning information and resources by contacting Jackie Hooker at **2017Eclipse@SpaceScience.org.**


Exit
Emergency Exit Onl
SOUNDS


EAGLE
BASEBALL


Do Arches
ay Up?
ows the stress on the stone to "flow" down to the ground.
without support columns. A flat beam of the same size
dapse under its own weight.

STEM Resource Clearinghouse

www.starnetlibraries.org

FEATURED COLLECTIONS

All Collections ›

Browse All Activities

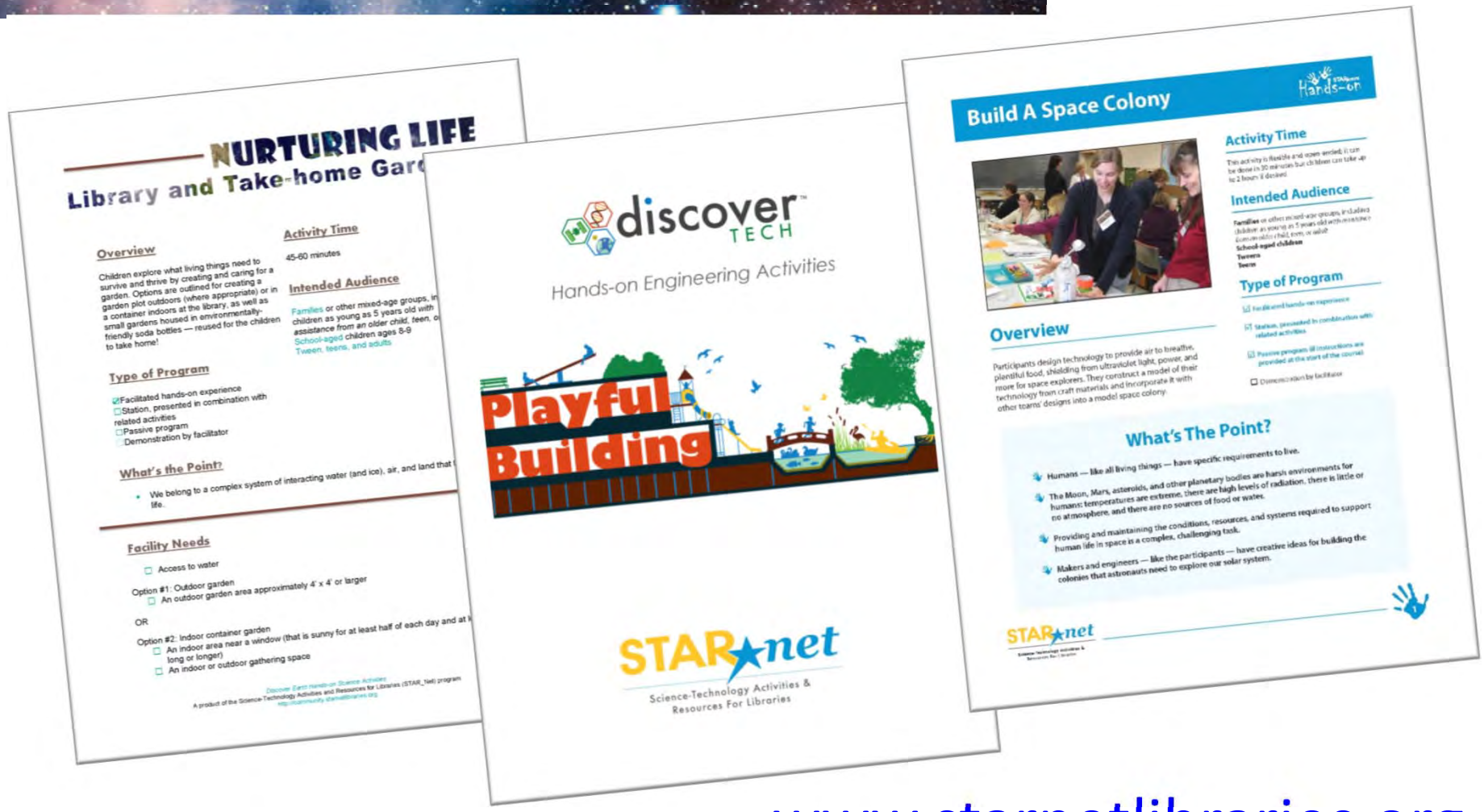
Earth Science Activities

Playful Building

Discover NASA: From Our Town to Outer Space

STAR net
