

Callisto™: Space Innovation Tour

Facilitation Guide

We can't wait to introduce you to the special technology that could potentially revolutionize space travel for future astronauts. Use this facilitation guide to provide an excellent tour experience for students at home or in the classroom!

1. Prepare for the tour

- Review the [tour learnings](#) and teacher guide below to see key learnings. Click through the tour (links below) on your own.
- Distribute [graphic organizers](#) to students if desired.

2. Select your tour style

Host a tour with student devices

A host projects the tour to a group and students join to compete against each other from separate devices.

- [Full Tour \(~50 minutes\)](#)
- [Split Tour : Part 1 \(~25 minutes\)](#)
- [Split Tour : Part 2 \(~25 minutes\)](#)

Project the tour without student devices

The host projects tour to group without students joining on separate devices.

- [Full Tour \(~50 minutes\)](#)
- [Split Tour : Part 1 \(~25 minutes\)](#)
- [Split Tour : Part 2 \(~25 minutes\)](#)

Share the tour for independent student play

Students complete the tour by themselves on their own devices. Teacher cannot see student responses.

- [Full Tour \(~50 minutes\)](#)
- [Split Tour : Part 1 \(~25 minutes\)](#)
- [Split Tour : Part 2 \(~25 minutes\)](#)

For additional support in setting up Kahoot, visit: <https://support.kahoot.com/hc/en-us>

3. Facilitate the tour


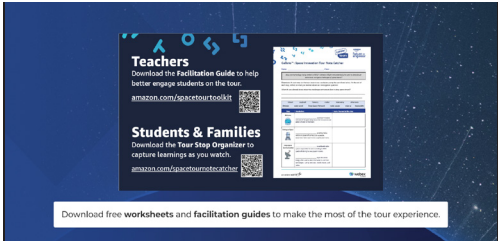
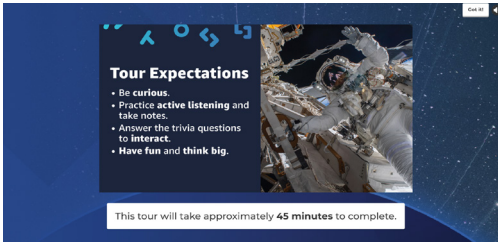
- Use the guide below to walk students through the tour. Ask students to share their thoughts or respond to questions to build more interaction.
- To advance slides, click " Got It" in the top right corner.
- Use our teacher toolkit for optional follow up activities and/print completion certificates.

Kahoot! Tips

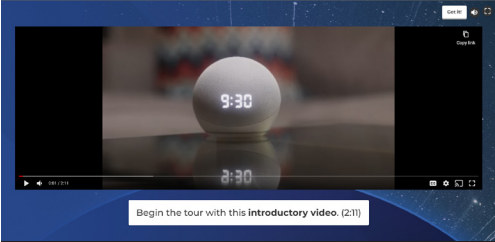
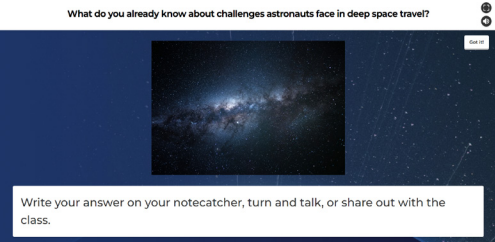
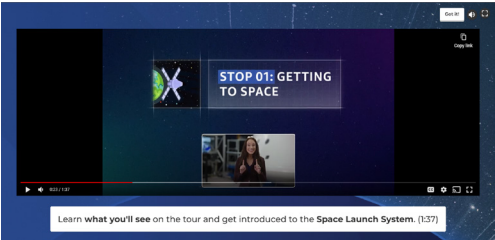
- If the video clips are playing too softly, check that the volume bar on the YouTube video is at maximum volume.
- There is no go back feature. If you need to go back to a video, the links to the segments on YouTube are provided in the facilitation guide below.
- **Warning:** Hitting space bar auto-advances the slide with no go-back feature.

