

# *Jr. Space Colony*



## Pre-visit Activities

Grades 3-5



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Stacy Wilson  
Cherie Xavier  
Carol Morton

600 Settlers Landing Road • Hampton, Virginia 23669-4033 • (757) 727-0900 • [www.vasc.org](http://www.vasc.org)

# Pre-visit Activity Preview

These activities are intended for use before your visit to the Virginia Air and Space Center. It is beneficial for the students to have some prior knowledge of the moon and what would be necessary to build a colony there before they take part in the Space Colony program. All of the activities can be tailored to your specific classroom needs and time frames, and the procedures listed are suggestions for teaching. Please refer to the enclosed material and list of further resources for your lessons.

1. How important are you? This activity encourages students to write from another person's point of view, specifically an original settler from Jamestown. Using a list of occupations of the original settlers, the students must imagine themselves as the settlers and explain their importance to the settlement. A great lesson to incorporate **Language Arts** into your **Social Studies** curriculum.
2. Will your occupation be needed in space? Occupations that are important to space exploration and colonization may be common as well as complex. Students can **research** specialized occupations and find out what it would take to become a space pioneer. **Language Arts, History and Science**.
3. Where is the best place to live on the moon? The surface of the moon has many different features. With some information about the moon, your students can make a logical decision about where they would build their colony, and they can do it with style. **Art** gives this **Language Arts, Science** and **Math** activity a little color.
4. You found my crater! Do your students like to play Battleship? Then this activity is for them. Let them be creative, have fun, and work with a partner while developing map skills. A simple letter-number grid and some information about the moon are all they need to get the fun started. **Social Studies and Science** couldn't be more fun.
5. How much do you know about Earth? An encyclopedia, textbook or the Internet can help your students know more by using them as references. Students can practice **reference skills** and learn more about the place they live at the same time. **Language Arts and Science**.
6. Like Earth, like Moon? How are the Moon and Earth the same or different? The students can **compare and contrast** the two by analyzing information. Using a graphic organizer will help the visual learners in your class and your students will be quick to answer your questions about the two space wonders. **Language Arts skills and Science**.
7. Welcome to my civilization! With a little help from the book Weslandia by Paul Fleischman, your students can plan it all. They'll understand everything needed to build and maintain a colony, including farming, inventing a monetary system, making appropriate clothes, and so on. This activity can be used as a project throughout a unit and can be started before or after your visit. Get your students' creative juices flowing with this one. **Language Arts, Science and Art**.

# *Pre-visit Procedures*

## **Activity 1: How important are you? (Language Arts, Social Studies)**

Discuss the difficult beginnings of the Jamestown settlement, pointing out how important certain people were to the settlement because of their occupations. Obtain a list of the original settlers, first supply, and second supply, from the website [apva.org](http://apva.org). Make a transparency or give copies of the list of people to your students. Point out to them the importance of laborers and tradesmen who worked building shelter and eventually worked in the crop fields. Ask questions like: Did they need a jeweler, a perfumer, or a pipe-maker? Were the apothecaries and the surgeon important? Why did the third supply have mostly laborers and tradesmen aboard? Many questions can be asked for the students to analyze the information.

Once you have gone over the list, ask each student to choose one of the settlers and imagine being him and having his job. Have them write one diary entry, or a week's worth of entries, as that man. Have them focus on how important he was to the settlement because of his job. Was he needed there or could he help the colony in other ways?

**Activity 1 Extensions:** Have each student dress up as the chosen settler and read the entries aloud to the class. For more dramatic flare, the students can collectively write and produce a class play, based on their diaries. To add **math** into the mix, keep a log of the occupations chosen and construct a table from which the students can make a variety of graphs. Older children can even compute median, mode, mean, and range from each set of data.

### **Activity 2: Will your occupation be needed in space? (Language Arts, Social Studies, Science)**

Explain to the students that many of the men and women who work at NASA have very specialized occupations. Ask them if they think all occupations will need to be specialized if we had a colony in outer space and explain why or why not. What kinds of things would be included in a colony on the moon and who would need to work there? After your discussion, show them the list of potential careers in space. Have each student select one of the careers and find out some information about it. They may use the question sheet provided to find the information. They may use books, reference materials, textbooks and the Internet to find out answers. Have them share the answers with the class.

