SciGirls and GLOBE

Julie Malmberg

&

Sarah McCrea

Sunday, July 17, 2016

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SciGirls Overview

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SciGirls

The Big Idea

To change how millions of girls (ages 8-13) think about STEM

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Made Possible by: NSF

Additional Support from: NORTHROP GRUMMAN Foundation, infor, PPG Industries Foundation, The Mosaic Company Foundation

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Supported by: NOAA, U.S. Department of Commerce

Implemented by: UCAR

SciGirls

Our Approach

- On TV
  - national PBS Kids series
- Online
  - safe, social networking website
- On the Ground
  - activities and professional development

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SciGirls

On TV

- check your local PBS listings –OR- watch full episodes online at pbskids.org/scigirls -OR- download from iTunes

- Features *real* girls doing investigations they're passionate about
- Highlights the *process* of science

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SciGirls

On TV

Season One Episodes:

- Turtle Mania
- Puppet Power
- Dolphin Dive
- Digging Archaeology
- Horsing Around
- Blowin' in the Wind
- High-Tech Fashion
- Science Cooks!
- Underwater Eco-Adventure
- Robots to the Rescue!
- Star Power
- Going Green

Season Two Episodes:

- Aquabots
- Mother Nature's Shoes
- Habitat Havoc
- The Awesome App Race
- Multitasking Mania
- Insulation Station
- Workin' It Out
- Bee Haven
- Pedal Power
- Super Sleuths

Season Three Episode Topics:

- Frog Whisperers
- Flower Power
- SkyGirls
- Butterfly Diaries
- Feathered Friends
- Terrific Pacific

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SciGirls

SciGirls

Online

pbskids.org/scigirls

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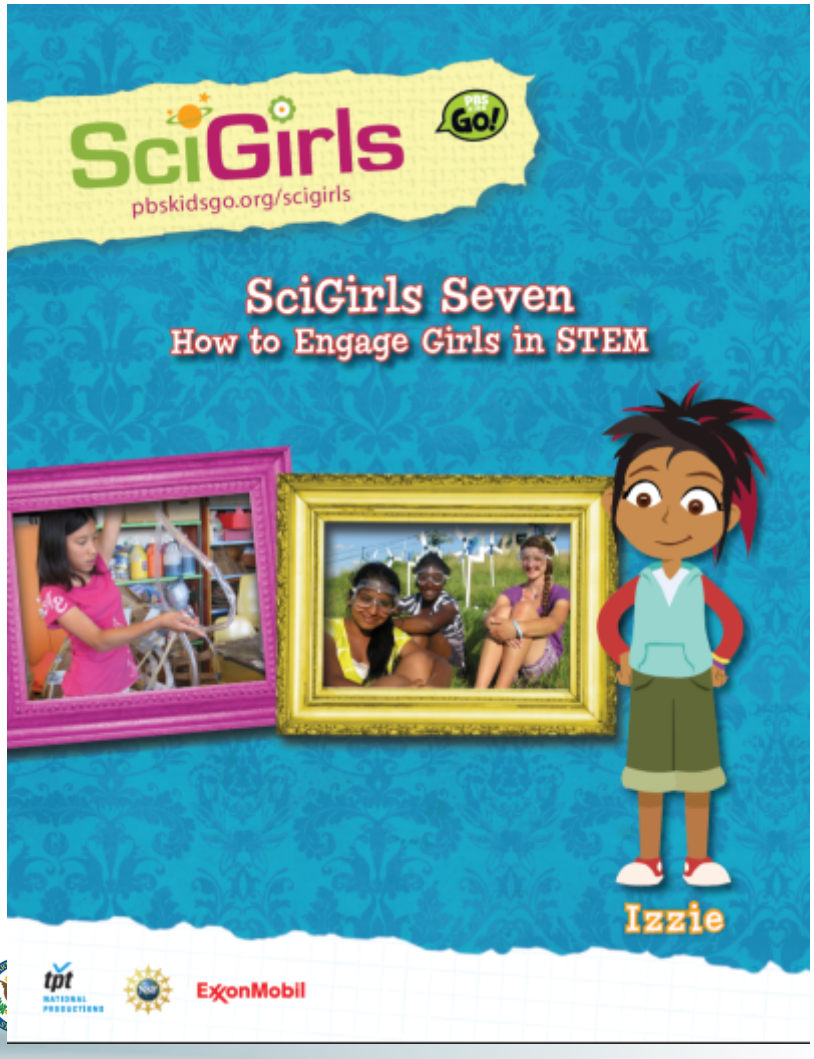
On the Ground

- *SciGirls Seven*: Strategies to engage girls in STEM
- Tips for using the *SciGirls Seven*
- Applying the *SciGirls Seven*



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SciGirls

SciGirls Seven

1. **Girls benefit from collaboration, especially when they can participate and communicate fairly.** (Parker & Rennie, 2002; Fancsali, 2002)

2. **Girls are motivated by projects they find personally relevant and meaningful.** (Eisenhart & Finkel, 1998; Thompson & Windschitl, 2005; Liston, Peterson, & Ragan, 2008)

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3. **Girls enjoy hands-on, open-ended projects and investigations.** (Chatman, Nielsen, Strauss, & Tanner, 2008; Burkam, Lee, & Smerdon,1997; Fanscali, 2002)

