

# MARS MISSION AND NASA EDUCATOR RESOURCES

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NORTH DAKOTA SPACE GRANT CONSORTIUM



# MEET THE SPACE GRANT TEAM!

- Director, Jim Casler
- Deputy Director, Caitlin Nolby
- Coordinator, Marissa Saad

Come visit us at UND, in the Space  
Studies Department in Clifford Hall!



# WORKSHOP GOALS

## You will be able to:

- Confidently conduct today's activities in your own classroom.
- Better understand concepts regarding space sciences.
- Effectively communicate in teams to successfully complete a mission to Mars.
- Save Mark Watney!



The background is a solid dark red color. In the four corners, there are decorative elements consisting of thin, light red lines that resemble circuit traces or a stylized atomic structure. These lines connect to small, empty circles. The top-left and bottom-left corners have more complex, branching patterns, while the top-right and bottom-right corners have simpler, more linear patterns.

ROCKETS TO THE RESCUE!









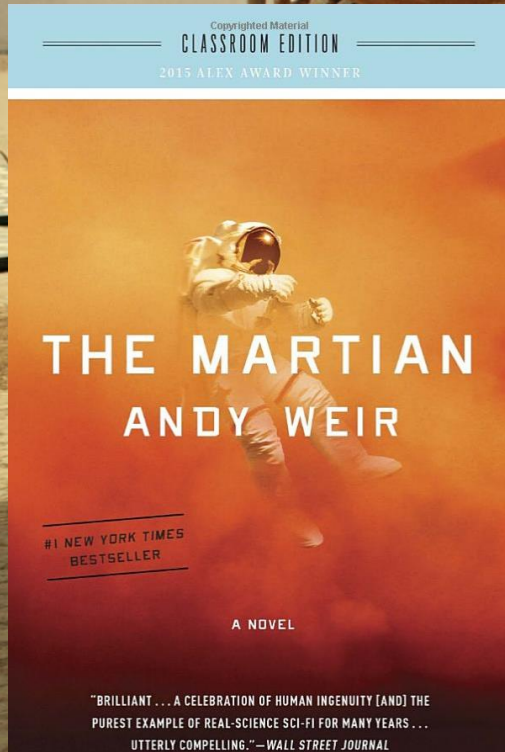












Classroom-appropriate novel  
(not the movie!)





# ROCKETS TO THE RESCUE

- Goal: Build and launch a rocket, keep your payload intact, and save Mark Watney!
- Launch your payload to Mars!
- What will be *your* team's strategy?



4-H  
NATIONAL  
YOUTH  
SCIENCE DAY



4-H NATIONAL YOUTH SCIENCE DAY

**ROCKETS  
TO  
THE RESCUE**



# ROCKETS TO THE RESCUE

## CRITICAL THINKING QUESTIONS

1. Was your rocket successful?
2. Take a look at other teams' designs. What materials did they use? Did their results differ from yours? Describe the outcomes.
3. How did gravity affect your design?
4. What should scientists consider when selecting materials? (think of sizes, weight, composition of the atmosphere, etc.)
5. Extra consideration: Integrate this activity into the classroom – add budgets, weight restrictions, competition between NASA centers, etc.
6. What shapes were the most aerodynamic? Are these necessarily the best designs?

# NASA EDUCATION

The screenshot shows the NASA Education website for educators. The top navigation bar includes links for Topics, Missions, Galleries, NASA TV, Follow NASA, Downloads, About, and NASA Audiences, along with a search bar. The main header features a large image of Earth from space with a pencil graphic and icons for science, technology, and math, including the equation  $E=mc^2$ .

**For Educators**

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**For Educators:**

- [Grades K-4](#)
- [Grades 5-8](#)
- [Grades 9-12](#)
- [Higher Education](#)
- [Informal Education](#)
- [Current Opportunities](#)

**Related Topics**

- [All Topics A-Z](#)

**Space Station**  
NASA Astronauts Headline Public Events in Washington Area

**EXPRESS**  
Subscribe: Weekly Email Highlighting Education Opportunities

**Current Opportunities for Educators**  
Browse the STEM-related professional development opportunities, webinars, workshops, and ways for you and your students to get involved with NASA.

