NASA Wallops Flight Facility
Visitor Center

Field Trip & Educator Resource Guide

2016

Taking
education
to new heights.

"Our vision at NASA is to reach for new heights and reveal the unknown so that what we do and learn will benefit all humankind. That is a vision that challenges all of us. "

- Charles Bolden

NASA Administrator

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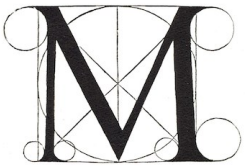


Thank you for choosing the NASA Wallops Flight Facility Visitor Center as your field trip destination! In this guide you will find materials that will help you prepare for your trip. The guide is designed to enhance your understanding and knowledge of our facility and guide you in planning your visit.

Visitation Guidelines

Essential Information

Hours of Operation

The Visitor Center days of operation change throughout the year. When selecting a date for your visit, please ensure that the Visitor Center is open:

September – June:	**Tuesday—Saturday**	**10am—4pm**
July – August:	**Daily**	**10am – 4pm**

Closed all federal holidays except July 4th

*The Visitor Center is unable to conduct group programs and tours on weekends. Groups are welcome to attend our Public Programs and Events which are regularly scheduled on the weekends. Please call ahead to confirm your group's attendance for Public Programs.

Contact the **Education Coordinator** at **757-824-2297.**

Group Programs and Field Trip Options

We offer a variety of education programs for school, education and civic groups. These programs include special presentations, films, hands-on activities and age appropriate guided tours of the NASA Wallops Flight Facility Main Base and Wallops Island. For each program selected, you will be emailed a list of *Helpful Websites* that incorporate background information, games and activities to implement at home or in the classroom along with the pre-field trip activities. Programs and tours must be booked at least **4 weeks** in advanced and dates are based upon availability.
Please contact our **Coordinator** at **757-824-2298** to schedule a program or for more information.

Min/Max Participation for Group Programs at Visitor Center

The minimum number of participants is **8**. If you arrive with less than the minimum required, your tour/ program is subject to cancellation.

Groups must comply with our number of student to chaperone ratios:

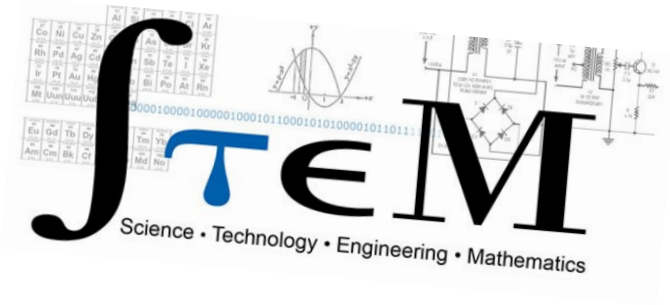
Pre-K-2	1 chaperone per 5 students
3rd-6th	1 chaperone per 7 students
7th-12th	1 chaperone per 9 students

There is a maximum of **100** participants for a group program. If a group with greater than 100 participants requests a program, we will assess the Visitor Center Staff availability and resources to accommodate 2-3 groups in one day.

Education Programs by Grade Level

The NASA Wallops Visitor Center offers free engaging and hands-on educational programs that are age appropriate by grade level and address areas of STEM academics. The programs are also designed to complement Virginia and Maryland Standards of Learning and NGSS. For more information, full program descriptions and list of standards addressed contact the
Education Program Coordinator at **757-824-2297**.

*Can be seen on *Science on a Sphere*—> SOS



Pre-K—K

Wonderful Weather

Students use their senses to learn about the weather.

Puppets in Space

Learn about space exploration with Sam the Monkey and his astronaut friends.

Story Time

Listen to Echo and Amelia while learning about Earth from space.

1st –2nd

Sun-Earth Connections

Discover how the Sun and Earth are connected.

Moving Solar System

Explore the eight planets moving around our Sun.

Moon Mania

Learn about moon phases, NASA research, craters and lava pools.

Weather Works

Learn about storm formation and how weather works!

3rd– 4th

Geo Geeks

Discovering mountains, rivers and how to read topography maps!

The Atmosphere is Everywhere

Earth's atmosphere is complex! Find out why in this program.

