

MOREHEAD

PLANETARIUM AND SCIENCE CENTER



ASTRONAUT

CLASSROOM ACTIVITIES

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INTRODUCTION

The exploration of space is considered by many the greatest endeavor that humankind has ever undertaken. What does it take to be part of this incredible journey? What does it take to become an astronaut?

Astronaut provides some answers to these questions as it takes students from Earth into space and beyond. Presented in high-definition fulldome digital video with explosive surround sound, the show is an educational adventure!

Students experience a rocket launch from inside the body of an astronaut. They explore the amazing worlds of inner and outer space, from maneuvering through microscopic regions of the human body to floating around the International Space Station. They meet an animated test astronaut, Chad, and discover the perils that lurk in space from his viewpoint.

The show is narrated by Ewan McGregor. Your students may know him from the *Star Wars* prequel trilogy and other films. The show was produced by the National Space Centre, based in the United Kingdom, and lasts approximately 30 minutes.

Inside Morehead Planetarium and Science Center's GlaxoSmithKline Fulldome Theater or PLANETS Portable Planetarium, *Astronaut* becomes an immersive learning experience that involves students in looking, listening, contemplating and inquiring.



PRESIDENT BARACK OBAMA GREETES THE STS-132 ATLANTIS CREW AND INTERNATIONAL SPACE STATION ASTRONAUT T.J. CREAMER IN THE OVAL OFFICE, JULY 26, 2010. OFFICIAL WHITE HOUSE PHOTO BY PETE SOUZANSEN

You can build on this experience by continuing with related activities in your classroom—and extending them to hands-on learning, reading and writing. In the following pages are some examples of approaches you can take.

We hope you will find that *Astronaut* activities introduce and reinforce a range of science and non-science content you need to cover, while also addressing the varied interests and learning styles of the children in your classroom. ✨

CONNECTIONS TO STANDARDS

A *stronaut* addresses the major physical and environmental hurdles of human space travel, as well as how technology has been employed to help overcome some of these hurdles.

Specific North Carolina Standard Course of Study goals and objectives discussed in the show include the following Grade 6 Science Objective:

Objective 2.03—Evaluate technological designs.

They also include the following Grade 7 Science Objectives:

Objective 2.03—Evaluate technological designs.

Objective 4.01—Analyze how human body systems interact to provide for the needs of the organism.

THE COMMON CORE STATE STANDARDS

In addition to the familiar North Carolina Standard Course of Study, our state has recently adopted the new Common Core State Standards. This guide contains materials to help teachers begin to build lesson plans that connect with the themes of these standards. “Writing about *Astronaut*” and “Looking Up: Topics in *Astronaut*” have been developed with the English Language Arts Common Core Standards in mind. ✨

WRITING ABOUT *ASTRONAUT*

The *Astronaut* show provides your students with a rich experience you can draw upon for writing assignments. Such assignments will help them develop writing skills and knowledge of domain-specific words they will be able to call upon throughout their school years.

The new Common Core English Language Arts Writing Standards for Grade 6 include the following:

Standard 2—Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content

Standard 3—Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

Standard 7—Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

Similar instructions are included in the Common Core for English Language Arts Writing Standards for Grade 7:

Standard 2—Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

Standard 3—Write narratives to develop real

or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

Standard 7—Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

These standards may be addressed with assignments such as those described below, which enable students to integrate newly learned scientific content into discussions and written work that develops their communication skills.

When giving any of the writing prompts described below, assign the length depending upon the time available and your students' level of writing skill. These types of assignments can be accompanied by illustrations, models, or other artifacts you ask the students to create. The pre-writing steps can be used with the suggested prompts or with prompts that you create.

PRE-WRITING

At the end of the *Astronaut* guide we have included a glossary of key scientific vocabulary. These are all useful words that you may wish to review with your students and include in class discussions and in writing assignments.

However, in writing about aspects of the show, your students may choose to convey memories and ideas that require other vocabulary. They

may already know some of the words they need, but not know how to spell them. Or they may need to learn new words in order to discuss and describe the new experience this show represents for them.