**Activity 2 Extensions:** Depending on time, you may have the students form their answers to the question sheet into a report that can be written and/or presented orally. Have the students list what they think are the 5 or 10 most important jobs. Chart the answers.

### **Activity 3: Where is the best place to live on the Moon? (Language Arts, Science, Math, Art)**

Discuss the landscape of the moon. Explain the different features on the surface using the moon fact sheet enclosed and compare them to the features here on Earth. After the discussion, survey the class and find out how many would put their houses at the base of a volcano, on the edge of a rille, inside a crater, etc. Summarize the information using a graph or chart.

Have the students, working alone or with partners, decide where on the moon they would put their houses. Ask each student or group to make a drawing of the house on the moon. What kind of land features is it near or not near? Would it be at the base of a volcano, the edge of a rille, or would it be on the plains? Have the student, or students, write a description of the area, the design of the house, and explain why that part of the moon was chosen. Be sure they use the proper terminology in their writings.

**Activity 3 Extensions:** This could be done as a project with students making 3-dimensional models of the landscape features and homes.

#### **Activity 4: You found my crater! (Social Studies, Science)**

Teach or review how to read a simple letter-number grid using maps and or the moonscape grid sheet enclosed. Go over the different surface features of the moon so that the students are aware of the terminology and what the features look like.

Give each student a grid sheet with large squares and have them draw their own version of the moonscape, being sure to draw one crater.

Inform the students of the rules, similar to Battleship. The object is to find the other's crater. Have the students pick a partner, or assign partners, without letting each other see their moonscapes. Using bingo chips or some other markers, have them call out letter-number sets in order to find their partner's crater. Once a person's crater is found, the game is over. Let them pick another partner and play a new game.

**Activity 4 Extension:** Use smaller grid paper for more letters and numbers. Have the students find more than just the crater.

#### **Activity 5: How much do you know about Earth? (Language Arts, Science)**

Ask the students what kind of information they know about the Earth. Write down answers on the board, or have the students brainstorm lists for a minute or so. Discuss the answers.

Hand out the enclosed blank Earth facts sheet and give the students plenty of reference materials to find the answers to the sheet. Let them use books, textbooks, encyclopedias or the Internet to find the answers. Go over the answers as a large group, in pairs or small groups. Some answers may vary from the enclosed answer sheet, so use your discretion for a right or wrong answer.

**Activity 5 Extension:** Have the students find out a fact that may not be asked for on the sheet.

#### **Activity 6: Like Earth, like Moon? (Language Arts, Science)**

Ask the students what they know is the same or different about the Moon and Earth. Show the students a transparency or give them copies of the enclosed Moon and Earth fact sheets. Have them use the sheets to compare and contrast the two. Use a graphic organizer such as a Venn Diagram or simple chart to make the comparison visual. Discuss the outcome of the comparison.

**Activity 6 Extension:** This could be done in small groups with each making a graphic organizer. Those can be compared for similarities and differences.

#### **Activity 7: Welcome to my civilization! (Language Arts and Science)**

**\*\*This could be done as a long term project starting before your visit to the center, or it can be started after your visit.**

Read the book Weslandia by Paul Fleischman. Discuss all of the things Wesley went through to create his own civilization, and what he thought was important to keep it running. Have the students create their own civilization. Assign students, individually or in groups, the following tasks: create a crop and explain what it needs to grow and what it will be used for, describe the climate and design clothes that are appropriate for it, invent a new sport and explain the object of the game and how the scores will be tallied, create a new language and/or alphabet and write a sentence using either, develop a monetary system and explain the values of coins and or paper money, make laws for the people, name the new civilization. The students can make their written explanations in the form of diary entries or short reports, which can be orally presented to the rest of the class. The students can include drawings or 3-dimensional models with their presentations, or even expand their creativity by writing their own fiction novels based on their civilizations!

