Tell Your Lunar Gateway Story
Teacher Guide

Summary

- Coding skill level: **Intermediate**
- Recommended grade level: **Grades 1-5 (U.S.), Years 2-6 (U.K.)**
- Time required: **50 minutes**
- Number of modules: **1 module**
- Coding Language: **Tynker Blocks**

Teacher Guide Outline

Welcome!
- How to Prepare

Activity
- Overview
- Getting Started (20 minutes)
- DIY Module (30 minutes)
- Extended Activities

Going Beyond an Hour
- Do More With Tynker
- Tynker for Schools

Help

Welcome!

In this lesson, students will learn about the Lunar Gateway, a small spaceship that will orbit around the Moon and serve as a temporary home/work space for astronauts. Additionally, students will learn about the Artemis program, which will land American astronauts, including the first woman and the next man on the moon. You can read about the Lunar Gateway and Artemis program here:

- Lunar Gateway: https://www.nasa.gov/topics/moon-to-mars/lunar-gateway
- Artemis: https://www.nasa.gov/artemis

You can find more helpful websites in the "Help" section of this teacher guide.

Students will imagine themselves as Artemis astronauts living and working on the Lunar Gateway in the year 2024. The lesson is intended to be completed in two different parts (as described in the "Getting Started" section of this teacher guide). In Part 1, students are introduced to NASA's plans for lunar exploration by completing a variety of fun activities. There's also an optional "The Artemis Generation—My Role As An Artemis Astronaut" assignment, which will allow you to assess your students' understanding. The assignment will also guide your students' thought process before they start coding their "Tell Your Lunar Gateway Story" Tynker project. You can find an answer key to "The Artemis Generation—My Role As An Artemis Astronaut" assignment in the "Help" section.

In Part 2, students will combine their coding, innovation, and art skills as they complete the "Tell Your Lunar Gateway Story" project using Tynker. Students are provided a tutorial to help guide their creative process as they complete the project. Additionally, they'll reinforce coding concepts such as delays, direction and turning, sound playing, loops, simple events, input/output, and more! "Page 2" of the tutorial also includes three different sample projects. **Note:** This project is open-ended and research focused. Students are provided suggestions on how to get started, but need to choose which code blocks to use.

How to Prepare

This activity is designed for self-directed learning. Your role will be to help students individually and facilitate as they complete the activities. The best way to prepare is to:

1. **Familiarize yourself with the material.** After selecting your Tynker lesson (e.g., Tell Your Lunar Gateway Story), read through this teacher guide and complete the activity before assigning it to students. This will allow you to troubleshoot anything in advance and plan for potential questions from your students.
2. **Get students excited about coding.** Inspire students and get them excited for the Hour of Code event. Here is a link to resources such as inspirational videos

and posters from the Hour of Code website:
https://hourofcode.com/us/promote/resources#videos

3. **OPTIONAL: Sign up for a teacher account.** Although an account is NOT required, creating a free teacher account will allow you to access teacher guides, answer keys, and tons of additional resources. You'll also be able to create free accounts for your students, monitor their progress, and see their projects.

4. **OPTIONAL: Create student accounts.** From your teacher account, you can easily create free student accounts for all your students. This will allow them to save their projects and progress, so they can continue coding when they get home! Again, this is not necessary to complete the Tell Your Lunar Gateway Story lesson.

5. **OPTIONAL: Print certificates to hand out.** While signed in to your Tynker teacher account, you can print certificates by clicking on a classroom from your teacher dashboard, clicking the "Gradebook" tab, going to "Hour of Code," and clicking the "Print All Certificates" button. This will only print certificates for student accounts assigned to the selected classroom.

6. **Complete this lesson in two different parts.** Please refer to the "Getting Started" section of this teacher guide.