**Search Educational Resources**  
Search hundreds of resources by subject, grade level, type and keyword. These lesson plans and teaching materials support your STEM curriculum.  
[A-Z List of Publications](#)  
[A-Z List of Websites](#)  
[Educator Resource Centers](#)

**Benefits to You**  
NASA, UN Photo Competition Highlights #WhySpaceMatters on

**Journey to Mars**  
NASA Celebrates Martian New Year in Mars, Pennsylvania

**K-4**  
Educators K-4



[Topics](#)[Missions](#)[Galleries](#)[NASA TV](#)[Follow NASA](#)[Downloads](#)[About](#)[NASA Audiences](#)

## For Students



$$E=mc^2$$

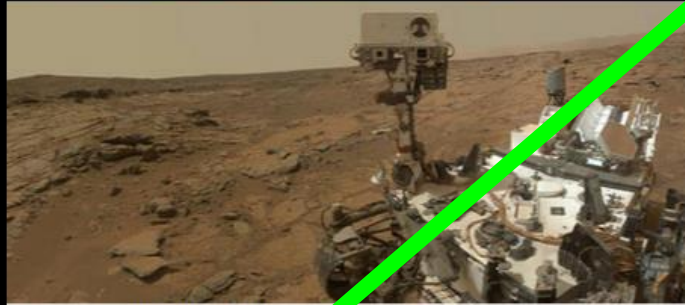
### Follow

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[Grades 5-8](#)[Grades 9-12](#)[Higher Education](#)

### Related Topics

[All Topics A-Z](#)

Explore This: Planetary Explorer



NASA Kids' Club



Explore This: Technology



Now in Space!  
Expedition 44

Expedition 44 is part of a special mission. Scott Kelly and Mikhail Kornienko are staying on the space station for one year!

Planet of the Month: Jupiter -- King of the Planets

# NASA for Students

[Text Only Site](#)

Ready For A Challenge?

Exploration Design Challenge



Join Now!

Mars FunZone




Start Exploring





# Space Math at NASA



National Aeronautics and Space Administration  
Goddard Space Flight Center

Flight Projects | Sciences and Exploration

## Space Math @ NASA

Home

Problem Books

STEM Modules

Inquiry

Math by Grade Level

Math in Science

Math in Engineering

Math in Press Releases

Math by NASA Mission

Articles

### Space Math @ NASA

SpaceMath@NASA introduces students to the use of mathematics in today's scientific discoveries. Through press releases and other articles, we explore how many kinds of mathematics skills come together in exploring the universe.

#### Partnering NASA Missions

**Astrophysics:**

- Chandra - [Click here](#)
- Kepler - [Click here](#)
- James Webb ST - [Click here](#)

**Earth Science:**

- SAGE-III - Under development

**Heliophysics:**

- Hinode - [Click here](#)
- IMAGE - [Click here](#)
- MMS - [Click here](#)
- RBSP - [Click here](#)
- THEMIS - [Click here](#)

**Planetary:**

- Cassini - [Click here](#)
- Dawn - [Mission Math](#)
- EPOXI - [Click here](#)
- InSight - [Click here](#)
- Juno - [Click here](#)

#### Partnering NASA Programs

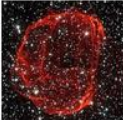
- Eyes on the Solar System - [Click here](#)

### SpaceMath@NASA News Updates


**March:** NASA [Press Release](#) about SpaceMath@NASA- [\[Read Press Release\]](#)  
**July:** New math guide to [Mars Exploration](#) and the Curiosity Rover - [\[Click Here\]](#)  
**August:** Expanded and updated math guide on [Black Holes](#) posted- [\[Click Here\]](#)  
**November:** SpaceMath@NASA served 6,000,000th math problem at the website!  
**December:** New multi-media Grade 6 [Math Modules](#) added- [\[Click Here\]](#)  
**February:** New multi-media Grade 8 [Math Modules](#) added- [\[Click Here\]](#)  
**April:** The 7 millionth Space Math problem is downloaded

#### Math in the News

A behind-the-scenes look at the math in NASA press releases



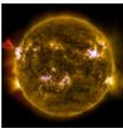
**Problem 517: A Distant Supernova Remnant Discovered**  
Students explore the size and speed of a distant supernova remnant nebula and compare it to the speed of the International Space Station. (PDF)