Science-Technology Activities & Resources For Libraries

Cornerstones of Science
awakening curiosity, enriching lives



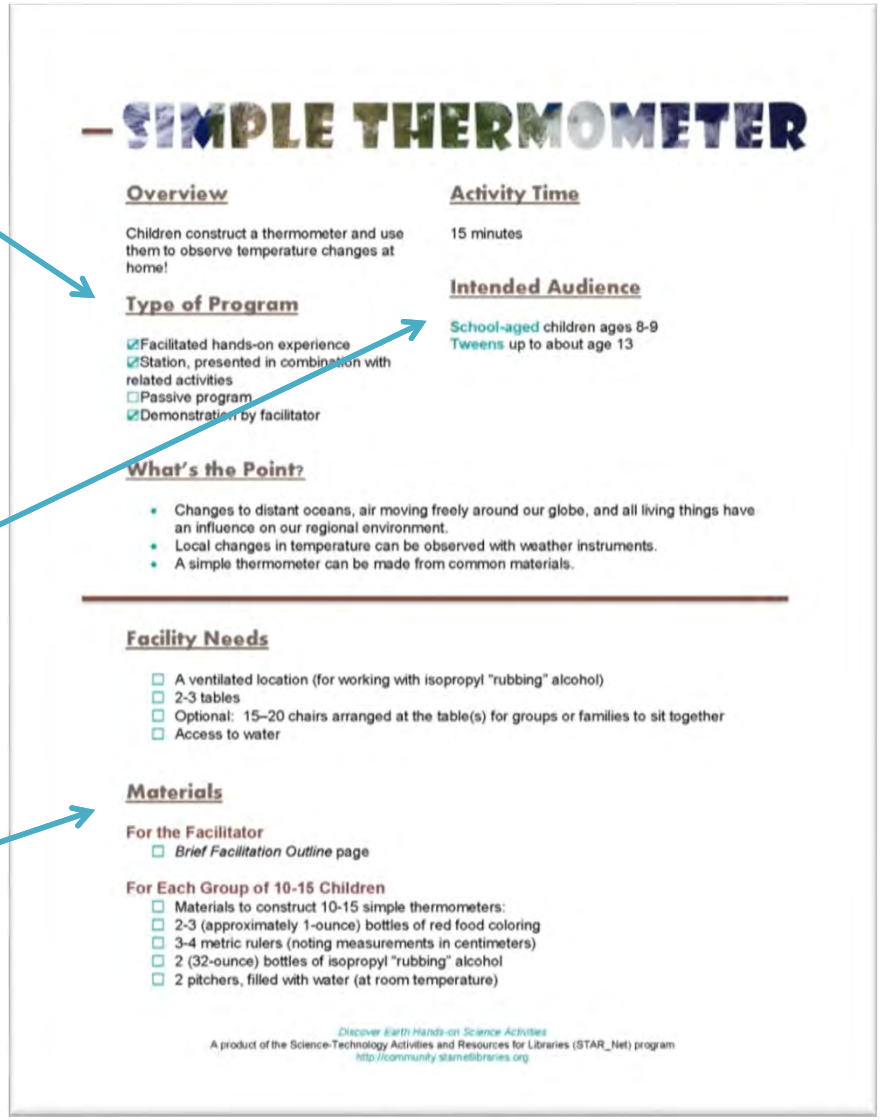
www.starnetlibraries.org

STAR_Net Hands-on Activities

- For multiple age groups
- Inexpensive!
- Flexible for use in different types of programs
- Correlate to national education standards

Time-saving Standard Format

- For various program formats
- For ALL library patrons
- For ANY programming budget



SIMPLE THERMOMETER

Overview

Children construct a thermometer and use them to observe temperature changes at home!

