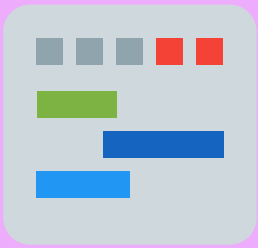
Mission Logistics

Have you ever wanted to travel to the Moon? Have you ever wondered what goes into the planning the mission to the Moon? You and your team will design a "mission" to the Moon. Just like the NASA mission designers, you will have a "catalog" of mission hardware from which you can choose. And, just like the NASA mission designers, you will have budgets for mass, power, and cost that you must keep in balance. Mission planning also uses knowledge from many different scientific fields including engineering, physics, astronomy, biology, and more!



NASA Mission Planning
To plan out tasks and activities during missions, NASA uses special mission planning software to develop timelines for each mission

MATERIALS

- Scissors ***
- Paper ***
- Pencil ***
- Equipment cards
- Cargo activity sheets

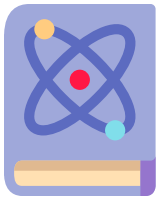
*** Materials found at home

WE CHALLENGE YOU TO

Design a mission to get astronauts back to the Moon

AND LEARN ABOUT

- Mission planning
- Scientific equipment
- Mass, power, and cost constraints



FURTHER EXPLORATION

Ride 2 Station Online | https://rocketsciencec2e.ksc.nasa.gov/
Ride 2 Station iOS App | https://apps.apple.com/us/app/rocket-science-ride-2-station/id1486222141
NASA Desert RATS iOS App| https://apps.apple.com/us/app/nasa-desert-rats-virtual-test-site/id463505939
Spacecraft 3D iOS App| https://apps.apple.com/us/app/spacecraft-3d/id541089908

DESIGN

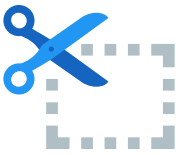
1) Plan your mission to the Moon
   a. Be sure to include a launch system, power system, computer system, communication system, mechanical systems, science instruments, and optional mobility system.
   b. Consider the following questions
      - How many astronauts will be in the crew?
      - How long are you planning to stay?
      - Will you need to build a habitat in which to live?
      - What types of science experiments do you want to perform?
      - How much power will it take to run your equipment?

BUILD

2) Determine your cargo
   a. Below are six types of cargo that you will need to pack into your cargo bay's limited amount of space. Prioritize the importance of each cargo to transport, and write numbers 1 to 6 next to the left column (1 being the supplies needed the most, 6 being the supplied needed the least).
   b. When prioritizing, be sure to consider the resources available at the selected landing site, and what is needed for survival and the construction of a lunar base.

Type of Cargo	Examples
Food	dried, frozen, and canned foods such as tortillas and peanut butter
Supplies	space suits, clothing, medical supplies, toiletries
Life Support	oxygen, water, air filters, water purification system
Mining Equipment	shovels, pickaxes, drills, robots, rotary wire brush
Power Equipment	generators, wires, electrical cords, outlets, light bulbs, solar cells
Building Equipment	power tools, construction materials, bricks, metal structures

3) The 8 inch by 10 inch grid represents the cargo bay of your rocket. Using the shapes on the cargo worksheets (see Mission Logistics activity), pack your cargo bay following your list of priorities. For example, if food is your top priority, there should be a greater percentage of food in the cargo bay
   a. Try to pack the cargo so there are no empty spaces. Use only the shapes given. Do not cut them to fit inside the cargo bay.



DISCUSS

A. Which types of cargo did you determine to be more valuable and how did you determine the amount of each type of cargo?
B. What do you think would be the hardest part or parts of planning a mission to the Moon?
C. Do scientists and engineers get everything they need and/or want when they are planning their missions? Why?