

TEACHER EVENT CHECKLIST
SPACE BASICS 101

Date Completed	PRE EVENT REQUIREMENTS
	1. Print out a copy of this entire file (color copy preferred). Please note: this document is 10 pages long.
	2. Sign Agreement to Participate and E-mail to the Distance Learning Outpost at within 3 business days of confirmation.
	3. Have students take Pre-Event Quiz on page 5.
	4. Complete all pre-event activities with the students on pages 4.
	5. Teacher to E-mail a minimum of 5 student questions to NASA no later than 3 business days prior to your event.
	6. Review NASA Event Guidelines with students on page 9.
	DAY OF EVENT ACTIVITIES
	1. The students will be asked to share their activity results during the event with the NASA host.
	2. Bring classroom research and proposed experiment or activity to support student presentations.
	POST EVENT REQUIREMENTS
	1. Have students take Post-Event Quiz to demonstrate knowledge of subject.
	2. Teacher(s) and students to fill out event feedback .
	2. Distance Learning Outpost will respond to any follow-up questions.
	3. At Teacher's discretion students are to complete extended activities .

**Teacher Agreement To Participate
NASA's Distance Learning Outpost**

I have reviewed the Space Basics 101 Learning Module and agree to complete all of the required activities with my students, both prior to, and following, the video teleconferencing event.

Teacher(s) _____

School/Institution _____

Event # _____

Date of Event _____

Fax this form to the Distance Learning Outpost Office at (281) 483-3789

or

E-mail to dlo1@jsc.nasa.gov within 3 business days of confirmation.

Space Basics 101 Expedition

Instructional Goal

Upon completion of this learning module, students will gain an appreciation of the training and technology needed to live and work in space.

Learning Objectives

1. Students will gain an understanding of the training required at NASA for its astronauts
2. Students will be able to identify components of the Shuttle and ISS
3. Students will develop a mission research proposal for an on orbit flight

National Education Standards

Science Standards (NSTA)

Science as Inquiry

Abilities necessary to do scientific inquiry

Science and Technology

Abilities of Technological design

Understandings about science and technology

History and Nature of Science

Science as a human endeavor

Mathematics (NCTM)

Communication

Organize and consolidate their mathematical thinking to communicate with others.



Grade Level:

Grades 4-12

Estimated Time requirements:

Activity Set #1 30 minutes

Activity Set #2 Choose 2 by grade level

- Activity A 50 minutes
- Activity B 50 minutes
- Activity C 50 minutes
- Activity D 50 minutes

Activity Set #3 25 minutes

Videoconference 50 minutes

STUDENTS WILL BE ASKED TO SHARE THEIR RESULTS AND INFORMATION DURING THE EVENT.

Texas Essential Knowledge and Skills (TEKS)

Science

4 - 8.2 A,B,C,D,E

9-12 Science as Inquiry

OVERVIEW

You have been accepted into NASA's Astronaut Training Program! Be prepared to share some of your unique qualifications, attend a preview of your training and flight expectations, and propose an experiment to be flown aboard the shuttle or ISS before you arrive at the home of the Astronaut Corps in Houston Texas!

INSTRUCTIONAL STRATEGY

Pre-Event Classroom Component

Activity Set #1

1. Students take [Pre-Event Quiz](#) to test their knowledge prior to these lessons about Space Basics. Students keep these quizzes on file to compare to their [Post-Event Quiz](#).
2. [Terminology](#), at the teacher's discretion, should be introduced during the pre-event classroom activities.

Activity Set #2

1. Required of all grades, 4-12, please complete the activity below with your class.

In [Activity A](#) students will research, design, and propose potential experiments and activities for Educator Astronauts to carry out on board the Space Shuttle and the International Space Station.

Students will be asked to present their experiment and activities during the DLO event.

2. Please complete the activity below that corresponds with the grade level you teach with your class. (If you teach 8th grade, please select the one, or both, that best fits your class.)

Grades K-4, [Activity B](#), Living In Space, will provide some insights about working and living in space.

Grades 5-8, [Activity C](#), Who Is It and Why I Should Be An Astronaut, students identify personal goals, skills, and interests that would enable them to be an astronaut.