**Problem 516: Hinode Observes Solar Eclipse from Space**  
Students use the geometry of a solar eclipse to estimate the distance to the sun using simple proportional reasoning. (PDF)



**Problem 515: Telling Time on Mars**  
Students learn about the difference in time between a martian day and an Earth day, and use this to explore how work schedules change for scientists working with the Curiosity rover on Mars. (PDF)



**Problem 514: Solar Flares and the Stormy Sun**  
Students use simple averaging to explore the sunspot cycle and our sun's changing activity levels in 2012 and 2013. (PDF)

(More problems from 2012-2013)

### Multi-Media Math Modules




**Grades 6, 7 and 8:** Standards-based, multi-media math resources featuring NASA eClips video segments, readings from NASA press releases, online interactive resources, and of course math problems! [\[click here\]](#)


#### Problem Archives

- I - Problems 1 to 38
- II - Problems 39 to 64
- III - Problems 65 to 101
- IV - Problems 102 to 148
- V - Problems 149 to 233
- VI - Problems 234 to 342
- VII - Problems 343 to 428
- VIII - Problems 429 to 478
- IX - Problems 479 to Current



# International Space Station - Live!


[Topics](#) [Missions](#) [Galleries](#) [NASA TV](#) [Follow NASA](#) [Downloads](#) [About](#) [NASA Audiences](#)



## International Space Station

[Space Station](#) [Overview](#) [Images](#) [Videos](#) [Media Resources](#)

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[One-Year Crew](#)  
[SpaceX](#)  
[Orbital](#)  
[Commercial Crew Program](#)  
[Media Contacts](#)  
[Space Station Tour](#)

Related Topics

[Commercial Resupply](#)

Space Station Updates



Station Science Ongoing as SpaceX Launch Slips to June 28  
3 days ago


The three inhabitants of the International Space

INTERNATIONAL SPACE STATION  
OFF THE EARTH, FOR THE EARTH

6058 : 10 : 19 : 10


Station Time in Orbit

Tweets

**Scott Kelly**  
@StationCDRKelly  
1h  
#MondayMotivation  
Color your world.  
Good morning from  
@Space\_Station!  
#YearInSpace  
pic.twitter.com/gp5sC  
Retweeted by Intl.  
Space Station

Tweet to  
@Space\_Station

Commercial Resupply





TV Coverage Set for Seventh SpaceX Resupply Mission to Space Station

Who's on the Space Station Now?

Expedition 44 & One-Year Crew


Commander Gennady Padalka  
Scott Kelly  
Mikhail Kornienko




One-Year Mission

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**ISS HD Earth Viewing Experiment**  
[Follow](#) 85,923 followers



1198 / \$1,039,431


LIVE


Loa


Tweet 115 | 8+1 | 22k


Videos


Social Stream

**jojokitten**  
minertyler100: no problem  
there's more ahead  
12 minutes ago

**minertyler100**  
darn missed the sunrise  
18 minutes ago

**minertyler100**  
WOOOAH  
18 minutes ago

**jojokitten**  
love a good sunrise!  
27 minutes ago

**orion**  
Pedro1961: you have right

FLIGHT


ASTRONAUTS

INTERNATIONAL SPACE STATION

RESEARCH

[ESA > Our Activities > Human Spaceflight > International Space Station](#)

