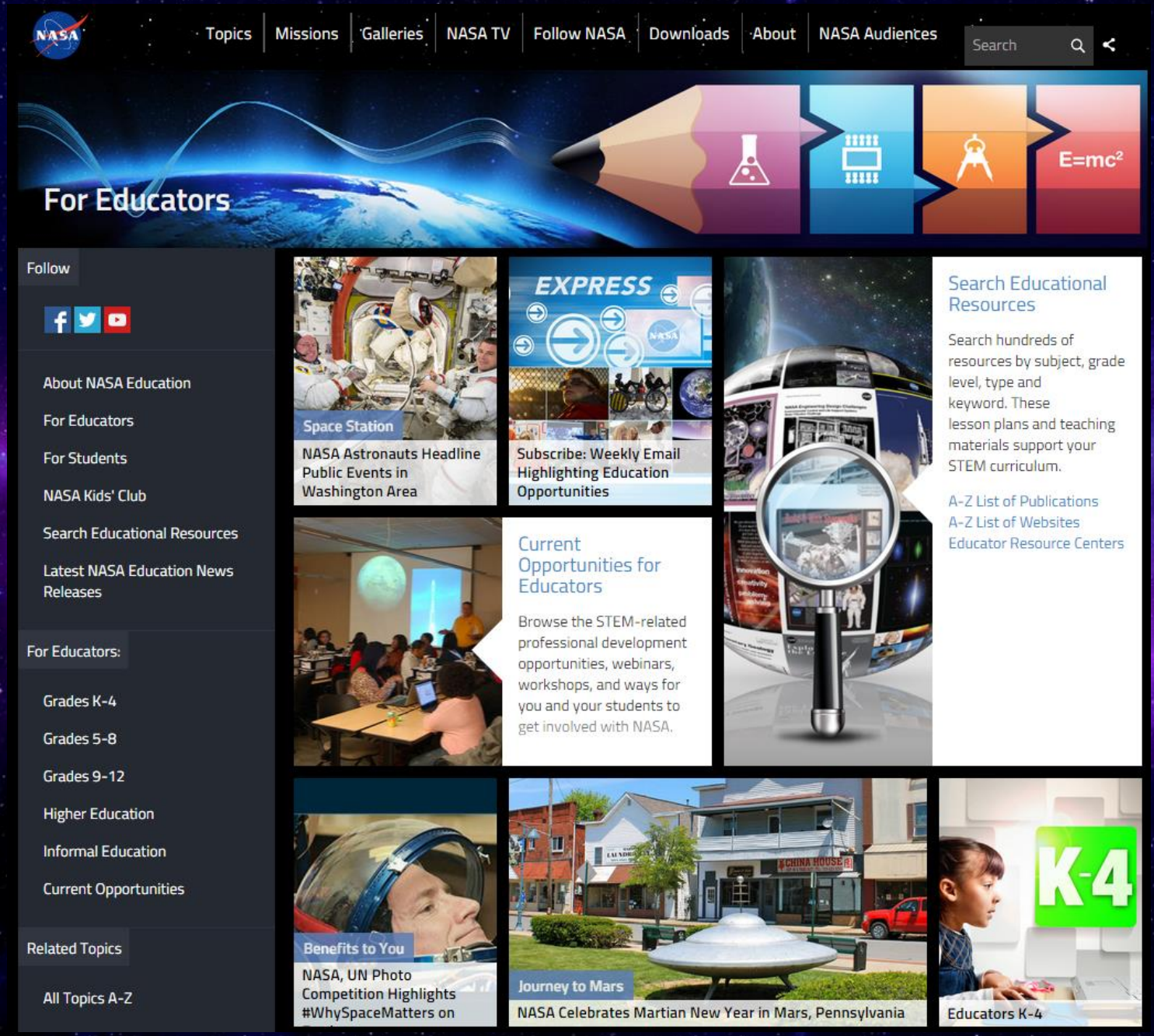
Educator Resources in Space Sciences

Caitlin Nolby and Marissa Saad

North Dakota Space Grant Consortium

NASA Education



NASA for Students

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- For Students
- NASA Kids' Club
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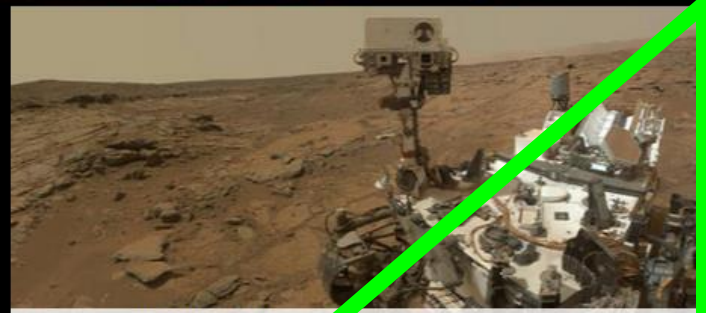
For Students: Grades K-4

- Grades 5-8
- Grades 9-12
- Higher Education

Related Topics

- All Topics A-Z

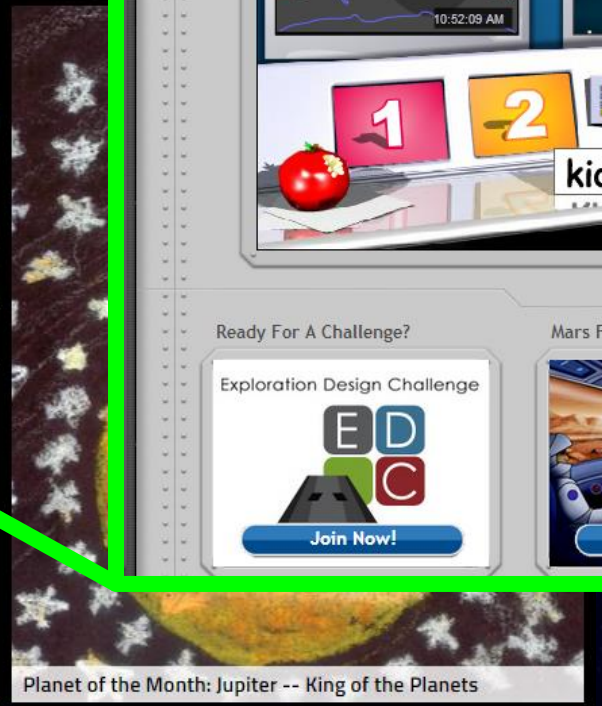


NASA Kids' Club

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

Space Math at NASA

National Aeronautics and Space Administration
Goddard Space Flight Center

GO

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 todays 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

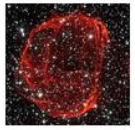
- Eyes on the Solar System - Click here

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 suns changing activity levels in 2012 and 2013. (PDF)

(More problems from 2012-2013)

