UNIVERSITY of WISCONSIN UWMILWAUKEE | Manfred Olson Planetarium

The Distance to Mars

About half the time when you look up at night or during the day, you will see the Moon. It looks so near and bright. And yet sending people there is challenging. Now imagine planet Mars that looks like a dot in the sky. Before we venture on our mission, it is important to understand how far we are going. We want to show why going to Mars is a much more challenging task than the Moon and the Moon is hard enough.

You will need:

1. A Pea (or a similar sized object)
2. Chalk
3. Bright colored paper
4. A Ruler or Yardstick
5. An adult helper if possible

Steps:

1. Using a scale of about 1000 miles equivalent to 1mm. place the pea (or small object) on the sidewalk and this will act as your Earth. Measure 9" away from Earth and make a dot mark with your chalk. This will act as your Moon. Take a picture.

2. It took Apollo 11 almost 76 hours to travel from the Earth to the Moon. Can you calculate how long it would take to travel an inch on our scale.

	Length (Miles)	Scale Model
Earth's Diameter	7917	1 pea
Moon's Diameter	2159	1 dot with chalk
Mars' Diameter	4212	1 lentil
Distance of Moon from Earth	239000	9 inches
Closest Mars is from Earth	33900000	37 yards
Farthest Mars is from Earth	249170000	272 yards

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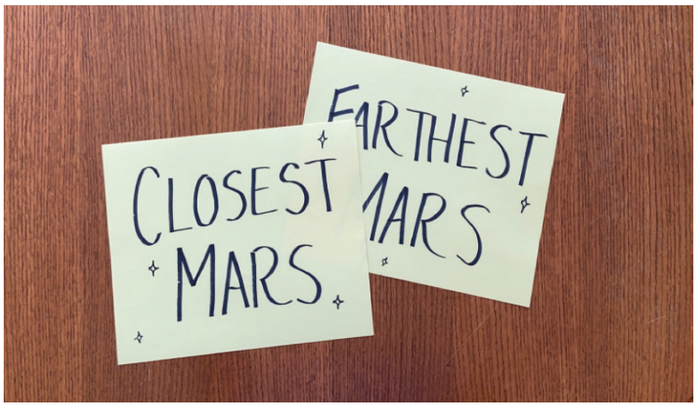
Workspace:



3. Now, using sturdy paper, make two signs. Label one Closest Mars and label the other Furthest Mars. It might be helpful to use two different colored pieces of paper for each sign. Colorful enough to stand out. If you have people available to help it might be best to use two different individuals in two different colored shirts to represent Closest Mars and Furthest Mars.

4. Place the Closest Mars sign or designated person 37 yards away from your Earth. Place the Furthest Mars sign or designated person 272 yards away from your Earth. Take a picture.

Bonus:

1. How does the distance to the Moon compare to the minimum distance to Mars? What do you notice about the farthest location of Mars?

2. Missions to Mars happen every two years to take advantage of the proximity of Mars to the Earth. Why do we do that?

For more fun activities, visit the UWM Planetarium website at: http://uwm.edu/planetarium/

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Mars Helicopter

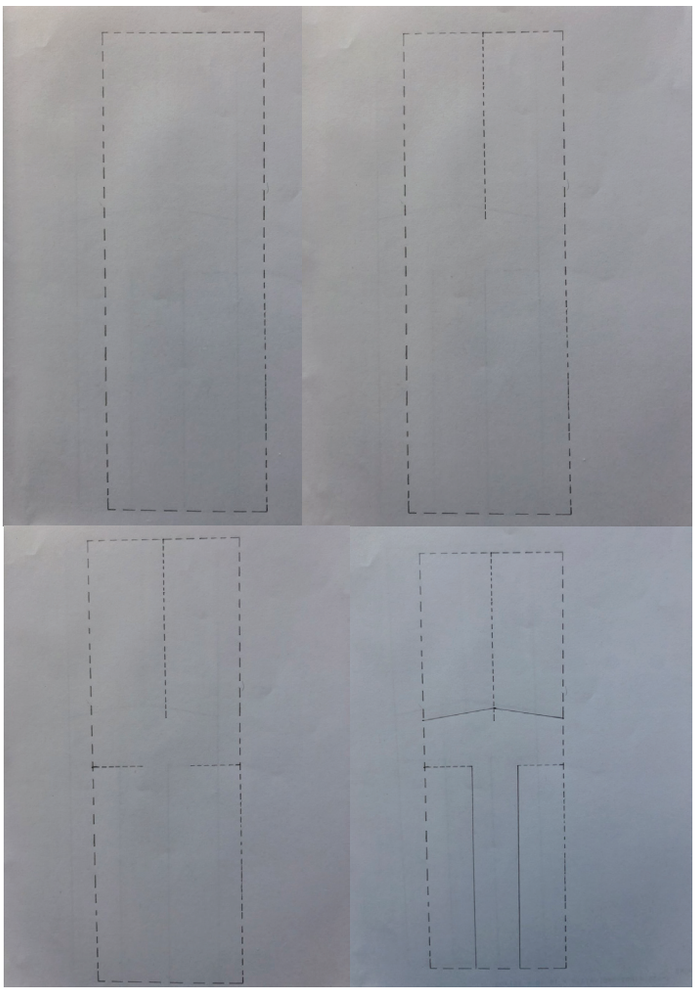
We need your help once again space engineer. NASA's Perseverance Mars Rover carries the first helicopter to the surface of Mars. This helicopter is lightweight to fly on Mars and has large blades that can rotate quickly to generate enough power to overcome the gravity of the Red Planet and lift it off the surface With the mission, you will build your own paper helicopter.