4. **Girls are motivated when they can approach projects in their own way, applying their creativity, unique talents and preferred learning styles.** (Eisenhart & Finkel,1998; Calabrese Barton, Tan, & Rivet, 2008)

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5. **Girls' confidence and performance improves in response to specific, positive feedback on things they can control – such as effort, strategies and behaviors.** (Halpern, et al., 2007; Zeldin & Pajares, 2000; Blackwell, Trzesniewski, & Sorich Dweck, 2007; Mueller & Dweck, 1998)

6. **Girls gain confidence and trust in their own reasoning when encouraged to think critically.** (Chatman, et al., 2008; Eisenhart & Finkel,1998)

7. **Girls benefit from relationships with role models and mentors.** (Liston, et al., 2008; Evans, Whigham, & Wang, 1995)

SciGirls

scigirlsconnect.org

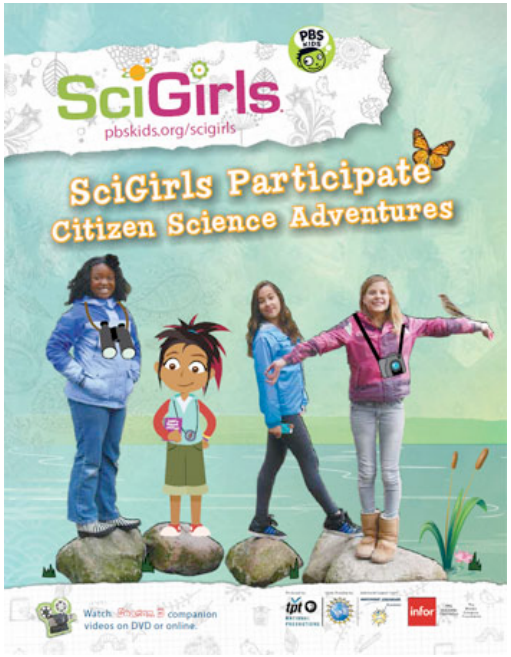
SkyGirls

NASA Earth Science STEM Engagement and SciGirls Seven Strategies

Sarah McCrea
SSAI/ NASA LaRC Education Outreach Coordinator
Sarah.mccrea@nasa.gov

Sunday, July 17, 2016

PBS SciGirls episode featuring the NASA CERES S'COOL Project



Episode 303: SkyGirls
Airs April 2015 on PBS

Virginia SciGirls Emma, Lauren and Madison have the ultimate "*stratus* update!" Teaming up with NASA scientists, they identify clouds from the ground and compare their data with satellite images, ultimately creating a "mostly cloudy" museum display.

The Students' Cloud Observations On-Line Project is:

Students' Cloud Observations On-Line (S'COOL) is a hands-on project that supports NASA. S'COOL involves students in weather and climate research.

Soon to be GLOBE Clouds Protocol!

Education and Outreach

http://science-edu.larc.nasa.gov/SCOOL/

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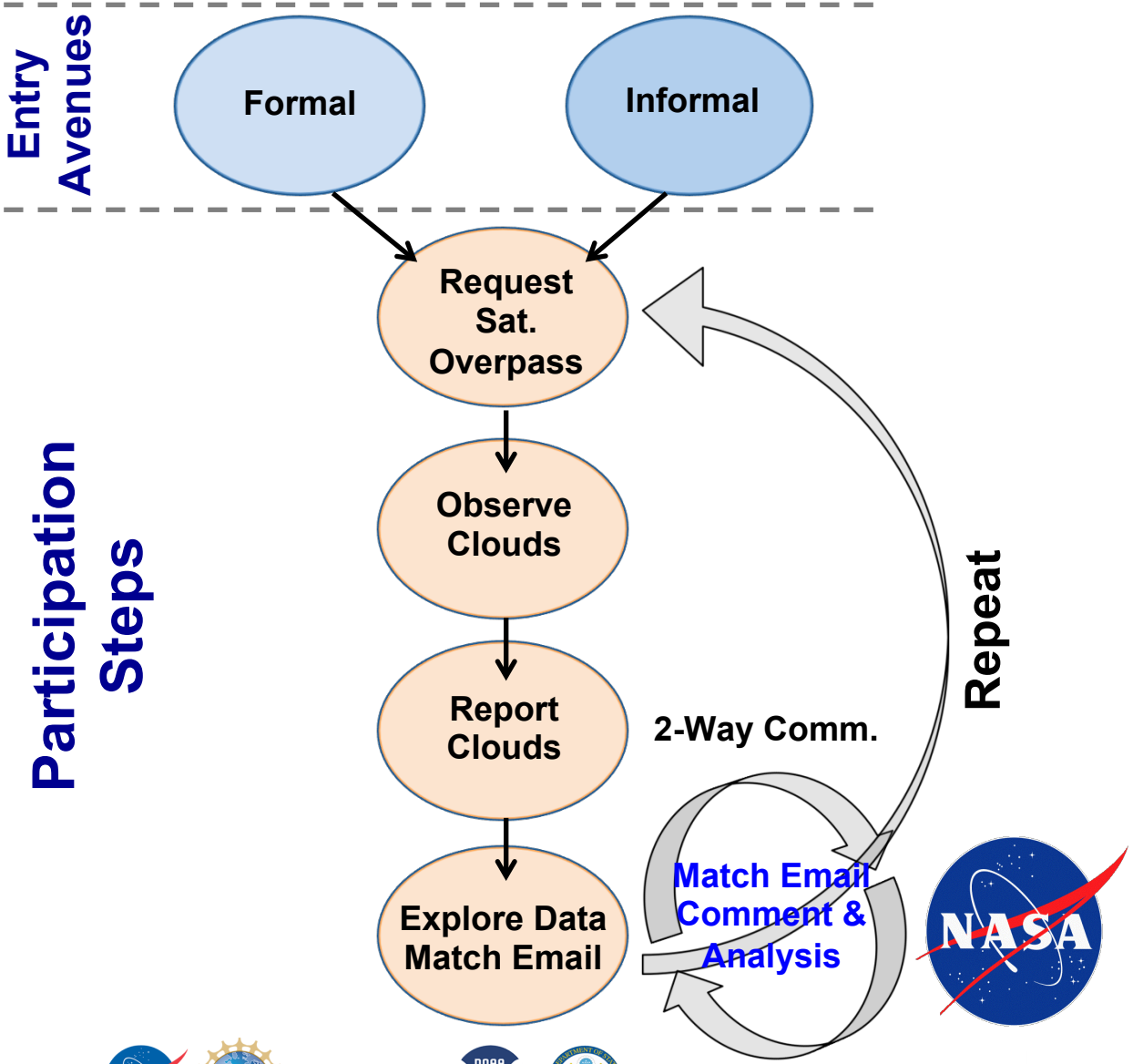
SkyGirls