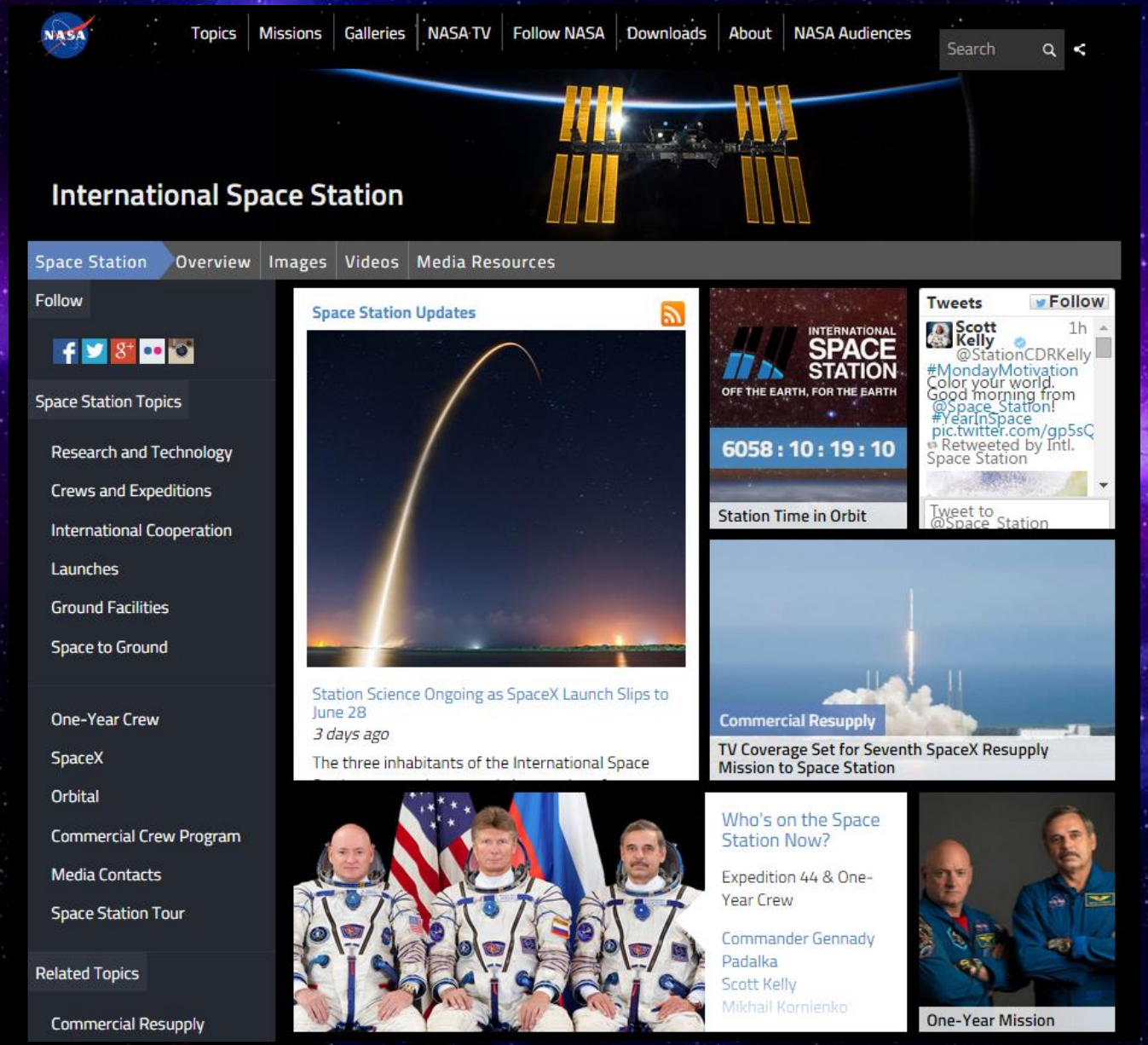
Multi-Media Math Modules

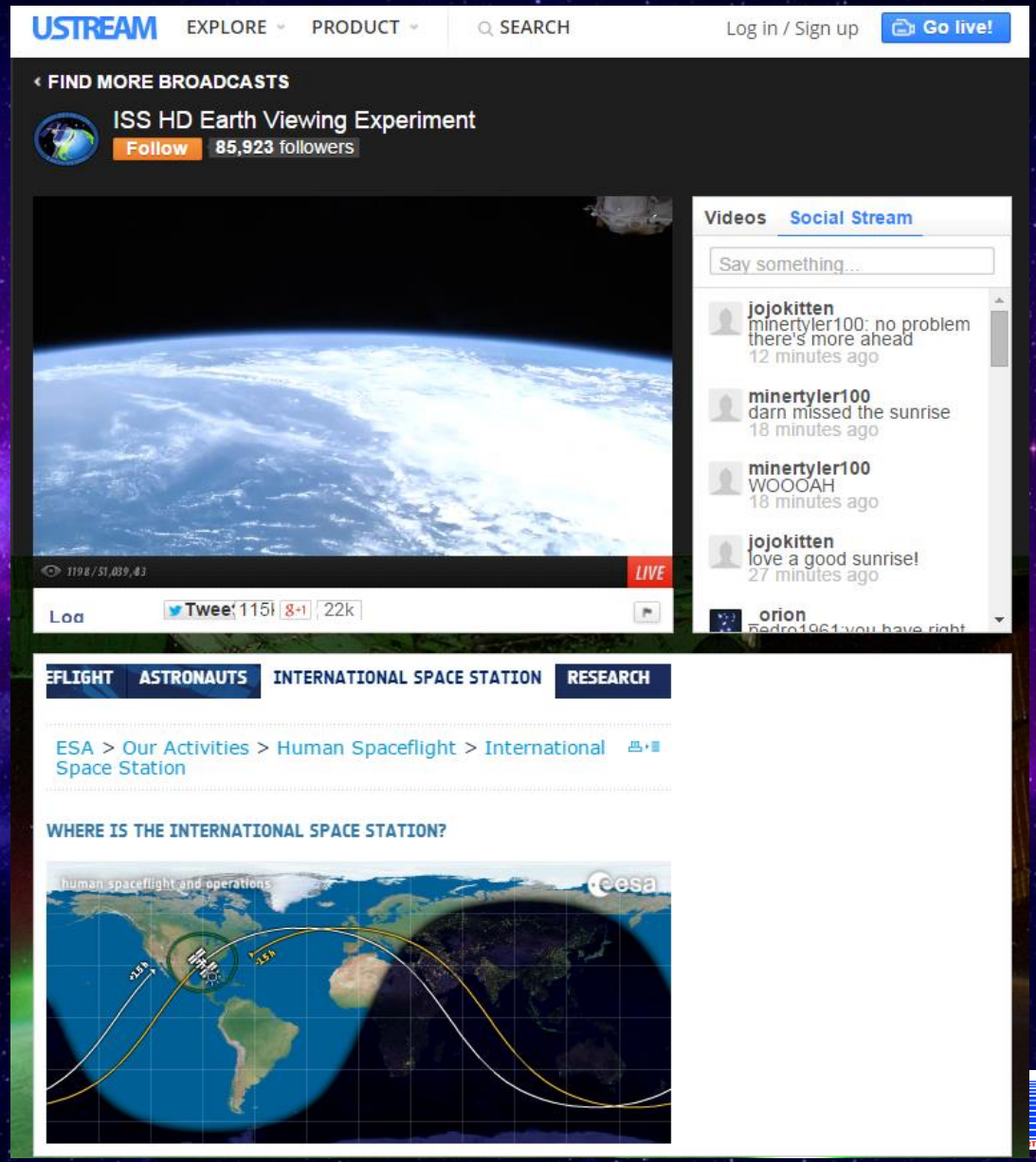
Grades 6, 7 and 8: Standards-based, multi-media math resources featuring NASA eClips video segments, readings from NASA press releases, online interactive resources, and of course math problems!
[click here]

