

Performance Task Item: Space Invaders

Part A:

Read “The Apollo Space Program” and answer questions 1 – 4.

1. According to the text, how many flights actually landed on the moon? How many spaceflights were there?
2. What things did the astronauts find on the moon? Why was it easier for the astronauts to explore the moon on a lunar rover rather than on foot?
3. What years did the Apollo Missions take place? How many years has it been since the last moon landing? Use text evidence to find your answers.
4. What does the phrase *“One small step for man, one giant leap for mankind”* mean? Pair/Share what you think that phrase means. State in your own words.

Part B:

Read “SpaceX has Successful First Launch with Recycled Rocket Booster” and answer questions 10 – 12.

10. What is the main idea of this article?

11. What do you think might be different in space travel when businesses get involved? Using the Venn Diagram provided, compare and contrast the way space travel might be different if business is in charge or the government is in charge. You may need to complete some research.

12. According to the article, Elon Musk is making a spacecraft to fly to Mars and dreams of making a place for people to live on Mars. If humans were to inhabit a new planet, what are the things you would want to make sure the planet has and what things would you want to bring with you? Due to space constraints, you may bring only 10 things besides your family and friends. Remember, there is a difference in wants and needs. Research Mars and see what things you might need and anything you might want. Fill out the sheet “MARS OR BUST” - Write each item you plan to bring and your reason for bringing it.

Read the Two Infographs from Barrios Technology about space travel for tourists.

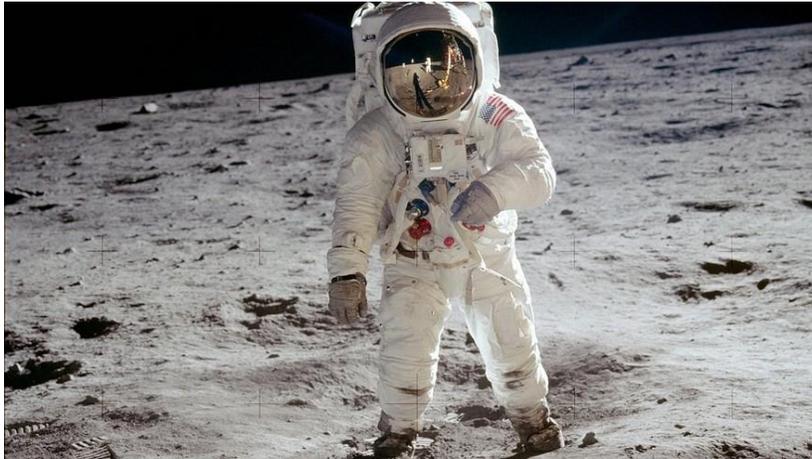
13. Why will making space travel to tourists be different than traveling on an airline?
Using all of your resources, do you think space tourists should have to go to training?
Why or why not?

14. Could you be an astronaut? Research what astronauts have to do at the International Space Station. You can use this website by NASA:
<https://www.nasa.gov/audience/foreducators/stem-on-station/dayinthelife> or any reputable website for your research. You will create a power point presentation on ‘the day in the life of an astronaut’. Be sure to include sleeping, eating, activities, cool things that happen as they travel through space (for example, weightlessness). A rubric has been provided to help you with your presentation.

15. After looking at all the informational text, space travel could be a possibility in your lifetime for people who have not had the training to be an astronaut. Would you be interested in space travel? Write an opinion paper using the attached opinion writing graphic organizer. A rubric has also been provided to guide your writing.

ARTICLES/STUDENT MATERIALS

“The Apollo Space Program”



TOP: Astronaut Buzz Aldrin, lunar module pilot, stands on the surface of the moon near the leg of the lunar module, Eagle, during the Apollo 11 moonwalk. Photo taken by astronaut Neil Armstrong, NASA

BOTTOM: On July 16, 1969, the huge, 363-foot tall Saturn V rocket launched the Apollo 11 mission. NASA.gov

Apollo was the name of a space program. It was led by NASA, the U.S. space group. The program began in the early 1960s. It resulted in American astronauts making 11 spaceflights and walking on the moon.

Six of the flights landed on the moon. The first Apollo flight happened in 1968. It went around the moon. The first moon landing took place in 1969. The last moon landing took place in 1972.

Twelve astronauts walked on the moon. They studied the surface and collected rocks to bring back to Earth.

Scientists are still studying the moon rocks. They offer lots of information. The rocks teach scientists about the history of the moon and outer space.

When Did Humans First Visit The Moon?