4. Get an Amazon Gift Card when you submit your feedback [Complete this survey](#) to help us improve future tours and receive a \$5 Amazon gift card (US Only)

Callisto: Space Innovation Tour

Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
1 30 sec		<p>Say: “You may have seen on the news that NASA is returning to the moon with its new Artemis program. Today we’re going to take a look at special technology experiments aboard the spacecraft that is going to be launched. Today you get to be virtual crew members, getting a special look at the technology and the people who built them.”</p>	
2 1 min		<p>If you'd like your students to access digital notes, have them scan the QR code or access a doc at the tinyurl provided. Students should make a copy of the document. They'll have to switch between the Google Docs and Kahoot tabs to answer questions and take notes.</p> <p>If using paper note catchers, this would be the time to distribute.</p> <p>PDF Word Google Doc</p>	
3 30 sec		<p>Set tour expectations with your class.</p> <p>Read the expectations to students.</p> <p>Say: “On the next slide you'll answer if you agree or disagree with the statement ‘Right now, I am interested in career opportunities in computer science and technology.’ Remember, there is no right answer, and this does not count towards your points.”</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
4 2 min 30 sec		<p>Show Video 1. Video is 2:11 in length.</p> <p>Say: "On the next slide you will answer what you already know about the challenges astronauts face in deep space travel."</p>	
5 2 min		<p>Students share out whole group, turn and talk to partners, or write answers on paper.</p> <p>Select a few answers and read them aloud to class or have students share out answers.</p>	
6 2 min		<p>Show Video 2. Video is 1:37 in length.</p> <p>Say: "When I hit next, you'll answer the question, "How much liquid propellant (fuel) does the Space Launch System Rocket need to reach space?" It's okay if you don't know the answer, you'll learn it in the next video."</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
7 45 sec	<p>Slide 29 shows a question: "How much liquid propellant (fuel) does the Space Launch System Rocket need to reach space?" with four answer choices: 735 gallons, 7,350 gallons, 735,000 gallons, and 7,350,000 gallons. The correct answer is 735,000 gallons.</p>	<p>Read the question and on-screen answer choices to students. How much liquid propellant (fuel) does the Space Launch System Rocket need to reach space?</p> <p>Answer: 735,000 gallons</p> <p>Say: On the next slide, you'll answer how long you think it will take for that fuel to be used!</p>	
8 45 sec	<p>Slide 30 shows a question: "How long does it take for the Space Launch System to burn that fuel?" with four answer choices: 3 minutes, 8 minutes, 25 minutes, and 10 hours. The correct answer is 8 minutes.</p>	<p>Read the question and on-screen answer choices to students. How long does it take for the Space Launch System to burn that fuel?</p> <p>Answer: 8 minutes</p> <p>Say: "Let's continue learning how we're getting back to the Moon!"</p>	
9 1 min 30 sec	<p>Slide 9 shows a video player with the title "ORION SPACECRAFT". The video is 1:07 in length. The description below the video says: "Discover more about what's onboard the Orion spacecraft. (1:07)"</p>	<p>Show Video 3. Video is 1:07 in length.</p> <p>Say: "We learned that many things have been payloads in past journeys to space. What do you think will NOT be a part of a payload in Artemis I?"</p>	

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Slide #
(suggested time)

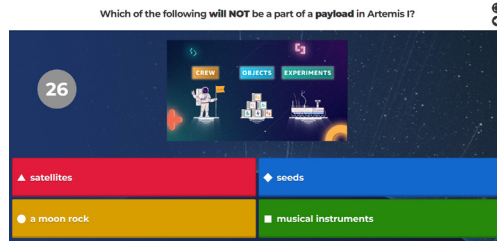
Slide Image

Facilitation Tips

Notes

10

45 sec



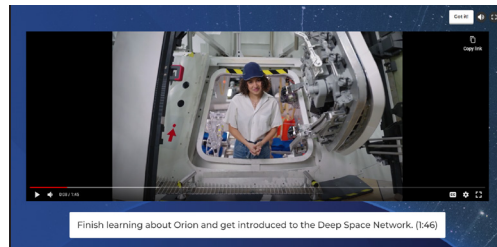
Read the question and on-screen answer choices to students. Which of the following will NOT be part of a payload in Artemis I?

Answer: musical instruments

Say: "Let's continue to learn about a special payload flying about the Orion spacecraft in Artemis I."

