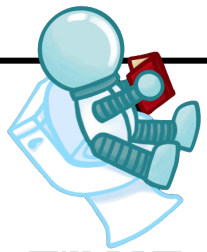
Name: _____ Date: _____

Science Friday Think Big

From “Artemis II test flight heads toward the moon” and “Artemis II tackles a minor plumbing issue on its way to the moon“

“Go for toilet”: Artemis II’s out-of-this-world plumbing problem



The Artemis II mission successfully launched on April 1, 2026, for a 10-day adventure, slingshotting around the moon and back. But almost as soon as the Orion spacecraft left the launchpad, the astronauts encountered a problem with an important piece of equipment: the toilet. Investigate the engineering behind space toilets and discover how Artemis II’s crew solved a surprising plumbing problem in microgravity.

1. Engineering new inventions is awesome! What equipment would you engineer for astronauts on spacecraft like Orion during missions?

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2. Ninety-six bags of human waste have been left on the moon. What is your prediction about what scientists might discover when the bags are finally retrieved and studied?

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3. Christina Koch is an electrical engineer and physicist. In a pinch, she was also the “space plumber.” What other unexpected roles might be needed for the next Artemis mission?

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The original audio for this story and the transcript can be found at:

https://www.sciencefriday.com/segments/artemis-ii-mission-launch-moon/

It is about 18 minutes long.

https://www.sciencefriday.com/segments/minor-glitch-for-artemis-ii/

It is the first story and is about 2 minutes long.

This story aligns with the following NGSS standards:

- ETS1.A: Defining and Delimiting and Engineering Problem
  - MS-ETS1-1 - Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible.
  - 3-5-ETS1-1 - Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- ETS1.B: Developing Possible Solutions
  - MS-ETS1-3 - Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
  - 3-5-ETS1-2 - Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- ESS3.C: Human Impacts on Earth Systems
  - MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
  - 5-ESS3-1 - Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

Expected answers:

1. Answers may vary.
2. Answers may include ideas about how long human bacteria survived or went dormant, as well as how it degraded/decomposed in the moon’s ecosystem..
3. Answers may include jobs relating to the maintenance of equipment in lunar habitats.