National **Space Sustainability** Competition

2026

NATIONAL SPACE DAY

About the National Space Sustainability Competition

The National Space Sustainability Competition (NSSC) invites 6th-8th grade students to envision innovative solutions to one of space exploration's greatest challenges: living beyond Earth. Sponsored by leading space industry partners, this competition challenges students to think critically and creatively about the growing need for sustainable practices in space. By developing new ideas and presenting them through models, mission briefings, and video pitches, students will explore how they can play a role in the future of space exploration.

ADDRESSING THE NEED FOR SPACE SUSTAINABILITY

As humanity looks beyond Earth, orbital space and even the Moon are emerging as key destinations for exploration, research, and long-term living. Building a sustainable presence beyond Earth comes with unique challenges - from creating habitats and producing food to managing resources like rockets, fuel, water, energy, and waste. Each of these problems requires innovative solutions to ensure that life in orbit and on the Moon is not only possible but also sustainable.

With the space industry projected to grow significantly over the next few decades, addressing these challenges now is essential to supporting safe, responsible, and lasting human activity beyond Earth. Careers in the space sector offer exciting and rewarding opportunities, from engineering and science to business, logistics, and communications. But for the space industry to thrive sustainably, we need skilled, creative thinkers ready to take on complex problems — starting with students who are just beginning their educational journey in STEM.

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ENGAGING YOUNG MINDS IN SPACE CAREERS

The NSSC connects students' interests in STEM with the practical skills required for a future in the space industry. By exploring the issue of living outside Earth, students can see how various careers contribute to space missions and operations, highlighting the teamwork and diversity of skills that are essential for successful space exploration. While astronauts capture our imagination, the majority of space work is done on Earth by engineers, data analysts, biologists, machinists, and many others who enable space missions.

Through this competition, students gain experience in design, problem-solving, and entrepreneurship, positioning them well for future STEM careers. They'll learn to think like engineers, develop ideas like entrepreneurs, and communicate like professionals, skills that are valuable not only in space but in any future career.

COMPETITION OVERVIEW

The NSSC invites teams of 6th-8th grade students to design a solution that tackles the issue of building a permanent presence in orbit and beyond. A team's complete submission will include:

- **Mission Brief:** Teams will create a 2-3 page briefing covering the problem they have chosen to tackle, their solution, an explanation of how it works, and a sustainability snapshot highlighting how their solution supports reusing or recycling materials, safe energy use, minimal waste, human comfort and safety, and long-term use.
- **STEM Component:** Students will engineer or design a concept model to further demonstrate how their solution functions. This could be a CAD Diagram or Model (2D, 3D, or hand-drawn), Labeled Technical Drawing, System Diagram, or Physical Prototype.
- **Video Pitch:** Each team will produce a 3-minute video summarizing their solution and showcasing their creativity, problem-solving, and entrepreneurial thinking.

COMPETITION TIMELINE

The NSSC will kick off with the release of resources by **November 21, 2025**, including a space sustainability guide for teachers and students. Submissions will be due by **January 31, 2026**, followed by judging and winner announcements in early **May 2026**.

COMPETITION GOALS

This competition aims to:

- Engage students in understanding and solving real-world issues related to space sustainability.
- Inspire interest in STEM and space-related careers, showing students that their skills have relevance in a global industry.
- Encourage creative thinking and collaboration in designing solutions for complex challenges.

By focusing on the emerging issue of living beyond Earth, the NSSC helps students discover that the space industry is much larger than they may have imagined, with career opportunities that span across diverse fields.

Role Descriptions and Guide

STUDENT PARTICIPANT

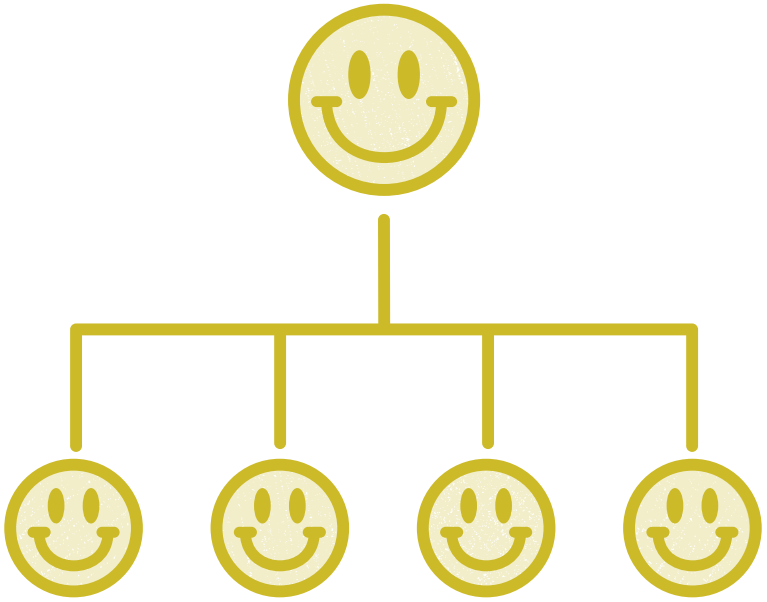
Student participants are the innovators of the National Space Sustainability Competition. Working in teams, they'll dream up creative, practical solutions for sustainable living in orbit and on the Moon — from habitats and food systems to tools, recycling such as reusable rockets and alternative fuel, or power sources. Students will research, design, and present their ideas through a Mission Brief, a model (physical, technical, or 3D), and a video pitch showcasing their "space company" and solution.