**WHERE IS THE INTERNATIONAL SPACE STATION?**

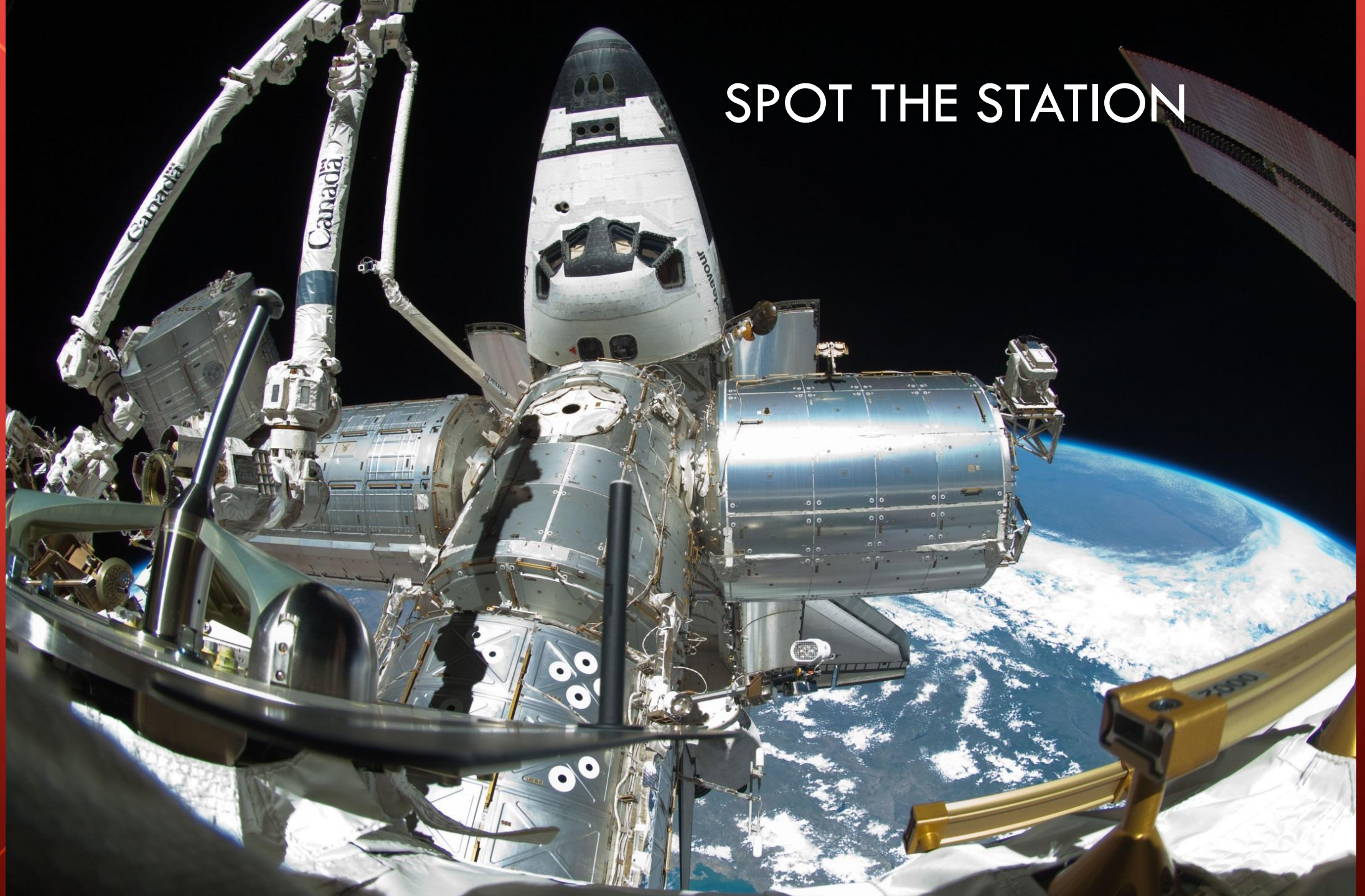


human spaceflight and operations

ces



SPOT THE STATION





# Mars Curiosity Rover





# NASA – Lunar Reconnaissance Orbiter

NASA National Aeronautics and Space Administration  
Goddard Space Flight Center

Flight Projects | Sciences and Exploration

**LUNAR RECONNAISSANCE ORBITER**

Home The LRO Mission Images and Multimedia Science and Data Education and Outreach

**LRO KIDS!**

Get animations, streaming video, cartoon characters, audio narration, interactive games!

**SPACE OPERATIONS LEARNING CENTER**

**Explore! Marvel Moon**

Discover our scientific, cultural, and personal understanding of Earth's

NASA | Wall-E Learns About Proportions

**LRO CRAFTS**

Moon Concentration  
How Good is Your Memory?

Moon Quiz  
Is it a big hunk of cheese? Take quiz and find out!

Moon Cookies  
Make these tasty cookies (no baking required)

Unscramble  
Take the Challenge!  
Unscramble Moon-related graphics

Wordsearch  
Help Us Find Our Lost Lunar Words

Moon Calculator  
How much would you weigh if you lived on the Moon?

