

Lunar Colonies

A view of Earth from space, showing the curvature of the planet and city lights at night. The Earth's surface is dark, with numerous bright yellow and orange lights representing cities and urban areas. The atmosphere is visible as a thin blue layer along the horizon. The background is a deep black space filled with many small, distant stars.

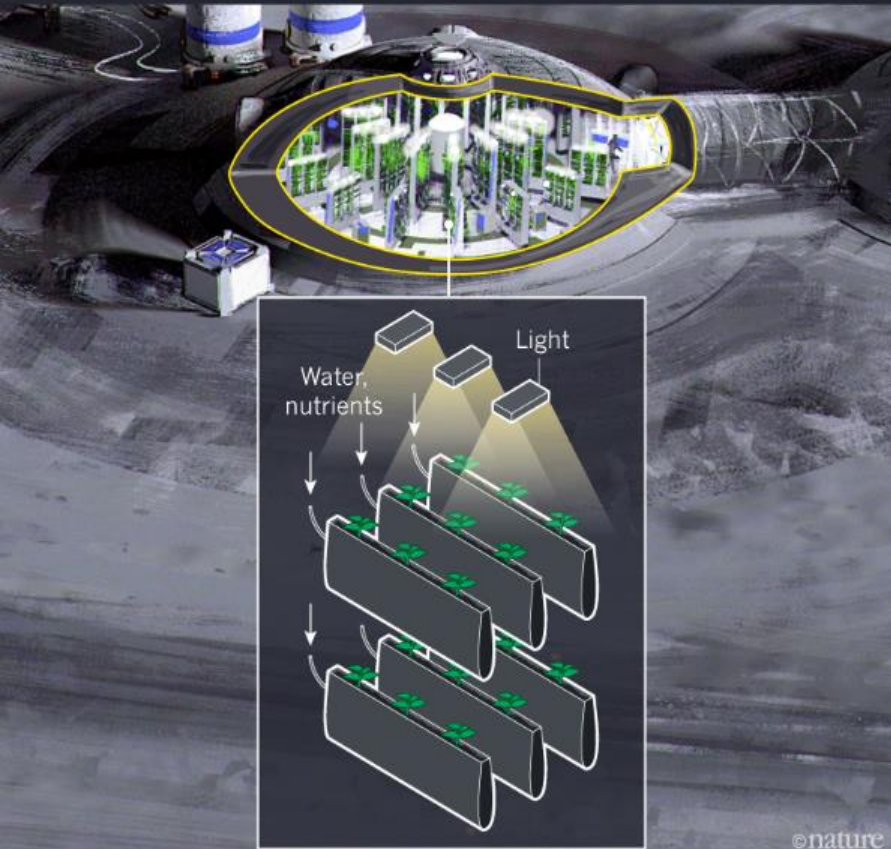
Brock Lotti, Bruce Wang, Yifan Hu

What are some ideas for developing a lunar colony in which people can survive?

- As Earth's nearest planetary neighbor, the Moon has potential to be a source of new scientific advances and economic growth.
- It is the best place for us to test our deep space systems and operations in preparation for the first human mission to another planet: Mars.
- **ROBOTIC MISSIONS** : Our return to the Moon begins with robots.
 - NASA's Lunar Reconnaissance Orbiter has been mapping the Moon for scientific research in preparation for a human return.
 - NASA's has already selected the first two robotic missions, beginning in 2021, which will deliver science and commercial payloads to the surface of the Moon.
 - Robots will hopefully be able
 - **The European Space Agency** will test if robotic 3D printers could one day build dome-shaped shelters that could house the first space explorers on the Moon.
 - This would be done by combining loose soil with special salts as “structural ink,”
 - MIT researchers **3D-printed the entire basic structure** of a 12-foot high building in just 14 hours, with the help of a large industrial robotic arm.

FOOD

Food such as kale and potatoes could be grown hydroponically in a sheltered greenhouse lit by LEDs. Plants recycle waste and turn carbon dioxide into oxygen, so would form an essential part of a life-support system



Food on the Moon

On the Moon, astronauts would grow plants such as kale and lettuce in water under white and red LEDs which they can tweak to alter the mineral and Vitamin composition of the plants.

<https://www.nature.com/articles/d41586-018-07107-4>



- **Greenhouse**

There will be huge subsurface greenhouses.