Bizarre Stars

Not everything you see shining in the night sky is a star. We will find out how bizarre those stars are!

5th—6th

Solar System

Take a closer look at our neighbors in the Solar System during this program.

Science Alliance

Use inquiry and project based learning to create a science alliance!

Rocketry

Ever launch a model rocket? Do you know we launch real rockets? Learn all about Wallops Rocketry program.

All programs are correlated to meet science standards for the Virginia SOL, Maryland Common Core and Next Generation Science Standards.

For full descriptions please contact the Education Program Coordinator at 757-824-2297.

7th—8th

Rocketry-Model Rocket Launch

Learn all about Wallops Rocketry programs. Ask about out our Model Rocket launch add-in option.

Extreme Weather

Students will learn all about the NOAA facility at Wallops and how weather is monitored.

Environmental Investigation

Use scientific investigation and project based learning to find out about our local environment.

9th—12th

Space Junk

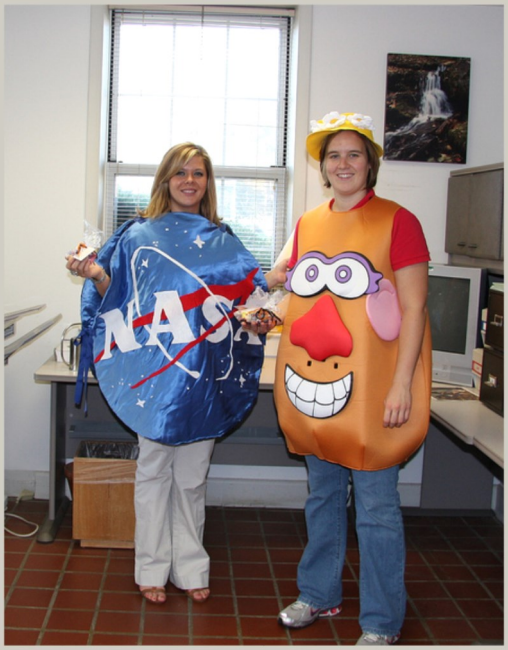
Take a closer look at orbital debris and discover how much garbage is floating in space.

Our Place in the Universe

We live on a very unique planet referred to as the "Blue Marble". Students discover the elements and conditions necessary to sustain life on Earth.

Internship/Career Talk

Student learn about and explore internship opportunities and discover what it takes to be employed by NASA.



Onsite group programs can be customized for your classrooms' individual needs. Whether you have time constraints, or would like to split your visit between two sites, we will try to accommodate your schedule.
Please contact the trip **Coordinator** at **757-824-2298** to discuss custom details that may work for both you and our staff.

Field Trip Add-On Options

Science on a Sphere

Science on a Sphere (SOS) is a perfect tool to help students visualize environmental processes of the Earth and it's place in the universe. Animated images of atmospheric storms, climate change, the solar system and ocean temperature can be shown on the sphere. It is a useful tool to help explain complex environmental processes, in a way that is intuitive and captivating.

Educators have the option for some programs to be conducted using the SOS*. In addition to programs, educators may also ask for specific datasets to be played or topics to be discussed in short, educational presentations or they can build their own playlist online.
**Look for " S.O.S " icon to determine what programs can be seen on the sphere!*

Visit http://sos.noaa.gov for more information!

Auditorium Use

Our large, multipurpose auditorium is also available for groups to use in conjunction with group programs or educational visits. We offer a variety of videos that can be played on request to enhance chosen topics or just add an additional element to your visit.

These educational movies and videos range from past rocket launches to space related programs produced by the Natural History Museum and NASA. The auditorium has a max capacity of 120 individuals.

For a list of videos, or questions about scheduling a video, contact the **Coordinator** at **757-824-2298.**

Lunch Options

Groups attending on-site programs at the **Visitor Center** can bring bagged lunches. Open air picnic tables are available on the grounds for lunch breaks. At this time there is no venue for eating lunch indoors, please make additional arrangements in case of inclement weather.
Groups that schedule a **Wallops Base Tour** may use our employee cafeteria to eat bagged lunches or purchase lunch.

