

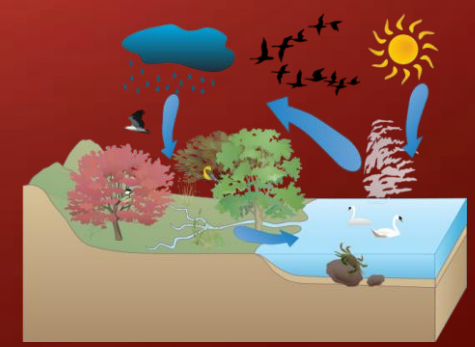
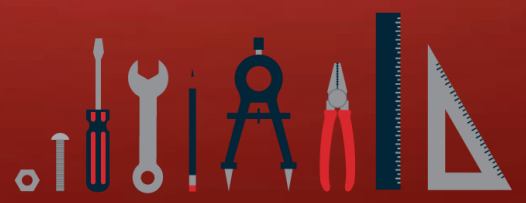
WELCOME STEM AMBASSADORS!

SEPTEMBER 17, 2016

JIM CASLER, MARISSA SAAD, AND CAITLIN NOLBY

NORTH DAKOTA SPACE GRANT CONSORTIUM

$$E=mc^2$$



MEET THE SPACE GRANT TEAM!

- Director of Space Grant, Jim Casler
- Deputy Director, Caitlin Nolby
- Coordinator, Marissa Saad



INTRODUCTORY ACTIVITY

- You will likely be completing many activities together, so let's get to know each other!
- Write down:
 - Name
 - Major and College
 - Favorite TV show/book and food
 - Fun fact
 - One expectation for today's training
 - One thing you're looking forward to as a STEM ambassador!



TRAINING DAY: LEARNING OBJECTIVES

You will be able to:

- Confidently conduct today's activities with K-12 students, teachers, and the general public.
- Understand the *SciGirls Seven* and how these teaching strategies can be incorporated into your position as a STEM Ambassador.
- Utilize the proper methods for reporting hours and reimbursement procedures (hey, it's important to get paid for your work!) 😊
- Conduct self-initiated outreach events and effectively lead STEM activities not included in today's training
- Lead engaging tours of the UND Human Space Flight Laboratory (UND students)
- Get excited about your position as a STEM Ambassador!

WHAT DOES A STEM AMBASSADOR DO?

- Help students engage in areas of space exploration and general STEM, by using effective instructional strategies and educational resources, with engaging and inspiring content.



WHAT DOES A STEM AMBASSADOR DO?

- Conduct your own STEM outreach and/or our scheduled activities
 - In 2015-2016:
 - STEM Carnivals
 - Elementary school visits
 - Booth events
 - Library Outreach Events



WHAT DOES A STEM AMBASSADOR DO?

- Teacher Workshops
- High Altitude Balloon Launches
- Super Science Day
- Tours of Human Space Flight Lab
- Star Parties at the Observatory
- Prep time for activities counts too!
- Travel time (only if out of town, e.g. Mayville to Grand Forks)
- Required course “credit hours” do not qualify for SA hours



You'll practice “creating things on the fly”

TIMESHEETS

- \$12/hour
 - Fill out your timesheet, reporting the hours you've worked
 - Timesheets need to include "title" of each activity we can refer to in Google sheet
 - Take pictures at events! If participants did not sign NASA media release form, take pictures of the backs of their heads
 - We will send out Google sheet to keep track of number of individuals reached with description of event (make sure this is up to date before sending in time sheet)
 - UND students – Caitlin will sign it, email it to Bev Fetter (fetter@space.edu)
 - Non-UND students: your advisor will sign it, email it to Bev Fetter





...Or larger events....

Calling Astronaut Tim Kopra while he was on the ISS!

Learning how to control mass groups! 3.....2....1 ... Blastoff!