Activity Time

15 minutes

Intended Audience

School-aged children ages 8-9
Tweens up to about age 13

Type of Program

☑Facilitated hands-on experience
☑Station, presented in combination with related activities
☐Passive program
☑Demonstration by facilitator

What's the Point?

- Changes to distant oceans, air moving freely around our globe, and all living things have an influence on our regional environment.
- Local changes in temperature can be observed with weather instruments.
- A simple thermometer can be made from common materials.

Facility Needs

- ☐ A ventilated location (for working with isopropyl "rubbing" alcohol)
- ☐ 2-3 tables
- ☐ Optional: 15–20 chairs arranged at the table(s) for groups or families to sit together
- ☐ Access to water

Materials

For the Facilitator
- ☐ *Brief Facilitation Outline* page

For Each Group of 10-15 Children
- ☐ Materials to construct 10-15 simple thermometers:
- ☐ 2-3 (approximately 1-ounce) bottles of red food coloring
- ☐ 3-4 metric rulers (noting measurements in centimeters)
- ☐ 2 (32-ounce) bottles of isopropyl "rubbing" alcohol
- ☐ 2 pitchers, filled with water (at room temperature)

Discover Earth Hands-on Science Activities
A product of the Science-Technology Activities and Resources for Libraries (STAR_Net) program
http://community.starnetlibraries.org

Learner-centered Facilitation Tips

Activity

1. **Share ideas and knowledge.**
   - Introduce yourself and the library. Help the participants learn each other's names (if they don't already).
   - Frame the activity with the main message: We belong to a complex system of interacting water (and ice), air, and land that fosters life.
   - Invite the participants to talk about what they already know about taking care of living things and what life needs, in general, to survive. Use open-ended questions and invite the children to talk with you and each other. Guide the conversation toward identifying the four requirements for life: nutrients (food), water, warmth (energy), and shelter (stable environment).

Use discussion to help the participants start to think about their prior experiences and build new understandings about what life needs. Some conversation-starters are:

- What do you provide for your pets to help them survive?
- What are some things you would need to have with you or find to survive in the wilderness?
- Do you think other planets or moons in our solar system could support life? Why do you think so?

Upcoming Webinars

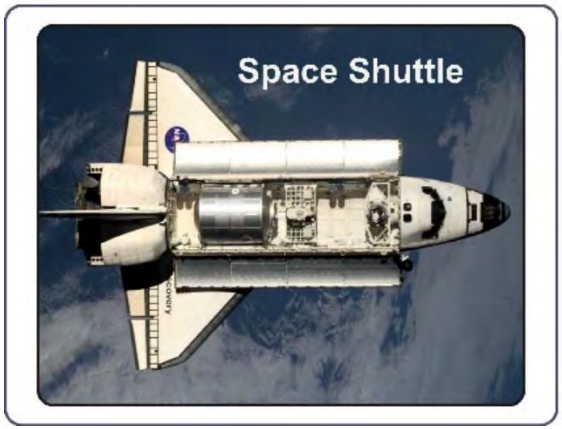
July 20, mini-webinar:
Afterschool Alliance's Lights On Afterschool

August 17:
New Website and Clearinghouse Tour

September 14:
Creative Building Activities

October 12:
2017 Solar Eclipse

Image Sorting



- Sort the images on your tables in a way that makes sense to your group

Activity guide and cards:

greatballsoffireexhibit.org

Small and Large

Answers:

1. Lions
2. Space Shuttle
3. Asteroid Ida
4. Moon
5. Mars
6. Earth
7. Jupiter
8. Sun
9. Solar System
10. Galaxy
11. Cluster of Galaxies

Near and Far

- Arrange the images, in order, from the nearest the surface of Earth to farthest from the surface of Earth.

