FAR, FAR AWAY

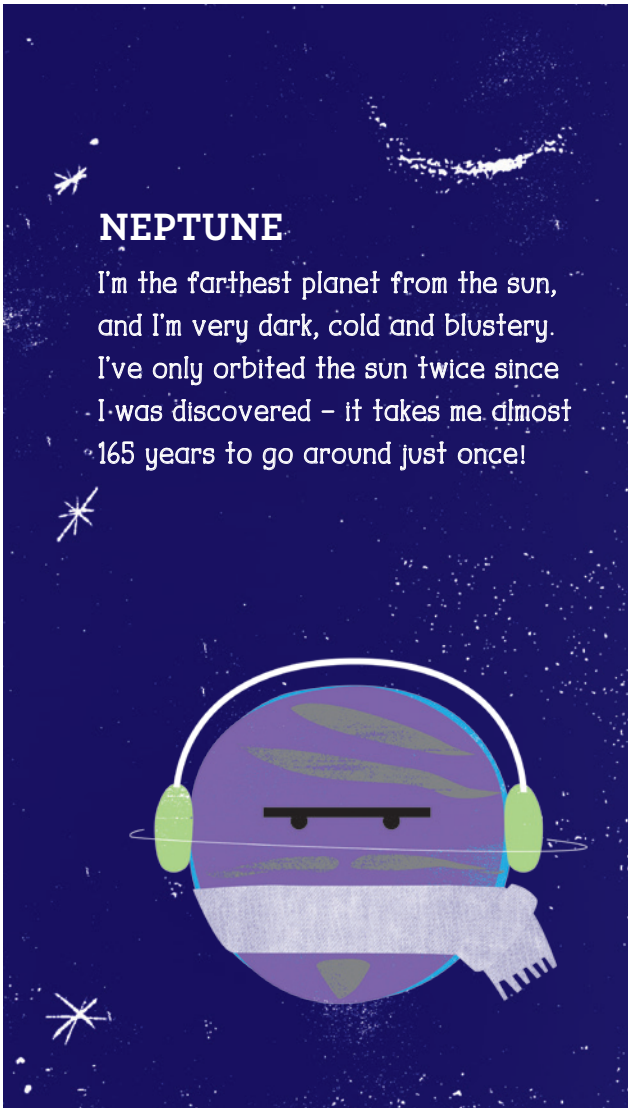
EXPERIMENT: SOLAR SYSTEM SCALE MODEL AND JETPACK

OUTSIDE FUN!

The distances between planets in our solar system are so far they're hard to imagine. It takes about eight months for a spacecraft to reach Mars, which is 78 million kilometers (or 50 million miles) from Earth. Try to imagine the size of the solar system with this fun game.

