Day 8 & Day 9: Theme, Speech Writing

English Language Arts

- We learned a great deal about themes in primary sources and applied them accordingly. Now, it is your time to apply a theme of risk for continued exploration as you write a speech to the nation to explain why or why we should not go to Mars.
- Write a brief speech to address the nation as if you were the President of the United States detailing a new mission to Mars. At the conclusion of your mini-speech, write down what tone you are expressing as well as the theme that you want to convey to the American public.
- Additional Resource on Mars Exploration:
  In Search of Life on Mars and Jupiter's Moon
  https://bit.ly/2XZnLwT

Note: you will have two days to complete this task (Day 8 is Day 1 and Day 9 is Day 2)

Day 8: Surface Area

Math

Finding Surface Area of a Sphere

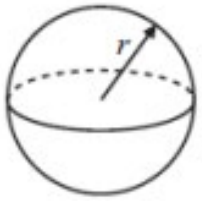
Determine the depth of the water on the surface of Mars by using the surface area formula to determine how much water would be available on the Surface of Mars if the ice caps were to melt.

Materials:

- Calculator

Surface area is defined as a measure of the area on the surface of an object. However, spheres are not like typical objects. Because of that, they need to use a formula specifically for a sphere. The formula for finding the surface area of a sphere is:

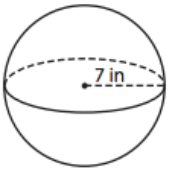
$$A = 4\pi r^2$$



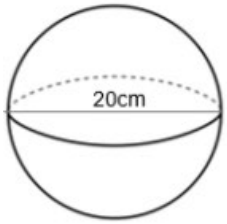
In this formula, r = the radius of a circle (or half of the diameter of a circle). Remember that pi can also be represented with the numerical value of 3.14.

Practice:
In this example, calculate the surface area of the sphere. Use 3.14 for pi.

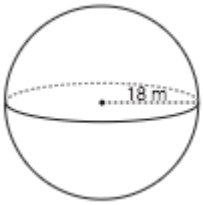
$A = 4\pi r^2$
$= 4*(3.14)(7)^2$
$= 4*(3.14)(49)$
$A = \boldsymbol{615.44\ in^2}$



Try a few examples on your own.



Surface Area = _____



Surface Area = _____

An orange has a radius of 3 inches. What is the surface area of the orange?

Exploring the North Pole of Mars from Orbit

It has been known for nearly 100 years that Mars has two polar caps, which change in size with the martian seasons. Both the North and South Polar Caps contain frozen water in different amounts. The photo above was taken by NASA's Mars Reconnaissance Orbiter and shows the details in the 1,200-km wide North Polar Ice Cap in the summer showing the deposits of frozen water ice.

Scientists estimate that, if the Polar Ice Caps were completely melted, they would produce 2.5 million cubic kilometers of liquid water covering the surface of Mars.

Problem 1 – Mars is in the geometric shape of a sphere with a radius of 3,400 km. If the formula for the surface area of a sphere is $S = 4 \pi R^2$, what is the surface area of Mars?

Problem 2 – The volume of a shell of water covering the surface of Mars to a *depth of h kilometers* is given by V = h x A where *A is the surface area* of Mars in square kilometers. If the volume of the melted water ice from the polar caps is 2.5 million km^3, what will the depth of the water be in meters if it completely covered the surface of Mars? Use the answer you calculated in Problem 1 to help you solve for the depth (h).

Day 8: Mars Colony

Science

Mars Colony: Living on another planet

Plan how to solve various problems of power, water, food, temperature, heat, living space, oxygen, and survival on Mars.

Materials:

- Paper
- Your Planet Chart from Day 4 Science

Congratulations! You have been chosen to be one of the first humans to travel to and live on Mars. This is quite an accomplishment! However, there is one small problem; there is nothing there at the moment. You, along with a team of other astronauts, will be designing a colony to live on Mars when you get there. You will need to design blueprints for your colony and how you will survive. The goal is for you to go to Mars, live there for 6 months, and build a long-lasting colony that other humans can eventually come to and live in permanently.

<u>Things to consider:</u>

- Where will you get energy?
- What will you live in?
- If you are building things, how will you get them there (you only have 1 trip)?
- What will you eat?
- How will you get around?
- What will you drink?
- How many buildings will there be?
- How will you build them?
- What resources on Mars can you use?

<u>What you need to complete:</u>

- Draw a set of blueprints (or a diagram) illustrating your colony.
- You need to label the parts in your colony (building types, purposes, etc.).
- You will need to have a written explanation of how you will get food, water, shelter, and energy.
- Explain how big your buildings will be.
- Explain any resources that Mars can offer to help your colony survive.

Additional Resource:

A One-Way Trip to Mars? http://ow.ly/MZyX50AWFop

WQED education

Day 8: Space History, Exploration

Social Studies

- Determine the phrase that you would recommend be uttered when a human steps foot on Mars while analyzing the events of Apollo 11.