Activity guide and cards:

greatballsoffireexhibit.org

Near and Far

Answers:

1. Eagle
2. Jet
3. Aurora
4. Hubble Space Telescope
5. Moon
6. Sun
7. 4 Vesta
8. Saturn
9. Kuiper Belt
10. Orion Constellation and Nebula
11. Andromeda Galaxy
12. Hubble Deep Field View

Strange New Planet

1. Telescope observations
2. Space probe
3. Orbiting spacecraft
4. Lander/rover

Planet Party

Credit: Halfblue/Wikipedia

https://spotthestation.nasa.gov

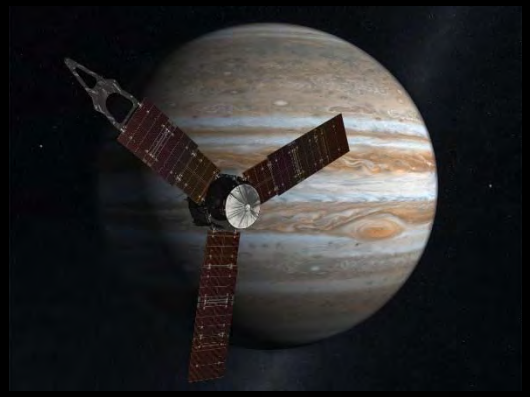
Gail Borden Public Library

NASA In-Flight Education Downlink

June 30 at 11:35 a.m. EDT / 10:35 a.m. CDT:

http://www.nasa.gov/multimedia/nasatv

Looking low in the west July 4 at 9:30 p.m.



NASA Spacecraft Arrives at Jupiter

Looking low in the west July 4 at 9:30 p.m.

International Observe the Moon Night

An Opportunity to Prepare for the 2017 Total Solar Eclipse and to Sustain Engagement

INTERNATIONAL OBSERVE THE MOON NIGHT

InOMN

- Annual worldwide celebration of lunar and planetary science, since 2010.
- Tens of thousands of people participate each year, from 98 countries and 49 US states.
- Resources and science & evaluation trainings available through observethemoonnight.org

08 October 2016

15 July 2017

Eclipse 2017

http://eclipse2017.nasa.gov

Build a Space Colony

Build a space colony out of craft materials

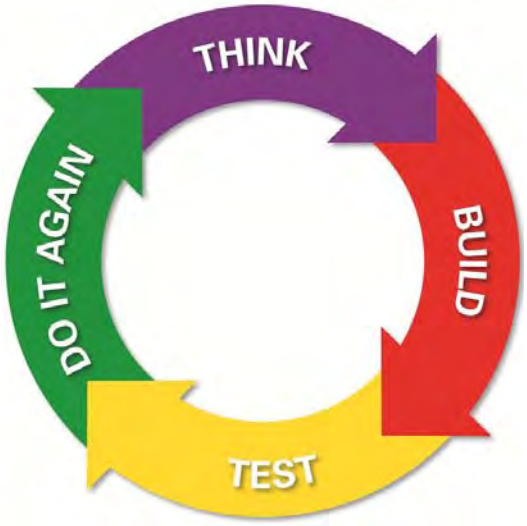
Some people in Bangladesh use cloth to clean their water…

Credit: National Science Foundation

…to take out small creatures in the water that help spread disease

Credit: National Science Foundation

Low-tech Water Filter for High-impact Clean



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Plan

Activity 1: *Design a Park*

Play

Activity 2: *Team Machine*
Activity 3: *Water Wedges*
Activity 4: *Levers at Play*

Power and Protect

Activity 5: *Low-tech Water Filter for High-impact Clean*
Activity 6: *Wind Turbine Tech Challenge*

Feedback

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Resources For Libraries

Booth 2162

2017 Eclipse

Interactives

Programming Resources

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