# Pre-visit Resources

## **Books**

Midnight on the Moon by Mary Pope Osborne and M. Loehr (Magic Treehouse Series #8)

The Moon by Robin Kerrod

Space-a Nonfiction Companion to Midnight on the Moon (Research Guide Series for Magic Treehouse) by Will Osborne and Mary Pope Osborne

Weslandia by Paul Fleischman

## **Places**

NASA Langley ERC at the Virginia Air and Space Center  
600 Settlers Landing Road, Hampton, VA 23669-4033  
Phone: (757) 727-0900, ext. 757

[www.vasc.org/erc](http://www.vasc.org/erc)

E-mail: [erc@vasc.org](mailto:erc@vasc.org)

\*\*Pictures and posters included in this packet came from the ERC. The Living in Space activity books for teachers are also available for you to have. Please come into the ERC or call or e-mail a request for them.

## **Websites**

Students will thoroughly enjoy the following websites:

[www.vasc.org/erc](http://www.vasc.org/erc)

[www.canadian-learning.com/READINGR/rr-alt.html](http://www.canadian-learning.com/READINGR/rr-alt.html)

\*\*This website takes you to the Reading Rainbow homepage. The shows are listed with subjects as well as books.

[www.apva.org](http://www.apva.org)

[www.learningpage.com/](http://www.learningpage.com/)  
[www.theeducatorsnetwork.com/main/](http://www.theeducatorsnetwork.com/main/)  
[www.nasa.gov/](http://www.nasa.gov/)  
[www.spacelink.nasa.gov/](http://www.spacelink.nasa.gov/)  
<http://kids.msfc.nasa.gov/defaultNoFlash.asp>  
[www.windows.ucar.edu/tour/link=/earth/earth.html&edu=elem](http://www.windows.ucar.edu/tour/link=/earth/earth.html&edu=elem)  
<http://seds.lpl.arizona.edu/nineplanets/nineplanets/earth.html>  
[www.moonshop.com/ms/Moonlink\\_E.html](http://www.moonshop.com/ms/Moonlink_E.html)  
<http://seds.lpl.arizona.edu/nineplanets/nineplanets/luna.html>  
[http://nssdc.gsfc.nasa.gov/planetary/ice/ice\\_moon.html](http://nssdc.gsfc.nasa.gov/planetary/ice/ice_moon.html)

## History of Jamestown

Jamestown, Virginia was founded May 14, 1607 nearly 400 years ago. Jamestown was primarily a profit oriented colony funded by stockholders in England. Their hopes were to reap quick and easy riches from their initial investments. Unfortunately many colonists preferred to look for gold and silver, and assumed neighboring Indians would give them food. Despite a surrounding abundance of food, game, and fish, many Englishmen died of hunger, dysentery, malaria, and yellow fever during the first summer. The winter of 1609-1610 became known as “the Starving Time.” The colony always had a small population because of a high death rate from disease. Only 12 percent of the original 500 colonists were alive in 1611.

At first, the Indians were friendly. They helped the Englishmen by planting corn and teaching them how to make fish traps.

By the 1730’s there were thirteen (13) English colonies in America with a population of nearly 700,000 people. The Native Americans found themselves being crowded out by the colonists who were grabbing up land. Sometimes tribes fought bitter wars against the colonists for the land. Others moved west, and some Indians tried to adopt European ways of living.

## Career Questions

1. Pick a career. How has this career changed over time (from past to the present)?
2. How much education is needed for this career? What are the tools needed for this career?

3. How will this career change for use in the future of colonizing the moon?
4. Describe this job and its usefulness in colonizing the moon.
5. How important would this job be in the future of a colony on the moon?