http://pbskids.org/scigirls/videos/earth-beyond

Process

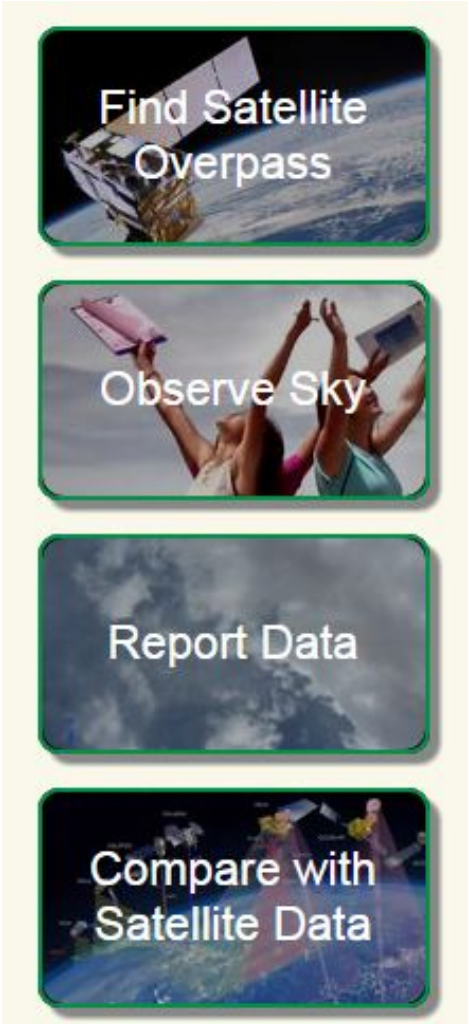

Entry Avenues
Formal
Informal
Participation Steps
Request Sat. Overpass
Observe Clouds
Report Clouds
Explore Data Match Email
2-Way Comm.
Match Email Comment & Analysis
Repeat

S'COOL Website Support

- Audience related sections of the website containing relevant data.
- Uniform lesson format created, reviewed and edited by a team of educators, scientists, and communicators.
- Standard Alignment of Project.
- Printable Resources.
- Leveraging of NASA-wide Resources.

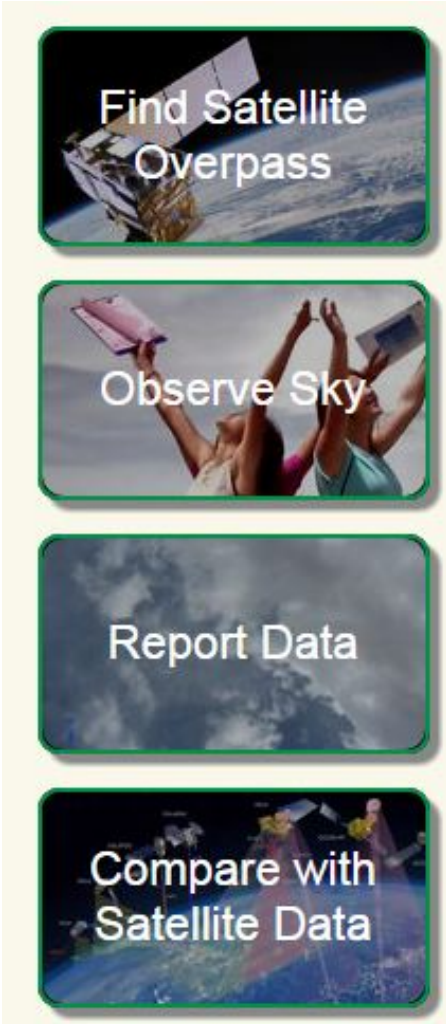
Protocol

- Find Satellite Overpass times
- Observe the sky +/- 15 minutes of overpass
  - Total cloud cover
  - Sky visibility
  - Sky color
  - Contrails
  - High, mid and low level clouds
  - Ground measurements



Protocol

- Record your collected data online.
- You will get your results compared with satellite results for analysis.

