

## Make Your Own Pocket Solar System

There's a lot of empty space in our solar system – distances between planets are vast! The solar system is made up of eight planets and many other objects orbiting the sun. In addition to planets, there are moons, comets, asteroids, dust, and gas, all influenced by the gravitational pull of the Sun. Make a scale model to show how faraway the planets would be from the Sun and each other, if the entire solar system were shrunk down to a meter across!

### Supplies:

- Two letter-sized sheets of paper
- Scissors
- Glue stick or tape
- Crayons, markers, or colored pencils
- Ruler or tape measure
- “Make Your Own Solar System” print-out, included at the end of the PDF version of this activity

### Instructions:

1. Fold your two sheets of paper in half the long way (“hot dog style”). Crease firmly. Unfold, and cut the sheets along the crease.
2. Use tape or a glue stick to attach the four strips of paper together, like you are making a banner.
3. Measure the length of your strip once all four strips of paper are combined. Measure your strip in meters. Cut your strip so it is 1 meter (100 centimeters) long.
4. Print the “Make Your Own Pocket Solar System” quarter sheet at the end of the PDF version of this activity. (If you do not have a printer, no worries! Where this activity instructs you to cut out and paste items, you can draw them instead.)
  - a. Note: This print-out includes four identical copies of the same picture. Use the extra copies for siblings, or make another solar system project with them. Feel free to cut out the quarter page you'll be using before the next steps in the activity, but we recommend you cut out the planets and other solar system objects out when listed below, since they are quite small and easy to misplace once they are cut out.

5. Cut out the Sun and the Kuiper Belt. Cut closely around items, leaving little or no white space. Paste the Sun at one end of the paper and the Kuiper belt at the other end.
6. Fold the paper in half and make sure you crease it firmly. Unfold the paper, draw a line in the crease to mark the orbit, and cut and paste the Uranus sticker somewhere on this crease.
7. Refold the paper in half and fold it in half again (you should now have fourths). At the halfway point between Uranus and the Kuiper belt, draw an orbit line and cut and paste the Neptune sticker.
8. At the halfway point between Uranus and the Sun, draw an orbit line and cut and paste Saturn.
9. Now, fold the Sun up to Saturn. Unfold the paper and cut and paste Jupiter at the halfway point between Saturn and the Sun. Be sure to add a line representing the orbit.
10. Fold the Sun to meet Jupiter. Unfold the paper and cut and paste the asteroid belt picture at the halfway point between Jupiter and the Sun.
11. Fold the Sun to the asteroid belt. Unfold the paper and cut and paste Mars at the halfway point between the Sun and the asteroid belt. Draw Mars' orbit line.
12. Fold the Sun to Mars. Leave it folded and fold that section in half again. Unfold the paper and you should have three creases: Mercury and its orbit go on the crease closest to the Sun, Venus goes on the next crease, and Earth goes on the final crease.
13. Label each object that you pasted.
14. Scientists have sent many satellites into space to study our solar system. You can draw some of them onto your model, too! Research a satellite currently in space at <https://solarsystem.nasa.gov/missions>, then add it to your model.
15. Are you surprised by the distances between various objects in our solar system? In what ways?



**Important note:** The pocket solar system model shows the relative **distance** between objects in the solar system. It doesn't show the relative **size** of the Sun and the planets. If we were to also take into account the size of the Sun and planets on this same scale, the Sun would be smaller than a grain of sand, and you would need a strong magnifying glass to see any of the planets!

## Exploring our Solar System

Your model shows the planets lined up so you can see them all at once. In real life, the planets are usually scattered around the Sun along their orbits. Earth and the other planets in the inner solar system are relatively close together, compared with the planets that lie beyond the asteroid belt in the outer solar system. After our Sun, the next closest star to Earth is Proxima Centauri. If we wanted to add Proxima Centauri to our pocket solar system, it would be almost 7 kilometers (4 miles) away. You'd need a really long strip of paper!

**NASA's science missions explore our solar system, and beyond.** It takes a long time to travel vast distances, so missions can last for decades. Many people work together to plan and carry out such big projects—from mechanical engineers to planetary geologists. They agree on research goals, design and build tools and instruments for spacecraft, and figure out how to launch the craft and get the data back to Earth.

Where would you go if you could plan your own mission into space? Consider these questions as you plan your mission:

- Where would you want to send a space craft?
- What instruments would your spacecraft have? A camera for capturing pictures? A microphone for measuring sound? A thermometer for taking temperature readings? A chemistry kit for testing for different minerals?
- Who would you need on their spacecraft team? What role would each person play?
- How much would your mission cost, and who would pay?
- What would you do with your spacecraft once the mission was over?
- What are the risks and benefits of sending a spacecraft to explore rather than humans?

*Activity and images adapted from the National Informal STEM Educator's Network (NISE Net) under a Creative Commons Attribution Non- Commercial Share Alike 3.0 United States (CC BY-NC-SA 3.0 US).*

(IMAGES NOT TO SCALE)

SUN

POCKET SOLAR SYSTEM!

MAKE YOUR OWN

MERCURY VENUS EARTH MARS



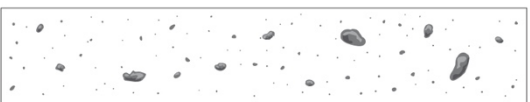
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JUPITER SATURN URANUS NEPTUNE

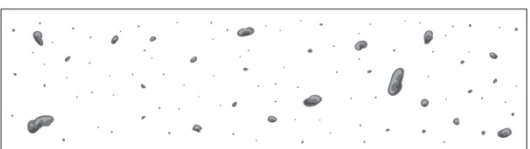


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ASTEROID BELT



KUIPER BELT



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SISTEMA SOLAR DE BOLSILO!

¡CREA TU PROPIO

CINTURÓN DE ASTEROIDES

CINTURÓN DE KUIPER

(LAS IMÁGENES NO ESTÁN A ESCALA)

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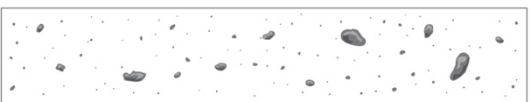
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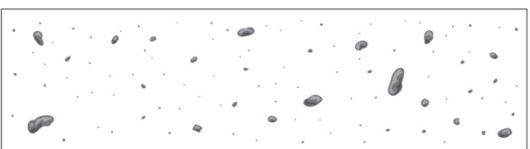


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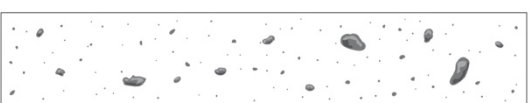
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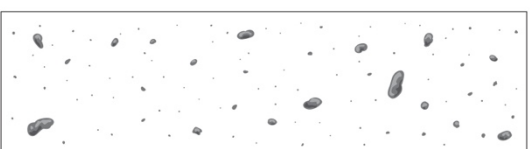


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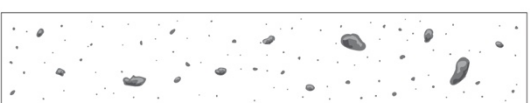
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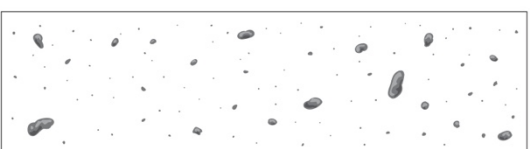


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