### **The Moon**

Names for the moon:	Luna, Selene
Planned Colonization date:	NONE
Distance from Earth:	shortest - 356,399 km. or 222,749.4 miles greatest - 406,699 km. or 254,186.9 miles
Diameter:	3,476 km. (2172.5 mi.)
Mass:	1/81 the mass of Earth
** How much would you weigh on the moon if you were 80 lbs? **	
Rotation Period:	27.3 days
Orbit period around Earth	27.3 days
Surface Gravity:	1/6 the gravity of Earth
Atmosphere:	NONE
Length of day and night:	About 15 days each
Temperature at the Equator:	Ranges from 127° C. to -173° C. (2600° F. to -280° F.)
Average Speed around Earth:	3,700 km. per hour (5920 mph)

#### Moon Features:

Lunar Soil – called regolith: formed by ground lunar rocks

Craters: formed by meteorites

Highlands – called lunar terra: pocked by craters

Plains – called lunar maria: caused by lava flows; “maria” means “seas”

Rilles: long narrow valleys caused by cracks in crust or rivers of lava

Water: is suspected to be locked in ice under the surface

Volcanoes: without cones

Lunar core: made of iron

### **Teacher Information /Answer Sheet**

#### **The Earth**

Names for the Earth:	Telles, Gaia
Distance from the moon:	shortest - 356,399 km. or 222,749.4 miles greatest - 406,699 km. or 254,186.9 miles
Distance from the Sun:	shortest - 146,000,000 km or 91,000,000 miles greatest – 152,000,000 km or 94,500,000 miles

Diameter:	12,753 km or 7,926 miles
Rotation Period:With respect to the Sun	24 hours
With respect to the stars	23 hours and 56 minutes
Revolution period around Sun:	365 days 5 hours
Atmosphere: 5 levels	troposphere, stratosphere, mesosphere, thermosphere, exosphere
Length of day and night:	Differs depending on latitude and longitude and where the Earth is in its revolution around the sun. During the spring and autumn equinoxes, the length of night and day are 12 hours each.
Temperature:	-89°C to 57.7°C or -128°F to 136°F
Average speed around the sun:	29.8 km/second or 18.5miles/second

**Earth Features:**

Water: 70% of the earth is covered with water; we need water to survive.  
 Water makes rivers, lakes and oceans. It has also carved out canyons.

Moving plates: these plates form mountains and cause earthquakes and volcanoes.

Biomes or ecosystems: tropical rain forest, desert, temperate forest, tundra, grassland and ocean.

Inner Earth: made up of the crust, mantle and outer and inner core. The inner core is made of mostly iron and has a temperature of about 7500° C or 9000° F which is hotter than the surface of the Sun.

**Student Sheet**

**The Earth**

Names for the Earth:

Distance from the moon:

Distance from the Sun:

Diameter:

Rotation Period: With respect to the Sun

With respect to the stars

Revolution period around Sun:

Atmosphere: 5 levels

Length of day and night:

Temperature:

Average speed around the sun:

### **Earth Features:**

Water:

Moving plates:

Biomes or ecosystems:

Inner Earth:



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## **Careers in Aerospace**

Have you started thinking about what you would like to do when you grow up? There will be a continued demand for aerospace scientists, engineers, technologists, and technicians. The choices you make in school could affect your career possibilities.

People who study numbers and the relationship between numbers are called Mathematicians; Engineers are problem solvers; Scientists study how the universe works; and Astronauts explore and conduct research in space.

Teamwork is an important part of the lives of all NASA personnel. A Mathematician, Engineer, Scientist and Astronaut all depend on each other's skill and knowledge to get the job done. These are some kinds of jobs offered at NASA. What would you like to be?

CREW OF A SPACECRAFT	Commander Pilot Mission Specialist Payload Specialist	ENGINEERING DESIGNERS	Architectural Electrical Mechanical
PHYSICAL SCIENTISTS	Astronomer Chemist Geologist Meteorologist Physicist Oceanographer	LIFE SCIENTISTS	Biologist Medical Doctor Physiologist Nutritionist Psychologist
SOCIAL SCIENTISTS	Economist Sociologist	MATHEMATICIANS	Computer Scientist Mathematician Systems Analyst Statistician
ENGINEERS	Aerospace/Astronautics Chemical Civil Biomedical Computer Electrical Industrial Environmental Materials Mechanical Nuclear Petroleum Plastics Safety Systems		

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