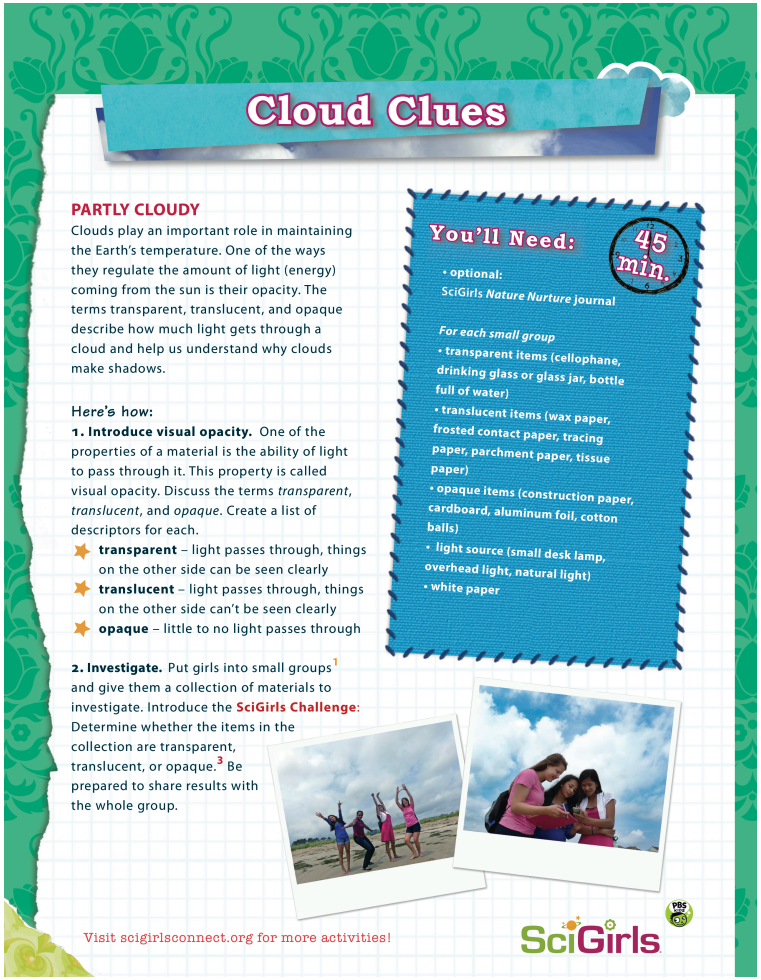


SkyGirls

http://pbskids.org/scigirls/videos/earth-beyond

Hands-On: Cloud Clues

This activity prepares students to understand opacity and how it pertains to clouds.



Cloud Clues

PARTLY CLOUDY

Clouds play an important role in maintaining the Earth's temperature. One of the ways they regulate the amount of light (energy) coming from the sun is their opacity. The terms transparent, translucent, and opaque describe how much light gets through a cloud and help us understand why clouds make shadows.

You'll Need: 45 min.

- optional: SciGirls *Nature Nurture* journal

For each small group

- transparent items (cellophane, drinking glass or glass jar, bottle full of water)
- translucent items (wax paper, frosted contact paper, tracing paper, parchment paper, tissue paper)
- opaque items (construction paper, cardboard, aluminum foil, cotton balls)
- light source (small desk lamp, overhead light, natural light)
- white paper

Here's how:

1. Introduce visual opacity. One of the properties of a material is the ability of light to pass through it. This property is called visual opacity. Discuss the terms *transparent*, *translucent*, and *opaque*. Create a list of descriptors for each.

