

Future Moon Base Planning Project

This project combines research, science understanding, collaboration, and problem solving as students plan a future Moon base and present their ideas as a team.

SCROLL
to take a look inside!



Teach With
Fergy

Science Research and
Engineering Design Project

WHAT STUDENTS DO

1. Each group member researches one Moon base system.
2. Students complete their individual written responses.
3. The group builds one presentation together.
4. Groups present their Moon base plan to the class.

Role 5: Transportation and Safety Specialist
Figure out how astronauts could move around, work safely, and respond to emergencies outside the base.

Research questions to answer

1. Why does a Moon base need transportation systems such as rovers or cargo movement?
2. What safety issues must astronauts solve when working outside the habitat?
3. How is moving around the Moon different from moving around on Earth?
4. What emergency systems or plans would a Moon base need?
5. What improvement would you suggest for future lunar transportation or safety systems?

Helpful reminder: Remember to think about safety. Think about spacesuits, communication, landing zones, and emergency planning.

Your individual role

- Follow the guiding questions to the best of your ability.
- List 2 specific details or examples from your research.
- One realistic improvement for future Moon missions.
- Key vocabulary you can use on your slide and while presenting.

Use the space below for your notes

Group Presentation Planning Template
Plan your deck before you start building it. Use the same layout, font choices, and visual style across the whole presentation.

Slide #	Slide title	What must be included	Who speaks?
1	Mission challenge	Introduce the post-Artemis III Moon base plan and why a base is needed.	Shared
2	Habitat	Explain shelter, construction, maintenance, and protection.	Student 1
3	Life support	Explain how oxygen, water, carbon dioxide, and recycling are managed.	Student 2
4	Food production	Explain how food storage, nutrition, and waste management are handled.	Student 3
5	Power	Explain how power is generated, stored, and used.	Student 4
6	Transportation and safety	Explain how movement, hazards, and safety are managed.	Student 5
7	Challenges	Explain the major Moon base challenges your team had to solve.	Shared or assigned
8	Benefits	Explain why a Moon base would be worth building.	Shared or assigned
9	Timeline	Show how humans could move from post-Artemis III planning to an early base.	Shared or assigned
10	Improvements / expansion	Explain future improvements or how the base could expand over time.	Shared or assigned

Presentation tips

- Keep each content slide focused on one major base system.
- Use labels, diagrams, icons, or photos that help teach the audience.
- Avoid copying large blocks of text onto your slides.
- Practice transitions so the presentation sounds smooth from one speaker to the next.

Individual Written Submission
Use this page to turn your research into a clear explanation. Submit this page for your individual grade.

Student information

Prompt	Response
Name	
Group role	

Write-up prompts

Prompt	Response
Explain your system: How does this part of the Moon base help astronauts live and work over time?	
Use evidence: Add at least 2 specific facts, examples, or details from your research.	
Challenges: Name one major problem or limit this system must solve on the Moon.	
Suggest an improvement: Describe 1 realistic improvement for future missions and explain why it would help.	
Vocabulary to include: Use at least 3 important science or mission words connected to your role.	