TEACHER/ADULT TEAM SPONSOR

Teacher or adult mentors are the steady hands supporting student teams behind the scenes. Often an educator, parent, or guardian, this mentor helps students stay organized, meet deadlines, and manage any required paperwork. They don't design the project — instead, they provide encouragement, keep the group on track, and make sure the competition runs smoothly for their team.

PROFESSIONAL MENTOR

Professional mentors bring real-world space industry experience to the competition. They act as advisors and sounding boards, helping students ground their ideas in realistic possibilities while encouraging exploration and creativity. Professional mentors meet with teams at least once (and ideally more), offer feedback, and share their own education and career journeys. They guide without giving away answers, fostering teamwork and problem-solving skills. without giving away answers, fostering teamwork and problem-solving skills.



JUDGE

Judges are experienced professionals from across the space sector who evaluate student projects during the final stage of the challenge. Using a clear rubric, they score entries in areas such as Creativity & Innovation, Feasibility & Practicality, Technical Presentation, the Mission Brief, and the Video Pitch. To ensure fairness, judges cannot also serve as professional mentors. Their insights and feedback help celebrate student achievements and highlight promising ideas for the future of orbital and lunar sustainability.

Submission Checklist

ALL ENTRIES MUST BE SUBMITTED BY MARCH 31ST, 2026 AT 5:00 P.M. MST

REGISTRATION REQUIREMENTS

- ☐ Team has been registered by a parent/guardian/school representative through the **competition website**
- ☐ Team consists of 2-4 students currently in 6th through 8th grade and a teacher/adult mentor
- ☐ Team members reside in the United States of America or its territories
- ☐ Team members are not, nor are immediate families of, employees of the contests host (Space Foundation) or its affiliates

MISSION BRIEFING REQUIREMENTS

- ☐ Mission Briefing utilizes provided template
- ☐ Solution/System/Tool has a name
- ☐ Mission Briefing includes a complete Sustainability Snapshot
- ☐ Included images are clear and high quality
- ☐ Mission Briefing has been saved in PDF format
- ☐ Mission Briefing does not exceed 3 pages

STEM COMPONENT REQUIREMENTS

- ☐ Students will engineer or design a concept model to further demonstrate how their solution functions. This could be a CAD Diagram or Model (2D, 3D, or hand-drawn), Labeled Technical Drawing, System Diagram, or Physical Prototype.
- ☐ Team has exported high-quality image renderings (PNG, JPG, or PDF) of their STEM Component or taken screenshots that clearly showcase design and functionality

VIDEO PITCH REQUIREMENTS

- ☐ Video does not exceed 3 minutes in length
- ☐ Video reviews the problem of living beyond Earth, describes the team's solution, and outlines a plan for the solution
- ☐ Video is in landscape format and recorded at a resolution of 720p or higher
- ☐ Audio is clear and understandable
- ☐ Video is engaging and easy to follow
- ☐ Video is .MP4 or .MOV file type and under 500 MB

SUBMISSION REQUIREMENTS

- ☐ All files are named with the correct format: ("TeamName_School_Year_DeliverableType")
- ☐ All submitted files contain no copyrighted, threatening, abusive, or offensive material
- ☐ All materials are in full compliance of the **Official Rules.**
- ☐ A parent or guardian over the age of 18 has completed a consent form for each participating student

Mission Brief Template

Welcome, Space Engineers

Humanity is preparing for its next giant leap — building a home in space. But living beyond Earth is no easy task. Space has no air to breathe, extreme temperatures, and no grocery stores or hardware shops when something breaks!

Your challenge is to imagine how humans can **live and work sustainably in orbit and on the Moon**. That means creating solutions that:

- Keep astronauts **safe, healthy, and comfortable**
- Use **resources wisely** (reuse, recycle, reduce waste) and how resources are acquired
- Depend on **safe, renewable energy** such as solar, or **sustainable energy** such as nuclear
- Can **last a long time** and adapt to new needs
- Are within the **realm of possibility** with real-world or near future technology

In this mission, your team will:

1. Identify a **problem** astronauts face living beyond Earth.
2. Create a **solution** (structure, reusable rocket, new fuel, resource acquisition, temperature controls, system, or tool) that addresses it.
3. Explain **how it works** in simple terms.
4. Show how your idea is **sustainable** using the Sustainability Snapshot.

Remember: You are not just inventors — **you are pioneers shaping the future of space exploration**. Think big, be bold, and design like the future depends on it… because it does!

TEAM-CREATED WRITTEN OVERVIEW (1–2 PAGES MAX)

Mission Name & Team Members

Mission Name: _____

Team Members: _____

Teacher/Guardian Name: _____

The Problem

What challenge are you solving for humans living in space?

_____

_____

_____

_____

_____

The Solution

What is your idea? *Choose a name or phrase that is easy to remember and reflects the purpose of your solution.*

_____

_____

_____

_____

How It Works

Simple explanation of how it functions. *Remember your STEM Component and Pitch Video can help reinforce this explanation.*

Sustainability Snapshot

Fill out the table below to show how your idea supports life beyond Earth in a safe and sustainable way.