Crossword Puzzles  
Answer clues and solve the puzzle

Ask Dr. Marc  
Dr. Marc answers questions asked by visitors about the mission and other topics.

Lunar Cryptograms  
Decode these important

Welcome to the  
**Space Operations Learning Center (SOLC)**

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**SPACE OPERATIONS LEARNING CENTER**

**BEGINNER**

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**Did You Know?**  
Light from the Sun reaches Earth in around 8 minutes.

**Kids Zone 2 Earth Science**  
**Kids Zone 3 Space Station**  
**Kids Zone 4 The Moon**  
**Kids Zone 5 The Sun**  
**Kids Zone 6 Comets, Meteors and Asteroids**

**ADVANCED**

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**SCaN**



# Lunar and Planetary Institute

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## EDUCATION *and* public outreach

[TEACHERS AND FACULTY](#) [OTHER SCIENCE EDUCATORS](#) [PUBLIC](#) [ABOUT US](#)

### Teachers and Faculty

LPI K-12 Teacher Workshops, Institutes, and Field Trips

Exploration of the Moon and Asteroids by Secondary Students

LPI Summer Intern Program

Humans in Space Youth Art Competition

Educator Resources

Education Newsletter

LPI Higher-Education Faculty Programs



Find upcoming LPI teacher trainings in Earth and space science topics, and connect to resources from past workshops and field trips.

### Explore!

#### NEW AND UPCOMING



**Cosmic Explorations: A Speaker Series**  
The Universe is Out to Get Us and What We Can (or Can't) Do About It



**Solar System Exploration Pre-Service Teacher Institute**  
June 23-27, 2014  
Application deadline: June 2



**Mars Through Time Workshop**  
July 8-11, 2014  
at the University of New Mexico



# SciGirls Activities



[About](#) [My Page](#) [Activities](#) [Video](#) [en español](#) [Groups](#) [Learn](#) [Program Resources](#) [Forum](#) [Photos](#)

## Activities

SciGirls has made a commitment to providing quality, gender-equitable, inquiry-based STEM activities that are fun for all! Check out the activities under the following topic areas:

[Earth & Space](#)  
[Engineering](#)  
[Health](#)  
[Life & Environmental](#)  
[Physics & Chemistry](#)  
[Technology](#)

Download the complete guides from Season Three:



SciGirls Participate: Citizen Science Adventures  
 Public participation in scientific research, also known as citizen science, engages ordinary people (kids and adults) in the collection of data for use by research scientists. The activities in this book support and prepare your girls for participation in citizen science.

Download the complete guides from Season Two:

Welcome to  
SciGirls CONNECT

[Sign Up](#)  
or [Sign In](#)

SciGirls on Facebook

Like

SciGirls on Twitter

Follow

Tweets

PBS LearningMedia @PBSLrnMedia 8h

What kind of stuff is preserved in a bog?  
 @SciGirls activity/video describes functions of unique wetland environment.

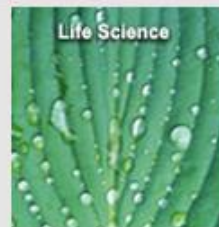




# NASA Summer of Innovation

## What to Consider When Selecting Content

### Themed Units



Life Science



Physical Science



Earth & Space Science



Engineering

### Grades 4-6

#### Life Science

- Body
- Food
- Life Out There?
- Plants
- Survival

#### Physical Science

- Aeronautics
- Force and Motion
- Gravity
- Properties of Matter
- Waves and Optics

### Grades 7-9

#### Earth and Space Science

- Climate and Seasons
- Destination Mars
- Earth Moon Systems

#### Engineering

- Aeronautics
- Challenges
- Design Process

## Themed Camp Guides



### Aeronautics Camp

This camp centers on the mathematical and design principles of flight design.



### Designing for Space Camp

This camp centers on developing an appropriate learning progression that focuses on the concepts necessary to learn about engineering.



### Life Science Camp

This camp centers on the characteristics of living things, astrobiology, exoplanets and adaptations to the space environment.



# NASA Discovery Program



## Space School Musical

Hannah is trying to finish her science project - a model of the solar system. But there's a problem: it's due tomorrow, she's not finished yet, and it's past her bedtime. How will she get it done? With a little help from her friends – the most talented troupe in the Milky Way!