Checklist

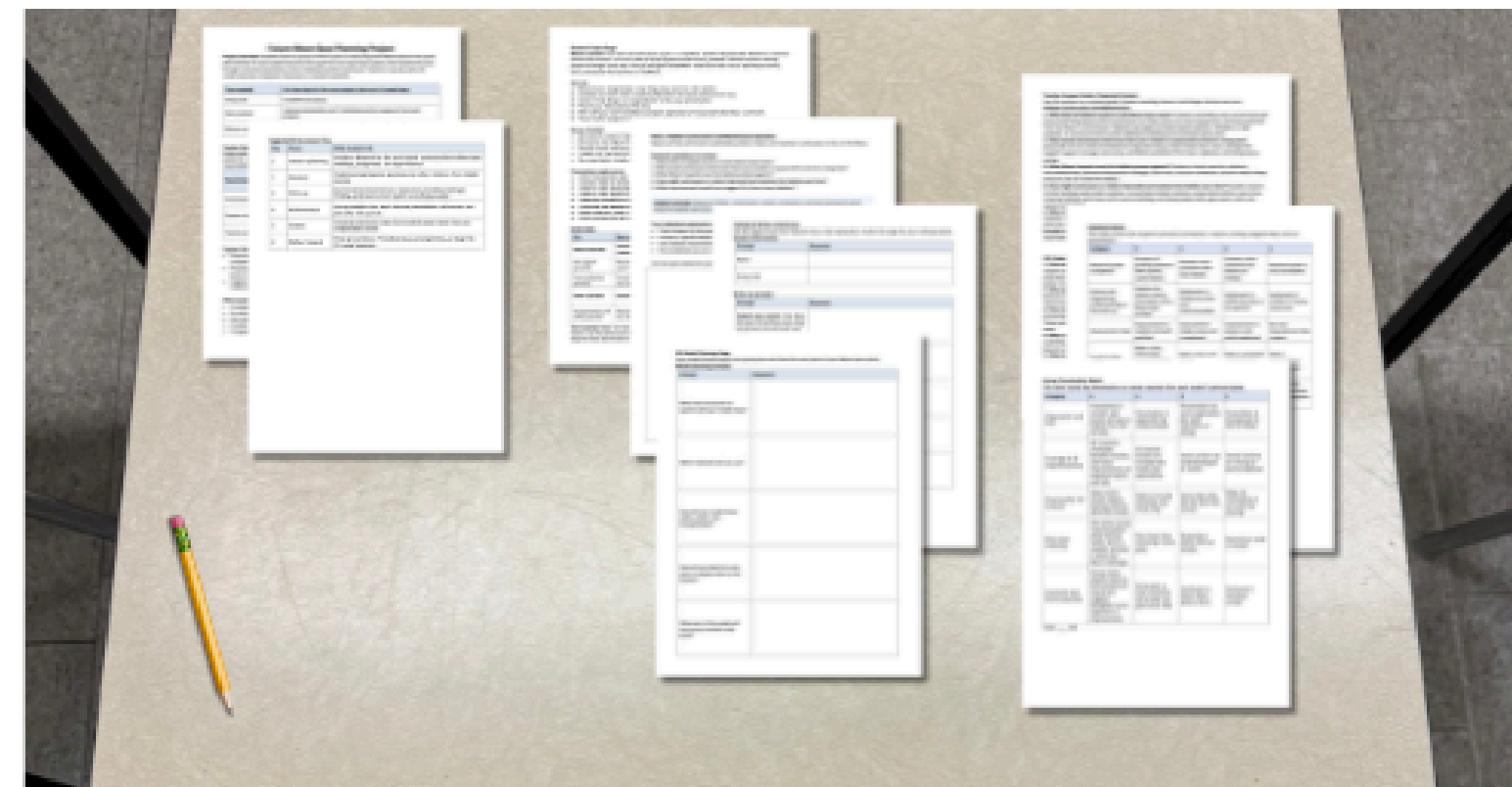
- My explanation teaches how the system works, not just what it is called.
- My facts are accurate and relate directly to the Moon base plan.
- My challenge is realistic and clearly explained.
- My improvement idea is practical and justified.

THE PROBLEMS YOU FACE

- Limited time to create engaging projects that build research, speaking, and science understanding.
- Need collaborative activities that keep every student accountable for their own learning.
- Difficulty finding meaningful presentation projects that are structured, engaging, and easy to grade.