Activity

Overview

Objectives
Students will...
- Research NASA topics such as the Lunar Gateway and Artemis lunar exploration program
- Apply coding concepts and code blocks to create a "Tell Your Lunar Gateway Story" project

Materials
- **For web:** Computers, laptops, or Chromebooks (1 per student)
- **For mobile:** iPads or Android tablets (1 per student)

Vocabulary
- **Code:** The language that tells a computer what to do
- **Actor:** A Tynker character or object that can talk and interact with others
- **Stage:** The background of the project where the Actors are placed
- **Sequence:** The order in which steps or events happen
- **Command:** A specific action or instruction that tells the computer to do something

U.S. Standards

- **CCSS-ELA:** RI.1.7, RF.1.4, RF.1.4.A, SL.1.1, RI.2.7, RF.2.4, RF.2.4.A, SL.2.1, RI.3.7, RF.3.4, RF.3.4.A, SL.3.1, RF.4.4.A, RF.1.4.A, RF.4.4, SL.4.1, RF.5.4.A, RF.5.4, SL.5.1
- **CCSS-Math:** MP.1
- **K12CS:** P1.1, P1.3, P2.1, P2.3-2.4, P3.2-3.3, P4.4, P5.1-5.2, P6.1-6.3, P7.2-7.3
- **CSTA:** 1A-AP-09, 1A-AP-11, 1A-AP-12, 1A-AP-13, 1B-AP-11,1B-AP-12, 1B-AP-14, 1B-AP-15
- **CS CA:** K-2.AP.13, K-2.AP.14, K-2.AP.15, 3-5.AP.10, 3-5.AP.13, 3-5.AP.14, 3-5.AP.17
- **Illinois CS:** K-2.AP.09, K-2.AP.10, K-2.AP.11, K-2.AP.12, K-2.AP.13, K-2.AP.14, 3-5.AP.11, 3-5.AP.12, 3-5.AP.14
- **ISTE**: 1.c, 1.d, 4.d, 5.c, 5.d, 6.b

U.K. Standards

National Curriculum in England (computing):

- **Key Stage 1 (Year 2)**
  - Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions
  - Create and debug simple programs
  - Use logical reasoning to predict the behaviour of simple programs
  - Use technology purposefully to create, organise, store, manipulate and retrieve digital content
  - Recognise common uses of information technology beyond school
  - Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies
- **Key Stage 2 (Years 3-6)**
  - Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
  - Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration
  - Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Getting Started (20 minutes)

The lesson is intended to be completed in two different parts:

Part 1:

Introduce students to NASA's plans for the Lunar Gateway and Artemis Generation by completing the following activities:

- Play this short NASA video that introduces the Artemis program: https://youtu.be/dOKKkV-30dE
- Ask students to read about the Lunar Gateway: https://www.nasa.gov/feature/questions-nasas-new-spaceship
  Optional: Ask students to create "true/false" statements about the Lunar Gateway, then quiz a friend.
- Introduce students to the Lunar surface in-situ resource utilization (ISRU) capabilities: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20190032062.pdf
- Have students try out the NASA Forward to the Moon with Artemis Explorer Activities: http://nasa.gov/exploreractivities
- Tell students that they're going to use Tynker in an upcoming activity to create their own project where they will imagine themselves as Artemis astronauts living and working on the Lunar Gateway. *Optional:* Before students start coding, ask them to complete "The Artemis Generation—My Role As An Artemis Astronaut" assignment (located on the next page) for homework or as an in-class activity:

Name _____

Date _____

The Artemis Generation—My Role As An Artemis Astronaut

Directions: Answer the questions below, then create an outline for your "Tell Your Lunar Gateway Story" project.

Questions:

1. Why is NASA sending astronauts to the Moon?

   _____

   _____

   _____

   _____

2. What is the Lunar Gateway?

   _____

   _____

   _____

   _____

3. List 5 hazards of sending humans to space.

   _____

   _____

4. There is a lot of water ice at the South Pole of the Moon. How can water ice be used on space missions?

   _____

   _____

5. Imagine you are an astronaut on an Artemis mission. You are living and working on the Lunar Gateway. Tell a story describing your job. Below are questions to prompt ideas:

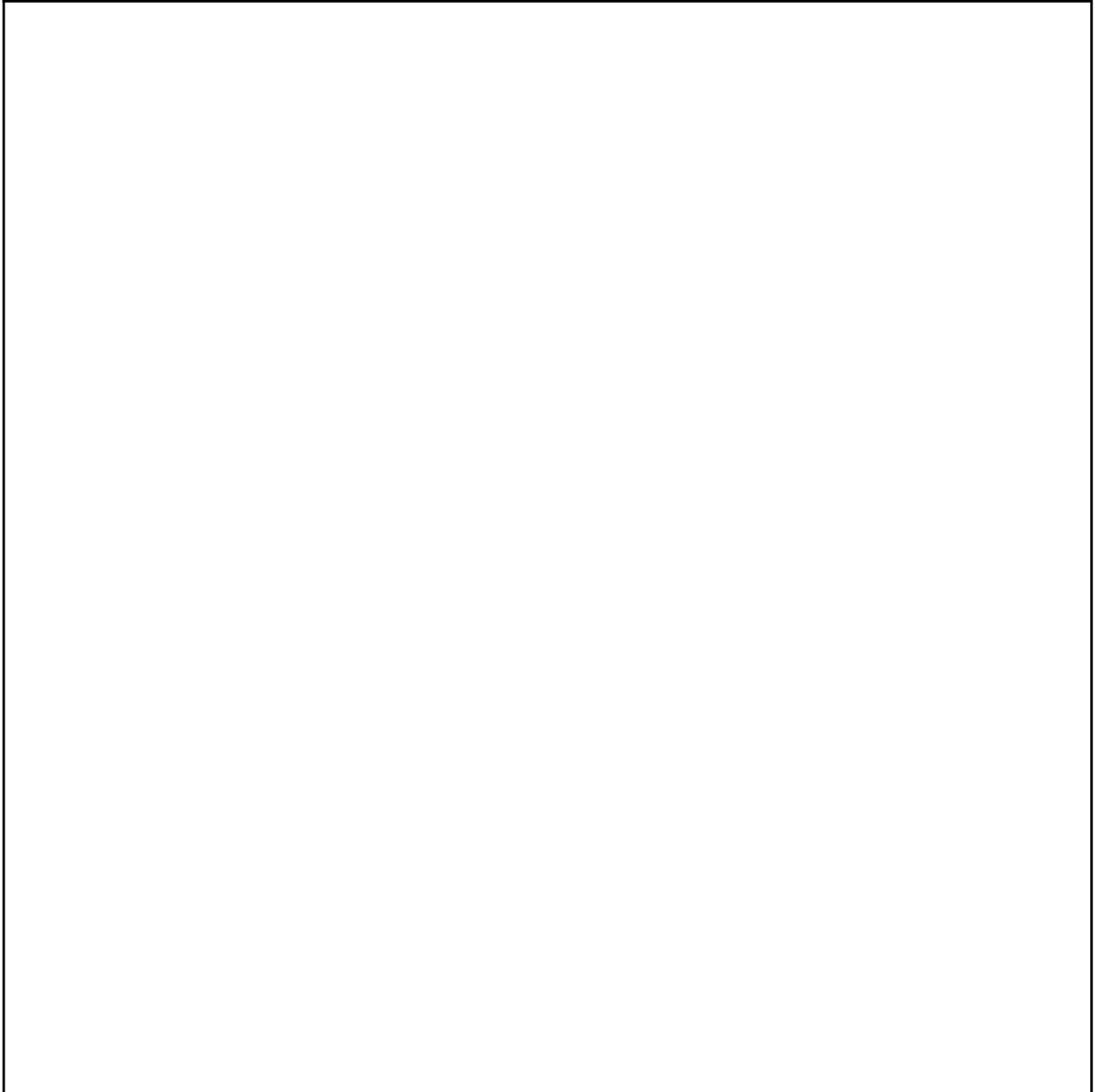| Guiding Questions |
| --- |
| Will you stay in the Lunar Gateway or will you travel to the surface of the Moon? |
| Will you conduct a robotic mission? What will you do? |

If you stay on the Gateway, what is your job? Will you conduct an experiment, make repairs, take pictures of the Moon?
If you travel to the surface of the Moon, will you collect rock samples?
Will you set up an experiment?
Will you collect samples of water ice?