Category	How Your Idea Helps
Reuse or Recycling: How can materials, water, or air be reused instead of wasted?	
Safe Energy Use: How does your idea use renewable or sustainable energy?	
Minimal Waste: How will waste be reduced, reused, or turned into something useful?	
Human Comfort & Safety: How will your design keep astronauts safe, healthy, and comfortable?	
Long-term Use: Can your idea last for years or be repaired and adapted as needed? What happens to your solution when the mission is complete?	

Notes & Sketches (Optional)

Use this space for quick drawings, diagrams, or extra notes.

What is Sustainable Architecture?

Here on Earth, sustainable architecture is a design approach that aims to minimize the negative impact of buildings on the environment, while creating healthy, efficient, and durable spaces for people.

It balances **environmental, social, and economic** goals by focusing on:

- **Efficient use of resources:** Reducing energy and water consumption, conserving materials, and reusing or recycling whenever possible.
- **Low environmental impact:** Limiting pollution and waste, protecting ecosystems, and cutting greenhouse gas emissions over a building's entire life cycle.
- **Human well-being:** Designing healthy indoor environments with good air quality, natural light, and comfortable temperatures.
- **Long-term resilience:** Ensuring buildings are durable, adaptable, and able to respond to changing climates or needs.
- In short, sustainable architecture is about designing and constructing buildings that meet present needs without compromising the ability of future generations to meet theirs.

SOME REAL-WORLD EXAMPLES OF SUSTAINABLE ARCHITECTURE ON EARTH

Here are a few clear, real-world examples that show how sustainable architecture looks in practice on Earth — all of them use resources wisely, support people's health, and reduce environmental impact:

1. **Bullitt Center – Seattle, USA**
    - Often called "the greenest commercial building in the world."
    - Features: A huge rooftop solar array, rainwater capture and filtration, composting toilets, and natural daylighting.
    - Why it's sustainable: It produces more electricity than it uses ("net positive") and treats its own water and waste.
2. **Bosco Verticale ("Vertical Forest") – Milan, Italy**
    - Two residential towers covered with over 900 trees and thousands of plants.
    - Why it's sustainable: Vegetation improves air quality, reduces urban heat, and provides insulation, cutting energy use for heating and cooling.
3. **BedZED (Beddington Zero Energy Development) – London, UK**
    - An eco-village of homes and offices.
    - Features: Super-insulated walls, passive solar heating, green roofs, and a focus on walking/cycling instead of cars.
    - Why it's sustainable: It dramatically reduces energy and water consumption while supporting community living.
4. **CopenHill – Copenhagen, Denmark**
    - A waste-to-energy plant with a public ski slope and hiking trail on its roof.
    - Why it's sustainable: It generates clean energy from waste, reduces landfill, and reuses the roof space for recreation and green landscaping.

Tip: Research these and other examples here on Earth for inspiration on how to apply these same design principles into your own solution to living in space.

WHAT IS DIFFERENT ABOUT CREATING SUSTAINABLE ARCHITECTURE FOR SPACE?

When you extend the idea of sustainable architecture to space or the Moon, the core principle—meeting present needs without compromising the future—stays the same, but the focus shifts because the environment and available resources are so different.

Keyways the definition evolves:

- **Extreme resource conservation:** On the Moon or in space, every kilogram of material, air, water, and energy is precious. "Sustainable" means using resources already on the surface (like lunar regolith for shielding or building blocks), recycling air and water almost completely, and designing systems to last with minimal replacement parts.
- **Closed-loop life-support:** Sustainability isn't just about efficient heating or cooling; it's about maintaining an ecosystem that supports life—oxygen production, carbon dioxide removal, waste processing, and food growth—all within a sealed habitat.
- **Radiation and micrometeoroid protection:** Earth buildings consider weather; orbital and lunar architecture must

sustainably shield people from radiation, vacuum, and impacts, while balancing material use and mass.

- **Adaptability and self-repair:** Because resupply is rare and costly, structures must be durable, modular, and capable of being repaired or reconfigured with tools or robotic assistance.
- **Minimal environmental disruption:** In orbit, "environmental stewardship" means being aware of what pieces of your rocket, satellite, or habitat may permanently remain in space. Is your mission contributing to the ongoing problem of orbital debris ("space junk") and are you aware of how your satellites position in orbit might affect future missions. On the Moon, this means protecting its surface and scientific value—minimizing dust, contamination, and irreversible changes.
- **Launch and transport efficiency:** Sustainability includes the carbon and cost footprint of getting materials from Earth, so designs prioritize lightweight, multifunctional, or locally sourced components.

In short, sustainable architecture in space is about creating self-sufficient, durable habitats that responsibly use local and transported resources to protect both human life and the extraterrestrial environment.