11

2 min

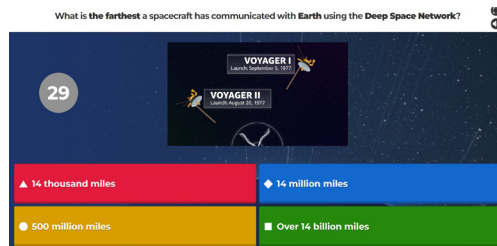


Show [Video 4](#). Video is 1:48 in length.

Say: "The Deep Space Network is used to communicate with spacecraft hurtling through space. What do you think is the farthest a spacecraft has communicated with Earth over the Deep Space Network?"

12

45 sec



Read the question and on-screen answer choices to students. What is the farthest a spacecraft has communicated with Earth using the Deep Space Network?

Answer: Over 14 billion miles

Say: "Let's continue learning how Deep Space Network communication works."

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
13 1 min 45 sec		<p>Show Video 5. Video is 1:30 in length.</p> <p>Say: "Since the spacecraft will be so far away from Earth, it will take time for the radio wave to reach Orion. How long do you think it takes for a radio wave from Earth to reach a spacecraft near the moon?"</p>	
14 45 sec		<p>Read the question and on-screen answer choices to students. How long does it take for a radio wave from Earth to reach a spacecraft near the Moon?</p> <p>Answer: About 1 to 2 seconds</p> <p>Say: "We'll finish learning about Deep Space Communication and begin learning about the technologies of the Callisto payload!"</p>	
15 1 min		<p>Show Video 6a. Video is 0:49 in length.</p> <p>Say: "Before we move to the next stop, let's do some review trivia!"</p>	

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Slide #
(suggested time)

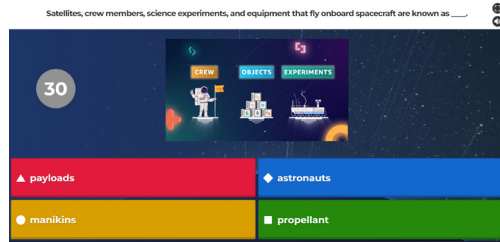
Slide Image

Facilitation Tips

Notes

16

45 sec



Read the question and on-screen answer choices to students. Satellites, crew members, science experiments, and equipment that fly onboard spacecraft are known as ____.

Answer: payloads

Say: "Great job! Let's do another quick question."

17

45 sec



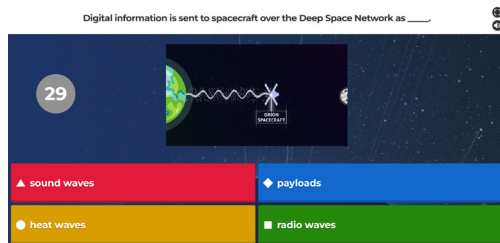
Read the question and on-screen answer choices to students. The 3 sites of the ____ are spaced out so no matter where Earth is in rotation, spacecraft can communicate with Earth.

Answer: Deep Space Network

Say: "One more review question before we continue our tour."

18

45 sec

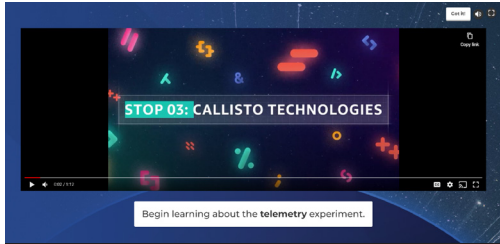
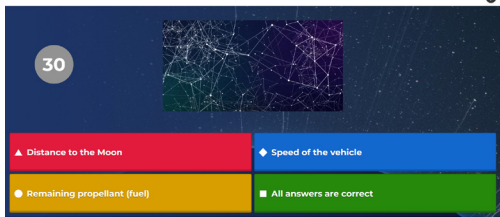



Read the question and on-screen answer choices to students. Digital information is sent to spacecraft over the Deep Space Network as ____.