1. Remembering. Ask your students to close their eyes for a little while and remember all the things they saw when they were in the planetarium.

2. Discussing. Ask them to open their eyes and say out loud some of the things they remember. You can give every student the chance to mention one thing she or he remembers. You can make a rule that they must mention things that aren't already on the board. You can also ask students to work in duos or groups to create common lists of words that they can then share with the class.

3. Recording. Write the words down on the board as they are mentioned so that the students can see how they are spelled. Students can draw from this vocabulary as they respond to the writing prompt you assign.

You can repeat steps 1-3 to focus students' attention on particular aspects of Astronaut, possibly providing some questions that guide them toward content you wish to cover.

4. Telling. Keeping an audience in mind can be a complicated task, so you may wish to broach this topic with students. Discuss with your students that writing is an opportunity to tell someone else about an experience or an idea you want them to know about. Ask your students to think about the person or people to whom they are going to “talk” as they write. As they write, they may want think about telling or “talking” to a parent or guardian at home, or perhaps someone at school, like the principal or their fellow students.

5. Organizing. Remind your students that organization is important because it helps the person they're telling to follow along and not get confused. You can mention that a good way to organize writing about an experience is to write about it in the order that things happened. Another good way for them to organize is by choosing topics or ideas to focus on (which they can do in a pre-writing or brainstorming phase), and not try to write about everything or too much all at once.

WRITE FROM YOUR EXPERIENCE

Prompt. Describe *Astronaut* to someone who did not get to see the show.

Prompt. Tell someone who did not get to see *Astronaut* the three most important things you learned from the show.

Prompt. Based on what you learned in *Astronaut*, write about whether or not you would wish to train to become an astronaut. Explore the advantages or disadvantages of such a career choice.

WRITE FROM YOUR IMAGINATION

Prompt. Based on what you saw in *Astronaut*, write a short story about an astronaut who trains to go into space. The show mentioned many difficulties that astronauts and astronauts-in-training may encounter; one of these potential difficulties should serve as the “complication” at the heart of your story. How will the complication be resolved? Who will be the main character or characters in the story? Will the story be funny or serious?

Prompt. Based on what you saw in *Astronaut*, write a poem about how it would feel to travel into space.

Prompt. Based on what you saw in *Astronaut*, write a poem about how it would feel to return to Earth after a long journey into space.

WRITE FROM YOUR RESEARCH

Prompt. Ewan McGregor, the narrator of *Astronaut*, mentions that a major part of an astronaut's job is to conduct experiments in microgravity. Independently or as part of a group, design an experiment you would wish to conduct in space. Develop an hypothesis, materials list, and protocol for this experiment. The experiment must be one that will take advantage of the weightless environment in which it will be conducted. It should be novel (something you believe has not been attempted before), but also feasible. It should be useful (i.e., people will benefit from the findings). And it should involve something you or your group are interested in knowing about. Present your project to the class or to a group of fellow students to get feedback before turning in your final version for grading.

Prompt. Was there something in the *Astronaut* show that you would like to know more about? Propose your topic to your teacher so that she can help you learn more (by talking about it in class and carrying out research in the media center). Write about what you learn in an essay. Alternatively, create a research poster that you will present in a classroom poster session. ✨

LOOKING UP: TOPICS FROM *ASTRONAUT*

In this activity, students use the Internet to collect information that they incorporate into a story or essay. After viewing *Astronaut*, they find out more about related topics by navigating the “World Book @ NASA for Students” on the NASA website.

The “World Book @ NASA for Students” is designed for elementary school students. It contains articles with information about space and Earth science, aeronautics, and space exploration. They are designed to be useful for students doing research. You may wish to tell your students about this resource during many types of lessons related to space and Earth science. A sample lesson that integrates science with language arts, “Looking Up: Topics from *Astronaut*,” is included here.

“Looking Up: Topics from *Astronaut*” can be used alone, or it can become part of the research process as students work on prompts described in “Writing about *Astronaut*,” the previous section of this guide.

