Hot Science

Living on Mars

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Cool Activities

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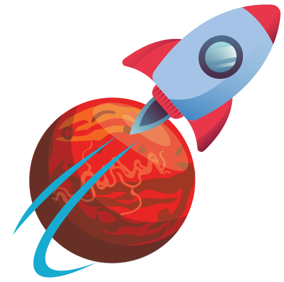


About Mars

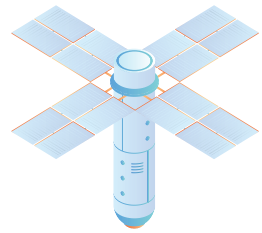
Mars has been the subject of scientific curiosity for hundreds of years. For decades, we've only been able to collect a handful of images from the few successful missions that have taken place, until today. You along with a few other astronauts have been chosen to be the first humans to set foot on Mars. The trip will be long, approximately 2.5 years, and morale will be tough to maintain, but this trip is essential for furthering, our understanding. As Dr. Joe Levy mentioned in the video Mars potentially holds the answers to so many questions we have about life and the Universe, so its exploration is essential to further our understanding.

Your Challenge

Pack everything your team is going to need for a trip to Mars in a 1 cubic meter box.

Materials

- Calculator (optional)
- Phone or tablet
- Cardboard box (shoe box preferred, or any other size you can find)
- Ruler
- Masking Tape
- Personal items for your Mars trip



Things to Consider

Packing

1. Divide into groups of 3-4. Each astronaut team is allowed to bring one box with materials to make the team feel comfortable or keep their morale high. The box size is a standard shoe box (typical dimensions are 28.54 inches x 18.7 inches x 40.94 inches). Start by calculating the volume of the box. (Note: If you cannot find a shoe box, your team can decide to use a larger box.)

2. Your team needs to decide what personal items or supplies they will bring. These can be items like your phone, favorite books or snacks. You will need to find these materials around your house or classroom to calculate their volumes. If you cannot find all the materials, you can look up their dimensions online.

3. Calculate the volumes of each item you team will take and subtract it from the total box volume. You can also use the masking tape or a paper and pencil to help you visualize how the materials will fit in the box. For items with irregular shapes (like pieces of clothing), select the closest volume shape to calculate the volume.

4. Try to not leave empty spaces in your box. Empty space won't help you when morale is low.

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Next Steps

Unfortunately, this mission to Mars is going to cost billions of dollars. Each pound will cost $10,000 to transport through space. In addition to space constraints, you want to pack your box in the most cost-efficient way possible. Look at the items you packed and figure out what you can remove or change to keep the price of the box as low as possible without having any empty space.

Before you begin packing for your trip there are a few of factors you should keep in mind. You are only allowed to bring one box for your entire team. This box can be any size, just remember you have to fit everything your team will need perfectly in this box. Be sure to calculate the volume of the box you've chosen. No empty space is allowed. Empty space won't help you when morale is low.

- Mars doesn't have any electricity and the limited amount of electricity you might be able to generate will be used for research equipment. Keep this in mind when deciding what items you want to pack. A tablet sounds like a good idea until you realize you can't charge it.

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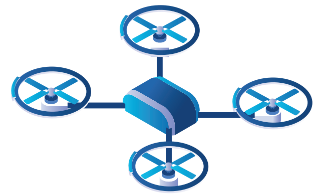
- Essential items like water, food, research equipment and other materials needed for basic survival will be provided by NASA so you just have to focus on packing items that will keep your team comfortable and morale high.



Answer Brainstorm

1. How do we decide what items are the most important vs. least important?

2. What can you bring to help keep up morale (things that the entire group will enjoy)?

3. What are some things that weren't mentioned above but might need to be considered when packing your box?

4. Did you take into consideration Mars' environment and climate when packing your box? If you didn't how do the items in your box change as a result?

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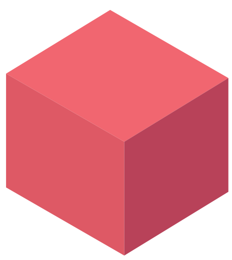
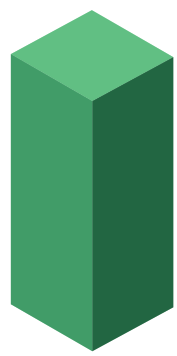
Volume of Common Shapes

l = length *w = width* *h = height* *r = radius*

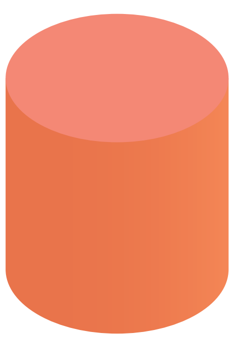


Cube
l^3

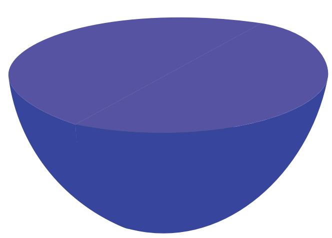


Rectangular Prism
lxwxh

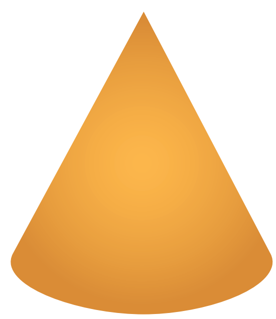
Sphere
$\frac{4}{3}\pi r^3$



Cylinder
$h\pi r^2$



Half a Sphere
$\frac{2}{3}\pi r^3$



Cone
$\frac{1}{3}\pi r^3 h$

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TEKS used in this activity
Science, Grade 6: 4A; 11C
Astronomy, High School: 2H
Earth and Space, High School: 2H; 2I