*PLEASE NOTE if students will be using employee cafeteria, the Visitor Center staff is NOT responsible for students money. Lunch options will be discussed further when scheduling your tour, and if you have questions, please contact our **Coordinator** at **757-824-2298**.

Media Release Forms

The Visitor Center uses images, video and text to promote our education programs. If you are a teacher, educator or homeschool family planning a visit to Wallops, we would like to be able to share your experience with others! Posting them on our website, or through social media, is a fun way to get others interested in STEM learning. Please let us know if you are willing to distribute media release forms to your students.

Group Tours of Wallops Flight Facility

Wallops Base Tour Guidelines

Groups interested in touring our facilities on the Main Base or Island Base are encouraged to schedule a **Base Tour.** We offer a variety of stops with speakers that incorporate different elements of Wallops. These tours highlight the aeronautics department, range control center, scientific balloon lab and launch sites on Wallops Island.

- All groups must come in **One Vehicle** with **room for a badged escort.** We do not provide a vehicle.
- Tours must be booked at least **4 weeks** in advanced, dates are based upon availability, and are conducted on **Tuesdays** and **Thursdays ONLY**.

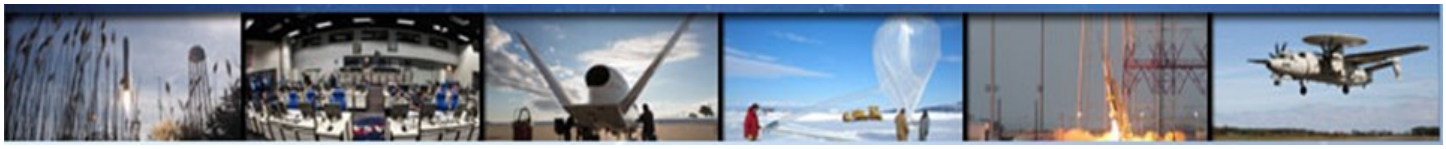
Min/Max Participation for Base Tours

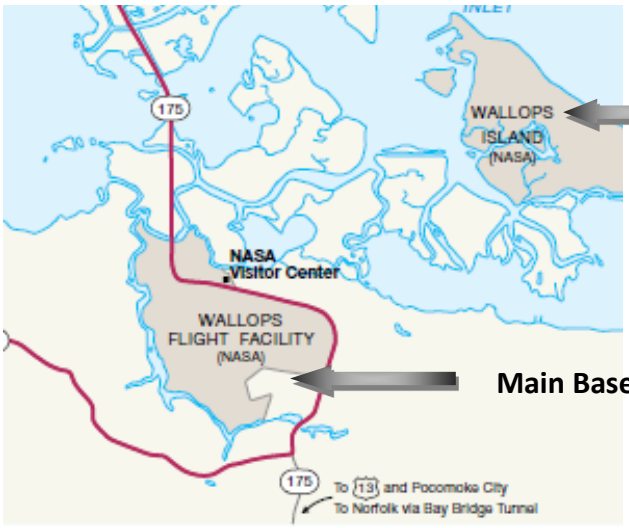
The minimum number of participants is **8**. If you arrive with less than the minimum required, your tour is subject to cancellation.

There is a maximum of **20** participants for a base tour. If a group with greater than 20 participants wishes to tour the base, they have two options:

A.) The desired area of interest has availability to accommodate 2 groups back to back in one day.
B.) Groups with more than 20 participants are eligible for a driving tour of Wallops Island .

* **NO TOURS ARE CONDUCTED DURING LAUNCH OPERATIONS**, this includes 2-**5 BUSINESS DAYS PRIOR TO A LAUNCH WINDOW AND 2-5 DAYS AFTER A LAUNCH WINDOW** depending on the mission. Confirmed and tentative tour schedules are **SUBJECT TO CHANGE OR CANCELLATION** due to ongoing launch operations, frequent launch date changes and upcoming missions/activities.





Island Base

Main Base

The Island Base is located 2.8 miles away from the Main Base in Wallops Island, VA. Groups touring the Island Base and launch pads are responsible for providing the vehicle and driver.