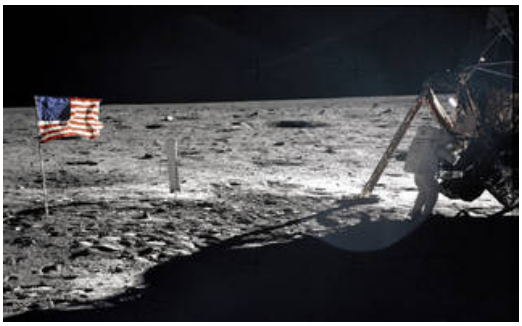
- Read the following article (attached), and, if possible, view the linked video within the article: www.nasa.gov/mission_pages/apollo/apollo11.html

- As Neil Armstrong set foot on the Moon, he stated, that's "one small step for man, one giant leap for mankind." Considering that, take time to ponder what phrase should be proclaimed by the first human to set foot on Mars.

- Write your phrase to be declared once the world reaches Mars with a human aboard.

July 20, 1969: One Giant Leap For Mankind

July 1969. It's a little over eight years since the flights of Gagarin and Shepard, followed quickly by President Kennedy's challenge to put a man on the moon before the decade is out.



Apollo 11 Commander Neil Armstrong working at an equipment storage area on the lunar module. This is one of the few photos that show Armstrong during the moonwalk. ***Credits: NASA***

Smoke and flames signal the opening of a historic journey as the Saturn V clears the launch pad. ***Credits: NASA***

Buzz Aldrin climbs down the Eagle's ladder to the surface. ***Credits: NASA***


Crater 308 stands out in sharp relief in this photo from lunar orbit. ***Credits: NASA***

It is only seven months since NASA's made a bold decision to send Apollo 8 all the way to the moon on the first manned flight of the massive Saturn V rocket.

Now, on the morning of July 16, Apollo 11 astronauts Neil Armstrong, Buzz Aldrin and Michael Collins sit atop another Saturn V at Launch Complex 39A at the Kennedy Space Center. The three-stage 363-foot rocket will use its 7.5 million pounds of thrust to propel them into space and into history.

At 9:32 a.m. EDT, the engines fire and Apollo 11 clears the tower. About 12 minutes later, the crew is in Earth orbit.

After one and a half orbits, Apollo 11 gets a "go" for what mission controllers call "Translunar Injection" - in other words, it's time to head for the moon. Three days later the crew is in lunar orbit. A day after that, Armstrong and Aldrin climb into the lunar module *Eagle* and begin the descent, while Collins orbits in the command module *Columbia*.

Collins later writes that *Eagle* is "the weirdest looking contraption I have ever seen in the sky," but it will prove its worth.

When it comes time to set *Eagle* down in the Sea of Tranquility, Armstrong improvises, manually piloting the ship past an area littered with boulders. During the final seconds of descent, *Eagle's* computer is sounding alarms.

It turns out to be a simple case of the computer trying to do too many things at once, but as Aldrin will later point out, "unfortunately it came up when we did not want to be trying to solve these particular problems."

When the lunar module lands at 4:17 p.m EDT, only 30 seconds of fuel remain. Armstrong radios "Houston, Tranquility Base here. The Eagle has landed." Mission control erupts in celebration as the

tension breaks, and a controller tells the crew "You got a bunch of guys about to turn blue, we're breathing again."

Armstrong will later confirm that landing was his biggest concern, saying "the unknowns were rampant," and "there were just a thousand things to worry about."

At 10:56 p.m. EDT Armstrong is ready to plant the first human foot on another world. With more than half a billion people watching on television, he climbs down the ladder and proclaims: "That's one small step for a man, one giant leap for mankind."

Aldrin joins him shortly, and offers a simple but powerful description of the lunar surface: "magnificent desolation." They explore the surface for two and a half hours, collecting samples and taking photographs.

They leave behind an American flag, a patch honoring the fallen Apollo 1 crew, and a plaque on one of *Eagle's* legs. It reads, "Here men from the planet Earth first set foot upon the moon. July 1969 A.D. We came in peace for all mankind."

Armstrong and Aldrin blast off and dock with Collins in *Columbia*. Collins later says that "for the first time," he "really felt that we were going to carry this thing off."

The crew splashes down off Hawaii on July 24. Kennedy's challenge has been met. Men from Earth have walked on the moon and returned safely home.

In an interview years later, Armstrong praises the "hundreds of thousands" of people behind the project. "Every guy that's setting up the tests, cranking the torque wrench, and so on, is saying, man or woman, 'If anything goes wrong here, it's not going to be my fault.'"

In a post-flight press conference, Armstrong calls the flight "a beginning of a new age," while Collins talks about future journeys to Mars.

Over the next three and a half years, 10 astronauts will follow in their footsteps. Gene Cernan, commander of the last Apollo mission leaves the lunar surface with these words: "We leave as we came and, God willing, as we shall return, with peace, and hope for all mankind."

Last Updated: July 15, 2019
Editor: NASA Administrator