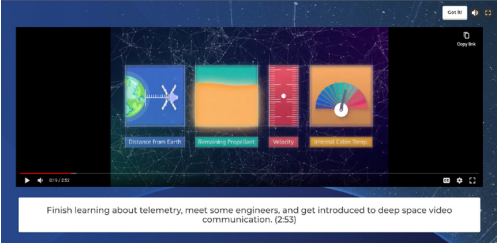
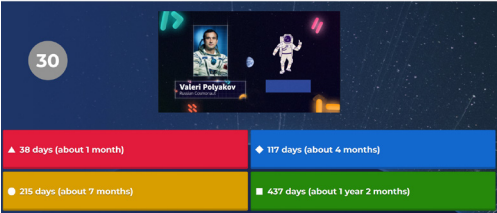
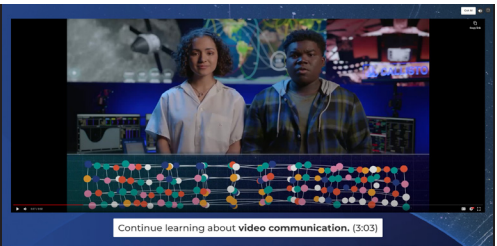
Answer: radio waves

Say: "Let's go learn about the Callisto payload and some of its technologies."

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
19 1 min 30 sec		<p>Show Video 6b. Video is 1:14 in length.</p> <p>Say: “We know in a car there’s many data points that can be collected from amount of gas left, to speed, to tire rotations. Which telemetry data points do you think will be accessible by the payload? And how many total data points do you think the payload can access?”</p>	
20 45 sec		<p>Read the question and on-screen answer choices to students. Which of the following telemetry data points will be accessible by the Callisto payload?</p> <p>Answer: All answers are correct</p> <p>Say: “There’s one more question about telemetry. How many telemetry data points do you think the Callisto payload can access?”</p>	
21 45 sec		<p>Read the question and on-screen answer choices to students. How many total telemetry data points are available on Orion flight software?</p> <p>Answer: Over 10,000</p> <p>Say: “That’s a lot of data points! Let’s finish learning about telemetry and meet the engineers behind the technology.”</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
22 3 min 15 sec		<p>Show Video 7. Video is 2:52 in length.</p> <p>Say: “Humans have been traveling to space since the 1960s! What do you think is the world record for amount of time a human has stayed in space?”</p>	
23 3 min 15 sec		<p>Read the question and on-screen answer choices to students. What is the world record for the amount of time a human has stayed in space?</p> <p>Answer: 437 days (about 1 year 2 months)</p> <p>Say: “That’s a long time away from Earth! Let’s learn how video communication can potentially help astronauts who are traveling in space for long periods of time.”</p>	
24 3 min 30 sec		<p>Show Video 8a. Video is 3:03 in length.</p> <p>Say: “Before we meet some engineers from Webex that made this technology possible, let’s do a quick review trivia question!”</p>	

Callisto: Space Innovation Tour

Slide

(suggested time)

Slide Image

Facilitation Tips

Notes

25

45 sec



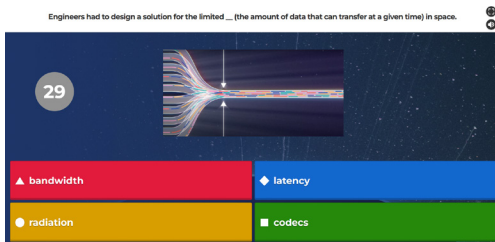
Read the question and on-screen answer choices to students. An engineer draws on the board at mission control but it doesn't show up on Callisto right away. This delay is called _.

Answer: latency

Say: "We have another trivia question for you!"

26

45 sec



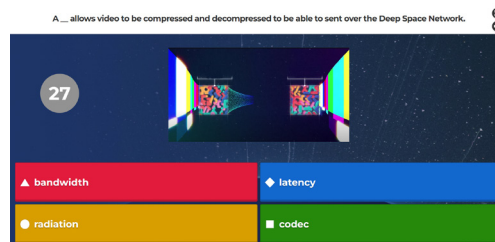
Read the question and on-screen answer choices to students. Engineers had to design a solution for the limited _ (amount of data that can transfer at a given time) in space.

Answer: bandwidth

Say: "One more then back to the tour."