Tour Packages

Half and full day tours are available:

- ⇒ **Half day** tours are conducted between **10 a.m.— 12 p.m.** or **1 p.m. – 3 p.m.**
- ⇒ **Full day** tours are conducted between **10 a.m.— 3 p.m.**

Additional time can be scheduled for the following: self-guided tour of Visitor Center, viewing of NASA 360 film "Wallops Flight Facility" in Visitor Center Auditorium, viewing of Science on the Sphere 3-dimensional data sets and movies, cafeteria lunch at Wallops Flight Facility,

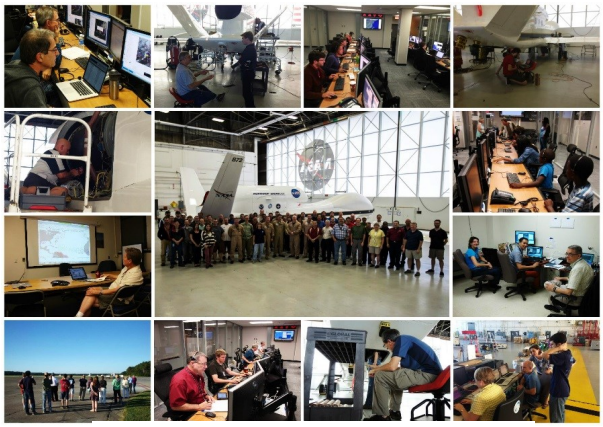
Groups touring the following facilities MUST WEAR CLOSED TOE SHOES*

◊ Fabrication & Testing (F-10)

◊ Aircraft Hangars (N-159 and D-1)

◊ Horizontal Integration Facility (HIF)

◊ Launch Pad Tours



HS3 Global Hawk Mission Team

For half day tours please choose two options from the packages:

All About Wallops

Get an overview of all the missions operated from Wallops Flight Facility. Tour our Range Control Center, Scientific Balloon Facility and even the Aircraft Hangar.

- Balloon Program Office
- Aircraft Hangar
- Range Control Center
- Wallops Island Driving Tour

Suborbital Rocket Package

Learn more about the Wallops launch range and see first-hand where rockets are built, tested and launched!

- Fabrication & Testing (2 stops)
- Range Control Center
- Wallops Island Driving Tour

Orbital Rocket Package

Discover orbital programs including the Antares Cargo Re-supply Mission that is responsible for resupplying the International Space Station.

- H-100 Cygnus Processing Building
- Range Control Center
- Horizontal Integration Facility
- Launch Pad 0A Tour *

**Launch Pad Tours are weather permitting.*

Earth Science Package

Rockets, planes, balloons and even NOAA here at Wallops are all learning more and more about our home every single day.

- Balloon Program Office
- Aircraft Hangar
- National Oceanic & Atmospheric Administration (NOAA)*

**The maximum number of participants is 15.*

Pre-Trip Activities-All Ages

Facilitating pre-trip activities will draw out prior knowledge, provide avenues for in-depth study and review, and incorporate reading and writing strategies. Conducting these activities sets the tone for your students and prepares them for their visit. It ensures that each student will come to the Museum with some shared experiences with their peers, and it will help contextualize the subject matter of the different exhibitions.

Watch NASA 360: Wallops Flight Facility

NASA 360 is an award-winning 30-minute television show that highlights how technologies developed by and for NASA impact *your* life and pave the way to the future. In this episode titled *Wallops Flight Facility* the hosts take you behind the scenes with scientist, engineers and staff in our various missions.

Find the video on our website http://www.nasa.gov/centers/wallops/visitorcenter/
OR on the NASA 360 website http://www.nasa.gov/multimedia/podcasting/nasa360/

K-W-L (What I Know-What I Want to Learn-What I Learned)

Part One (What I Know)

1. Have students draw lines on a piece of paper to divide it into thirds (or fold a piece of paper into thirds so you have 3 long columns).

2. Students write K, W, L across the top, one letter per column.

3. On the chalkboard, whiteboard, overhead projector or flip chart, do the same thing.

4. Keeping in mind the age of your students, and the program you chose, have students choose, or you assign, a topic from the list below, for students to write everything they know under the K column.

NASA	**NOAA**
Rockets	**Science**
The Solar System	**Airplanes/Flight**
Weather	**Engineer**
Other topic(s)	

5. Ask students to pair up (their partner can have the same topic or not) and share with their partners what they have listed. Many students will include misconceptions about what they think they know that can be addressed later.