SOME REAL-WORLD EXAMPLES OF SUSTAINABLE PROJECTS BEING DESIGNED FOR SPACE

1. **AxEMU – Axiom Space**
   - Developing next-generation Lunar/Extravehicular Activity (EVA) spacesuits. This includes creating designs that work on both the ISS and lunar missions.
   - Aspects of sustainability: more durable, multi-use suits are part of making space missions more affordable.
2. **Haven-1 – Vast**
   - A commercial space station with a planned launch in 2026. It will include a microgravity research, development, and manufacturing platform (the Haven-1 Lab).
   - Aspects of sustainability: enabling in-orbit manufacturing, reducing dependence on Earth supply. Also designing for efficient power and systems that can be reused.
3. **Starlab – Voyager Space**
   - A next-generation commercial space station being developed by Voyager Space in partnership with Airbus and other international collaborators. Starlab is designed to replace the International Space Station (ISS) as a hub for scientific research, manufacturing, and astronaut missions in low-Earth orbit.
   - Aspects of sustainability: built using modular components that can be serviced, upgraded, and reused over time. Starlab will test technologies for long-duration human life support, power management, and dust mitigation — all essential for future Moon and Mars habitats. Its focus on international and commercial collaboration also promotes shared resources and reduced waste, key principles of sustainable space development.

Tip: Remember that learning about space and going back to the Moon is an international effort. Research ongoing projects around the world for how actual scientists and engineers are trying to solve these design problems.

Engineering Basics for Middle School Students:

A Guide for the National Space Sustainability Competition

Welcome to the world of engineering! This guide will help you understand some key engineering concepts as you design a solution for living outside Earth. These basics will give you a strong foundation for your project.

UNDERSTANDING THE PROBLEM

Every great engineering project starts with a clear understanding of the problem. In this competition, your challenge is to help develop a solution to creating a sustainable presence in orbit or on the Moon, which could include habitats, tools, or systems (life support, growing food, maintenance, etc.) that make life outside Earth not only possible, but sustainable.

Key Questions:

- What is a problem astronauts will face while living and working in orbit or on the Moon?
- Is the problem recurring (i.e. the constant need for water) or something that can be fixed with a single solution (i.e. permanent structures to live in)?
- How can you address the problem with a long-term, sustainable solution in mind?
- How will you get your solution into space or to the surface of the Moon?

Tip: NASA is currently working on the Artemis program, an international effort to return humans to the Moon. Explore some of their ideas, concepts, and designs for inspiration. Be sure not to just copy an existing idea but create your own!

BRAINSTORMING SOLUTIONS

Once you know the problem, it's time to start brainstorming ways to solve it. Engineers use creativity and knowledge to come up with as many ideas as possible, then narrow them down to the best ones.

Techniques for Brainstorming:

- **Mind Mapping:** Start with the problem in the center of a page and draw out different ideas to solve it.
- **Questioning:** Ask questions like "What if...?" or "How might we...?" to spark new ideas.
- **Sketching:** Draw rough sketches of your ideas. Sometimes, seeing them visually can spark even more solutions!

Tip: No idea is too big or too small! Write down everything that comes to mind, even if it sounds a bit out there. Sometimes, the most unique ideas become the best solutions.

DESIGNING YOUR SOLUTION

Design is where ideas become a plan. Engineers use design tools to help them create and visualize their ideas. This could include digital software like Tinkercad or SketchUp to build a virtual model of your solution.

Key Design Elements:

- **Form and Function:** Think about how your design will look (form) and how it will work (function). A good design balances both.

- **Efficiency:** How well does your solution work? Think about ways to make it faster, simpler, or more effective. The fewer fail points in your design, the better.
- **Sustainability:** Since we're focusing on long-term solutions that need to last years, consider ways to make your design eco-friendly or reusable.

Tip: When using digital tools, explore tutorials to help you get started with basic shapes and functions. These can help you bring your ideas to life.

TESTING AND IMPROVING YOUR DESIGN

Testing is a big part of engineering! Once you've created a model of your solution, test it to see how well it works. Testing helps you identify areas that could be improved.

Testing Tips:

- **Simulate Real Conditions:** Imagine how your solution would work in space or on the Moon.
- **Gather Feedback:** Show your model to friends, teachers, or family members and ask for their feedback.
- **Iterate:** Engineers often go through several versions of a design. Based on your tests, make changes and try to improve your solution.

Tip: Testing can be as simple as imagining challenges your design could face or as hands-on as creating small-scale simulations.

COMMUNICATING YOUR IDEA

In engineering, it's not just about creating a solution — it's about communicating it too! Make sure to explain your idea clearly so others understand what it does and why it is important.

How to Communicate Your Idea:

- **Describe the Problem and Solution:** Explain what your solution does and why it's needed.
- **Use Visuals:** Use sketches, models, or diagrams to help show how your solution works.
- **Practice Your Pitch:** Practice explaining your idea in a few sentences. Imagine you're talking to someone who's not familiar with space — make it simple and clear.

Tip: Think of yourself as a storyteller. You're telling the story of your design and how it could make a difference in the world.

ENGINEERING MINDSET

Finally, remember that engineering is about more than just building things. It's about problem-solving, creativity, and resilience. If your first idea doesn't work, try a new approach. The best engineers know that learning from mistakes is part of the process!

Core Engineering Skills:

- **Curiosity:** Ask questions, explore new ideas, and dig into why things work.
- **Creativity:** Think outside the box and don't be afraid to try unusual solutions.
- **Persistence:** Keep going even if your first attempt doesn't work. Great engineers know how to learn from setbacks.