The first mission to send humans to the moon was Apollo 8. The spaceship circled around the moon on December 24, 1968. It did not land on the moon. Instead, it circled around it several times. Then it came back to Earth. The astronauts on the spaceship were Frank Borman, Bill Anders and Jim Lovell.

The first moon landing happened on July 20, 1969. It was the result of the Apollo 11 mission. The astronauts were Neil Armstrong, Michael Collins and Buzz Aldrin. Neil Armstrong became the first person in history to walk on the moon. "That's one small step for (a) man," he said. "One giant leap for mankind."

The following are some of the most famous Apollo missions:

Apollo 8 Date: December 21-27, 1968. Mission: First to orbit the moon. Crew: Borman, Lovell, Anders

Apollo 11 Date: July 16-24, 1969. Mission: First to land on the moon. Crew: Armstrong, Aldrin, Collins

Apollo 13 Date: April 11-17, 1970. Mission: Was supposed to land on the moon but had a malfunction. Crew: Lovell, Swigert, Haise

Apollo 17 Date: December 7-19, 1972. Mission: Last Apollo mission to land on the moon. Crew: Cernan, Schmitt, Evans

How Did Astronauts Land On The Moon?



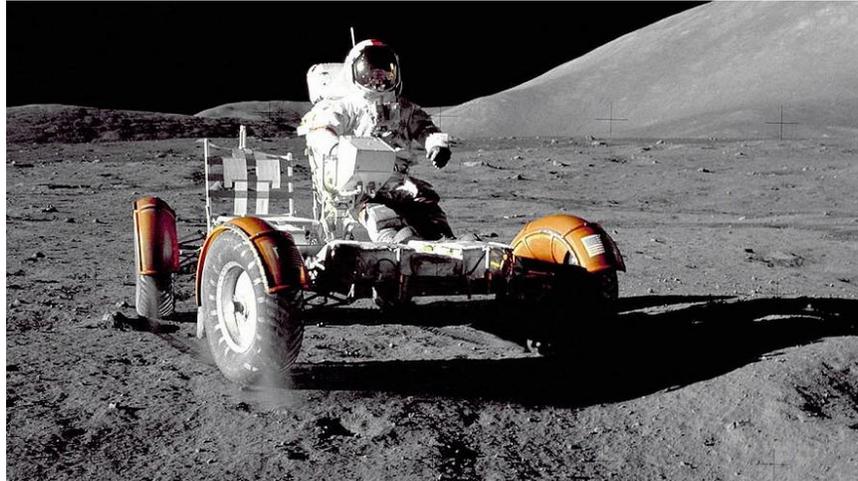
NASA used a giant rocket to launch the spaceships. The rocket was called Saturn V. It pushed the spaceships through the sky. Then it helped them fly to the moon.

On the last three missions, astronauts drove on the moon. They used a special car called the lunar rover. It helped them explore the moon's surface.

Why Was The Apollo Program Important?

In 1961, President John F. Kennedy made an announcement. He said he wanted to send astronauts to the moon. NASA did that with the Apollo program. It was the first time humans visited another world.

“U.S. May Return to Moon Soon with Help from Private Businesses”



Apollo 17 mission commander Eugene A. Cernan makes a short checkout of the Lunar Roving Vehicle during the early part of the first Apollo 17 extravehicular activity at the Taurus-Littrow landing site. This view of the lunar rover prior to load up was taken by Harrison H. Schmitt, Lunar Module pilot.

Photo: NASA

Humans first visited the moon in 1969. It was an American mission called Apollo 11. The astronaut Neil Armstrong became the first person to walk on the moon.

Armstrong was an astronaut for the National Aeronautics and Space Administration (NASA). NASA is part of the United States government. It builds rockets and studies space.

Now, the United States might return to the moon. Many government leaders working with President Donald Trump want to go back.

This time, NASA might work with businesses. The businesses will explore space. This will mean less money spent by the government.

It costs a lot of money to visit space.

Little Government Money for NASA

The government has stopped giving lots of money to NASA. There are not as many trips to space anymore.

Now, private companies want to go to space. They are offering trips to take regular people on a space ship.

The government may ask for help from the companies.

Elon Musk is the leader of the company SpaceX. It is offering trips to space. He met with Trump's team.

Some people in Trump's government once worked for NASA. They had a project called Constellation.

The project would get people back to the moon. The team worked under President George W. Bush.

Obama Did Not Support Return to the Moon

When Barack Obama was president, he stopped Constellation. He said it was too expensive. We had already been to the moon, he said.

The people who worked on Constellation still want to go to space. They were upset Obama canceled the program.

Now, NASA is working on a new powerful rocket. It is called the Space Launch System. One day it could bring people around the moon or to an asteroid. It could even bring people to Mars.