Note: You **do not** need to answer the "Guiding Questions." The purpose of this chart is to guide your creativity/inspiration for the project.

Tell a story describing your job/experiences on the Lunar Gateway:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Optional: Use the space below to sketch Actors or brainstorm ideas.

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Part 2:

Remind students that they're going to use Tynker to create their own project where they imagine themselves as Artemis astronauts living and working on the Lunar Gateway in the year 2024. Now that they know more about Artemis and the Lunar Gateway, they're ready to move on to the DIY module and bring their story to life through coding!

DIY Module (30 minutes)

This lesson has one DIY (do-it-yourself) module. Facilitate as students complete the Tell Your Lunar Gateway Story module on their own:
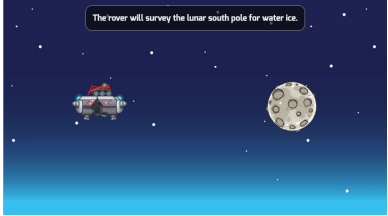
Tell Your Lunar Gateway Story (DIY)

- In this DIY, students will create an open-ended project that tells their story of their role as an Artemis astronaut on the Lunar Gateway. **Note:** This project is

open-ended and research focused. Students will need to determine which code blocks to use.

- "Page 2" of the tutorial includes three sample projects. You can view the samples by clicking (for web)/ tapping (for mobile) on the project images. Here's what they look like:

Samples	Image	Description
Sample 1: HERACLES		This is an animated presentation of an Artemis astronaut telling their story of conducting research on the Gateway. Students will watch the HERACLES rover travel from the Gateway to the Moon's surface. While on the Moon's surface, the rover will survey the lunar south pole for water ice.
Sample 2: My Gateway Diary		Students will meet an Artemis astronaut who tells her story about what it's like living on the Gateway.
Sample 3: Water Filtration		In this animated presentation, students will observe an astronaut performing one of their daily chores: checking for clean water and removing contaminants.

- Remind students to use their "The Artemis Generation—My Role As An Artemis Astronaut" assignment as a reference.
- Ask students to add a background and Actors to their project. They can draw their own artwork or select images from the Media Library.
- Are students struggling to draw their own Actors ("Step 3" of the tutorial)?
  - Ask students to watch the Tynker support video on how to draw their own Actor: https://www.tynker.com/support/videos.

- Do students need help locating the code blocks? Ask them to click this icon:

- Are students on the code blocks tab, and want to return to the tutorial? Ask them to click this icon:

- *Optional:* Direct your students to this link, which includes helpful video tutorials: https://www.tynker.com/support/videos

Extended Activities (10 minutes each)

Show and Tell
Encourage students to share their projects with the class:
- Use your projector to display their unique projects. What obstacles and successes did they experience? *Optional:* Encourage students to practice using coding terms (e.g., command, sequence) as they describe their project.
.
Discussion
Ask students:
- What are some of the different code blocks you used?
- What questions do you have about the Lunar Gateway or Artemis lunar exploration program?

Reflection
Share the following "takeaway" examples with students:
- Robots will be instrumental in assembling and maintaining a lunar base.
- The richer water deposits on the Moon are in the form of ice in dark craters.
- The Moon is a stepping stone to Mars.

Next, pair up students and ask them to discuss 3-5 of their own takeaways about NASA, lunar exploration, or the Lunar Gateway.

Going Beyond an Hour
If your students enjoyed an Hour of Code, they're sure to enjoy the rest of what Tynker has to offer! Tynker offers a complete premium solution for schools to teach computer science. Over 400 hours of lessons are available to take K-8 students from block coding

to advanced text coding. We offer tons of resources for teachers, including comprehensive guides, free webinars, and a forum to connect with other educators.

More Hour of Code Activities
Tynker offers many other tutorials for the Hour of Code, including STEM Hour of Code lessons that you can integrate into the subjects you already teach. Check out the main Tynker Hour of Code page to see all the tutorials!