Problem Archives

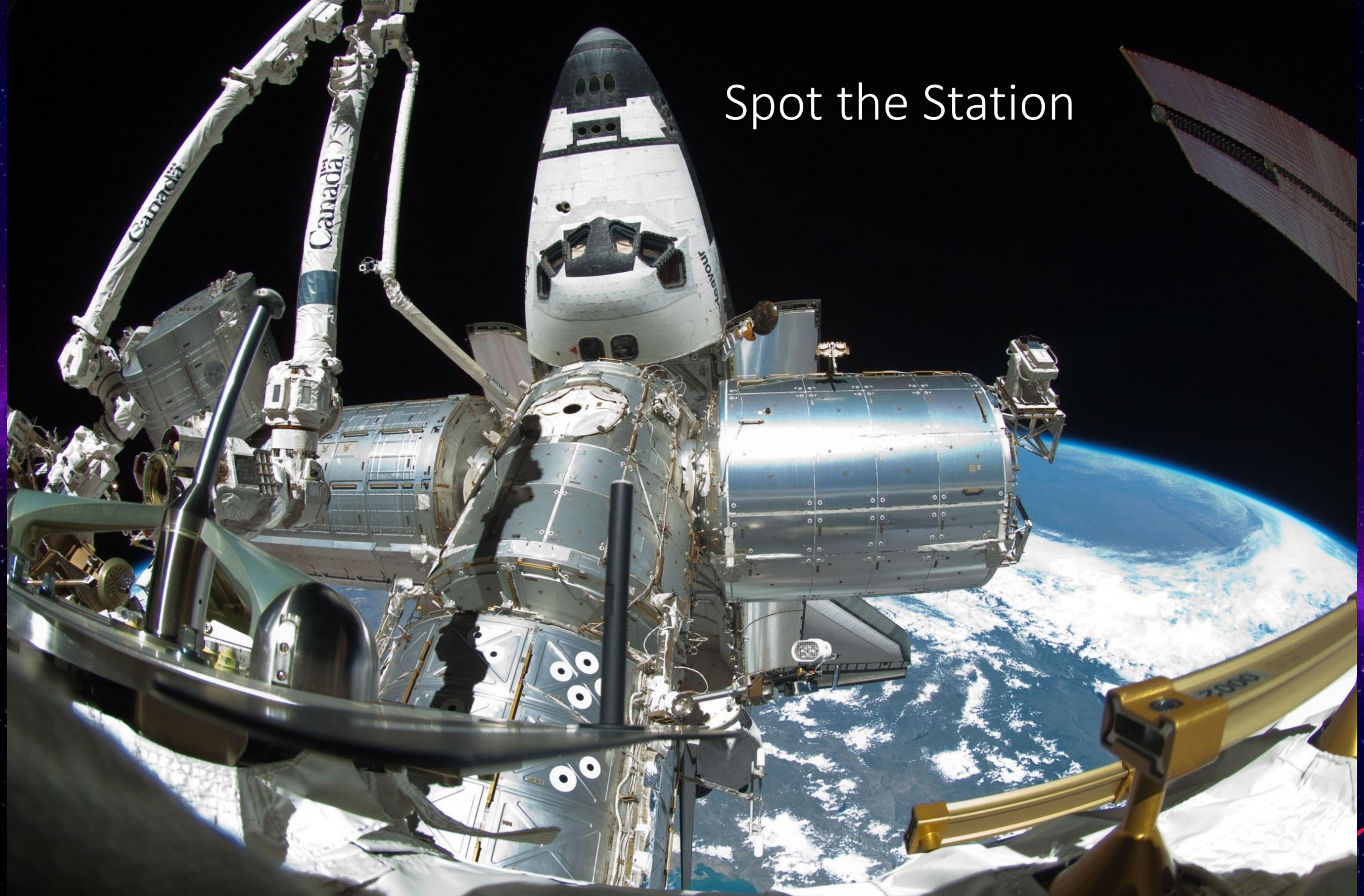
- I - Problems 1 to 38
- II - Problems 39 to 64
- III - Problems 65 to 101
- IV - Problems 102 to 148
- V - Problems 149 to 233
- VI - Problems 234 to 342
- VII - Problems 343 to 428
- VIII - Problems 429 to 478
- IX - Problems 479 to Current

International Space Station - Live!