With these engineering basics, you're ready to tackle the National Space Sustainability Competition! Whether you're working with digital or physical models, focus on creativity, problem-solving, and making a positive impact. Good luck and enjoy the journey of bringing your ideas to life!

How to Get Started with Tinkercad

Tinkercad is a free, easy-to-use 3D design tool that's perfect for bringing your ideas to life! Here's a quick guide to help you get started with designing your sustainable solution to living beyond Earth.

STEP 1: SET UP YOUR TINKERCAD ACCOUNT

1. Go to tinkercad.com and click on "Join Now" to create a free account.
2. Follow the prompts to set up your account. Once logged in, click on "Create New Design" to start a new project.

STEP 2: LEARN THE TINKERCAD WORKSPACE

- **Shapes Library:** Tinkercad provides basic shapes like boxes, cylinders, and spheres that you can use as building blocks. Find these on the right side of the screen.
- **Workplane:** This is your design space where you'll place and adjust shapes to create your model. You can rotate your view by right-clicking and dragging the mouse.
- **Toolbar:** Use the toolbar at the top for tools like align, group, and duplicate to make your design process easier.

Tip: Start by experimenting with a few basic shapes to see how they work together. You can resize, rotate, and move them around the workplane.

STEP 3: DESIGN YOUR MODEL

- **Drag and Drop Shapes:** Select shapes from the library and drag them onto the workplane. Adjust their size and orientation using the handles that appear around the shapes.
- **Combine Shapes:** Use the group tool to combine multiple shapes into a single piece, which is great for creating complex structures.
- **Add Holes:** Select the "hole" option to create empty spaces or cutouts in shapes. This can help add detail or function to your model.
- **Label and Color:** Tinkercad allows you to change colors and add text. Use this to label different parts of your model for clarity.

Tip: Try layering or grouping different shapes to create unique designs. For example, combining cylinders and rectangles can help you create tube-like structures or compartments.

STEP 4: SAVE AND EXPORT YOUR MODEL

1. Once your design is complete, click on "Export" at the top right.
2. Select ".STL" or ".OBJ" for 3D printing or .PNG to save an image of your design.

TINKERCAD TUTORIAL RESOURCES

To help you learn more about Tinkercad, here are some useful tutorials and resources:

- **Getting Started with Tinkercad:** Official Tinkercad Tutorials — Tinkercad's built-in tutorials cover all the basics, from shapes to combining tools.
- **YouTube Playlist for Beginners:** Tinkercad for Beginners — YouTube — Search for beginner-friendly videos on YouTube to learn specific skills and tips.

Using Tinkercad, you can transform your ideas into a detailed model for the National Space Sustainability Competition. Start small, have fun experimenting, and see where your creativity takes you!

How to Get Started with SketchUp

SketchUp is a powerful, user-friendly 3D design tool that is great for creating detailed models. Here's a simple guide to help you get started with designing your solution to creating sustainable life beyond Earth using SketchUp!

STEP 1: SET UP YOUR SKETCHUP ACCOUNT

1. Go to sketchup.com and create a free account by clicking "Start Modeling".
2. Choose SketchUp for Web (Free) to access a browser-based version that doesn't require downloads.
3. Once logged in, click "Create New" to start a new project.

STEP 2: LEARN THE SKETCHUP WORKSPACE

- **Toolbar:** Located on the left, the toolbar includes tools like Move, Scale, Push/Pull, Orbit, and Rectangle.
- **3D Navigation:** Use the Orbit, Pan, and Zoom tools (or your mouse) to move around your model and see it from different angles.
- **Measurement Box:** At the bottom, this box allows you to enter exact dimensions for your shapes, making it easy to create precise designs.

Tip: Practice moving and rotating the view to get comfortable navigating in 3D space. It will make designing easier and faster!

STEP 3: START DESIGNING WITH BASIC SHAPES

- **Draw Shapes:** Use the Rectangle and Circle tools to create base shapes. Click and drag to draw shapes directly on the workplane.
- **Push/Pull Tool:** After creating a shape, use the Push/Pull tool to turn it into a 3D object. This tool lets you "extrude" the shape into a box, cylinder, or other 3D forms.
- **Move and Scale:** Use the Move and Scale tools to adjust the size and position of each part of your model.

Tip: Experiment with combining basic shapes (like boxes and cylinders) to create more complex designs.

STEP 4: ADDING DETAILS TO YOUR DESIGN

- **Group Objects:** Select multiple shapes and use Group to combine them. This keeps parts organized and makes it easier to move and adjust pieces.
- **Components:** If you have parts that repeat (e.g., multiple antennas or thrusters), create a Component. Editing one will update all identical parts automatically.
- **Adding Labels and Colors:** Use the Paint Bucket tool to add color to different parts of your model, making it easier to distinguish each component.

Tip: Labels and colors make your model more understandable and visually appealing for presentations.

STEP 5: SAVE AND EXPORT YOUR MODEL

1. Save your project in SketchUp to return to it later if needed.

2. Export as a PNG for a 2D image of your design, or as an .STL file if you plan to 3D print it.

SKETCHUP TUTORIAL RESOURCES

To help you master SketchUp, check out these helpful resources:

- **SketchUp for Schools:** SketchUp for Schools Tutorials — This is the official guide, providing quick tips and tutorials tailored for beginners.
- **YouTube SketchUp Tutorials:** SketchUp Beginner Tutorials — YouTube — Search for beginner tutorials to learn specific tools or techniques.