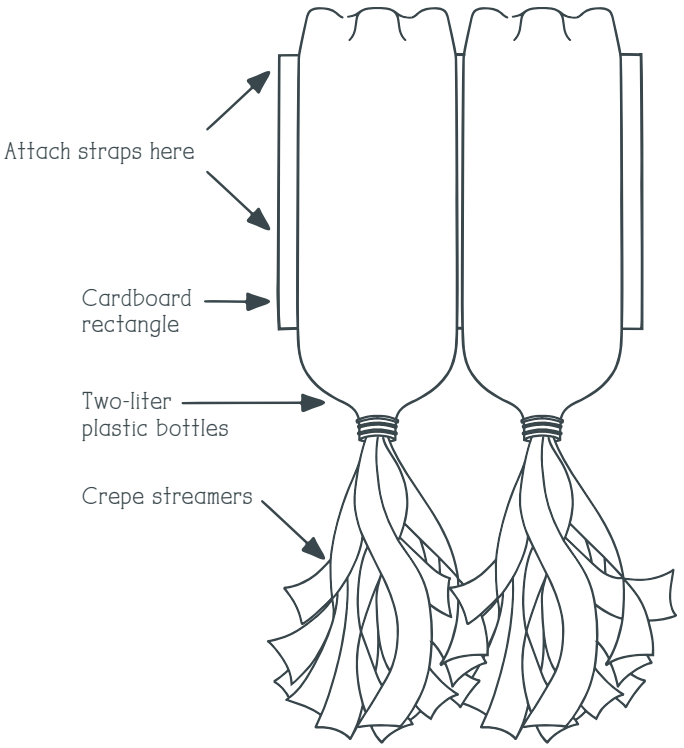
MATERIALS

- ☐ Tape measure
- ☐ Tape
- ☐ Markers or crayons
- ☐ Wide ribbon or straps
- ☐ Scissors
- ☐ Craft sticks
- ☐ Two two-liter bottles
- ☐ Cardboard
- ☐ Hot glue gun
- ☐ Stapler
- ☐ Silver spray paint or aluminum foil
- ☐ Crepe streamer (red, orange or yellow)
- ☐ Planet markers (msichicago.org/summerbrain)
- ☐ Modeling clay or Play-Doh (optional)



INSTRUCTIONS

Assemble your jetpack so you can fly across the solar system: Remove the labels from two two-liter bottles and spray paint them silver or cover them in foil. Cut a cardboard rectangle that's about 6 by 10 inches, or big enough to hold the bottles. When the bottles are dry, use hot glue to attach them to the



cardboard side by side. Make the straps by stapling ribbon to the top and bottom of both sides of the cardboard. Leave the ends open so you can tie the straps once the jetpack is on.

Prepare your fuel cells. Cut the crepe streamer into 10 pieces that are about a foot long and secure them together at one end with tape. Cut them in half lengthwise so there are 20 pieces of streamer in a bundle. Make eight bundles.

Print and decorate the planet marker templates. Cut out the markers and attach them to craft sticks like flags. Use the chart to make a solar system model to scale. Pluto isn't a planet (it's a dwarf planet), but it's a good reference point because it helps show the immense size of the solar system.

Planet/ Celestial Body	Distance From the Sun	Distance to Next Planet/Celestial Body
Sun	0	1.0
Mercury	1.0	0.8
Venus	1.8	0.7
Earth	2.5	1.4
Mars	3.9	9.3
Jupiter	13.2	10.9
Saturn	24.1	24.4
Uranus	48.5	27.6
Neptune	76.1	23.9
Pluto	100.0	---

Use these numbers with any unit of measurement – steps, inches, feet, sidewalk squares, etc. If your unit is a foot, measure 1 foot from the sun and place the marker for Mercury. For Venus, measure 1.8 feet (or 22 inches) from the sun or 0.8 feet (10 inches) from Mercury. Earth is 2.5 feet from the sun.

GAME ON

Strap on your jetpack. Exploration takes fuel, so you'll need to stop at Earth to refuel and drop off the planet markers. Load some fuel bundles into the open end of your jetpack. Here's how much fuel you'll need to reach each planet starting from Earth: Mercury 1, Venus 1/2, Mars 1, Jupiter 5, Saturn 10, Uranus 20, Neptune 40. Tear off the proper number of fuel streamers to reach each planet, collect the planet marker and stop off at Earth. Add more fuel as needed so you can visit all the planets.

WHAT'S HAPPENING?

Our solar system includes the sun, eight planets, more than 140 moons, several dwarf planets like Pluto, asteroids and comets. Scientists believe the outer limit of the solar system is the Oort Cloud, a spherical shell of icy objects. It's so far away that a comet from the Oort Cloud might take thousands of years to orbit the sun.

TIPS

Put each planet marker into a base of modeling clay so it can stand upright on the ground.

MORE WAYS TO PLAY WITH THE SOLAR SYSTEM

The hallway leading to MSI's Henry Crown Space Center shows pictures of the planets scaled in size to each other. For comparison, the sun is as big as the dome on the Omnimax Theater!

RECOMMENDED READING

"Get Started: Astronomy by DK"

"How Many Planets Circle the Sun?" by Mary Kay Carson

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