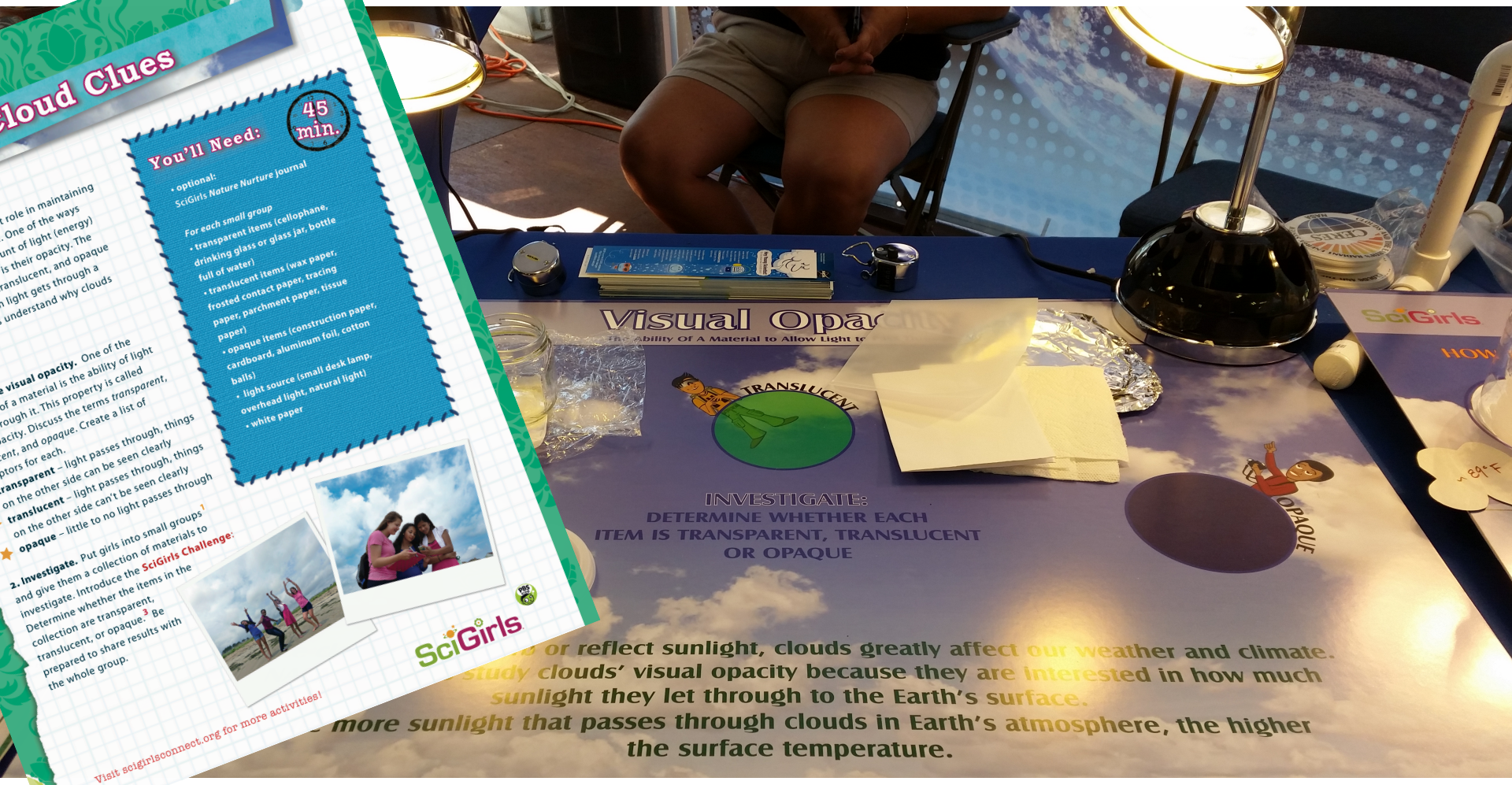
- **transparent** – light passes through, things on the other side can be seen clearly
- **translucent** – light passes through, things on the other side can't be seen clearly
- **opaque** – little to no light passes through

2. Investigate. Put girls into small groups[1] and give them a collection of materials to investigate. Introduce the **SciGirls Challenge**: Determine whether the items in the collection are transparent, translucent, or opaque.[3] Be prepared to share results with the whole group.

Visit scigirlsconnect.org for more activities!

SciGirls

Cloud Clues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45 min.
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SciGirls
Visual Opa
TRANSLUCENT
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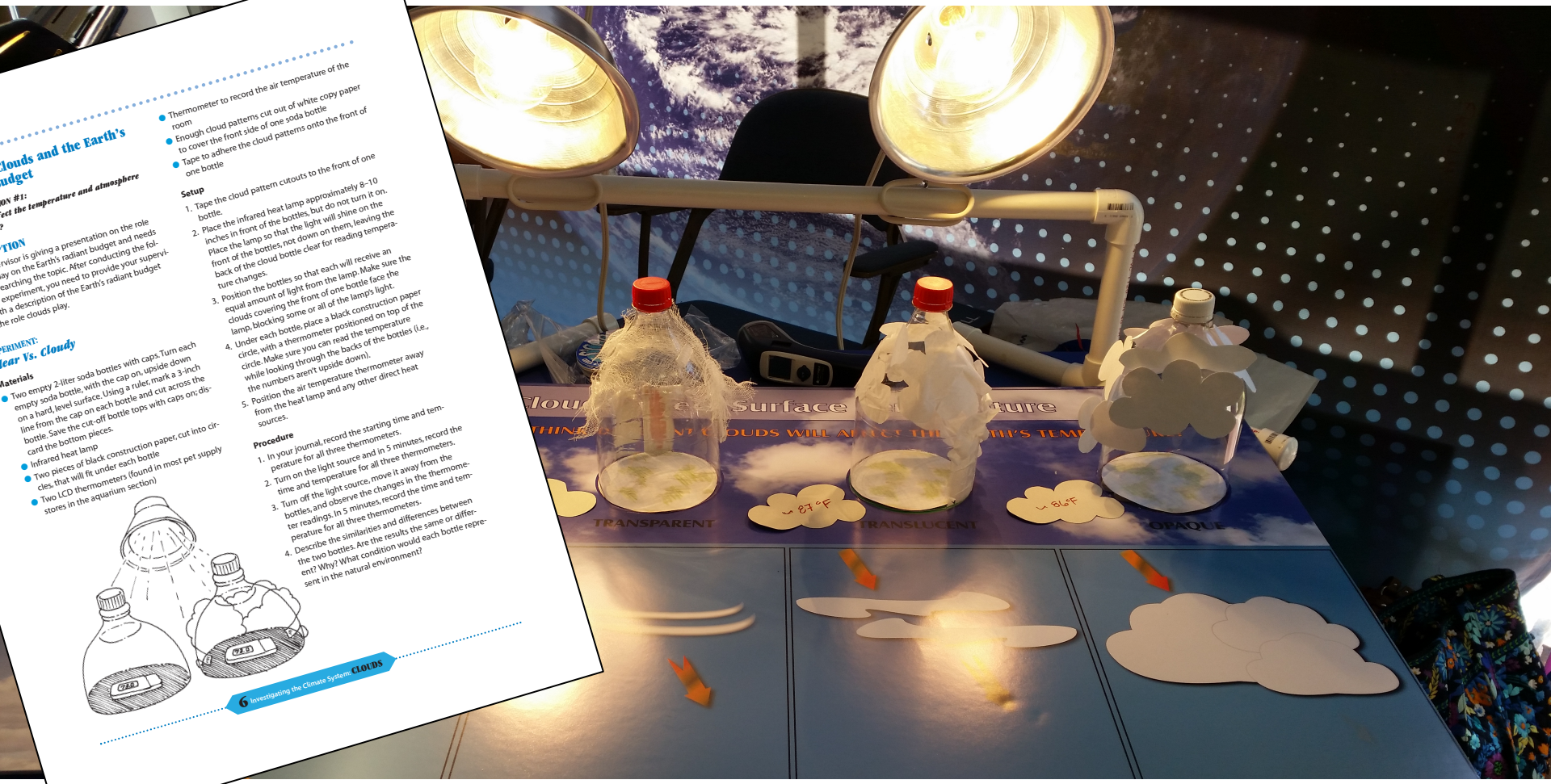
ITEM IS TRANSPARENT, TRANSLUCENT
OR OPAQUE
OPAQUE
SciGirls
or reflect sunlight, clouds greatly affect our weather and climate.
study clouds' visual opacity because they are interested in how much
sunlight they let through to the Earth's surface.
more sunlight that passes through clouds in Earth's atmosphere, the higher
the surface temperature.