6. Come back together as a group. Go through each topic one by one and ask students who chose that topic to share what they KNOW. If you have big poster paper, each topic can be written as a heading on each paper ahead of time and then taped on the board and filled in as each topic is discussed.

Part Two (What I Want to Know)

1. For two minutes, have students write under the "W" what they want to know about the topics you/they chose in
Part One.

2. Suggest that as they tour the Visitor Center, and listen to the program, they should think about the questions they have written down.

Part Three (What I Learned)
This section can be completed after your return.

EXAMPLE: The Solar System

K: What I know	W: What I want to know	L: What I learned
Sun is in the center	What is the Sun made of?	Gases Hydrogen and Helium
Mercury is a planet in our solar system	Where is it located?	Closest to the Sun

1. Allow time for students to look over the already completed two parts of the K-W-L before filling in What I Learned.

2. Have students take three minutes to write under the proper heading everything they learned about the questions they had listed under the Want to Know heading, or to clear up any misconceptions.

3E Activities: Explore, Examine, Extend

EXPLORE: Brainstorm ahead of time a list of questions about NASA and space science. Ask your students to do a similar 'brain dump.' Have students identify what they found interesting at the Visitor Cneter or what they want to know more about.
EXAMINE: Investigate what was in the exhibits and how this can help answer some of the questions from above.
EXTEND: Begin independent research projects on topics that interested them, the more specific the topic the better. These can be age appropriate and as short or long as desired. For example, have students pick one planet and research "Fun Facts" about it.

Pre-Trip Activities by Grade Level

The activities listed in this section are not required by any group. They have been chosen primarily to get the "brain juices flowing" for students and teachers alike. The activities can be as short or in-depth as you wish, but even just reviewing basic space related vocabulary can strengthen students experiences and also assist the presenter. Most students are not as familiar with this subject matter, so taking a few minutes for review before you arrive can help tremendously.

Pre-K – Kindergarten

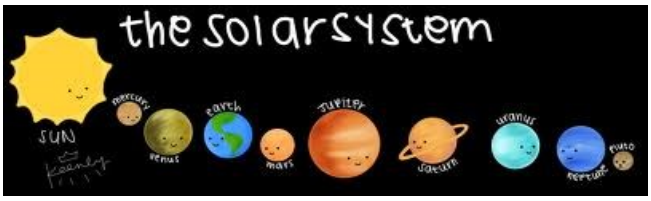
Discuss vocabulary words such as: **space, science, weather, solar system, orbit, rockets, airplanes, satellite**

- Lead weather themed crafts in class:
  - *Kool Aid Art: Sprinkle a little dry Kool aid mix onto a piece of paper. Have your child spray water from a spray bottle onto the paper. Use different colored Kool-aid mix. For added adventure, you may choose to take your children out into the rain with a piece of paper that has Kool-aid on it.
  - *Thunderstorm: When it is raining, watch the rain. Talk about the sounds that you hear during a rain storm. What are the signs that a storm is coming. Discuss storm safety.
- Build Paper Towel Tube Rockets!
- Watch the ***Space Racers*, a new, original, half-hour animated series for preschoolers that follows young spaceship cadets at the Stardust Bay Space Academy as they soar through the Solar System.**
  www.spaceracers.org

Grades 1st - 2nd

Discuss vocabulary words such as: **energy, solar energy, matter, light, liquid, solid, gas, orbit, stars, celestial objects.**
Show pictures of the Solar System that show the Sun at the center while the other planets orbit.
Next, **Map It:**

Make a map of the solar system and learn where all the planets are. You can make a map that shows the colors of the planets and their orbits. With a map, scientists can design their adventures and be able to have a clear idea about not only how to get there, but how to be able to learn the most from what they see.



Grades 3rd - 4th

Discuss vocabulary words/concepts such as: **geology, satellite mapping, weather systems, life cycles, galaxy, universe, atmosphere**

- **Sally Ride EarthKAM!**

  Look at images taken from the International Space Station and discuss looking at Earth from space. Find pictures that highlight geological phenomenon's such as mountain ranges, the Chesapeake Bay, rivers, lakes and islands.
  https://www.earthkam.ucsd.edu
- **Atmosphere:** Discuss Earth's atmosphere and explain the many different layers. Have students draw a diagram that depicts the layers and their heights from Earth's surface.