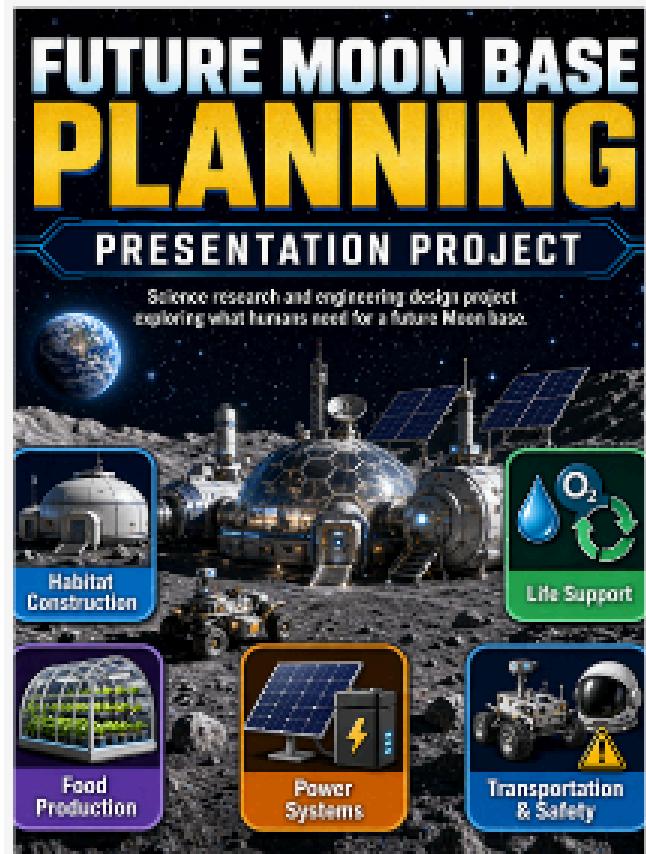
HOW IT BENEFITS YOUR STUDENTS

- Connects science research to real-world Moon base planning.
- Builds collaboration and presentation skills.
- Supports planning, organization, and clear communication.
- Encourages science and engineering problem solving.



What Will Your Students Learn?

NO PREP - Just Print and Go



Students research what humans would need for a future Moon base and work in groups to create a presentation explaining how the base could support long-term life and work on the Moon.

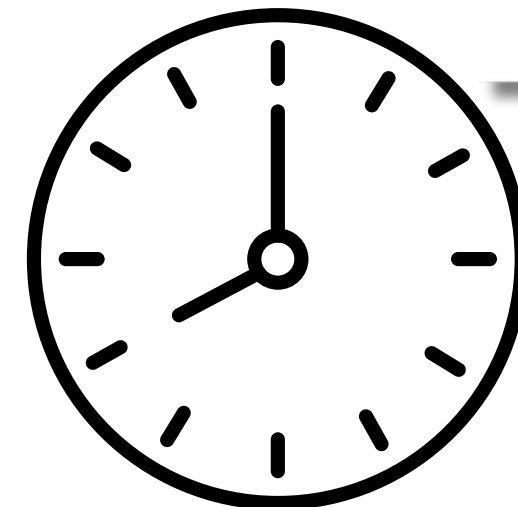
STUDENTS DEVELOP THEIR RESEARCH, COLLABORATION, & PRESENTATION SKILLS.

- **Future Moon Base Planning Challenges**
- **How Humans Could Live and Work on the Moon**
- **Habitat Construction and Maintenance**
- **Life Support Systems for Air and Water**
- **Food Production for Long-Term Moon Stays**
- **Power Systems for a Lunar Base**
- **Transportation and Safety on the Moon**
- **Moon Hazards and Environmental Challenges**
- **Limited Supplies, Space, and Energy Needs**
- **Researching Real-World Moon Base Systems**
- **Explaining Science Through Writing and Speaking**
- **Collaborating to Create a Group Presentation**

Time & Materials

Designed for 5–6 class days total:
Day 1 for project launch and role selection
Day 2 for research
Day 3 for the individual write-up
Day 4 for building the presentation
Day 5 for presenting to the class
Day 6 for finishing presentations, reflection, or extension

Students need Chromebooks or other devices for research, plus the printed project pages
If assigned, the optional 3D model can be built using basic classroom or recycled materials.



Easy Grading

Includes clear individual, group, and 3D model rubrics for easy grading of research, science understanding, presentation, and the overall Moon base plan.

Individual Rubric
This rubric scores each student's personal contribution: research, writing, assigned slide, and oral presentation.