Using SketchUp, you will be able to build a detailed, professional-looking model of your solution. Experiment, have fun, and remember that every great design starts with the basics!
Good luck!

Pitch Tips:

Making Your Space Sustainability Solution Stand Out!

Your pitch is the chance to showcase your team's creativity, problem-solving skills, and innovative approach to managing challenges humans will encounter as we attempt to build a sustainable presence in orbit or on the Moon. Below are some tips to help you create a clear, engaging, and memorable pitch that grabs the judges' attention.

1. PLAN YOUR PITCH STORY

Think of your pitch as a story that explains:

- **The Problem:** Start by briefly explaining what the problem you are trying to solve and why your solution is needed.
- **Your Solution:** Share your team's unique idea to address the challenges of living beyond Earth and describe how it works.
- **The Impact:** Explain how your solution could make a real difference for future space missions and life beyond Earth.

Tip: Keep it simple and focused! Judges only have a few minutes to understand your solution, so prioritize the most important information.

2. BE CLEAR AND CONCISE

You have just 3 minutes to pitch, so every second counts!

- **Use Simple Language:** Avoid overly complex terms and explain your idea in a way everyone can understand.
- **Focus on Key Points:** Cover the problem, your solution, and its impact without getting lost in the details.
- **Practice Timing:** Rehearse to make sure you can deliver everything within 3 minutes without rushing.

Tip: Use bullet points or a script to keep you on track and make sure you stay within the time limit.

3. MAKE IT VISUAL

Visuals are powerful tools for making your pitch memorable.

- **Use Your Model:** Show a digital or physical model of your solution. Explain its key parts and how they help make life sustainable in orbit or on the Moon.
- **Diagrams and Labels:** Include any simple graphics that help explain how your solution works.

- **Creative Props:** If possible, use props to illustrate points or show features of your design.

Tip: Test your visuals with people unfamiliar with your project to make sure they are clear, understandable, and visible on camera.

4. SHOW ENTHUSIASM

Judges want to see that you're excited about your solution!

- **Use Positive Body Language:** Smile, make eye contact with the camera, and stand confidently.
- **Practice Good Voice Tone:** Speak clearly, vary your tone to keep things interesting, and don't be afraid to show a little passion!
- **Engage the Audience:** Imagine you're explaining your idea to friends – this makes your pitch feel more relatable and engaging.

Tip: Remember that your energy can make your pitch memorable. The more excited you are, the more excited the judges will be!

5. END WITH A STRONG CONCLUSION

Wrap up your pitch with a brief summary:

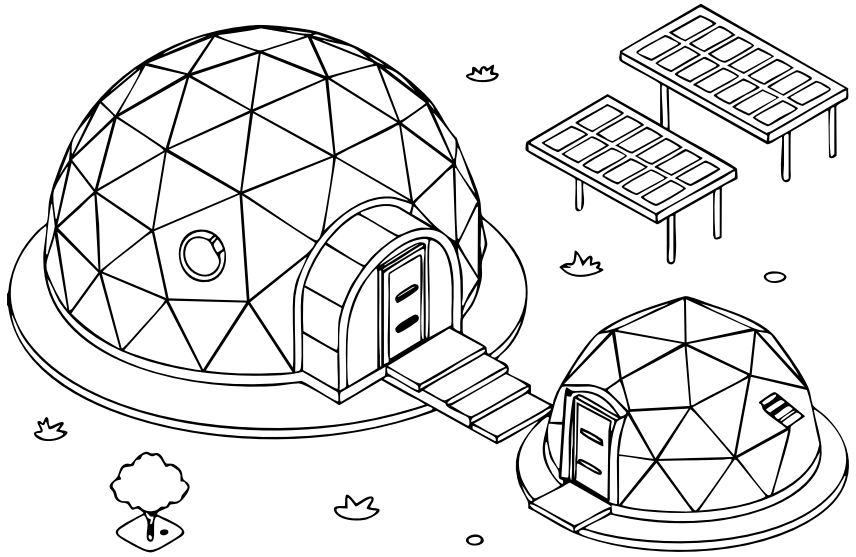
- **Restate the Problem and Solution:** Remind judges of the key points — the problem, your solution, and its potential impact.
- **Thank the Judges:** A simple "Thank you for considering our solution!" leaves a positive final impression.

Tip: A confident conclusion shows that you believe in your solution and are proud of the work you've done.

BONUS TIPS: PREPARING FOR THE PITCH

- **Practice Makes Perfect:** Practice your pitch multiple times. This helps you refine your timing, adjust your visuals, and build confidence.
- **Get Feedback:** Present to friends, family, or classmates, and ask for their feedback.
- **Record and Review:** Record your pitch and watch it to spot any areas that could be improved.

Remember: Your pitch is your team's chance to shine! Keep it clear, visual, and enthusiastic, and most of all, have fun sharing your ideas with the judges. Good luck!