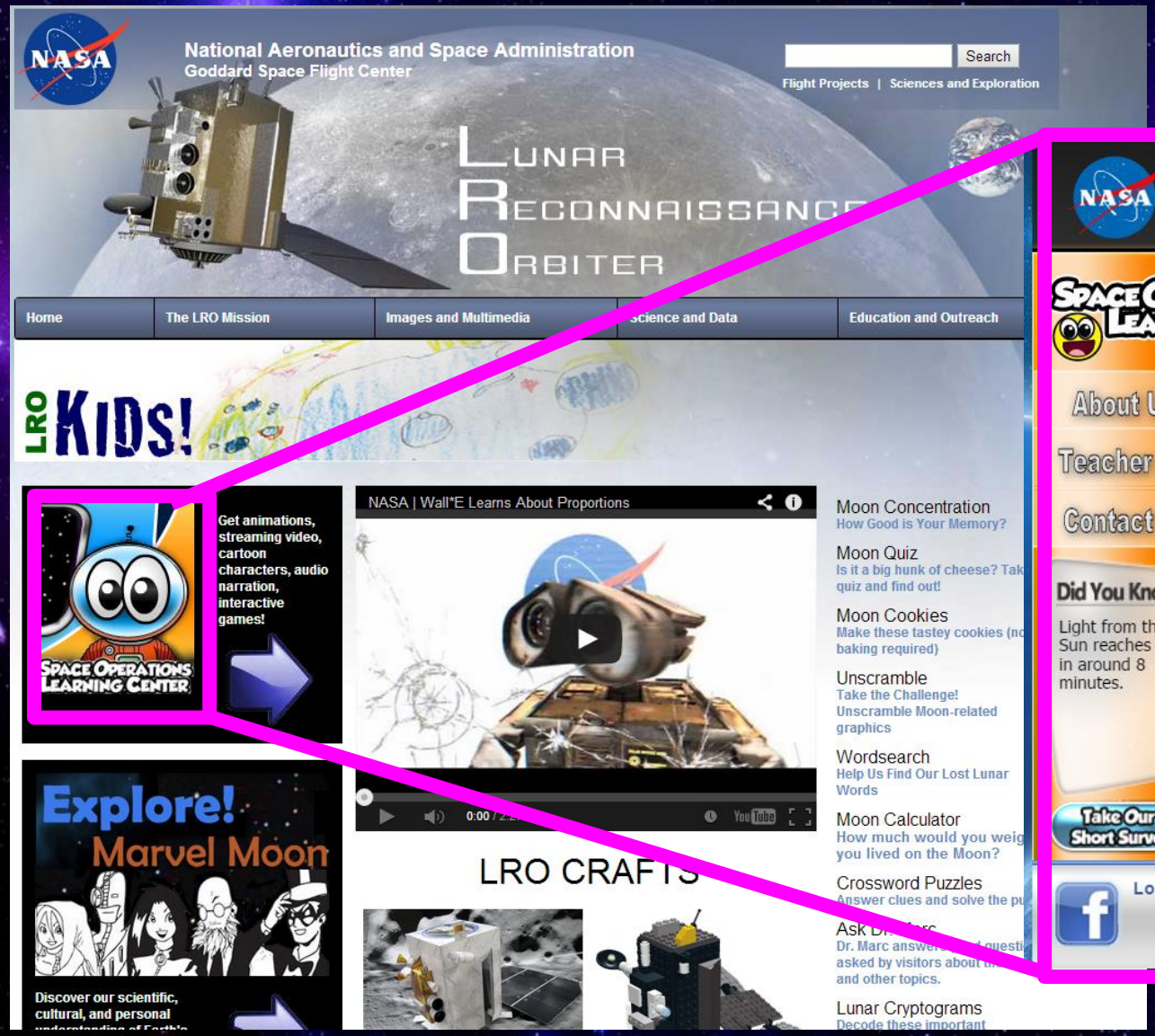


Spot the Station



Mars Curiosity Rover

NASA – Lunar Reconnaissance Orbiter



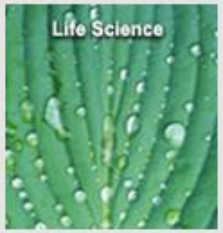
Lunar and Planetary Institute

SciGirls Activities

NASA Summer of Innovation

What to Consider When Selecting Content

Themed Units



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

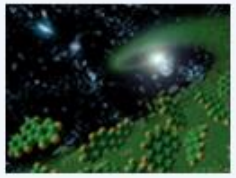
Themed Camp Guides

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

Discovery Program

Home
Program
Missions
News
Education
Multimedia
Small Worlds

Upcoming Mission Events

Dawn Orbit Insertion

ART & THE COSMIC CONNECTION

Mission Milestone Interactive

At A Glance

Discovery & New Frontiers Newsletter Archives

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HOME

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Discovery & New Frontiers News

Cosmic Art in Action!
New Activity Blends Science and Art, Spurs Creative Thought Processes

Onward to Ceres
Ion Propulsion Powers Dawn Through the Asteroid Belt

Looking Back at Us
MESSENGER Takes Image of the Earth

MESSENGER to Snap Earth
Mercury Orbiter Will Take Images of Earth and Moon

Read All about It!
Latest Discovery and New Frontiers Newsletter Now Online

Space School Musical
The solar system comes alive!

Exo's Discovery
Let the journey begin...
Take the controls and explore with Exo!