Category	4	3	2	1
Research guide completion	Answers all guiding questions with specific, useful details.	Answers most questions with clear details.	Answers some questions but details are limited.	Research guide is very incomplete.
Science and engineering understanding in the write-up	Explains the system clearly, accurately, and in Moon base context.	Explanation is mostly accurate and understandable.	Explanation is partly accurate or too general.	Explanation is unclear or mostly inaccurate.
Improvement idea	Improvement is realistic and well justified.	Improvement makes sense and is explained.	Improvement is weak or only partly explained.	No clear improvement idea is given.
Assigned slide quality	Slide is clear, informative, visually effective, and easy to learn from.	Slide is clear and mostly informative.	Slide is somewhat useful but lacks clarity or detail.	Slide is incomplete or hard to follow.
Oral presentation of assigned part	Speaks clearly, stays prepared, and teaches the topic well.			

Total: ____/20

Group Presentation Rubric
This rubric scores the presentation as a whole, separate from each student's personal grade.

Category	4	3	2	1
Organization and flow	Presentation is smooth, well timed, and easy to follow from start to finish.	Presentation is organized and mostly smooth.	Presentation has some organization but weak transitions or timing.	Presentation is disorganized and hard to follow.
Coverage of all required sections	All 5 systems, challenges, benefits, timeline, and future improvements are explained clearly and fully.	All required sections are included with mostly clear explanations.	Some sections are underdeveloped or uneven.	Several sections are missing or poorly explained.
Visual quality and cohesion	Slides match, visuals support learning, and the deck feels unified.	Slides are mostly consistent and visuals help.	Some slides help, but the deck feels uneven.	Slides are inconsistent and not useful for learning.
Moon base reasoning	Plan shows strong reasoning about what the base needs, why it is needed, and how it solves real Moon challenges.	Plan shows clear reasoning in most parts.	Reasoning is partly clear but uneven.	Reasoning is missing or unclear.
Conclusion and future expansion	Group clearly explains how the base would work overall and suggests thoughtful future expansion or improvements.	Group gives a clear conclusion and at least one good future idea.	Conclusion or future idea is weak or brief.	Conclusion is missing or unclear.

Total: ____/20

3D Model Rubric

Category	4	3	2	1
Accuracy and connection to the plan	Model clearly matches the group's research and presentation plan.	Model mostly matches the group's plan.	Model partly matches but some features are unclear.	Model has little clear connection to the group plan.
Required features shown	Model clearly shows multiple important base systems and structures.	Model shows the main features clearly.	Model shows some features but others are missing or weak.	Model is missing several important features.
Labels / explanation	Labels or model key clearly explain what the main parts are and why they matter.	Labels or key explain most main parts.	Labels or key are brief or incomplete.	Labels or explanation are missing or unclear.
Use of materials and effort	Model shows careful use of classroom or recycled materials and strong effort.	Model is complete and shows solid effort.	Model is partly complete or somewhat rushed.	Model is incomplete or carelessly made.

Total: ____/16

Your Project

Future Moon Base Planning Project

Project overview: Students work in groups of five to plan an early long-term Moon base for the years after Artemis III. Each student becomes the expert for one major base system, then teaches the class through a shared presentation and an individual written submission. Teachers may also add a 3D model extension using basic classroom or recycled materials.

Time needed	5-6 class days for the core project, plus up to 3 model days
Group size	5 students per group
Main product	1 group presentation and 1 individual written response from each student
Mission c	

Teacher O
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Suggested 6-Day Lesson Flow

Day	Focus	What students do
1	Launch + planning	Introduce Artemis III as the launch point, review the future Moon base challenge, assign roles, and begin research.
2	Research	Students answer guiding questions and collect evidence from reliable sources.
3	Write-up	Each student writes their own explanation, benefits/challenges thinking, and improvement idea for an individual grade.
4	Build the deck	Groups combine their work into one presentation, add visuals, and plan who will say what.
5	Present	Groups present to the class. Each student speaks about their own assigned base system.
6	Reflect / extend	Finish presentations if needed, discuss strongest ideas, or begin the 3D model extension.