THE GLOBE PROGRAM

#GLOBEinCO2016

Cloud Clues



Clouds and the Earth's Budget

ON #1:
ect the temperature and atmosphere
?

TION

rvisor is giving a presentation on the role ay on the Earth's radiant budget and needs earching the topic. After conducting the fol- experiment, you need to provide your supervi- h a description of the Earth's radiant budget he role clouds play.

PERIMENT:
lear Vs. Cloudy

Materials

- Two empty 2-liter soda bottles with caps
- Turn each empty soda bottle, with the cap on, upside down on a hard, level surface. Using a ruler, mark a 3-inch line from the cap on each bottle and cut across the bottle. Save the cut-off bottle tops with caps on; discard the bottom pieces.
- Infrared heat lamp
- Two pieces of black construction paper, cut into circles, that will fit under each bottle
- Two LCD thermometers (found in most pet supply stores in the aquarium section)
- Thermometer to record the air temperature of the room
- Enough cloud patterns cut out of white copy paper to cover the front side of one soda bottle
- Tape to adhere the cloud patterns onto the front of one bottle

Setup

1. Tape the cloud pattern cutouts to the front of one bottle.
2. Place the infrared heat lamp approximately 8–10 inches in front of the bottles, but do not turn it on. Place the lamp so that the light will shine on the front of the bottles, not down on them, leaving the back of the cloud bottle clear for reading temperature changes.
3. Position the bottles so that each will receive an equal amount of light from the lamp. Make sure the clouds covering the front of one bottle face the lamp, blocking some or all of the lamp's light.
4. Under each bottle, place a black construction paper circle, with a thermometer positioned on top of the circle. Make sure you can read the temperature while looking through the backs of the bottles (i.e., the numbers aren't upside down).
5. Position the air temperature thermometer away from the heat lamp and any other direct heat sources.

Procedure

1. In your journal, record the starting time and temperature for all three thermometers.
2. Turn on the light source and in 5 minutes, record the time and temperature for all three thermometers.
3. Turn off the light source, move it away from the bottles, and observe the changes in the thermometer readings. In 5 minutes, record the time and temperature for all three thermometers.
4. Describe the similarities and differences between the two bottles. Are the results the same or different? Why? What condition would each bottle represent in the natural environment?