Grades 8-12, [Activity D](#), Flight 105 STS-104 Careers, students discover the career pathways of the STS-104 crewmembers.

Students will be asked to present their experience and results during the DLO event.

Activity Set #3

1. Student Questions – A Desire To Explore Further
 - Develop at least 5 questions from the class on space basics
 - These questions should go beyond the basic information within the program
 - These questions should attempt to demonstrate “higher cognitive involvement” by the students
 - E-mail your questions at least 3 business days prior to your event with NASA
 - E-mail address is: DLO1@jsc.nasa.gov
2. Prepare the students for their participation in a live, interactive video teleconference with the NASA's Distance Learning Outpost.

Pre/Post Event Quiz

- 1) As an Astronaut Candidate you will need to know some NASA history:
 - a) What does the initials N.A.S.A. stand for and in what year was NASA created?
 - b) What are the three primary mission objectives of NASA?
 - c) List and briefly explain the major NASA space flight programs to date?
 - d) What do the initials I.S.S. stand for and what is it's primary international mission?
 - e) Name the countries that are participating in the ISS program with NASA.
- 2) What do the terms 'Microgravity' and 'Freefall' mean?
- 3) What does it mean to be 'Neutrally Buoyant' in a water environment?
- 4) Describe how you eat, sleep and work on earth and then explain how they would be different in space. (How is the force of gravity and Newton's Laws affected in space?)
- 5) What kinds of experiments or investigations would you propose as a Mission or Payload Specialist?

TEACHER ANSWER KEY to Pre/Post Event Quiz – Please don't share with the students. Answers should be similar to:

1. NASA History summary site: <http://history.nasa.gov/brief.html>
 - a. National Aeronautics and Space Administration, October 1st 1958
 - b. To understand and protect our home planet, to explore the Universe, and to inspire the next generation of explorers.
 - c. Mercury, Gemini, Apollo, Apollo-Soyuz, SkyLab, Shuttle, ISS. Details at website above.
 - d. International Space Station: An international space station research platform to take advantage of the microgravity environment to study: materials science, fluid physics, biomedical, and combustion science.
 - e. US, Russia, Canada, Japan, Brazil, European Space Agency Members (Germany, France, Italy, United Kingdom, Spain, Portugal, Belgium, Norway, Netherlands, Sweden, Denmark, Finland, Switzerland)
2. Microgravity: A small amount of gravity, 1/ 1,000,000.
Freefall: Where the pull of gravity on an object is countered with the forward speed of the object. The result is for the object to match the curve of the earth as it “falls” around the earth.
3. Neutrally Buoyant is a state where an object neither sinks to the bottom nor floats to the top but rather locates itself somewhere in the middle. It is weighted in such a way that it maintains its location somewhere in the middle, below the surface and above the bottom.
4. A variety of answers may result. All items would appear to float as a result of the lack of or reduction of gravity's pull on objects toward the center of the earth. How to move while suspended in mid-air, how to attach and anchor objects or of concern. While gravity based phenomena of sedimentation and convection would cease to exist and Newton's three laws would be easier to observe without gravity.
5. A great potential for creative answers. Visit <http://edspace.nasa.gov/earthcrew/earthcrew.html> for a student participation in proposing experiments aboard station. Current examples on ISS are found here: <http://www1.msfc.nasa.gov/NEWSROOM/background/facts/epo.html>

Space Basics 101 Terminology

Microgravity – A very small amount of gravity (1/1,000,000). Usually associated with a freefall environment in orbit around the Earth.

Freefall – Where the combination of forward speed, altitude, and the attraction of gravity on the moving object balance out and the object continues to fall around the earth.

NASA – National Aeronautic and Space Administration

ISS – International Space Station

Neutrally Buoyant – Where an object neither floats to the surface nor sinks to the bottom, but is located somewhere in the middle.

Earth Crew – A new education program that allows students to support the Educator Astronaut with ideas and experiments in space. <http://edspace.nasa.gov/earthcrew/mission2.html>

Astronaut – A person that is specially trained to fly in space

Research – A careful, systematic study and investigation in some field of knowledge. To search out all aspects of a topic.

Observe – An ability to notice, pay special attention to, or to arrive at a conclusion.