Grades 5th - 6th

Discuss new vocabulary words/concepts such as: **erosion, weathering, rotation, tide, lunar exploration,, gravity, gravitational pull**

- **Find a Lunar Calendar!**
  Have students find the lunar calendar for the month they will be visiting the Center. Discuss moon phases and why the phases occur.
- **Get involved with Citizen Science!**
  Citizens can now contribute to science no matter how old they are! Find an astronomically related citizen science program to get involved with and have students hold discussions about what they learn, how they contribute to science and if they enjoy doing it. Some programs including **Moon Zoo** and **Meteor Counting** can be found at:
  http://moon.nasa.gov/involved.cfm & http://mymoonspace.com/

Grades 7th - 8th

Discuss new vocabulary words/concepts such as: **scientific investigation, methodology, inquiry, NOAA, satellite imagery, rocketry, physics, model rockets/launching**

- **Explore Satellites in 3D!**
  Have students explore why we use satellites. Students can pick a satellite and investigate the mission that satellite is/was on and what data we are/were receiving from it. For example, here at Wallops Flight Facility we work with NOAA (National Oceanic and Atmospheric Association) to get satellites images of the Earth to forecast weather. We track Polar Orbiting and Global Orbiting Satellites known as POES and GOES that transmit images directly to our facility. Your class can even use the web to see satellites orbiting the earth right NOW!
  Visit **iSat** or **Eyes on the Solar System** **(eyes.nasa.gov)**

Grades 9th - 12th

Discuss new vocabulary words/concepts such as: **human impact, environmental effects, the goldilocks principle, space junk, debris, environmental science, escape velocity, launch pad, physics**

- **Who Can Live Here? Life in Extreme Environments Activities**

  In these NASA created activities students explore the limits of life on Earth to extend their beliefs about life to include its possibility on other worlds. Pick one or more activities and then research and discuss the **Goldilocks Principle** and the **Habitable Zone** and why Earth is so special in our solar system.

  Extreme Environments**: http://btc.montana.edu/ceres/html/ExtremeEnvironment/Extreme.htm**

- **Explore Space Junk-** Find out how many pieces of space junk are floating around in low earth orbit. Investigate what **COPUOS** is and what the **Orbital Debris Program** do.
- **Internships/Fellowships/Career Opportunities**

  Have students explore internships, fellowships and careers NASA has to offer. Get students to answer questions such as these:

  ⇒ What types of jobs do you think NASA offers?

  ⇒ What education qualifications does one have to acquire to work for NASA?

  ⇒ What departments would you be most interested in working with as an intern or employee?

  ⇒ How can you find out about career or educational opportunities in your area? Here at Wallops/Greenbelt?
- Then, have students find actual internship, fellowship or job applications, and if possible, fill one out for practice.

Visit https://intern.nasa.gov/ for more information.

National Science Education Standards

K-12 On-site Education Programs

Content Standard/ Program	Science as Inquiry	Physical Science	Life Science	Earth and Space Science	Science and Technology	Science in Personal and Social Perspectives	History and Nature of Science
Wonderful Weather	✓	✓		✓		✓	
Story Time	✓	✓		✓	✓	✓	
Our Moving Solar System	✓	✓		✓	✓	✓	✓
Moon Mania	✓	✓		✓	✓	✓	✓
Sun-Earth Connections	✓	✓	✓	✓		✓	✓
Weather Works		✓	✓	✓	✓	✓	
Geo Geeks		✓	✓	✓	✓		✓
Atmosphere is Every-where	✓	✓		✓	✓	✓	✓
Bizarre Stars	✓	✓		✓	✓		
Solar System	✓			✓	✓	✓	✓
Science Alliance	✓	✓	✓	✓	✓	✓	✓
Rocketry	✓	✓		✓	✓	✓	✓
Environmental Investigation	✓		✓	✓	✓	✓	
Space Junk		✓		✓	✓	✓	✓
Our Place in the Universe	✓	✓	✓	✓	✓	✓	✓

Educator Resource Center

The **Wallops Educator Resource Center (ERC)** gives educators the opportunity to access materials based on NASA's unique mission and results.