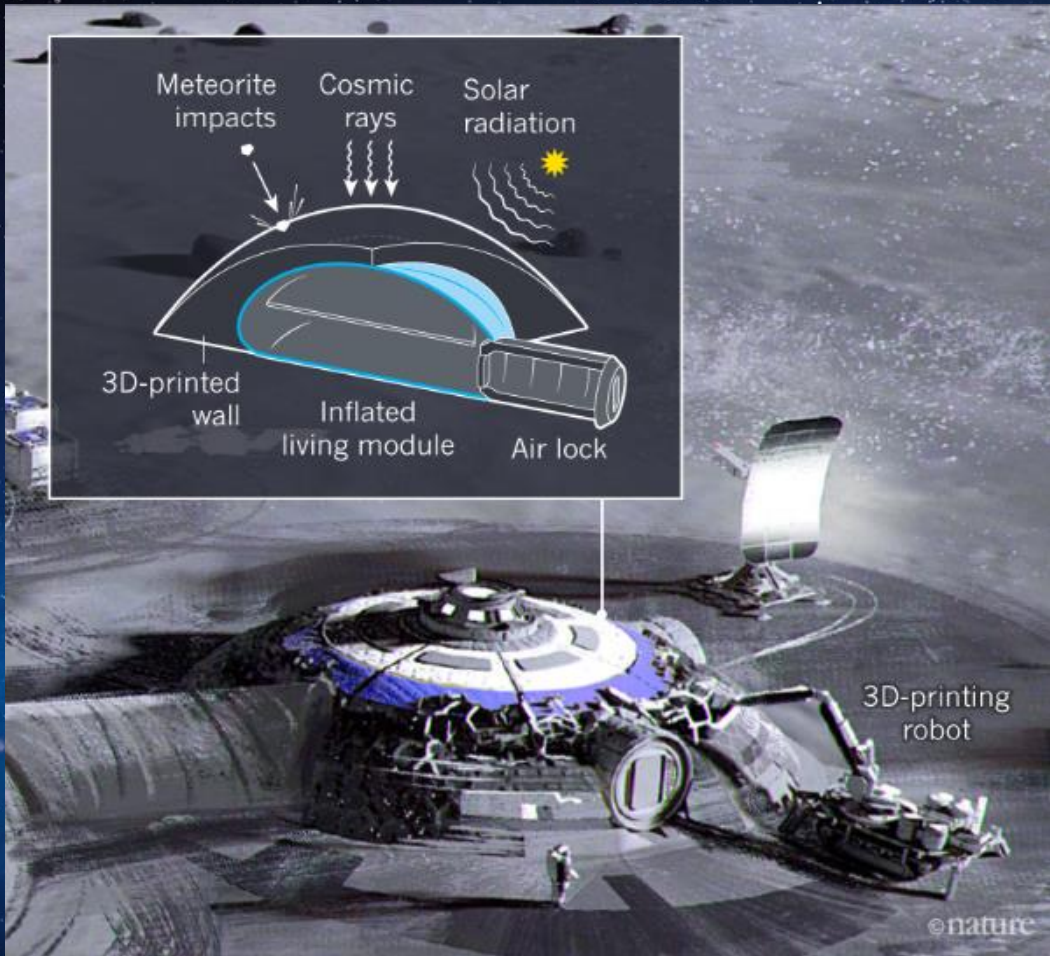
For food preparation, oxygen generation, waste recycling, and personal psychology, it's hard to beat a greenhouse. Every kg of mass we launch from Earth to the moon costs tens of thousands of dollars, so our goal is to be as close to 100% efficient in recycling as possible.



In May 2018, Chinese state media reported that volunteers finished a record 370-day stay inside such an ecosystem, a simulated base known as Lunar Palace 1, in which they grew crops and raised mealworms for protein.