“Looking Up: Topics from *Astronaut*” can help teachers address several Common Core Standards. For instance, the English Language Arts Language Standards for Grades 6 and 7 include the following:

Standard 6—Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

TEACHER’S GUIDE

1. Lead a brief discussion about NASA. Ask students:

- What does the acronym NASA stand for?
- Who works at NASA?
- What kinds of things do people at NASA do?

NASA is the National Aeronautics and Space Administration. From the History Division of the NASA website:

Since its inception in 1958, NASA has accomplished many great scientific and technological feats in air and space. NASA technology also has been adapted for many non-aerospace uses by the private sector. NASA remains a leading force in scientific research and in stimulating public interest in aerospace exploration, as well as science and technology in general. Perhaps more importantly, our exploration of space has taught us to view Earth, ourselves, and the universe in a new way. While the tremendous technical and scientific accomplishments of NASA demonstrate vividly that humans can achieve previously inconceivable feats, we also are humbled by the realization that Earth is just a tiny “blue marble” in the cosmos. (<http://history.nasa.gov/>; accessed 7/2009)

2. Write out “NASA—National Aeronautics and Space Administration” on the board.

3. Explain that the NASA website is a great

place to find information about space and aeronautics (the science of flight). Write the NASA web address (<http://www.nasa.gov>) on the board. Tell students they will use a certain part of the NASA website called the “Picture Dictionary” to gather information.

4. Pass out the “Looking Up” worksheets. Mention to the students that the topics they see on the worksheet are related to the *Astronaut* show.

5. Read the list of topics aloud to your students, so that they associate the correct pronunciation with the spelling of each topic.

6. Ask the students to circle three topics on the worksheet about which they would like to learn more. Students should write the three topics they select in the appropriate spaces on their worksheets. (You may choose to ask your students to work in duos, who will agree on the topics that interest them, work together to take notes, and then work on a collaborative piece of writing.)

7. Once students have selected their topics, direct them toward the computers. Explain the structure of the “World Book @ NASA for Students” website. (Words are listed alphabetically. Students can either scroll down the page or use the hyperlinked letters at the top of the page to jump to the appropriate section.)

8. When students find their topics, they should read the entries and make notes about any information they will need to use later. This activity requires students to assess and summarize written materials—useful skills they will need in order to do other research and to prepare for tests. Remind them that they should be careful to place in quotation marks any phrases which they are copying word for word.

9. When they finish finding and making notes

about their chosen topics, ask the students to write a short essay or story integrating all three of their topics. (You may decide to give this instruction before the students being choosing their topics. However, students may also have fun with the surprise of having to connect the topics in a narrative after they are chosen.) Each piece of writing can be as short as a page, or it can be longer, depending upon the time available and the writing level of your students.

10. Students can write their stories or essays on the back of the worksheets. Alternatively, this may be an occasion when you want them to develop their word-processing skills by composing on the computers they used for investigating their chosen topics.

POST-LESSON EXTENSIONS

Explore the topics. As a class, read aloud the topics included on the “Looking Up” worksheet. Ask students who chose one or more of the same topics to read their work aloud, so that everyone can hear how the topics were used by different writers. Find out who explored topics that no one else in the class chose, and ask those students to read their work aloud. Be certain that every student has the opportunity to read aloud and receive praise for her or his writing.

Look up other topics. Have your students complete the “Looking Up” activity more than once, but select different topics from the World Book each time. You can ask your students to select topics that they are interested in that appear in the “World Book @ NASA for Students” but do not appear on the worksheet. ⚙

Name _____

LOOKING UP: TOPICS FROM *ASTRONAUT*

All these topics are connected to the *Astronaut* show you saw. They are also in the "World Book @ NASA for Students" (<http://www.nasa.gov/worldbook/wbkids/index.html>).