Educators such as teachers, home school teachers, scout and church group leaders have the opportunity to preview, copy and/or receive NASA instructional products for free. Educators also have the opportunity to request large amounts of materials to be sent by mail directly to them at no cost. Call to request free materials from our **ERC Coordinator**.

ERC Coordinator:

Samuel Henry

Email: Samuel.S.Henry@nasa.gov

Phone: 757.824.1637

For more information about the Educator Resource Center Network and online resources visit the ERCN webpage.

www.nasa.gov/education/ercn

NASA Robotics Alliance Project

The Robotics Alliance Project here at Wallops strives to inspire students to learn about math, science and technology. Create a robotics team, volunteer at competitions or become a mentor! For more information contact the **Program Manager**.

NASA Robotics Program Manager:

Amy Davis

Email: Amy.L.Davis@nasa.gov

Phone: 757-824-1096

Girl & Boy Scout Programs

The NASA Visitor Center offers fun programs for both Boy and Girl Scouts that focus on a variety of topics. Most of the on-site education programs assist scouts in gaining science, astronomy, space exploration and earth science badges. Scouts are also welcome to schedule an on-base tour if they meet our Tour Guidelines. We are also able to customize a scout group visit to meet badge requirements. Please contact our **Coordinator** at **757-824-2298** to schedule a program!

STEM IN SCOUTING

BOY SCOUTS OF AMERICA

Public Programs & Events

Public Programs

The Visitor Center offers fun, hands-on learning opportunities for the public on the weekends for guests of all ages to enjoy. The programs cover a variety of topics including Wallops Flight Facility missions and model rocket launches, to earth and space science presentations. Scout troops, 4-H and other groups are encouraged to attend our weekend programs. Please call ahead to reserve space if your group consists of more than 10 people.

Saturday Programming

11 a.m. Toddler Time

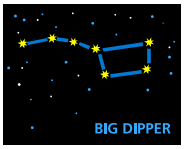
Saturday mornings starting at 11 a.m.. is our *Toddler Time*. During this program our young visitors 2-5 years old learn about a variety of topics that change from week to week. These programs include story time, puppet shows, crafts and more! The Toddler Time program will only occur if the Visitor Center is open so please check our hours of operation on our **About Us** page to plan your visit.

2:00 p.m. Changing Program

Every Saturday afternoon the Visitor Center will host a changing program. These programs range in topics from Wallops mission updates to space science education. These programs are most suitable for ages 6 and up and last ~45 min.

Events

The Visitor Center hosts unique programs, special events, and educational opportunities designed to capture the interest and imagination of all who attend. These events include astronomy nights, movie screenings, and launch viewing parties. These special events are fun for all ages and always free of charge. Please check our **Special Events** webpage for current schedule: https://www.nasa.gov/content/wallops-visitor-center/special-events



Adult and Day Trip Information

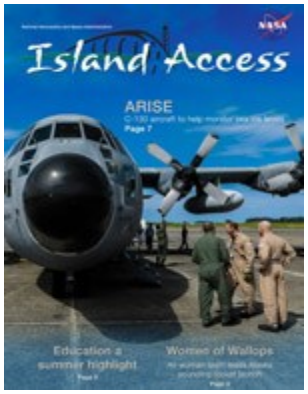
If traveling to the Visitor Center for a day trip, please check our hours of operation as they change throughout the year. Along with the museum exhibits, we offer movies in both our auditorium and Science on the Sphere theater that cover a variety of topics for your enjoyment.

Also during your visit, please sign our guest book and leave your email address to receive periodic updates of rocket launches, events and to receive our monthly newsletter entitled *Island Access.*

Get Our Newsletter

Island Access Magazine

https://www.nasa.gov/centers/wallops/home

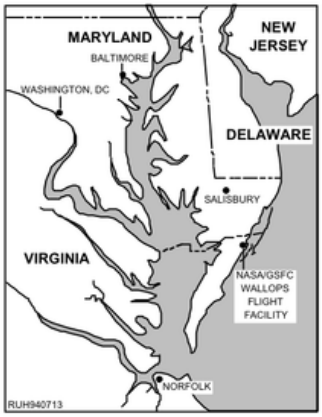


Stay Connected

Contact Us!