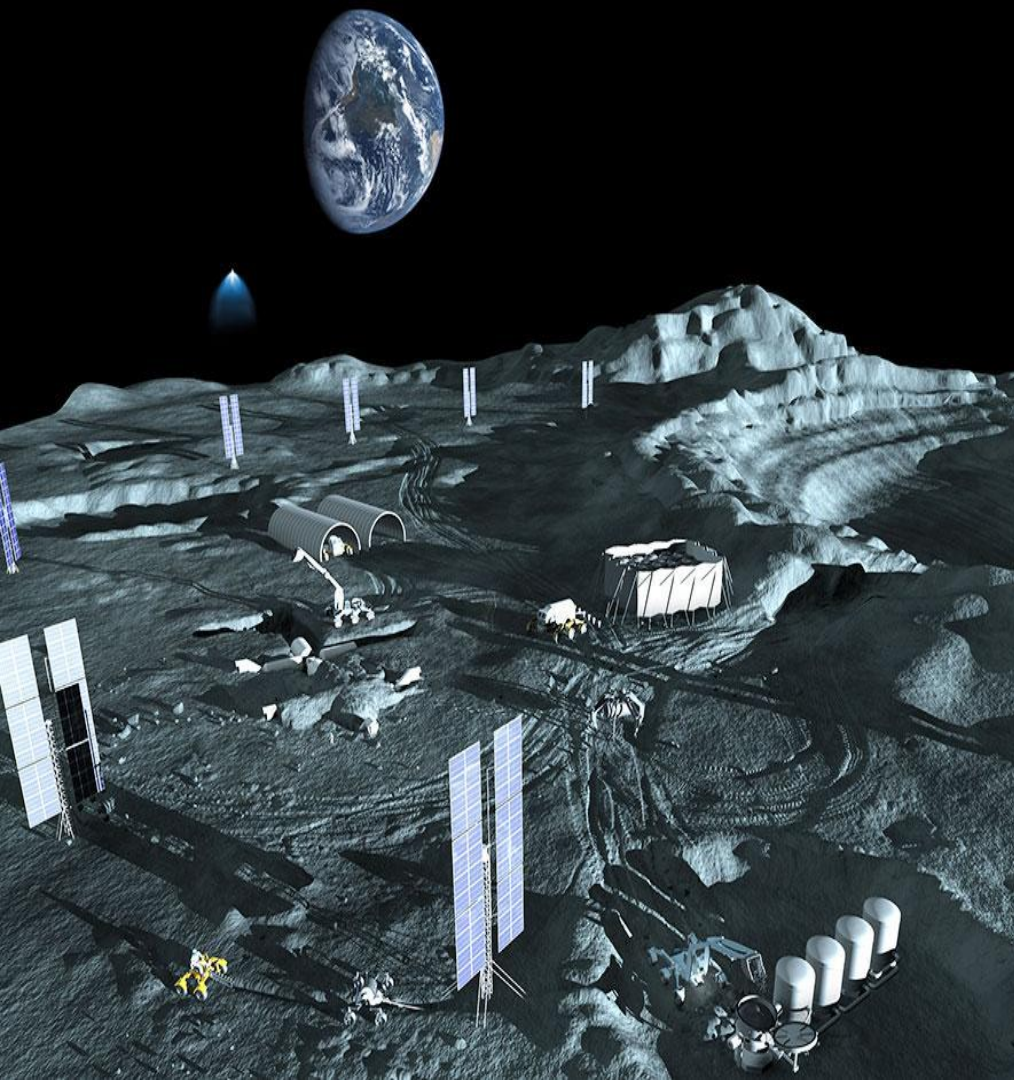
<https://www.space.com/40610-china-mock-moon-mission-lunar-palace-1-photos.html>



Other Things that can make people productive and happy

- Solar Power
- Gym

<https://www.newsweek.com/china-change-4-moon-lunar-mission-base-building-3d-printing-human-1295170>



- **Solar power**

Solar power works far better on the moon than on Earth since there is no atmosphere to worry about.

The base will also need a significant battery array to store energy during the days-long night.



Gym

- There is no question that physical activity will be a requirement of inhabitants.
- a gym will be mandatory. 1/6th gravity will wreak havoc on the bodies of inhabitants. There may also be a centrifuge to expose inhabitants to higher gravity than they would experience day to day on Earth.