27

45 sec


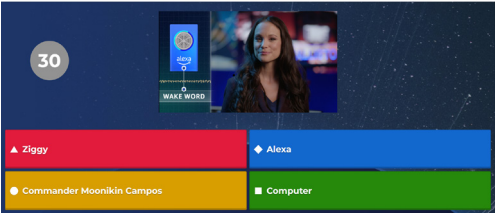



Read the question and on-screen answer choices to students. A _ allows video to be compressed and decompressed to be able to be sent over the Deep Space Network.

Answer: codec

Say: "Let's go meet some engineers that made this technology possible and start learning about voice artificial intelligence!"

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
28 3 min 30 sec	 <p>Finish learning about video communication by meeting engineers, and get introduced to voice ai. (3:17)</p>	<p>Show Video 8b. Video is 3:17 in length.</p> <p>Say: “Engineers program voice AI devices to wake up when a specific word or phrase is spoken. What word do you think will NOT wake up an Alexa device?”</p>	
29 45 sec	 <p>Which of the following words will NOT wake up Alexa?</p> <p>30</p> <p>WAKE WORD</p> <p>▲ Ziggy</p> <p>◆ Alexa</p> <p>● Commander Moonikin Campos</p> <p>■ Computer</p>	<p>Read the question and on-screen answer choices to students. Which of the following words will NOT wake up Alexa?</p> <p>Answer: Commander Moonikin Campos</p> <p>Say: “That may not wake up Alexa onboard Orion - maybe one day though! In the next video, we’ll continue learning how voice AI works.”</p>	
30 3 min 30 sec	 <p>Discover how voice AI works and meet the engineers behind it (3:19)</p>	<p>Show Video 9. Video is 3:21 in length.</p> <p>Say: “Let’s do a quick review questions.”</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
31 45 sec	<p>A student asks their device "Alexa, tell me a space fact." The full sentence they spoke is called ____.</p> <p>30</p> <p>▲ an intent ◆ a bandwidth ● an utterance ■ a wake word</p>	<p>Read the question and on-screen answer choices to students. A student asks their device "Alexa, tell me a space fact." The full sentence they spoke is called ____.</p> <p>Answer: an utterance</p>	
32 1 min	<p>Watch a demo of the Callisto Payload (S24). To watch the full demo and Q&A, visit https://www.amazon.com/callistodemo.</p>	<p>Show Video 10. Video is 3:23 in length. To watch the full 27 minute demo and Q&A with engineers, visit https://www.amazon.com/callistodemo.</p> <p>Say: "We have one more question, then it's time for the last video."</p>	
33 45 sec	<p>Vote on the telemetry utterance you want tested on the Alexa in Callisto.</p> <p>26</p> <p>▲ How fast are you going? ◆ What point on Earth are you over right now? ● What is the cabin pressure? ■ How fast are you spinning?</p>	<p>Read the question and on-screen answer choices to students. In the demo, there was a delay when communicating with the Callisto Payload. This delay is called ____.</p> <p>Answer: latency</p> <p>Say: "Let's watch one more video to close out the tour and then do some closing trivia!"</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
34 45 sec		<p>Show Video 11. Video is 0:33 in length.</p> <p>Say: “That’s the end of the tour. Before we get to see who won, we have a few questions that do not count towards your points. First you’ll answer what was your favorite part of the tour?”</p>	
35 45 sec		<p>Say: “Some questions are polls and do not count towards points. These questions will help Amazon make new tours in the future. Others are review vocabulary questions from our tour! Let’s see who will end up on the podium at the end.”</p>	
36 30 sec		<p>Read the question and on-screen answer choices to students. What is the name of NASA’s series of missions with a goal of putting the first woman and person of color on the moon?</p> <p>Answer: Artemis</p> <p>Say: “Now let’s answer how you felt about career opportunities in computer science and engineering BEFORE you took the tour. This will not count towards points.”</p>	

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Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
37 30 sec		<p>Read the question and on-screen answer choices to students. Humans (the crew) will be a payload on Artemis I?</p> <p>Answer: False</p> <p>Say: "Here comes another trivia question."</p>	
38 30 sec		<p>Read the question and on-screen answer choices to students. ___ data allows engineers on Earth to monitor the spacecraft when it's in flight.</p> <p>Answer: telemetry</p> <p>Say: "Great job. time for another question."</p>	
39 30 sec		<p>Read the question and on-screen answer choices to students. ___ may give future astronauts the ability to control spacecraft or obtain information using their voice.</p> <p>Answer: Voice AI</p> <p>Say: "Next up is a true or false question."</p>	