Wallops Visitor Center Location:

Bldg-J-20
Rt. 175 (on the way to Chincoteague Island)
Wallops Island, VA 23337



Visitor Center Manager: Kim Check
>Phone - 757.824.1148
>Email: Kimberly.A.Check@nasa.gov

Informal Education Coordinator: Sarah Needs
> Phone - 757.824.2297
> Email - Sarah.J.Needs@nasa.gov

Outreach & Events Coordinator: Shirley Lapole
> Phone - 757.824.2298
> Email - Shirley.J.Lapole@nasa.gov

Educator Resource Center Coordinator: Samuel Henry
> Phone - 757.824.1637
> Email - Samuel.S.Henry@nasa.gov

Stay CONNECTED

⇒ **Visitor Center Front Desk Information: 757-824-1344**

⇒ **Wallops Information Line: 757-824-2050**

⇒ **Radio: NASA 760 AM (range 5-10 miles from the Visitor Center)**

http://www.facebook.com/NASAWFF

http://www.twitter.com/NASA_Wallops

http://www.youtube.com/nasawallops

http://www.nasa.gov/rss/wallops_updates

http://www.ustream.tv/channel/nasa-tv-wallops (Live Webcast)

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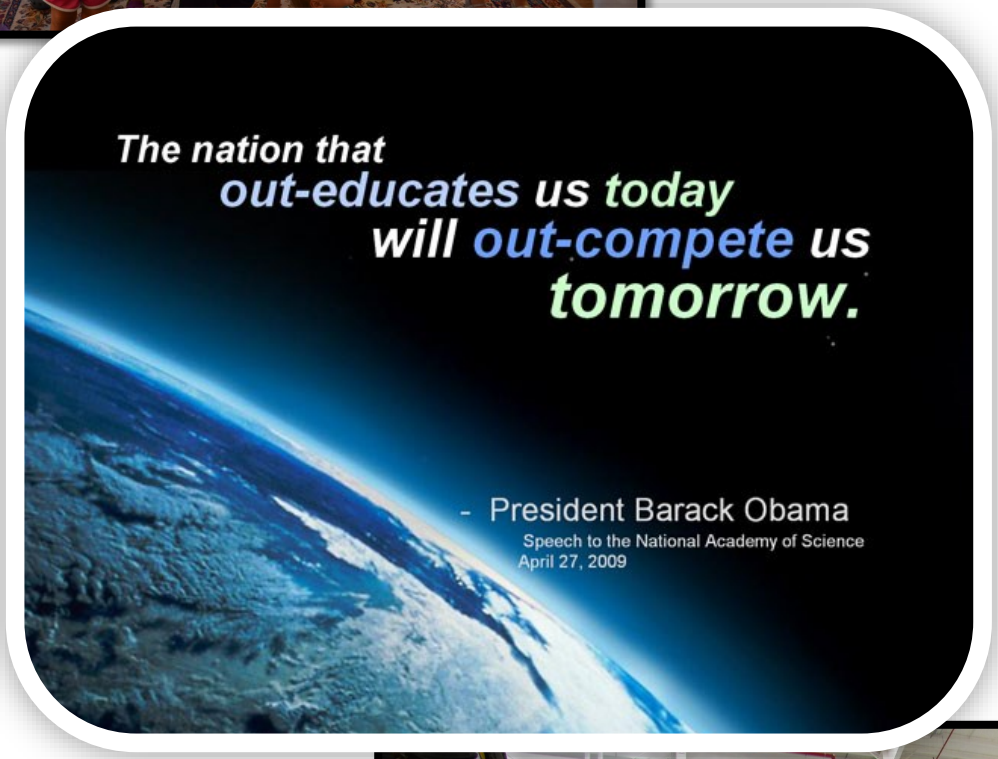
The nation that
out-educates us today
will out-compete us
tomorrow.
- President Barack Obama
Speech to the National Academy of Science
April 27, 2009

ATK
05/02/2014

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See You Soon!