### SONGS

WATCH VIDEOS & SING ALONG

### ACTIVITIES

CROSS-CURRICULAR & FUN

### GALLERY

PHOTOS & VIDEOS

### PRODUCE

YOUR OWN MUSICAL



Join Hannah on a trip through the solar system in this ultra-cool edu-tainment "hip-hopera" that is out of this world! Move and groove along with the planets, moons, meteors, comets, asteroids and even some rockin' scientists as they sing, dance and serve up the freshest facts in the galaxy. *Space is definitely one cool place.*





# NASA Educator Professional Development Collaborative

**CAST Conference**  
11/09/2017 from 01:00 pm - 04:00 pm ET  
Houston Texas  
*Presented by: Susan Kohler*

**Earth Sense – Remote Sensing at NASA: My NASA Data**  
Educators in Grades 4-12  
11/13/2017 from 06:30 pm - 07:30 pm ET  
*Presented by: John Weis, Facilitator and Presenter*

**Space Mathematics: Linking Math and Science**  
Educators in Grades 5-8  
11/14/2017 from 06:30 pm - 07:30 pm ET  
*Presented by: John Weis, Presenter*

**Earth Sense: the Scoop on Soil**  
Educators in Grades 4-10  
11/15/2017 from 05:00 pm - 06:00 pm ET  
*Presented by: Susan Kohler*

**Earth Sense – COMETS**  
Educators in Grades K-12  
11/16/2017 from 05:30 pm - 06:30 pm ET  
*Presented by: Dr. Karen Crow-Roark*

**Earth Sense – Remote Sensing at NASA: Sally Ride EarthKAM**

**ARCHIVES**

October 2017  
September 2017  
August 2017  
July 2017  
June 2017  
May 2017  
April 2017  
March 2017  
February 2017  
January 2017  
December 2016  
November 2016  
October 2016  
September 2016  
August 2016  
July 2016  
June 2016  
May 2016  
April 2016  
March 2016  
February 2016  
January 2016  
December 2015  
November 2015

UPCOMING EVENTS: Nov 02 – Earth Sense – Remote Sensing at NASA: For Your Eyes Only – Educators in Grades 5-8 at 06:00 pm ET -

**NASA EPDC** STEM EDUCATOR PROFESSIONAL DEVELOPMENT COLLABORATIVE

The NASA STEM Educator Professional Development Collaborative is a project led by Texas State University in collaboration with NASA.