Do More with Tynker

With Tynker, kids don't just acquire programming skills--they explore the world of possibilities that coding opens up. Tynker has several interest-driven learning paths that make coding fun, both inside and outside the classroom:

- **Coding and Game Design:** Your students can use Tynker Workshop, a powerful tool for crafting original programs to make games, stories, animations, and other projects. They can even share their work with other kids in the Tynker Community.
- **Drones and Robotics:** Tynker integrates with connected toys, including Parrot drones and Lego WeDo robotics kits, so kids can see their code come to life.
- **Minecraft:** Tynker integrates with Minecraft so your students can learn coding through a game they love. Tynker offers skin and texture editing, as well as a custom Mod Workshop that lets kids try their original code in Minecraft.

Tynker for Schools

Used in over 90,000 schools, our award-winning platform has flexible plans to meet your classroom, school, or district needs. All solutions include:

- Grade-specific courses that teach visual coding, JavaScript, Python, robotics and drones
- A library of NGSS and Common Core compliant STEM courses that are great for project-based learning
- Automatic assessment and mastery charts for whole schools and individual classes and students
- Easy classroom management with Google Classroom and Clever integration
- Professional training, free webinars and other teacher training resources

Need help getting Tynker started at your school? Contact us to learn more about teaching programming at your school with Tynker!

Help

Need help? Below you'll find answers to frequently asked questions about the Tell Your Lunar Gateway Story lesson.

What is Hour of Code?

The Hour of Code is a global learning event in which schools and other organizations set aside an hour to teach coding. No prior coding experience from you or your students is needed! The event is held every December during Computer Science Education Week. You can also organize an Hour of Code year-round. The goal of the Hour of Code is to expand access to computer science education for people of all backgrounds. Learning computer science helps students develop logic and creativity, and prepares them for the changing demands of the 21st century. Tynker has been a leading provider of lessons for the Hour of Code since the event began in 2013. Since then, over 100 million students from 180 countries have finished an Hour of Code.

How do I prepare for Hour of Code?

1. **Familiarize yourself with the material.** After selecting your Hour of Code lesson (e.g., Tell Your Lunar Gateway Story), read through the teacher guide and complete the activity before assigning it to students. This will allow you to troubleshoot anything in advance and plan for potential questions from your students.
2. **Get students excited about coding.** Inspire students and get them excited for the Hour of Code event. Here is a link to resources such as inspirational videos and posters from the Hour of Code website: https://hourofcode.com/us/promote/resources#videos
3. **OPTIONAL: Sign Up for a teacher account.** Although an account is NOT required, creating a free teacher account will allow you to access teacher guides, answer keys, and tons of additional resources. You'll also be able to create free accounts for your students, monitor their progress, and see their projects.
4. **OPTIONAL: Create student accounts.** From your teacher account, you can easily create free student accounts for all your students. This will allow them to save their projects and progress, so they can continue coding when they get home! Again, this is not necessary to complete an Hour of Code.
5. **OPTIONAL: Print certificates to hand out.** While signed in to your Tynker teacher account, you can print certificates by clicking on a classroom from your teacher dashboard, clicking the "Gradebook" tab, going to "Hour of Code," and clicking the "Print All Certificates" button. This will only print certificates for student accounts assigned to the selected classroom.

How can Tynker help me manage my Hour of Code?

Tynker has several free features for registered teachers that will help you manage your Hour of Code. If you set your students up with a Tynker classroom, you will be able to track their progress and print Hour of Code completion certificates for them to keep.

How do I open Tell Your Lunar Gateway Story?

Have your students go to this URL: tynker.com/hour-of-code

Who is this activity for?

Tell Your Lunar Gateway Story is intended for students in grades 1-5 (U.S.) and years 2-6 (U.K.) with some coding experience.

Do I need to create Tynker accounts for my students?

No, you do not need to create Tynker accounts for your students.
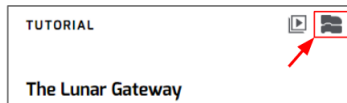
What devices do I need?

- **For web:** Computers, laptops, or Chromebooks (1 per student) with an internet connection
- **For mobile:** iPads or Android tablets (1 per student) with an internet connection
- If not enough devices are available, students can work in pairs on the same device

What will my students learn?