You will need:

1. Pencil
2. Scrap Paper
3. Ruler
4. Scissors
5. Measuring Tape

6. (Optional) 10 Feet of lightweight ribbon

Steps:



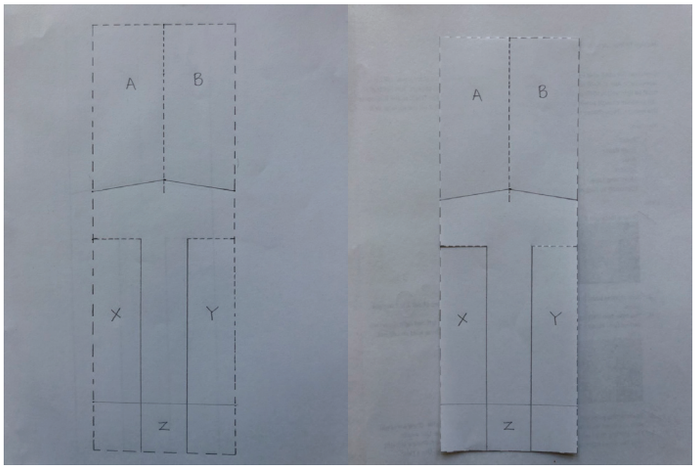
1. Draw a rectangle 3" wide and 9" long with dashed lines

2. Your starting point is the top middle of your rectangle. Draw a dashed line about 3 1/2" straight down.

3. You have two starting points. From the middle of your rectangle, on the left and right, draw two dashed lines about 1" straight towards the middle of your rectangle. These lines should not meet.

4. Your starting point will be the end of the middle-dashed line on the right side. Draw a straight solid line down from the point until it meets the bottom of your rectangle. Use a ruler. Repeat on the left side.

5. Your starting point will be about 1" above the bottom of your rectangle. Going from left to right, draw a straight line from the left dotted line to the right dotted line. Use a ruler. This should create three equally sized squares at the bottom of your rectangle.



6. Your starting point will be 1" above the left middle-dashed line. Draw a solid line to the middle-dashed line you made earlier. Use a ruler and the line should have an include of about 1/4". Repeat for the right side. These two lines should meet.

7. There will be two spaces in the top half of your rectangle. Label the left space A and label the right space B.

8. There will be two rectangles on the left and right of the bottom half of your bigger rectangle. Label the left X and label the right Y.

9. At the bottom of your bigger rectangle there will be three small squares. Label the center square Z.

10. Cut along all dashed lines.

11. Your propeller blades will be sections A and B. Fold along the solid lies. Fold section A backwards and fold section B forwards toward the center.

12. Fold the X and Y panels toward the center, and Z is folded upward to give the body of the helicopter rigidity and lower its center of gravity for a more stable flight.

It is time for a test flight. Stand up and hold the helicopter by its body. Rais it as high in the air as you can. Now, drop it. What can you observe? Which way do the blades turn? Drop the helicopter from a higher spot. (Climb a few stairs or standon a step stool.) How does the performance change?

Credited: NASA, "Make A Paper Mars Helicopter" NASA Jet Propulsion Laboratory. 2020. Web. 29 May 2020. https://www.jpl.nasa.gov/edu/learn/project/make-a-paper-mars-helicopter/