Student Project Page

Mission scenario: Your team has been asked to plan an early Moon base for the years after Artemis III. Artemis II showed that humans can travel safely on a 10-day deep-space mission, and later Artemis missions will help prepare for longer lunar stays. Your job is to plan what a Moon base would need next so astronauts can live, work, and expand their activities on the Moon.

Your Job

1. Research your a
2. Complete your o
3. Create or help d
4. Present your slid
5. Work with your t
6. If your teacher a

Success checklist

- o My research ans
- o My science and
- o My slide clearly t
- o I explain one imp
- o Our presentation

Presentation requir

- 1 title / introduc
- 5 content slides
- 1 slide on major
- 1 slide with a tit
- 1 final slide that
- Visuals, diagram
- A short introduc

Group Roles

Role

Habitat specialist

Life support specialist

Food production specialist

Power specialist

Transportation and safety specialist

Tip for groups: Make reports. Use the sam long-term base after

Role 1: Habitat Construction and Maintenance Specialist

Figure out how astronauts could build, protect, repair, and maintain a safe place to live on the Moon.

Research questions to answer

1. What kind of habitat would an early Moon base need?
2. Why would astronauts need more than just a lander or spacecraft to live for a long time?
3. What Moon hazard
4. How might astron
5. What improvement

Helpful reminder: I keep the habitat sa

Your individual subr

- Clear answers to
- At least 2 specifi
- One realistic imp
- Key vocabulary y

Use the space below

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1	Mission of
2	Habitat
3	Life support
4	Food production
5	Power
6	Transportation and safety
7	Challenge
8	Benefits
9	Timeline
10	Improvement expansion

3D Model Planning Page

Your model should match your group plan and show the main parts of your Moon base clearly.

Model planning prompts

Prompt	Response
What main structures or systems will your model show?	
Which materials will you use?	
How will your model show safety, power, and transportation?	
How will you label the main parts or explain them to the teacher?	
What part of the model will each group member help build?	

Presentation tips

- Keep each content
- Use labels, diagrams
- Avoid copying large
- Practice transitions

Teacher Answer Guide / Expected Content

Use this section as a content guide. Student wording, layouts, and design choices may vary.

Habitat Construction and Maintenance

1. What kind of habitat would an early Moon base need? A realistic early Moon base would need safe pressurized living spaces where astronauts can sleep, work, eat, store equipment, and stay protected from the Moon's environment. Habitats may begin as lander-based modules, inflatable or rigid modules, or structures built on with additional challenges and connected work areas.

2. Why would astronaut? Spacecraft are too small support support, storage swings.

3. What Moon hazards? micrometeorites, extreme pressure and air inside the

4. How might astronaut include landing ready-m covering habitats with k, regular inspections.

5. What improvement v radiation shielding, more more use of local lunar r Possible improvement i reparability, or long-term

Life Support (Oxygen, W

1. How would astronaut support systems that pri Early Moon bases would better recycling systems

2. Why would recycling because sending supplies reduce how much cargo

3. How would the base processing systems to re These systems would he stays.

4. What could go wrong could drop, carbon dioxide become unsafe. That co

5. What improvement v would be better recyclin base safer, reduce waste Possible improvement i reparability, or long-term

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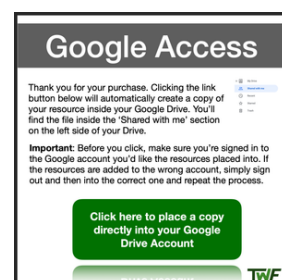
Total: ____/20

Student Instructions & Role Outlines

Teacher Instructions

Individual and Group Planning Pages

Individual and Group Rubrics and Answer Key



Thanks
**for your interest
in this resource!**

I am a real person and if
you have any questions,
suggestions, or concerns,
please reach out.



devon@teachwithfergy.com

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*Let's
Connect!*