Neil Armstrong	Meteor	Planet	Space Exploration
Astronaut	Navigation	Sally Ride	Valentina Tereshkova
Gravity	Oxygen	Robot	Weather

Circle three topics that you would like to use in your writing. As you read about your chosen topics in the "World Book @ NASA for Students," note any facts that you would like to include in your writing. Remember to place quotation marks (") around any phrases you copy word for word.

Topic 1: _____

Notes: _____

Topic 2: _____

Notes: _____

Topic 3: _____

Notes: _____

Use your three topics in a piece of writing. Remember to use complete sentences when you are writing. Your teacher will tell you how long your piece of writing should be and if you should write it on the back of this worksheet or on another piece of paper.

Name _____

LOOKING UP: TOPICS FROM *ASTRONAUT*

All these topics are connected to the *Astronaut* show you saw. They are also in the "World Book @ NASA for Students" (<http://www.nasa.gov/worldbook/wbkids/index.html>).

Neil Armstrong	Meteor	Planet	Space Exploration
Astronaut	Navigation	Sally Ride	Valentina Tereshkova
Gravity	Oxygen	Robot	Weather

Circle three topics that you would like to write a story about. As you read about your chosen topics in the "World Book @ NASA for Students," note any facts that you would like to include in your story. Remember to place quotation marks (") around any phrases you copy word for word.

Topic 1: _____

Notes: _____

Topic 2: _____

Notes: _____

Topic 3: _____

Notes: _____

Use your three topics in a story. Remember to use complete sentences when you are writing. Your teacher will tell you how long your story should be and if you should write it on the back of this worksheet or on another piece of paper. **Use your imagination and have fun writing your story!**

KEY SCIENTIFIC VOCABULARY

These words and concepts are included in *Astronaut*. After the show, you may wish to explore several of them further in your classroom by incorporating them into a discussion of *Astronaut* and into a follow-up lesson plan, such as a writing assignment.

astronaut. A person who pilots a spacecraft or works on one. “Astronaut” is the name used in the United States. “Cosmonaut” is the name used in Russia.

atmosphere. The mixture of gases that surround a planet, moon, or star, and are held near it by gravity.

cardiovascular system. The circulatory system of the heart and blood vessels.

electromagnetic radiation. The word “radiation” has to do with energy or matter moving through space. Any heated body produces electromagnetic radiation. Sunlight is a form of electromagnetic radiation produced by the sun, but so is ultraviolet radiation, infrared radiation, and gamma radiation.

experiment. A test or tests used to find out or prove something or to see whether an idea is correct.

gravity. A physical force attracting one object to another object.

meteor. This term describes the bright streak of light caused by a meteoroid as it burns up in Earth’s atmosphere. Other names for a meteor

include “shooting star” and “falling star.”

meteoroid. A small body in orbit about the Sun which may fall to Earth or to another planet.

navigation. A method used to learn exactly where airplanes, ships, or spacecraft are in the sky, on the ocean, or in space.

oxygen. A kind of gas. Oxygen is found in the air, soil, and water. Nearly all living things need oxygen to stay alive.

planet. A body that orbits a star in a solar system and which shines only by reflected light.

red blood cells. Cells that carry oxygen to all parts of the body.

robot. Robots are machines controlled by computers.

space exploration. Space exploration is travel into space to gather information about the Earth, Moon, planets, stars, and other things in space.

space junk. This “junk” circling the Earth is called orbital debris. It can be as small as tiny flecks of paint that have come off spacecraft and as large as satellites that are no longer working.

spacesuit. A specially designed garment that protects astronauts from the dangers of space.

weather. Weather is the condition of the air at a certain place and time.

weightlessness. Weight is the measure of the pull of gravity on an object. NASA astronauts do not feel the effect of gravity in space, which makes them seem like they have no weight, or feel weightless.

Adapted from the following sources

American Heart Association (<http://www.heart.org>)

Cosmicopia (<http://helios.gsfc.nasa.gov/index.html>)

NASA Education (<http://www.nasa.gov/offices/education/about/index.html>)

National Cancer Institute (<http://www.cancer.gov>)