Propose – To put forth for consideration or approval.

Discuss – To talk or write about a subject. To consider all aspects, both pro and con, of a topic.

Activity A All Grades

A Place In Space

In this activity students create potential experiments and activities for Educator Astronaut to carry out on board the Space Shuttle and the International Space Station and share their ideas during the DLO event.

Go to the 'toolbox' for further details or return to Earth Crew Missions for an overview.

<http://edspace.nasa.gov/earthcrew/mission2.html>

Fact Sheets on ISS experiments to date:

<http://www.scipoc.msfc.nasa.gov/factchron.html>

Activity B Grades K-4

A Place In Space

Living in Space

Four topics: Tight Working Spaces, Microgravity Through Falling, Space Food, and Relaxing in Space will provide some insights about working and living in space. Choose one, some, or all four to provide some interesting background for students before they connect with NASA for their Space Basic 101 experience.

http://www.nasaexplores.com/show2_k_4a.php?id=02-062&gl=k4#lessonlinks

"All About Astronauts" article

http://www.nasaexplores.com/show2_k_4a.php?id=02-062&gl=k4

Activity C Grades 5-8

A Place In Space

Who Is It? And Why I Should Be An Astronaut

In the activity, Who Is It?, students research a NASA astronaut and identify his/her interests, skills, and education needed to perform their job. In 'Why I Should Be An Astronaut' students identify personal goals, skills, and interests that would enable them to be an astronaut.

http://www.nasaexplores.com/show2_5_8a.php?id=02-062&gl=58#lessonlinks

"All About Astronauts" article

http://www.nasaexplores.com/show2_5_8a.php?id=02-062&gl=58

Activity D Grades 8-12

A Place In Space

Flight 105 STS-104 Career

In this activity students discover the career pathways of the STS-104 crewmembers, and gain insight into the teamwork and integrated effort that several careers have between each other for a mission in space.

http://www.nasaexplores.com/show2_912a.php?id=01-078&gl=912#lessonlinks

"When I Grow Up" article

http://www.nasaexplores.com/show2_912a.php?id=01-078&gl=912

NASA Event Guidelines

Review the following points with your students prior to the video teleconference event:

1. A video teleconference is a two-way event. Students and NASA presenters can see and hear one another.
2. Students are representing their school; they should be on their best behavior.
3. Students should be prepared to give brief presentations, ask questions and respond to the NASA presenters.
4. A Teacher(s) or other site facilitator should moderate students' questions and answers.
5. Students should speak into the microphone in a loud, clear voice.

**Get Ready, Be Ready, and have fun with your
Distance Learning Event with NASA!**

Post Event Teacher – Student Evaluation

1. **We need your help and support!** Choose the appropriate Form below. It usually takes teachers and students **less than 10 minutes** to complete. We welcome any input that you have at the following sites:
 - **Teacher Feedback Form:**
https://ehb2.gsfc.nasa.gov/edcats/centers/distance_learning.html
 - **Student K-3 Feedback Form:**
https://ehb2.gsfc.nasa.gov/edcats/centers/jsc_grades_K3_stud_fdbk.html
 - **Student 4-12 Feedback Form:**
https://ehb2.gsfc.nasa.gov/edcats/centers/dlo_412_student.html
 - **Technical Contact Feedback Form:**
https://ehb2.gsfc.nasa.gov/edcats/centers/jsc_dlo_tech_contact.html
 - **Parent/Chaperone Feedback Form:**
https://ehb2.gsfc.nasa.gov/edcats/centers/distance_learning_parent.html
2. Students and Teachers are **welcome to e-mail the Distance Learning Outpost** with any follow-up questions from the event at: <mailto:DLO1@jsc.nasa.gov>
3. **Please send** us any photos, video, web page link, newspapers articles, etc. of your event. We will be glad to post them on our web page!

Extended Activities for Space Basics 101

1. Perform further research on a wide variety of NASA topics at:
 - a. <http://spacelink.nasa.gov/>.
 - b. www.nasa.gov
2. Consider becoming an Earth Crew participant <http://edspace.nasa.gov/home.html> and actually submit your proposal to the Earth Crew website!