TINA MONETTE

- STEM Ambassador paperwork



The image features a solid red background with decorative circuit-like lines in a lighter red shade. These lines are located in the four corners, forming abstract patterns of lines and circles that resemble a printed circuit board or a network diagram. The central text is white and reads "SCIGIRLS!".

SCIGIRLS!

- To change how millions of girls (ages 8-13) think about STEM
- It's on PBS, Netflix, Youtube, etc.!



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



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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)



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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)



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



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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)



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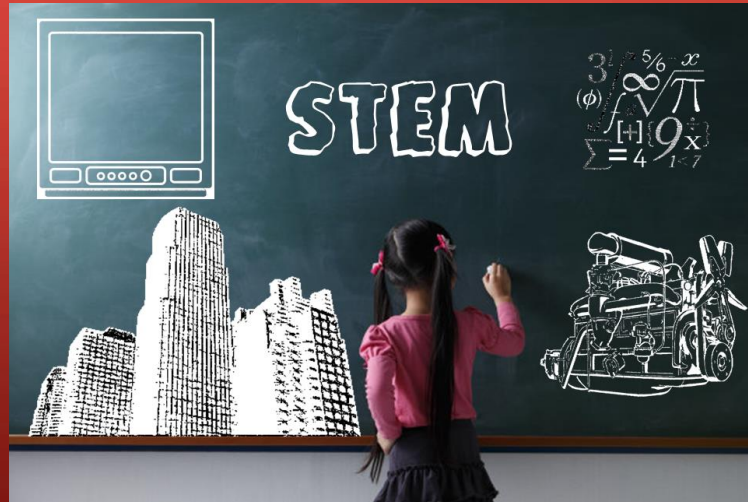


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SCIGIRLS SEVEN ACTIVITY

- Have you had any positive SciGirls Seven experiences in your life?
- Did any of your K-12 teachers make an impact on your academic career?
- Chose an approach and share your experience(s)!



DR. MARK GUY

- Teaching and Learning advice



VISITING SCHOOLS



- Always check in with the main office
- Administration will either call the teacher, walk you down, or give you directions
- Wear visitor pass, if provided
- Most will offer lunch if you're there all day
- Ask to take images
- Space is fun! Remind students to raise hands, 321 Rocket, or other "tricks"

The background is a solid dark red color. In the four corners, there are decorative elements consisting of thin, light red lines that resemble a circuit board or a network diagram. These lines connect to small, empty circles, creating a sense of connectivity and technology.

