
JUNK TO FUNK: Make a Moon Base

Building Sustainable Moon Habitat with Recycled Materials Student Workbook

Start the project

Dear lunar architects,

You and your team are invited to design **a moon base** for scientists to live and work. Can you design and build a moon base model with a **living and lab area, food supply area, and power plant** that addresses:

1. Living environment (1/6 gravity, $\pm 170^{\circ}\text{C}$ swings, vacuum)
2. Closed-loop ecosystem (oxygen/water/food cycles)
3. Sustainable energy supply (electricity, solar energy, biomass...)?

Recyclable Materials to Suggest:

- Cardboard (cereal boxes, toilet paper tubes, etc.)
- Plastic bottles and caps
- Foil, string, yarn
- Old newspapers and magazines
- Wires, buttons, LED lights
- Broken toys, cotton
- Soil, moss, stones



(Source: © European Space Agency (ESA), URL:

https://www.esa.int/Enabling_Support/Space_Engineering_Technology/Building_a_lunar_base_with_3D_printing)

My Rough Idea 

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My Team 

I think I'm good at _____

I think I'll need help to _____

They are my teammates:

- Ecologist: _____
- Electrical engineer: _____
- Architect: _____
- My role is _____

Our Teamwork Rules:

For example:

Be inclusive, supportive, passionate and positive.

Feel free and safe to ask questions.

- _____
- _____
- _____

Sign:

Research & Think

Are you curious about how the life will be like in the Moon? What are you curious about?

- Challenges for **Ecologists**

- _____
- _____
- _____

- Challenges for **Electrical engineers**

- _____
- _____
- _____

- Challenges for **Artists**

- _____
- _____
- _____

My research diary

Date: _____

Research Question: _____
I want to know ...

Result: _____

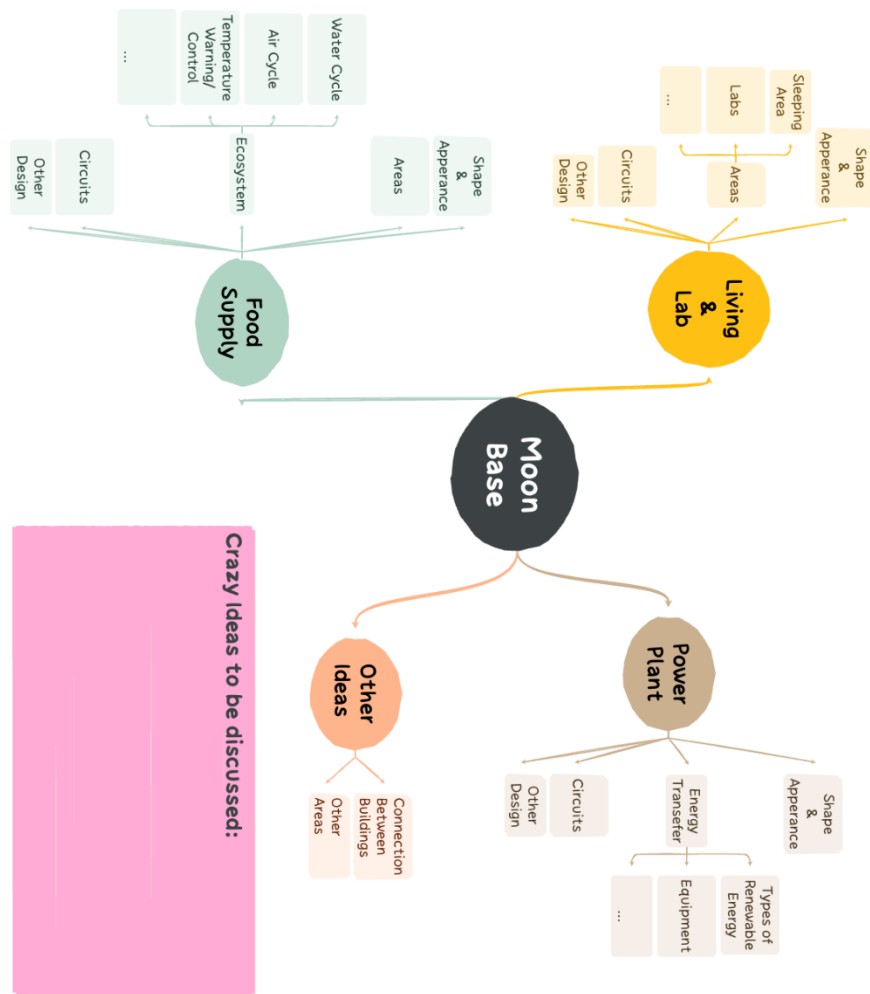
Based on the result, I have some ideas about the design:

You can pick questions from above or write a new one.

Is your original idea good enough? Any new ideas?

Discuss & Design

Brainstorm



Prepare for Model Making

If you finish your draft early, discuss how to make the model:

- How can we make our 2D design into 3D models?
- What kind of recyclable materials are we going to use?
- How do we separate our labour?
- ...

What do we need?	How many/much do we need?	Who will bring them?
Example: Shoe Box	2	Amy

Make a Model

SAFETY NOTES!

- 1) Do not attempt to do electronics on your own without the supervision of a knowledgeable adult. Don't leave your hand-made electronics connected without supervision.
- 2) There is a risk of fire and burns associated with electricity. DO NOT leave the projector on for long periods of time or unattended. Do not fall asleep with the projector on.
- 3) The LED used is very bright. Do not look directly at the light as to do so can damage your eyes. Do not touch the LED lamp when is on.
- 4) If you are not sure about how to do things, ask the responsible person in the room!

Summative Event

Judge Sheet

Process	Category	Team Name					
Presentation	Clear Ideas						
	Teamwork						
	Confidence						
	Visual Help						
Final Model	Knowledge						
	Requirement						
	Information						
	Neat & pretty						
Total							

Reflection Diary

Date: _____

I know something new and fun:

I want to know more about:

I'm happy about ...

I can do better in ...