Understanding Your STEM Component

When you're designing a solution for living in orbit or on the Moon, there are different ways to show your ideas. A **Technical Drawing** is a detailed sketch that shows the shape, size, and parts of your design, kind of like blueprints for builders. A **Systems Diagram** is a map of how different parts of your idea work together — for example, how power, water, and air might flow through an orbital or lunar habitat. A **CAD Drawing** (Computer-Aided Design) is made on a computer and can be 2D (flat) or 3D (like a digital model), which helps others see your design more clearly and from different angles. A **Physical Prototype** is a hands-on model you build — it could be made from cardboard, 3D printing, or other materials — so people can actually see and touch your idea in real life. Each method tells part of the story of your solution and helps explain how it could really work in space.

Type	What It Is	How it Helps Explain Your Idea
Technical Drawing	A detailed sketch that shows the shape, size, and parts of your design (like blueprints).	Lets others see exactly what your design looks like and how big it is.
Systems Diagram	A map that shows how different parts of your design work together.	Explains how resources like water, air, and energy move through your system.
CAD Drawing	A computer-made drawing, either flat (2D) or digital model (3D).	Lets people view your idea clearly, from different angles, and even test changes easily.
Physical Prototype	A real-life model you build with materials (cardboard, 3D printing, etc.).	Lets people see and touch your design, and imagine how it could really work in space.