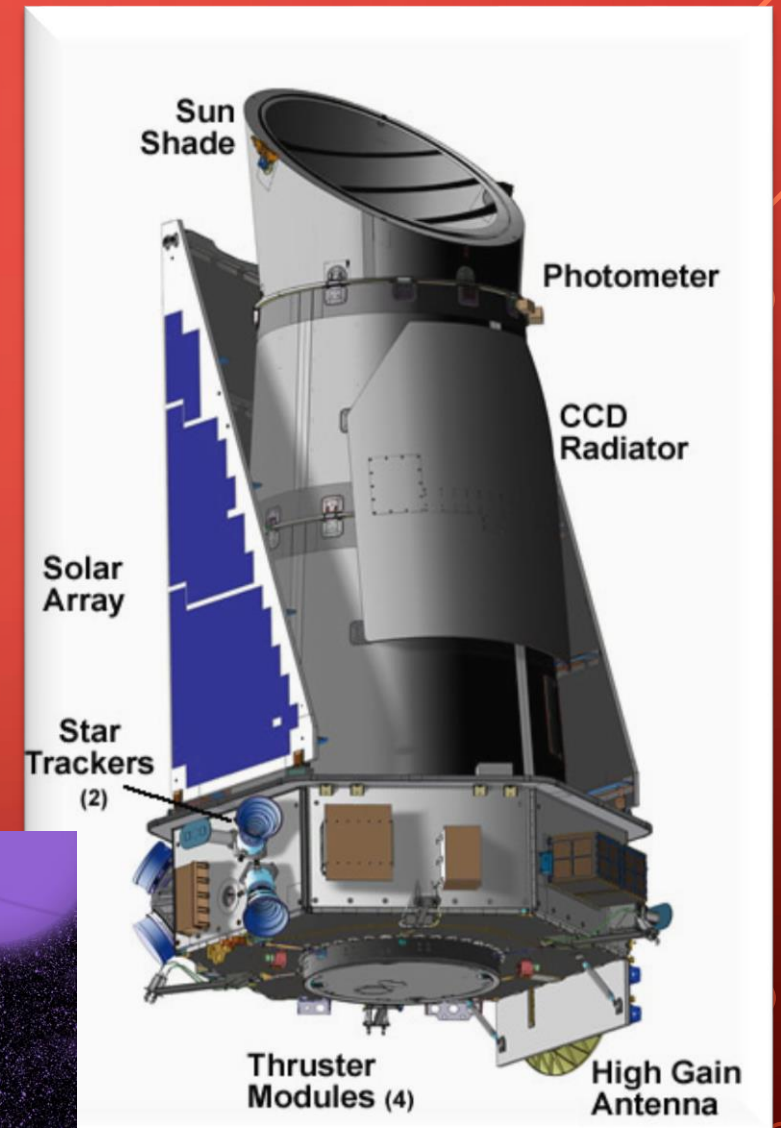
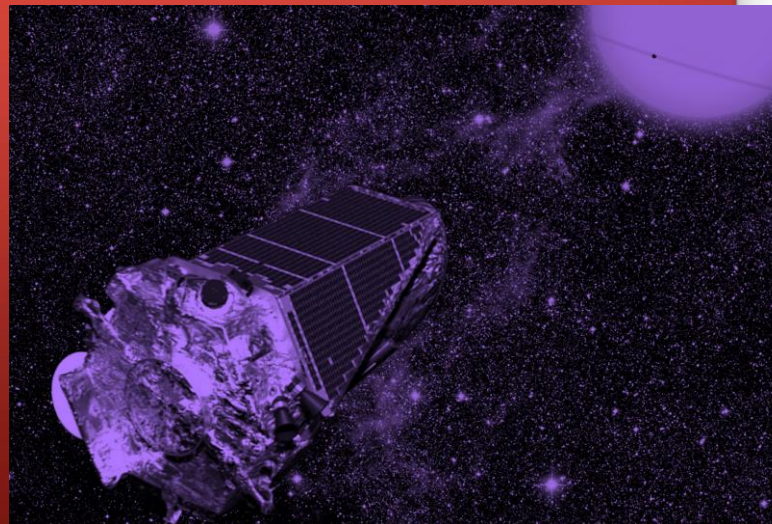
LET'S GET HANDS-ON!

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STRANGE NEW PLANET

STRANGE NEW PLANET

- Work in NASA teams to collect data to plan missions and explore new worlds!
- [How Kepler Works](#)
- [NASA Spacecrafts](#)
- Sort students by NASA Center
- Assign student roles



A decorative graphic on the left side of the page, consisting of a network of thin, light-colored lines and small circles, resembling a circuit board or a stylized tree structure. The lines are vertical and horizontal, with some diagonal branches, and the circles are placed at various points along these lines.