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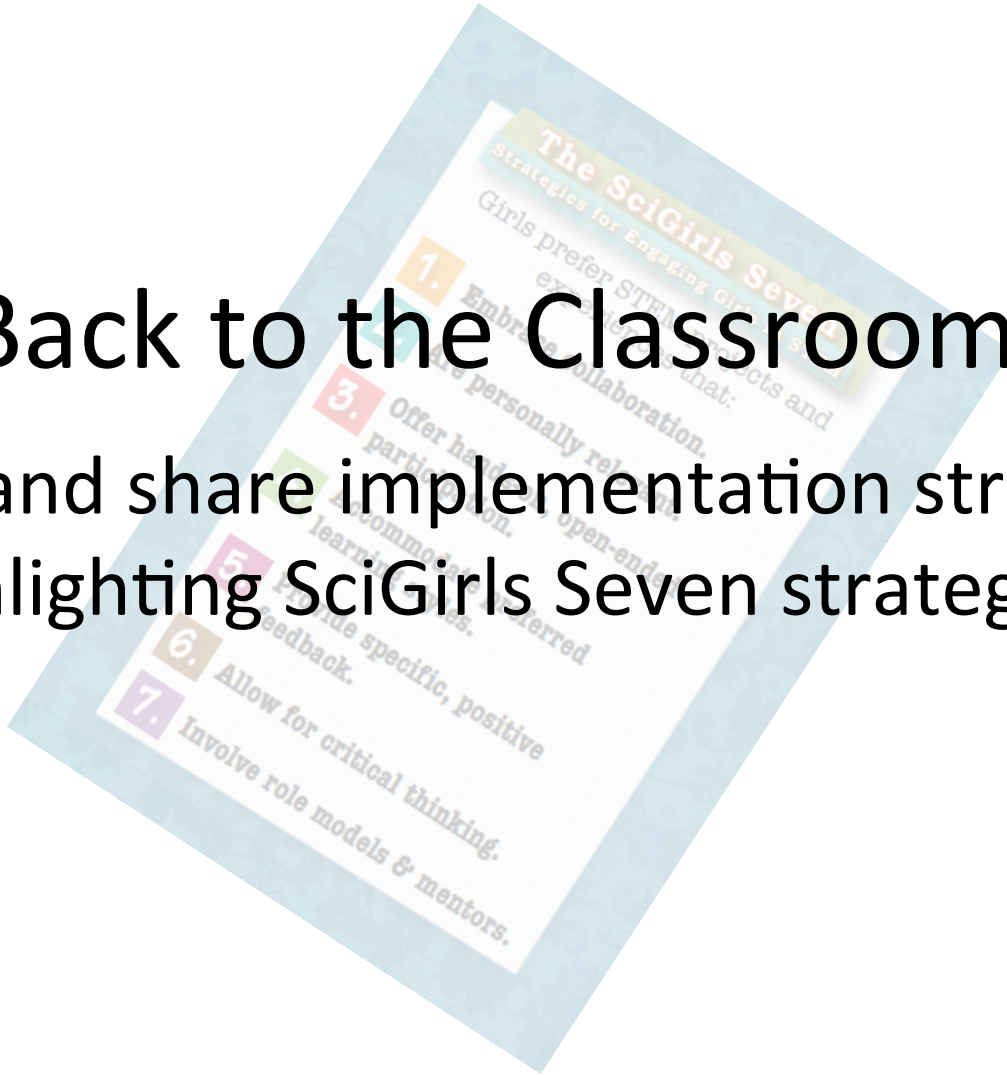


Back to the Classroom

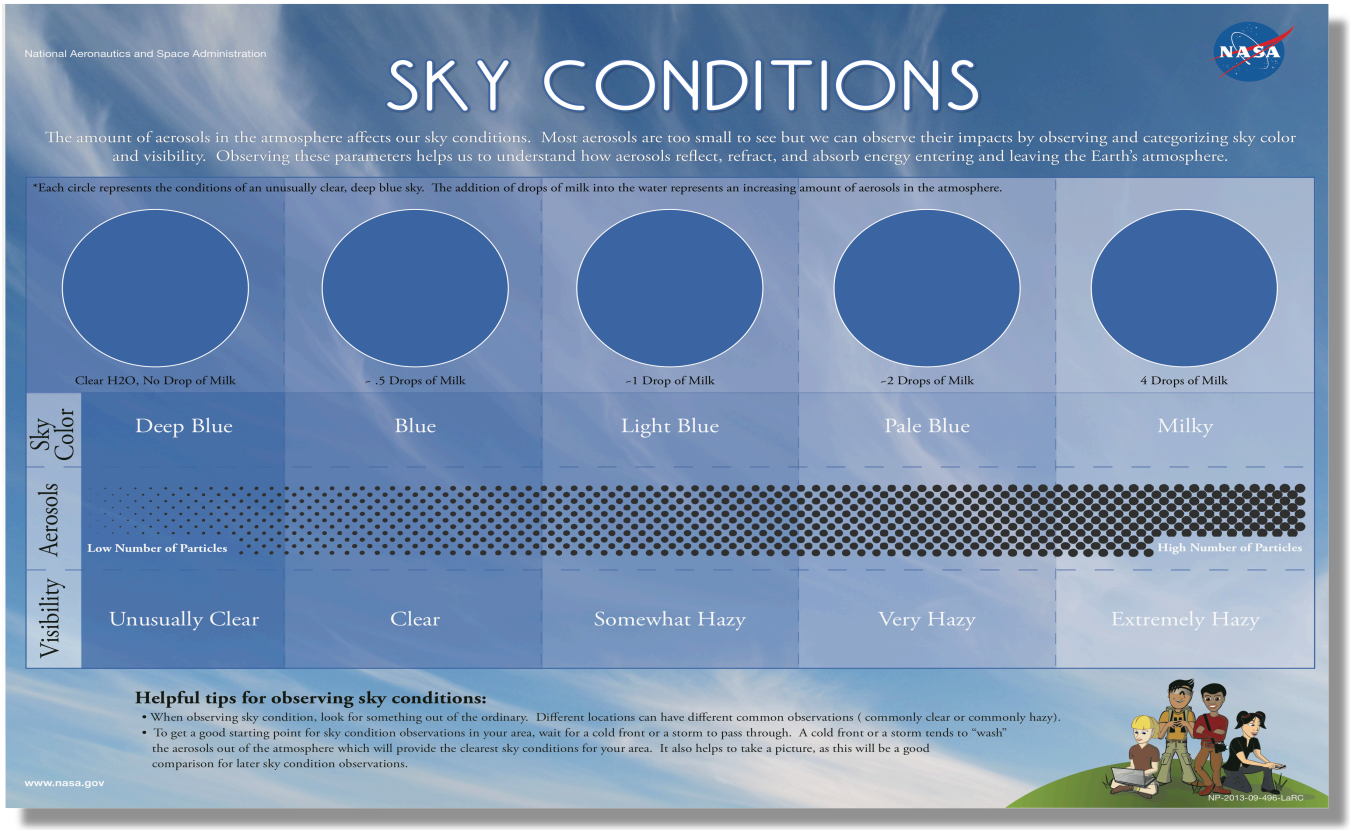
Discuss and share implementation strategies, highlighting SciGirls Seven strategies

Additional Activities

Hands-On: S'COOL Cloud Teller

This activity prepares students for S'COOL Cloud observations, cloud cover, identification, and classification.