Students will learn about the meaning behind NASA's human spaceflight plans for sending humans to the Moon and on to Mars. They will also use Tynker to create an open-ended project that tells their story of their role as an Artemis astronaut on the Lunar Gateway. This lesson will reinforce coding concepts as students experiment with code blocks. In this process, students will develop debugging and logical reasoning skills.
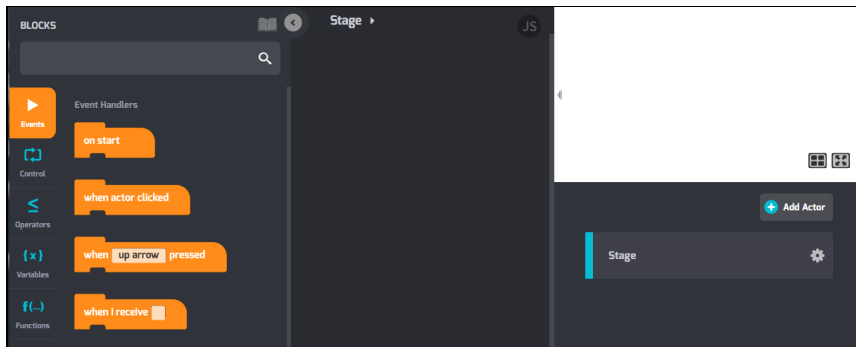
How do my students code their Actors?

The Tell Your Lunar Gateway Story DIY module includes a workspace for students to code their project. The section on the left is a tutorial tab that provides suggestions on what to create. **Note:** This is an open-ended project. Students will need to add their own code blocks, then add the code blocks to the center coding area. Students can access a variety of different code blocks by clicking this icon:

Once students have the code blocks tab open, they should see something similar to the image below. Ask students to click the different categories (e.g., events, control, motion, etc.) to find the code blocks they want to use.

What are some helpful websites I can refer to?

Below are websites you might find helpful:

- **What is the Artemis Program for Grades K-4 and Grades 5-8:**
  - **Grades K-4:**
    https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-the-artemis-program-k4.html
  - **Grades 5-8:**
    https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-the-artemis-program-k4.html

- **Explore Moon to Mars:**
  https://www.nasa.gov/topics/moon-to-mars

- **Moon's South Pole in NASA's Landing Sites:**
  https://www.nasa.gov/feature/moon-s-south-pole-in-nasa-s-landing-sites

- **Hazard of Human Spaceflight:**
  https://www.nasa.gov/feature/5-hazards-of-human-spaceflight

Do you have an answer key?

Yes, below are suggested answers to "The Artemis Generation—My Role As An Artemis Astronaut" assignment:

- **Question 1:** Why is NASA sending astronauts to the Moon?
  - **Suggested answer:** NASA is sending astronauts to the Moon to explore new areas, run tests, take samples, search for the Moon's water, and learn how humans can live and work in an environment beyond Earth. Ultimately, what we learn from this mission will help us get closer to one day exploring Mars!
  - **Helpful website:**
    https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-the-artemis-program-k4.html

- **Question 2:** What is the Lunar Gateway?
  - **Suggested answer:** The Lunar Gateway is a small spaceship (smaller than a studio apartment) that will orbit the Moon. Astronauts will use the Gateway as a housing unit and laboratory where they will conduct experiments and research the Moon.
  - **Helpful website:** https://www.nasa.gov/topics/moon-to-mars/lunar-gateway

- **Question 3:** List 5 hazards of sending humans to space.
  - **Suggested answer:** Radiation, isolation, distance from Earth, gravity, and hostile/closed environments.
  - **Helpful website:** https://www.nasa.gov/feature/5-hazards-of-human-spaceflight

- **Question 4:** There is a lot of water ice at the South Pole of the Moon. How can water ice be used on space missions?
  - **Suggested answer:** Water is necessary for long-term exploration because of its many uses. Water ice can be used on space missions for drinking, cooling equipment, breathing, making rocket fuel, and more!
  - **Helpful website:** https://www.nasa.gov/feature/moon-s-south-pole-in-nasa-s-landing-sites

How can I contact the Tynker support team?

If you have any issues or questions, send us an email at support@tynker.com.