LUNCH

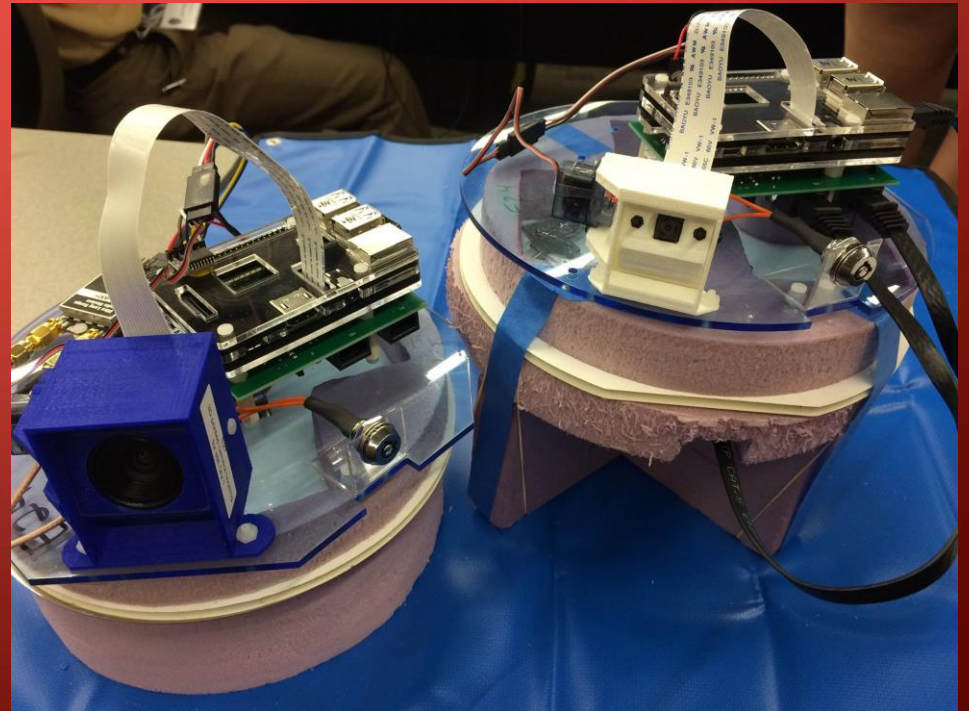
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AUGUST 21, 2017

Hint: 1979







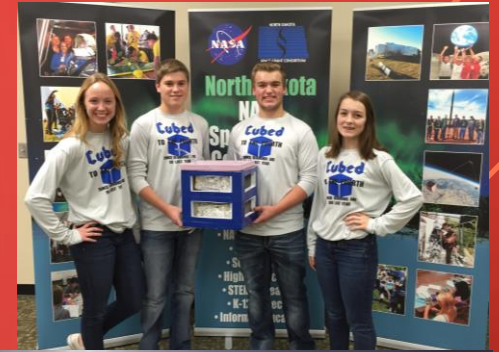


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NEAR-SPACE BALLOON COMPETITION

NEAR-SPACE BALLOON COMPETITION

- Middle and high school students create their own engineering design project
- Launches on a 1500-gram balloon, reaching 100,000 feet
- Teams are judged by SPST students and STEM Ambassadors
 - Integration Night
 - Launch Day
- STEM Ambassadors can participate with Integration, Chase, and Recovery



LEARNING OBJECTIVES – SPOT CHECK

You will be able to:

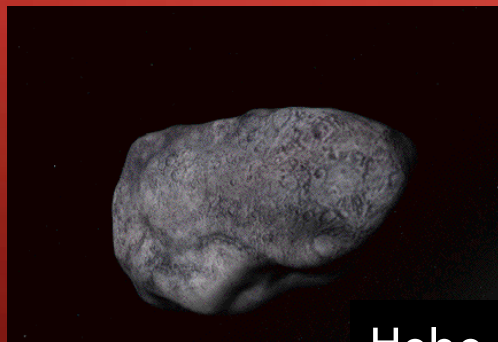
- Confidently conduct today's activities with K-12 students, teachers, and the general public.
- Understand the *SciGirls Seven* and how these teaching strategies can be incorporated into your position as a STEM ambassador.
- Utilize the proper methods for reporting hours and reimbursement procedures (hey, it's important to get paid for your work!) 😊
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- Lead engaging tours of the UND Human Space Flight Laboratory (UND students)

SUPER SLEUTHS

SUPER SLEUTHS

All meteorites that are found on Earth originally came from a **Parent Body**, or their starting location. The top four parent bodies are:

- 6 Hebe
- 4 Vesta
- 3103 Eger
- Mars

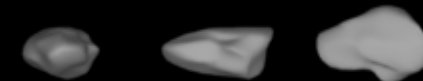


Hebe

Vesta



Mars



Eger

SUPER SLEUTHS

The activity:

You have found a meteorite in your backyard and want to know its parent body.