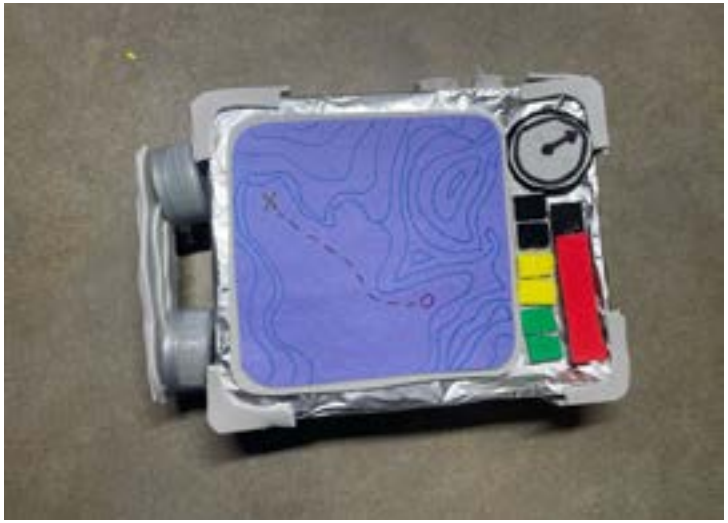
EXAMPLE STUDENT PROJECTS

Technical Drawing

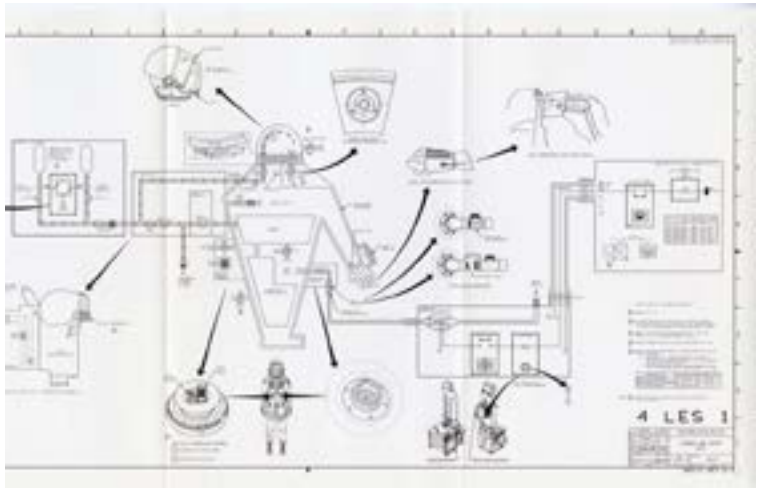
Systems Diagram

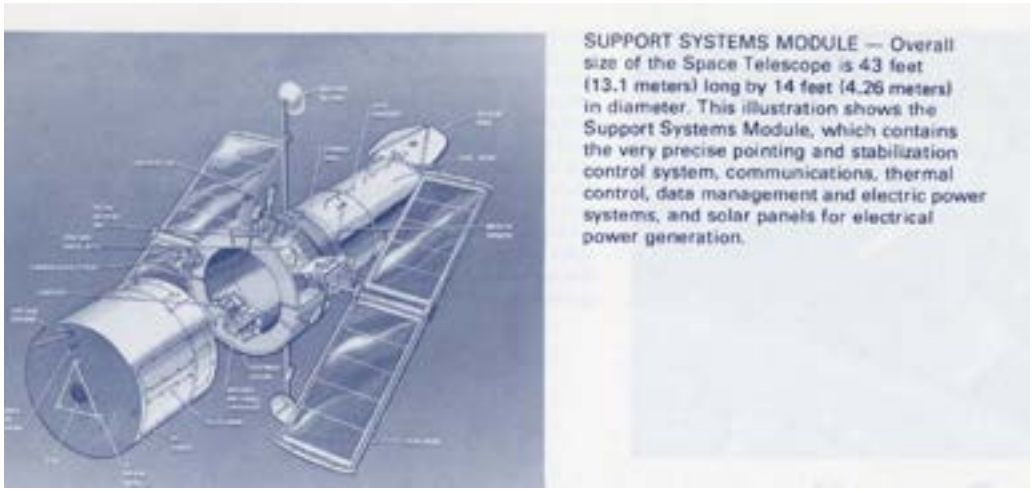
CAD Design

Physical Prototype

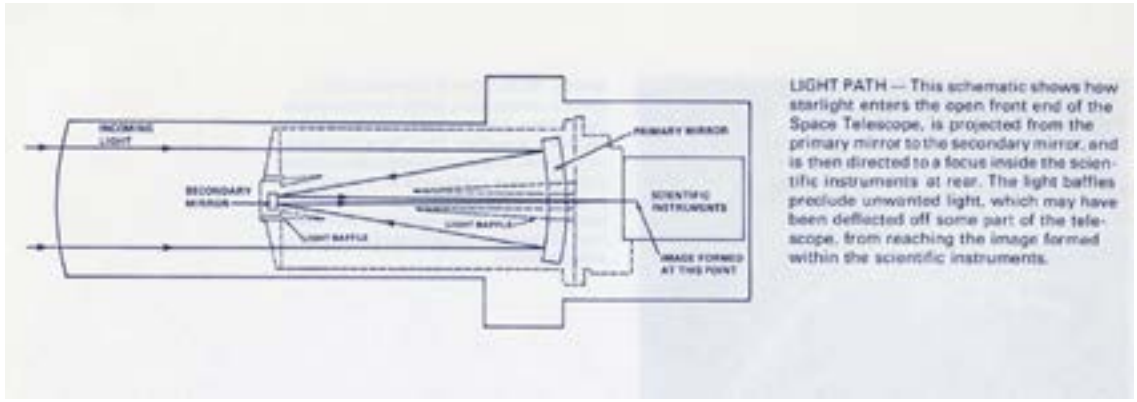


REAL WORLD EXAMPLES

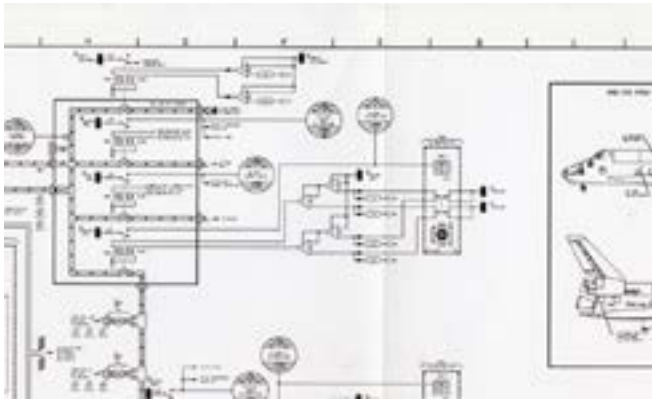




SUPPORT SYSTEMS MODULE — Overall size of the Space Telescope is 43 feet (13.1 meters) long by 14 feet (4.26 meters) in diameter. This illustration shows the Support Systems Module, which contains the very precise pointing and stabilization control system, communications, thermal control, data management and electric power systems, and solar panels for electrical power generation.



LIGHT PATH — This schematic shows how starlight enters the open front end of the Space Telescope, is projected from the primary mirror to the secondary mirror, and is then directed to a focus inside the scientific instruments at rear. The light baffles preclude unwanted light, which may have been deflected off some part of the telescope, from reaching the image formed within the scientific instruments.



Rubric

SCORING SCALE (FOR EACH CATEGORY):

- Excellent – Outstanding work, exceeds expectations
- Good – Solid work, minor improvements needed
- Fair – Adequate, but several areas to improve
- Needs Improvement – Lacks clarity, detail, or feasibility

CREATIVITY & INNOVATION (25 POINTS)

- Excellent (21–25): Highly original, unique, and creative solution
- Good (16–20): Some new ideas, moderately original
- Fair (11–15): Relies on common ideas, limited creativity
- Needs Improvement (1–10): Little to no originality

FEASIBILITY & PRACTICALITY (25 POINTS)

- Excellent (21–25): Very realistic with current/near-future technologies, with an emphasis on sustainability
- Good (16–20): Mostly feasible, some technical and sustainability challenges
- Fair (11–15): Major feasibility issues but some understanding shown, not very sustainable
- Needs Improvement (1–10): Unrealistic with little science/engineering grounding

TECHNICAL PRESENTATION (25 POINTS)

- Excellent (21–25): Very clear model/visuals, easy to understand
- Good (16–20): Mostly clear, some details missing
- Fair (11–15): Adequate but lacked clarity or detail
- Needs Improvement (1–10): Hard to follow or incomplete presentation

MISSION BRIEF (15 POINTS)

- Excellent (13–15): Clear, thoughtful, creative submission overview
- Good (10–12): Covers basics, some details missing
- Fair (7–9): Lacks key elements or clarity
- Needs Improvement (1–6): Minimal or missing strategy

VIDEO PITCH (10 POINTS)

- Excellent (9–10): Engaging, clear, professional
- Good (7–8): Understandable, minor improvements needed
- Fair (5–6): Somewhat clear, needs better engagement
- Needs Improvement (1–4): Hard to follow or missing

OVERALL RATING

- Exceptional: 90–100 points
- Strong: 75–89 points
- Competent: 50–74 points
- Needs Improvement: 25–49 points
- Incomplete: 0–24 points