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**Digital Badging »**

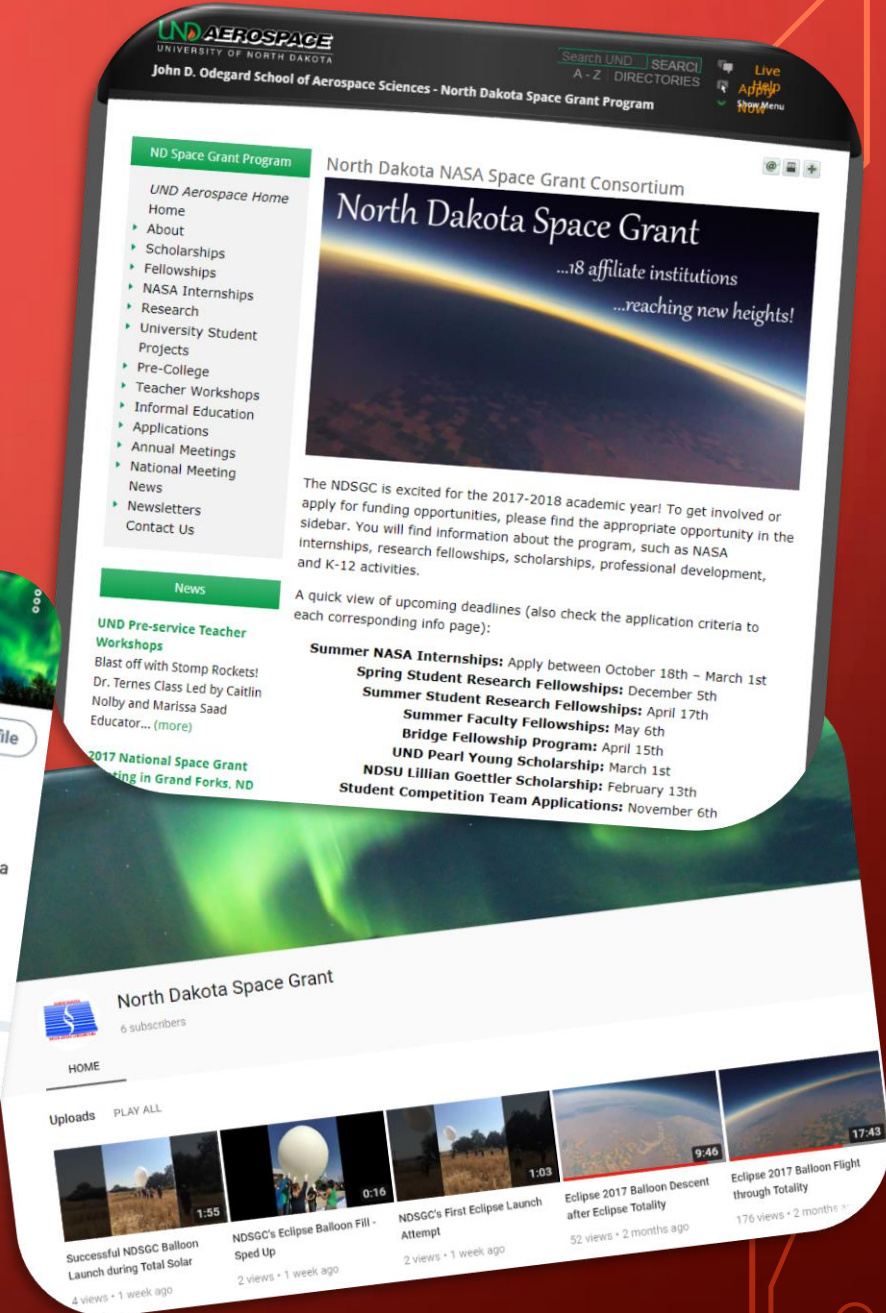
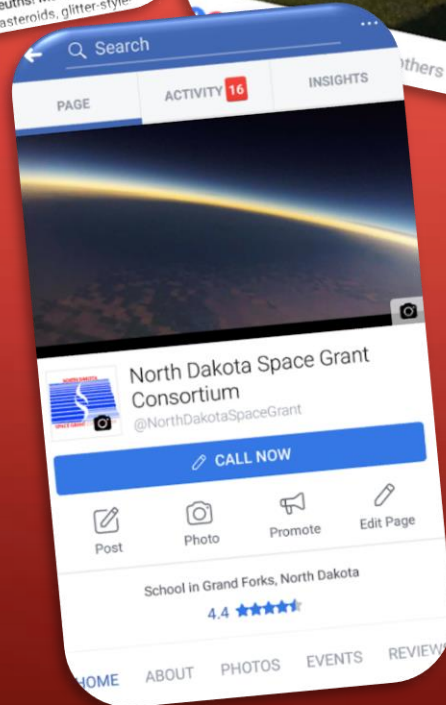
**NASA MEI »**

**NASA MSI Emerging Stars Network »**

**2016 NASA EPDC Annual Report »**



NDspacegrant.und.edu





# NDSGC K-12 Educator Email Listserv

- Workshop opportunities
- New STEM education resources for the classroom
- NASA student contests/team competitions
- Professional Development opportunities
- Emails ~once a week



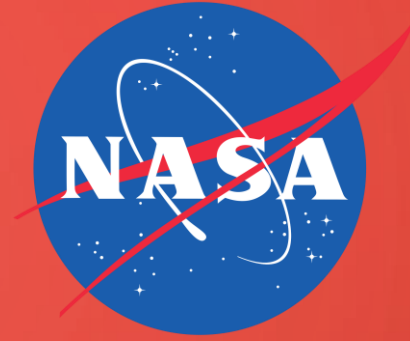


# NEAR-SPACE BALLOON COMPETITION

- Annual competition each fall semester
- Open to student teams grades 6-12
- Middle and high school students create their own science/engineering project
- Launches on a 1500-gram balloon, reaching 100,000 feet
- <http://blogs.und.edu/nsbc>







# MARS MISSION AND NASA EDUCATOR RESOURCES

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