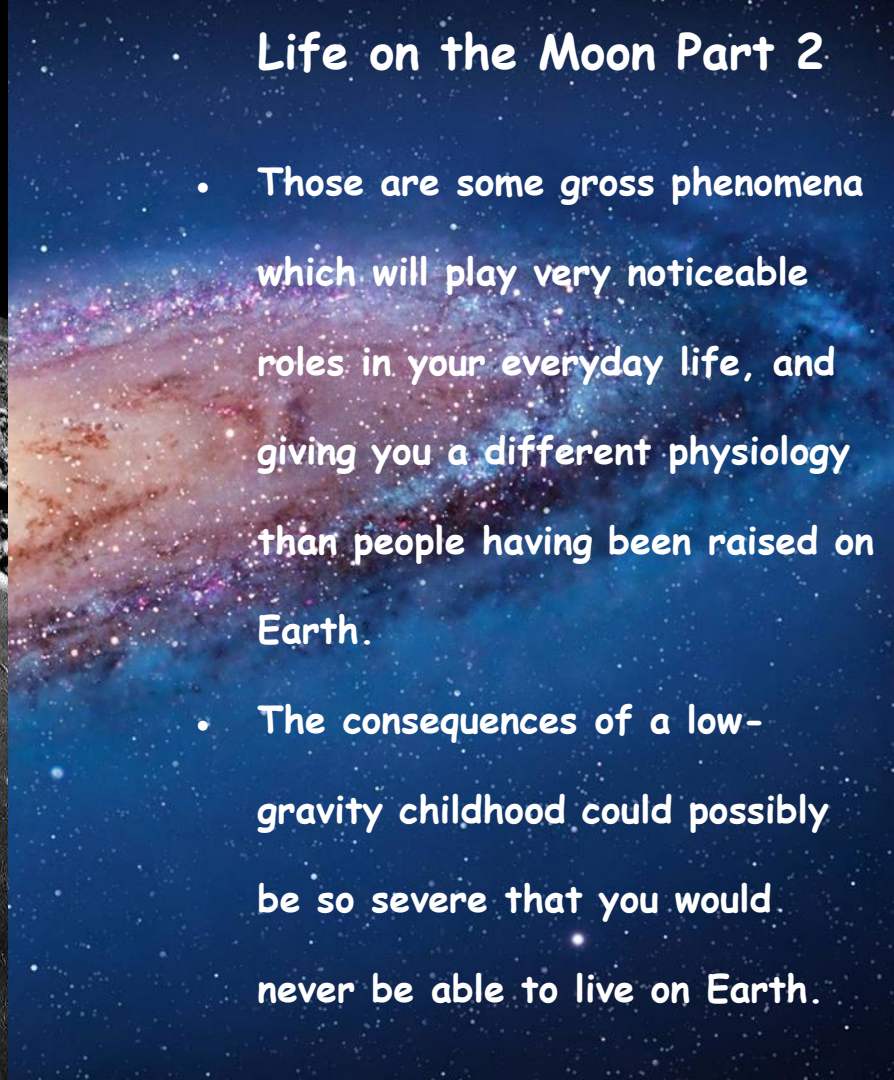
• Life on the Moon Part 1

As the moon has no atmosphere, steps would have to be taken to avoid radiation. Most of the time, you would have to stay indoors, preferably underground. You would probably need to take vitamin D supplements to compensate for the lack of sunlight, or the lighting would need to include UV rays. Your inner clock would be controlled by the electric lighting cycles, quite possibly giving you a different diurnal cycle than people raised on Earth.



Life on the Moon Part 2

- Those are some gross phenomena which will play very noticeable roles in your everyday life, and giving you a different physiology than people having been raised on Earth.
- The consequences of a low-gravity childhood could possibly be so severe that you would never be able to live on Earth.





• Life on the Moon Part 3

There are, however, lots of smaller phenomena which could come into play, depending on the nature of the base, such as

- * Never having been in touch with or directly exposed to any natural environment, such as wind, rain, open bodies of water, forests, grass, soil, etc. This would quite possibly make any first encounters with such environments a frightening, or at least overwhelming, experience.

- * Quite possibly having eaten only a very narrow selection of foods, limited by the size of the agricultural economy of the moon base.