NASA has generously allowed you to take samples from known parent bodies and it is your job to use the appropriate techniques to match your sample to the NASA sample.

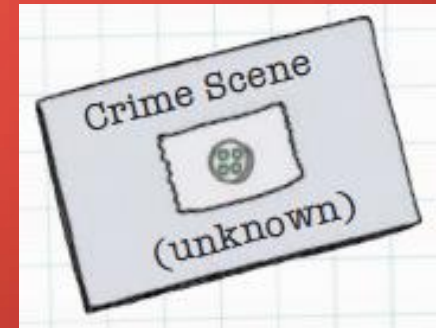
Things to consider:

- How will you collect your samples?
- How will you avoid cross-contamination?
- How will you identify the parent body (what characteristics will you examine)?

SUPER SLEUTHS

Students will match samples of glitter (asteroids) with its “Parent Body”. They will:

- Identify the problem
 - We found an asteroid (glitter) with an unknown parent body!
- Collect evidence
 - Students will use tape, microscopes, and tweezers
- Prepare slides
 - Students will use the tape to gather glitter evidence
- Observe and collect data
 - Match the characteristics of the sample to the parent body!
- Draw Conclusions
 - Students will explain which glitter is consistent with the unknown glitter



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ROCKETS TO THE RESCUE









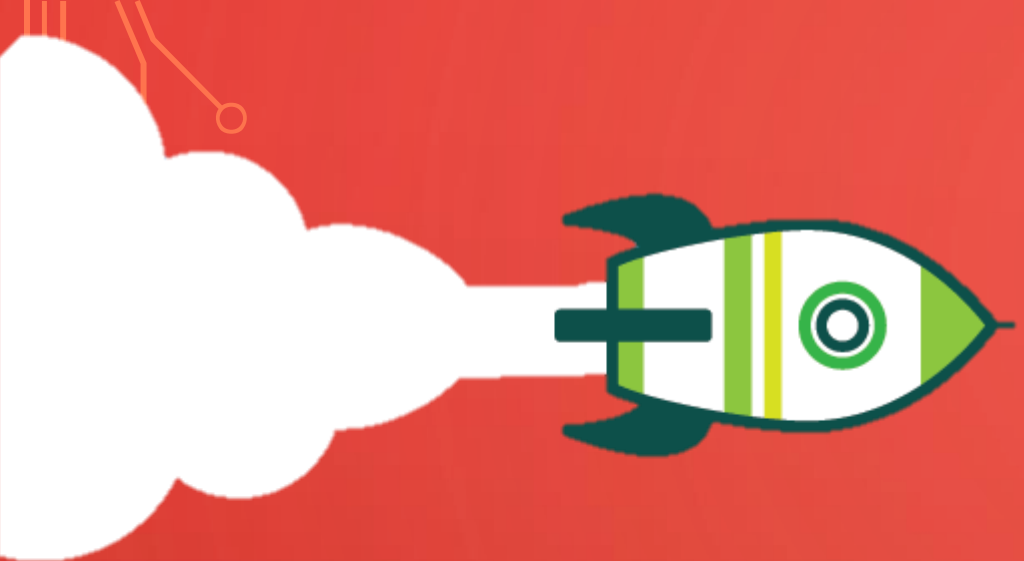
ROCKETS TO THE RESCUE

- 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

**ROCKETS
TO
THE RESCUE**



YOUR TASK!

- In your groups, chose a **NASA center!**
- Design your own **rockets** and **payload containers** to save Mark Watney!
- Think about:
 - What **shapes** are the most sleek and aerodynamic?
 - How will **gravity** affect your design?
 - How are you going to protect your **payload**?