NASA needs a lot of money to study space. It has joined together with the businesses SpaceX and Orbital ATK.

These companies helped NASA fix up the International Space Station. The space station floats above the earth. Some astronauts live in the space station. They use it to study space and do experiments.

SpaceX could send astronauts to the space station in 2018.

SpaceX has already sent supplies to the space station. It will also send two people on a trip around the moon in 2018.

Oklahoma lawmaker Jim Bridenstine wants to lead NASA.

Moon Materials May Have Uses on Earth

Bridenstine thinks the United States should return to the moon. We can mine it for materials we can use on earth, he says.

Scientists say billions of tons of water ice exist on the moon.

The moon could also be rich in metals. We could mine it for gold, platinum and cobalt.

“SpaceX has Successful First Launch with Recycled Rocket Booster”



A SpaceX Falcon 9 rocket, powered by a previously flown first-stage rocket, blasts off from launch pad 39A on March 30, 2017, carrying a SES 10 communications satellite. This was the first time SpaceX reused a booster rocket for a space mission. Photo by: Red Huber/Orlando Sentinel/TNS

CAPE CANAVERAL, Fla. — SpaceX sent up a rocket and then got it back on Thursday. The booster part of the rocket had flown once before. It was the first time a booster was used a second time.

Boosters launch spacecraft into space. They have several engines that must push satellites or shuttles into orbit. Then they usually drop off and fall down to Earth.

Elon Musk started SpaceX. It is a space company. It works with NASA, the United States space agency. Musk also owns the car company, Tesla.

SpaceX Landed Nine Rocket Boosters

Boosters cost more than other parts of the rocket, Musk says. They usually are dropped following takeoff. Then they sink into the Atlantic Ocean. SpaceX began flying back boosters in 2015. It has landed nine boosters.

Musk said this booster will not fly again. It will remain at Cape Canaveral for people to see.

Musk said it took 15 years to get to this. He brought all five of his young sons to the takeoff. He wanted them to see history.

The SpaceX Company has worked to make space flight easier. The company also wants to save money.

Musk did not know what to say after the rocket landed on the ocean platform. It had done what some had said was impossible. The rocket's job was to put up a satellite. A satellite moves around Earth to help with services on Earth.

"This is a huge day," Musk said. He called it an amazing step in the history of space.

Musk thinks boosters will be used many times.

Rocket Booster Landed In the Ocean

SpaceX worked on the booster after its first flight. Then it tested the booster. It had the same nine engines that it had the first time.

The rocket made a landing at sea Thursday after it was finished moving the satellite.

SpaceX is in southern California. Workers outside the company cheered during the flight. They cheered again when the satellite reached its place.

NASA is the U.S. space agency. It also has worked to use rockets more than once. It had booster rockets that dropped away in the air. They parachuted into the ocean to be saved.

SpaceX is used to doing new things. It is building a spacecraft for NASA astronauts. It also is working to fly two people to the moon next year.

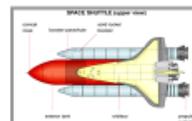
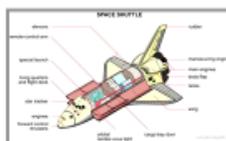
The company is making a spacecraft to fly to Mars. Musk's plan is to start a place for people to live on Mars.

First, though, Musk says he wants to make spaceflight cheaper. He can do this by reusing things like booster.

Passenger Training: What do they need to know?

While commercial airline passengers travel with little to no training at all, space tourists must have some training. The training should include:

- Vehicle Familiarization
- Safety
- Emergency Procedures
- Physiological Effects
- What to do and experience during the flight