Image Impact

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.*

North Dakota Space Grant

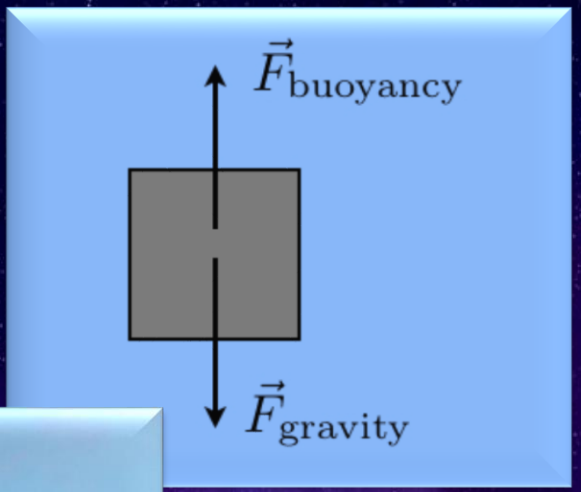
MayPort CG team members pictured are: Lance Johnson, Andrew Fugleberg, Marcus Dale, Gracy Leland, Sterling Minkler, and Joshua Weaver.

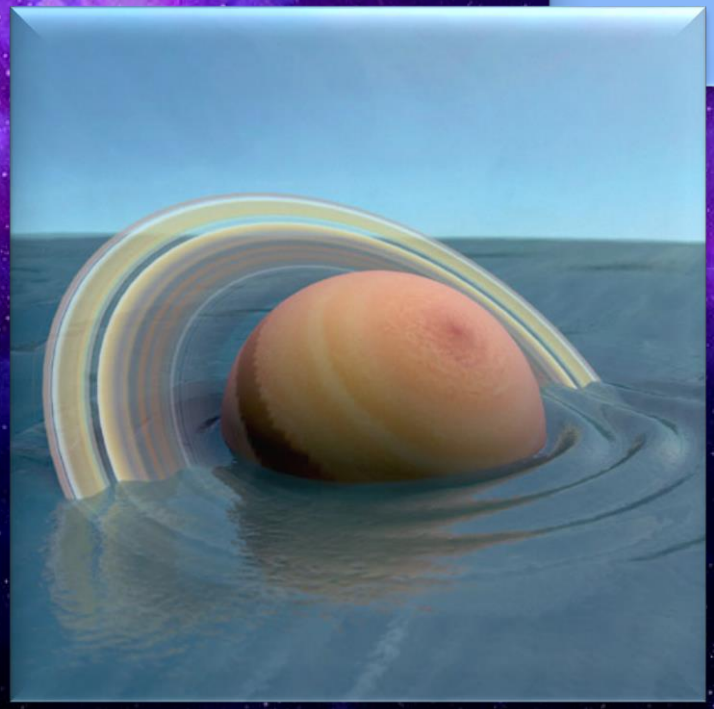
NDSGC K-12 Educator Email Listserv

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

SciGirls Deep Sea Diver

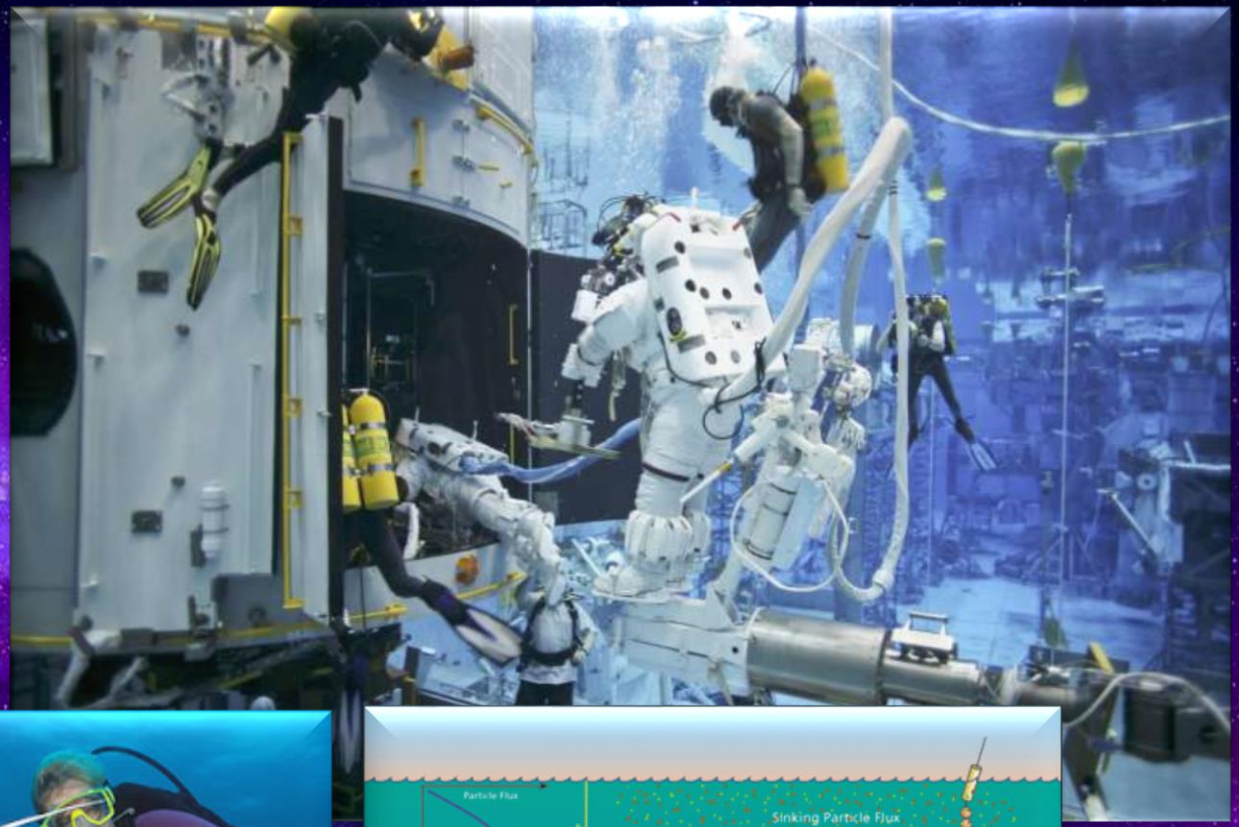
- Objective: Design and Build a Neutrally Buoyant Object
- What does it mean to be neutrally buoyant?
- Balancing act between forces
- Densities are equal
- Which planet would “float” in a giant pool of water?

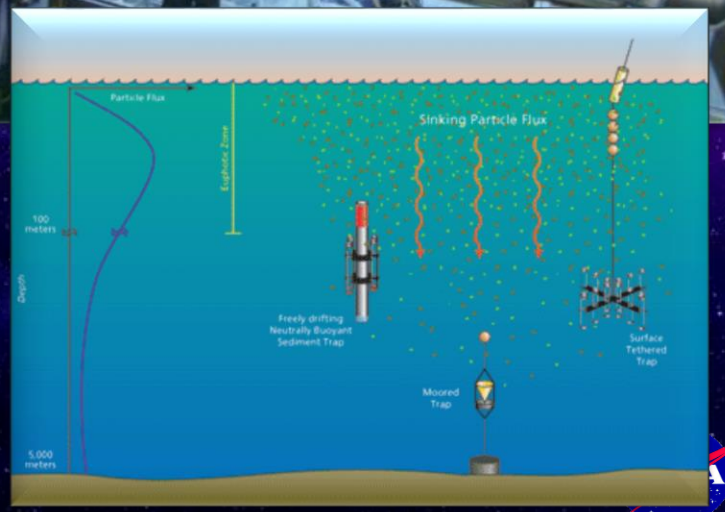




SciGirls Deep Sea Diver

- Why? Real World Applications?
- NASA's Neutral Buoyancy Laboratory
- Scuba divers
- Submarines
- Fish
- Science! –Taking ocean measurements





SciGirls Deep Sea Diver

1. Season 2, episode 1: *Aquabots*
2. Challenge: NASA is currently preparing for long-duration spaceflight (Mars or asteroid) and needs to practice procedures in the NBL. They need to select a contractor to design and build neutrally buoyant tools for training.
3. Make predictions on given materials
4. Design your “deep sea diver”
5. Collaborative Design Review
6. Final Presentations

SciGirls Deep Sea Diver

1. Reflect – what worked? What didn't?
2. Would this work in the ocean? Fresh water?
3. What would real life astronauts and divers use to make them neutrally buoyant?
4. How does density affect buoyancy?
5. How is it possible for a huge boat, such as a cruise ship, to weigh so much?
    1. (it is not as heavy as the volume of water that it displaced)
6. What is water displacement? How does that affect buoyancy?