

Grades: 6-8

Nova, “Back to the Moon”

On the 50th anniversary of the historic Apollo 11 Moon landing, NOVA looks ahead to the hoped-for dawn of a new age in lunar exploration. This time, governments and private industry are working together to reach our nearest celestial neighbor. But why go back? The Moon can serve as a platform for basic astronomical research; as an abundant source of rare metals and hydrogen fuel; and ultimately as a steppingstone for human missions to Mars and beyond. Join the next generation of engineers that aim to take us to the Moon and discover how our legacy of lunar exploration won't be confined to the history books for long.

After watching this episode, choose from the following questions and/or tasks to extend your learning

Question Box 1

- What evidence does Nova give to support the main idea? Provide text evidence.
- Using evidence from the program, explain why “Back to the Moon,” is a good title for this TV program.
- Identify specific details in the show that focus on the author’s goal.
- What is this program “saying”? Cite evidence to support your analysis.

Question Box 2

- What is the central message in this program? Explain?
- What are the program’s supporting claims or reasons that support the central message?
- What is the author trying to say through the TV program? What makes you believe this?
- Watch the launch of the Crew Dragon on May 27, 2020. How do you think the astronauts are feeling as the rocket prepares to launch?

Box 3 (Tasks)

- Compare and contrast the technology now and when Apollo 11 landed the first human on the moon.
- Use a graphic organizer to demonstrate, according to the video, why the United States wants to go back to the moon.
- It is estimated that the Apollo program cost \$288 billion in today’s dollars. It is estimated

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that the Artemis program would cost \$20-30 billion in addition to the current budget. The space industry sees the cost as a reasonable estimate. In addition, commercial companies have also contributed to the cost of the Artemis program so that the program is sustainable. Create a business plan that would be acceptable to the tax-paying public, the government, and the corporate sponsors using mathematics in your plan.

- The lunar lander for the Apollo era is estimated to be \$30 billion in today's dollars. In the Artemis program, it is being proposed that companies who want to invest in the program contribute 10% of the total cost of the system. Some companies are offering to contribute 30% of the total cost because of the non-NASA benefits they see. Assume you are a company wanting to invest in the Artemis project, how much would you invest? Why? Defend your actions to your board of directors using mathematics to justify your reasoning.
- Create a timeline of events of the space race of the 1950's and 60's.

Box 4 (Enrichment)

- Research and discuss the private entities that are working with the United States in sending humans to the moon.
- What are the advantages and disadvantages of governments working with private businesses in going to the moon?
- 12 white men have stepped foot on the surface of the moon. Who might be the first non-white person on the moon? Who might be the first woman on the moon? Research current astronauts who could fill those roles and discuss who should receive those honors and why?

Box 5 (Extend/Real-Life)

- Discuss NASA's Commercial Resupply project.
- Discuss NASA's Commercial Crew program.
- When most people think of space travel and the moon they automatically think of astronauts. While that is the most well-known career in space exploration it is not the only one.
- Brainstorm a list of careers and companies /suppliers/contractors that would be needed to launch a rocket into outer space.
- Complete your own exploration of the possibilities at this link:
<https://www.nasa.gov/stem-at-home-for-students-9-12.html>
 - Did you learn about other careers, etc. that you didn't include on your list? If so, what are they?
- Pick one of the projects and build it at home.