Additional Activities



Hands-On: Sky Conditions

This activity introduces sky condition parameters (color and visibility) in relation to aerosols and how to observe them.

Thank you!

Any Questions? Please email the NASA Clouds Team at scool@lists.nasa.gov

S'COOL Website: http://scool.larc.nasa.gov/

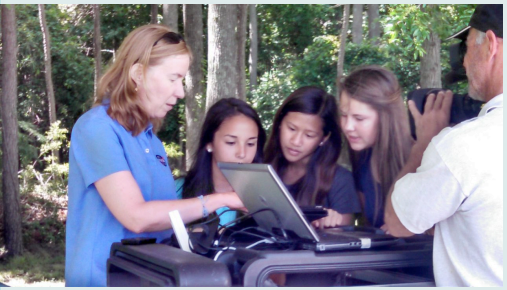
NASA SciGirl Activity: http://scool.larc.nasa.gov/cgi-bin/activities.cgi

To register: http://science-edu.larc.nasa.gov/SCOOL/register/

Sarah McCrea: sarah.mccrea@nasa.gov

STAY TUNED FOR SCOOL GLOBE INTEGRATION UPDATES!

SciGirls SkyGirls Episode



Dr. Lin Chambers reviewing weather balloon data with SciGirls

Dr. Travis Knepp launching a weather balloon with SciGirls

Dr. Yolanda Roberts, selected as the SciGirls Science Mentor

SciGirls, PBS Kids TV show, aims to spark girls' (8-12) curiosity in STEM

- Has reached over **14 million** girls, educators, and families – **most widely accessed** girls' STEM program available
- 2011 & 2013 nominated in 3 Daytime Emmy Awards categories including **Best Children's Series**
- 2011: **Won Emmy Award for New Approaches**

NASA LaRC hosted 5-person *SciGirls* crew and cast of 3 girls (Age 14) Monday, June 23rd, 2014. Dr. Roberts highlighted her work and NASA LaRC through the following collaborations:

- Greg Mekkes (8ft Wind Tunnel): Hands-on IR camera demonstration about infrared and visible radiation
- Dr. Travis Knepp: Weather balloon launch and atmospheric profile data analysis
- Dr. Lin Chambers: Discussion of S'COOL Observations relevance in science research
- David Mercer and Dave Brewer (Structures & Materials): Inflatable Habitat tour
- VA Air and Space Center: Provision of 12 ft. column to showcase the cast girls' final project

Science Directorate staff Yolanda Roberts, Lin Chambers, and Sarah Crecelius provided science content for the episode on clouds, weather, and S'COOL. This episode is set to air in early 2015.

SciGirls observing the clouds for the S'COOL Project

SciGirls Education and Outreach

On Sunday April 12th, 2015, the **CERES S'COOL Project hosted a viewing party for the premier of PBS's SciGirls Program**, Season 3/Episode 3, featuring Citizen Science: The S'COOL Project and 3 local middle school students.

The event took place at the Virginia Air and Space Center where **over 70 attendees watched the S'COOL episode on the IMAX screen and explored girls in STEM, NASA Earth Science, and NASA opportunities for students.** Exhibits and collaborations included:

- *PBS SciGirls*
- *NASA LaRC Office of Education and Students Opportunities (DEVELOP)*
- *LaRC Science Directorate E/PO (MY NASA DATA, SAGE III on ISS, CERES S'COOL, and CALIPSO)*
- *Women in STEM/NASA LaRC Women's Informal Network*

SciGirls Training

LaRC SD E/PO team member Sarah Crecelius attended the SciGirl's Year 4 training session May 13th-15th, 2015 in St. Paul Minnesota. The Science Directorate E/PO can now offer Educator/Role Model trainings providing strategies and best practices for engaging girls and the public in STEM focused around NASA missions ad materials. Through this collaboration we have joined a larger network of over 40 trainers and institutions around the United States and the National Girls Collaborative Project, sharing STEM products and engagement strategies.

On July 1st, 2015 SciGirls Trainers Sarah Crecelius and Jessica Taylor held a pilot Role Model Training course for 18 members of the Women's Informal Network at NASA Langley.
The agenda included:

- An Overview of the SciGirls Seven, seven research proven strategies for engaging Girls in STEM
- Utilizing the SciGirls Seven in a Role Model position
- Real life scenarios on how to incorporate these strategies into career activities and day-to-day experiences.
- Gathering feedback on the training course to build a valuable training resource for NASA

Participants received a SciGirls Role Model guide booklet and SciGirls activities and resources supporting SciGirls Citizen Science Season and highlighting Episode 3 – *Clouds & Satellites* which features the NASA CERES S'COOL Project.