Common Physiological Effects

- Nausea
- Space adaptation sickness
- Weightlessness
- Congestion
- Pressure



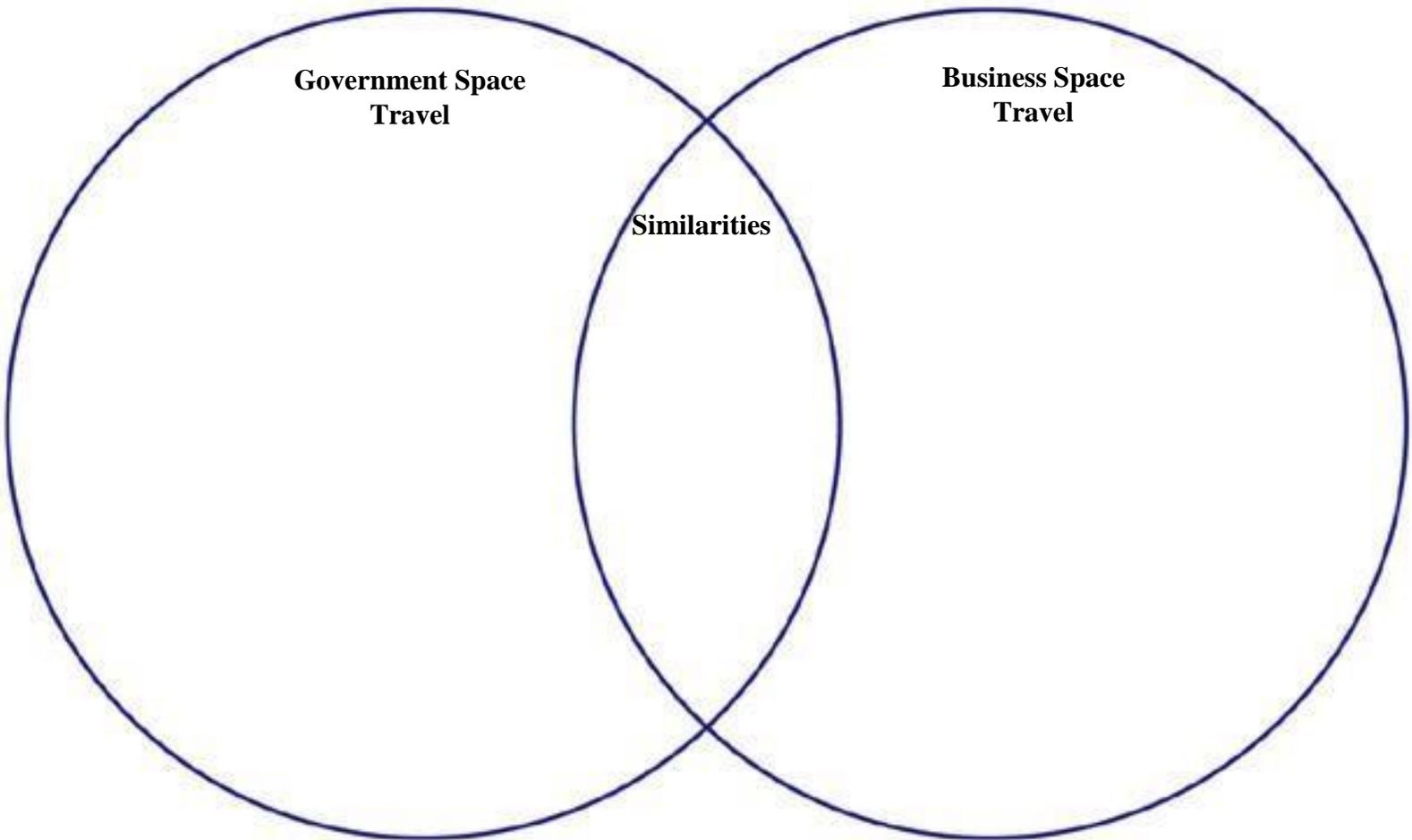
NON-FICTION

Text Features Chart

NAME:

<p>What is the heading or main title of the passage?</p>	<p>List any subheadings or subtitles.</p>
<p>Explain how the headings and subheadings work together.</p>	<p>What do you already know about the topic?</p>
<p>The passage will most likely be about...</p>	<p>The passage will teach me...</p>

Compare and Contrast Space Travel sponsored by the government (like NASA) and by businesses:



MARS OR BUST!



OPINION WRITING GRAPHIC ORGANIZER (OREO)

Topic: Would you be interested in Space Travel?