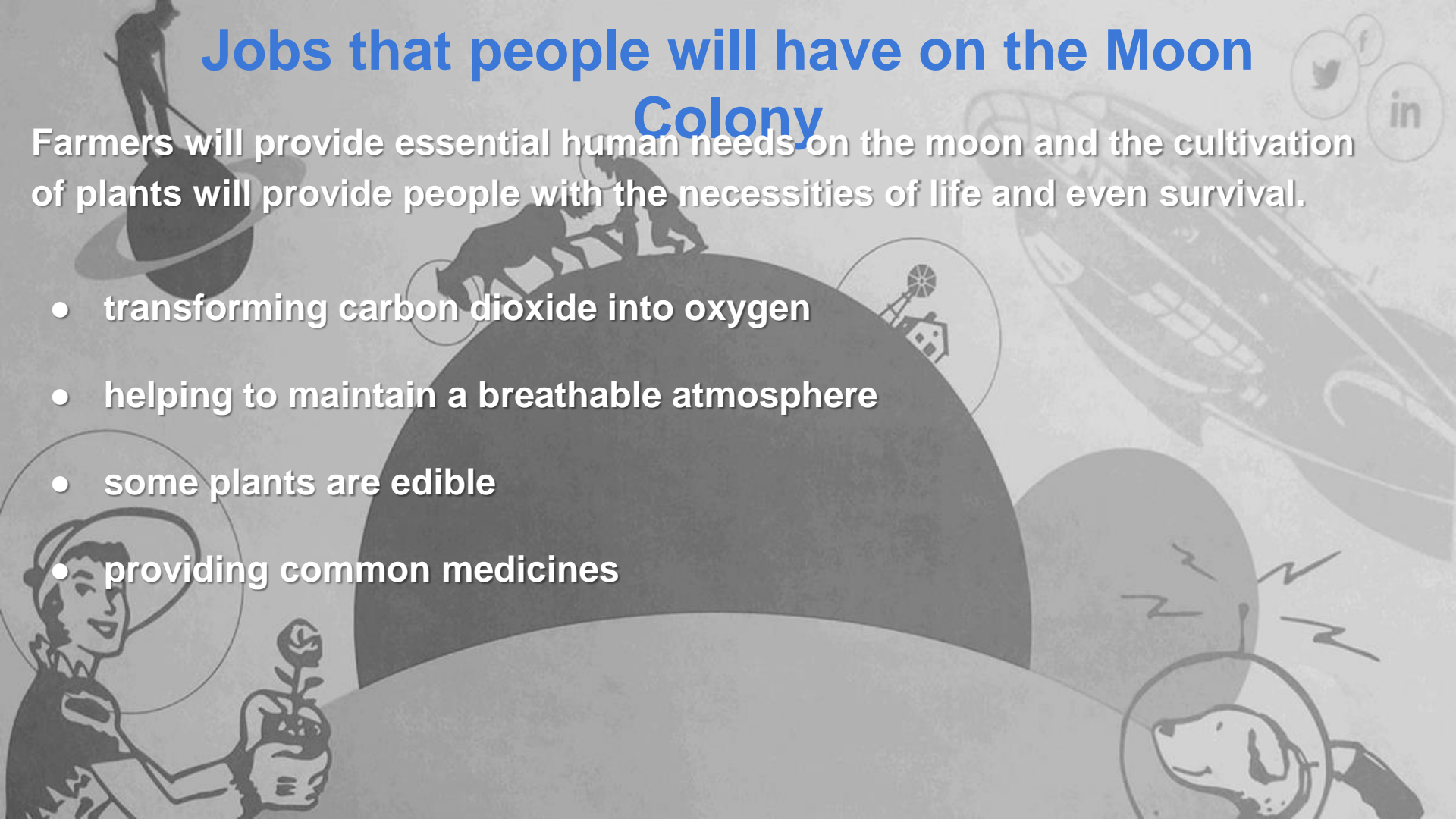
- * Quite possibly having had interactions with only a very limited number of people, depending on the size of the base.

- * Quite possibly having a "naïve" immune system, due to growing up in a highly controlled environment with little exposure to pathogens.

Jobs that people will have on the Moon Colony

Farmers will provide essential human needs on the moon and the cultivation of plants will provide people with the necessities of life and even survival.

- transforming carbon dioxide into oxygen
- helping to maintain a breathable atmosphere
- some plants are edible
- providing common medicines



Jobs that people will have on the Moon Colony



Emergency services are required on the Moon Colony.

- Moon is a high-risk environment
- People need to be aware of what will happen on the Moon and how to respond to those emergencies.
- People who get training can help those who are in trouble.

Jobs that people will have on the Moon Colony

- Moving equipment, resources, materials, and humans are critical to the success of the lunar colonization mission. Therefore, spaceship pilots or whatever space vehicle drivers are important to complete those missions. This job not only requires people to have driving skills but also to have a professional knowledge reserve of sophisticated space vehicles to face possible emergencies.
- In the future, we can build gambling cities like Las Vegas on the moon. In this way, it can not only provide entertainment for people who live on the moon, but also have more people working for this city, providing more jobs, and promoting the development of the moon economy. At the same time, such a city can attract more people to go to the Moon and live there and provide strong support for the prosperity of the moon.