Callisto: Space Innovation Tour

Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
40 30 sec		<p>Read the question and on-screen answer choices to students. Alexa starts listening when it hears a ____.</p> <p>Answer: wake word</p> <p>Say: "One last trivia question coming up!"</p>	
41 30 sec		<p>Read the question and on-screen answer choices to students. Someone wants Alexa to play music when they ask. This desired response (playing music) is called ____.</p> <p>Answer: an intent</p> <p>Say: "The next questions are some polls to give Amazon some information to help make their tours even better in the future. Then we'll find out the winner! The first questions asks about your tour experience on a scale from 1 to 5, with 1 meaning you did not like it, and 5 meaning you really liked it."</p>	
42 30 sec		<p>Read the poll question and answer choices to students.</p> <p>Say: "The next question asks if you now are interested in having a career in technology. 5 means you really interested in having a career in technology and 1 means you really are not intersted."</p>	

Callisto: Space Innovation Tour

Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
43 30 sec	<p>Slide 43 shows a poll question: "How interested are you in pursuing careers in technology?". The poll options are: 5 - Very Interested (red), 4 - Interested (orange), 3 - Neither Interested nor Uninterested (teal), 2 - Uninterested (blue), and 1 - Very Uninterested (green). The slide features a background image of Earth from space.</p>	<p>Read the poll question and answer choices to students.</p> <p>Say: "Next you'll answer if this tour increased, decreased, or had no change on your interest in having a career in technology."</p>	
44 30 sec	<p>Slide 44 shows a poll question: "How did this tour affect your interest in pursuing careers in technology?". The poll options are: Increased (red), No Change (orange), and Decreased (blue). The slide features a background image of Earth from space.</p>	<p>Say: "One last poll before we can end the tour and see who won! In this last poll, you'll answer if you agree or disagree with the following statement: I feel like I belong in careers in technology."</p>	
45 30 sec	<p>Slide 45 shows a poll question: "Do you agree or disagree with the following statement: I feel like I belong in careers in technology.". The poll options are: 5 - Strongly Agree (red), 4 - Agree (orange), 3 - Neither Agree nor Disagree (teal), 2 - Disagree (blue), and 1 - Strongly Disagree (green). The slide features a background image of a hand interacting with a digital interface.</p>	<p>Say: "Really great job today! Once I go through these next 2 slides we'll see the winner on our podium!"</p>	

Callisto: Space Innovation Tour

Slide # (suggested time)	Slide Image	Facilitation Tips	Notes
46 0 sec		Teachers: Complete the survey to receive a \$5 Amazon.com gift card (US only)	
47 0 sec		<p>Say: "I hope you enjoyed your virtual field trip and learned a lot about new technologies that may help astronauts in the near future. Maybe one day we'll be watching you launch into space or working on technologies such as the ones you saw on the tour."</p> <p>You may skip to the end for the podium or show the extension activities to students.</p>	

After the Tour

Complete the Survey



[CALLISTO TOUR SURVEY](#)



Print and distribute student certificates.



[DOWNLOAD CERTIFICATE](#)

Quiz

Test students' vocabulary knowledge with a bonus quiz.



[QUIZ KAHOOT!](#)

Lead Class Discussion

Dive into discussion with your class using any of the discussion questions. A variety of questions at different difficulty levels are provided.



[PDF](#) [WORD](#) [GOOGLE DOC](#)

Alexa Skills Building

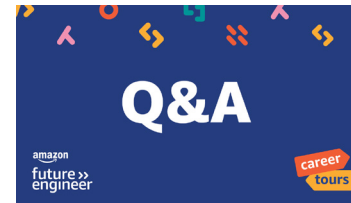
Grades 9 - 12 only. Students learn to program their own Alexa skills to help astronauts solve challenges of deep space travel.



[LEARN MORE](#)

Q&A

View the full Callisto Demo and hear from engineers as they answer questions not addressed on the tour.



[FULL DEMO AND Q&A](#)

Cisco Networking Academy

Free online course from Cisco to get hands-on experience and gain career ready skills.



[LEARN MORE](#)