Opinion

Reason 1

Reason 2

Reason 3

Evidence 1

Evidence 2

Evidence 3

Opinion Restated in Different Words

OPINION WRITING RUBRIC

Scoring Elements	Not Yet		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Focus/Opinion	<ul style="list-style-type: none"> Responds to some or no parts of the prompt Demonstrates little to no understanding of topic/text 		<ul style="list-style-type: none"> Responds to most parts of the prompt States an opinion that demonstrates limited understanding of topic/text 		<ul style="list-style-type: none"> Responds to all parts of the prompt States an opinion that demonstrates an understanding of topic/text 		<ul style="list-style-type: none"> Responds skillfully to all parts of the prompt States an opinion that demonstrates an insightful understanding of topic/text
Organization	<ul style="list-style-type: none"> Organizes with no evidence of paragraph structure Uses no linking words 		<ul style="list-style-type: none"> Organizes ideas and information in an incomplete paragraph structure (e.g., missing conclusion) Uses some linking words to connect reasons to opinion but simplistically or ineffectively 		<ul style="list-style-type: none"> Organizes ideas and information using a clear topic sentence, details, explanation, and concluding sentence Uses linking words and phrases to connect reasons to opinion 		<ul style="list-style-type: none"> Organizes ideas and information into logical, coherent paragraphs that are clear to the reader Uses linking words and phrases skillfully to connect reasons to opinion
Support/Evidence	<ul style="list-style-type: none"> Does not support opinion with reasons Provides no or inaccurate explanation of how reasons support opinion 		<ul style="list-style-type: none"> Supports opinion with minimal or irrelevant reasons Provides some explanation of how reasons support opinion 		<ul style="list-style-type: none"> Supports opinion with relevant reasons Provides clear explanation of how reasons support opinion 		<ul style="list-style-type: none"> Supports opinion skillfully with substantial and relevant facts, details, and/or reasons Provides explanations/analysis of how evidence supports opinion

<p>Language</p>	<ul style="list-style-type: none"> • Uses little to no correct sentence structure • Demonstrates limited understanding of grade-level appropriate conventions, and errors interfere with the meaning • Uses no academic or domain specific vocabulary 	<ul style="list-style-type: none"> • Uses some correct but repetitive sentence structures • Demonstrates some grade-level appropriate conventions, but errors may obscure meaning • Uses limited academic and/or domain-specific vocabulary for the audience and purpose 	<ul style="list-style-type: none"> • Uses correct and varied sentence structures • Demonstrates grade-level appropriate conventions; errors are minor and do not obscure meaning • Uses academic and domain specific vocabulary appropriate for the audience and purpose 	<ul style="list-style-type: none"> • Uses purposeful and varied sentence structures • Demonstrates creativity and flexibility when using conventions (grammar, punctuation, capitalization, and spelling) to enhance meaning • Uses precise and sophisticated academic and domain-specific vocabulary appropriate for the audience and purpose
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POWER POINT RUBRIC

	5	4	3	2	1
Content	Content is accurate and information is presented in a logical order.	Content is accurate but some information is not presented in a logical order, but is still generally easy to follow.	Content is accurate but information is not presented in a logical order, making it difficult to follow.	Content is questionable and information is not presented in a logical order, making it difficult to follow.	Content is inaccurate and information is not presented in a logical order, making it difficult to follow.
Slide Creation	Presentation flows well and logically. Presentation reflects extensive use of tools in a creative way. Correct number of slides.	Presentation flows well. Tools used correctly. Correct number of slides. Overall presentation is interesting	Presentation flows well. Some tools used to show acceptable understanding. Correct number of slides.	Presentation is unorganized. Tools are not used in a relevant manner. Lacking in number of slides.	Presentation has no flow. No tools used. Insufficient number of slides.
Slide Transitions	Transitions are smooth and interesting. Transitions enhance the presentation.	Smooth transitions are used on most slides.	Smooth transitions are used on some slides.	Very few transitions are used and/or they distract from the presentation.	No transitions used.
Pictures, Clip Art & Background	Images are appropriate. Layout of images is pleasing to the eye.	Images are appropriate. Layout is cluttered.	Most images are appropriate.	Images are inappropriate.	No images.
Mechanics	No spelling errors. No grammar errors. Text is in authors' own words.	Few spelling errors. Few grammar errors. Text is in authors' own words.	Some spelling errors. Some grammar errors. Text is in authors' own words.	Some spelling errors. Some grammar errors. Most of text is in authors' own words.	Many spelling errors and/or text is copied.
Technology Connection	Comprehensive use of technology is apparent.	General understanding of technology.	Acceptable understanding of technology.	Little understanding of technology.	No understanding of technology.

SCIENCE EXPERIMENT - STRAW ROCKETS **(OPTIONAL ACTIVITY)**

Prepare the following materials before the lesson:

- **plastic straws (at least one per student)**
- **clear tape (one roll per table)**
- **scrap paper (about five per student)**
- **permanent fine tip markers, like Sharpies (one or two per table)**

Have students write the date and the focus question (How can you use the Engineering Design Process to design and create an air powered rocket that flies the farthest?) in their science notebooks. For this lesson, ask them to draw a quick sketch of what they think their rockets will look like.

Next demonstrate how to make a paper rocket by rolling a half sheet of paper around a pencil and taping it so it stays together. Then, twist the paper around the sharpened end of the pencil to make a nosecone. Finally, place the rocket onto a straw and blow, shooting the rocket across the room.

(There are templates you can download such as this one from [NASA](#) or this one from [Kid Science Challenge](#), but you may want to leave it open for students to design their own solutions.)



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