BLAST YOUR ROCKETS TO MARS!



I'm hungry!

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UV ASTRONAUTS

UV Radiation

Easy, quick activity for all ages.
Light project to transport.

Materials: Beads, Pipe Cleaners,
Cloth, Saran Wrap, Tin Foil

Begin: Who knows what NASA
does? How do you get into space?
What do astronauts wear while in
space?

What do you wear in the summer?
Hats, sunglasses, sunblock...

“Will you help me find a space suit
that will protect astronauts?”
(I make “Sally” and say “her”)



Tip: Select the bead colors yourself!

POCKET SOLAR SYSTEM



The background is a solid dark red color. In the four corners, there are decorative white line-art patterns that resemble circuit traces or a stylized tree structure. These patterns consist of thin lines that branch out and terminate in small circles, creating a sense of connectivity and technology.

ENGINEERING ROBOTIC ARMS

ROBOTIC ARMS

- Used on the ISS
- Shuttle missions, food supply capsules, satellites, astronauts



HOW DOES THE END EFFECTOR WORK?

Follow the directions on your handout, and see what happens!

Was the pencil too slippery?

Were you successful?



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PARACHUTE PARADE

PARACHUTE PARADE

- You've been selected by NASA to design a parachute that will safely land their astronauts back to Earth! NASA has provided you with an assortment of parachute-building materials. Chose wisely, the lives of the crew are depending on you!



PARACHUTE PARADE

CRITICAL THINKING QUESTIONS

1. Did your Orion spacecraft land safely?
 - a. What caused it to land safely? (or) Why did your Orion crash land? What could you have done differently?
2. Take a look at other teams' parachutes. What materials did they use? Did their results differ from yours? Describe the outcomes.
3. What could be the real-life consequences of using a compromised parachute?
4. What should scientists consider when selecting parachute 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.

CLOSING REMARKS

- Tour of Human Space Flight Laboratory and Space Studies Department
 - Recommended for UND students
- Questions on employment paperwork?
- Suggestions and/or opinions?
- **NASA Media Release Forms**
 - Remember to take pictures of your hard work! We'll upload these to NASA and our Aurora
- Have fun!

POSITION EXPECTATIONS

- Take pictures at events! If participants did not sign NASA media release form, take pictures of the backs of their heads
- We will send out Google sheet to keep track of number of individuals reached with description of event (make sure this is up to date before sending in time sheet)
- Work around your school schedule – classes/tests/homework comes first!
- Position can include summer of 2017 too!



LEARNING OBJECTIVES – WHAT DO YOU NEED FROM US?

You will be able to:

- Confidently conduct today's activities with K-12 students, teachers, and the general public.
- Understand the *SciGirls Seven* and how these teaching strategies can be incorporated into your position as a STEM ambassador.
- Utilize the proper methods for reporting hours and reimbursement procedures (hey, it's important to get paid for your work!) 😊
- Conduct self-initiated outreach events and effectively lead STEM activities not included in today's training
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CONTACT INFO

MARISSA SAAD

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- Cell: 617-462-0610
- Work: 701-777-4161

CAITLIN NOLBY

- cnolby@space.edu
- Cell: 763-843-6479
- Work: 701-777-4856

WHAT'S NEXT?

- Slides posted on Space Grant website
- Join Remind to receive reminders about Space Grant upcoming outreach
- Marissa will send out emails of upcoming outreach opportunities
- Highly encourage you to conduct activities without invitation of NDSGC – it expands our reach!
- If you are ever unsure if an activity counts for hours, just ask!
- Upcoming outreach:
 - Star parties – ask Amanda and Sean
 - GF Public Library booths – Laura Munski
 - Devils Lake, ND – Sept 22nd Astronomy Edu Event

SUCCESS!!



**YOU ARE NOW A
STEM AMBASSADOR!**