girl scouts of central indiana

# Space Science Investigator

While you're at home and chilling with the family, now is a perfect time to act like a space scientist, learn more about our solar system, and learn about how big it actually is.

**Steps**:

1. Model the solar system
2. Circle the sun
3. Discover the stars
4. Use tools to explore
5. Share your sky

**Purpose:** When I've earned this badge, I will understand that the Earth orbits the sun and how far away the sun, moon, planets, and stars are from our home planet, Earth.

**Step 1:** Model the solar system

Our solar system not only contains Earth, but also many other planets and moons, as well as asteroids, comets, and other cosmic bodies. Your first goal will be to make a model to represent the solar system!

**Create a solar system walk on your sidewalk!** Not only will you be able to see how the planets are spread out, but as your neighbors walk the sidewalks, they might learn something new as well!

*Materials Needed* - Tape or sidewalk chalk.

You can either draw the planets to scale or just label where they go!

1. Pick a good starting location. You will be walking in a straight line approximately 1,019 large steps from there! We ended up going around the block for ours. *Alternative: If you feel that might be too much, feel free to cut the number of steps in half. (It won't match up with the size of the planets, but it will be okay)*
2. The sun will be your first celestial body. You can either place a piece of tape labeled "sun" or you can try to create a model by drawing it to scale.
3. Use the solar system walk table found at the end of this guide for your model and distance references!
4. Questions to ask
    a. *Did any of the spacings surprise you?*
    b. *Would it be easy to travel to Mars based on the distance? Why or why not?*
5. We would love to see the solar system walks you created. Feel free to take images and share them with Kristen Bruna (kbruna@girlscoutsindiana.org). If you have a neighborhood social media site, encourage your neighbors to check it out as well! But remember to keep up with the social distancing!

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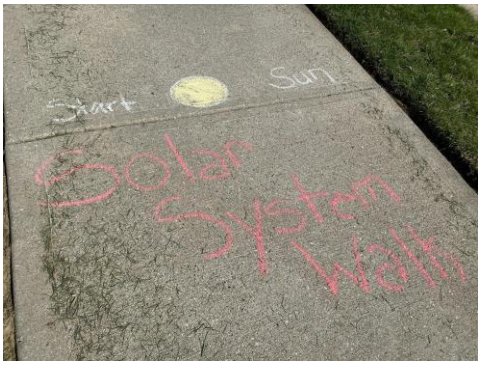
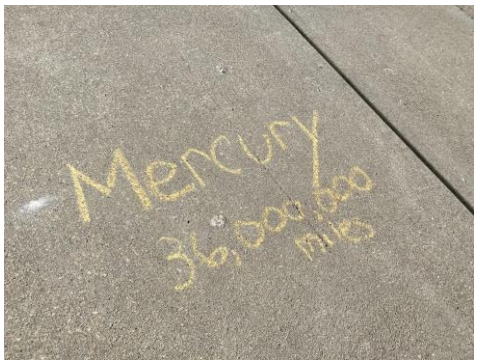
Our examples




- For more fun! Try to look up where the Asteroid Belk, Kuiper Belt, and Oort Cloud would fit into the solar system. Include that in your model as well!

**Step 2:** Circle the sun

Every year that the Earth goes around the sun (365.24+ days) we get a little bit older. One year older to be precise! What if we weren't on Earth? How old would we be?

***Before you complete the next activity, make a prediction as to how old you would be the following planets:*

*Mercury, Mars, and Neptune*

**Find your age on other planets.** Go to the Your Age on Other Worlds Website. Type in your birthdate and check out your new birthdays! How close were your predictions?

- For more fun! Celebrate your next planetary birthdate!
- Pick an age at least 10 years from now and write your future self a letter. You can write about how life is now at this moment as well as thinking about how things will be changed with more trips around the sun.

**Step 3:** Discover the stars

Everything we see in the night sky is actually really far away. The closer our star neighbors are, the brighter they usually become. Our own star, the sun, is still 93 million miles away!

**Night sky scavenger hunt**. Using an app (Skyportal, Skyview are good) to double-check yourself, try to find the following constellations and other celestial bodies in the night sky. Some might be easier than others. As you find them, look to see if you can identify some of the individual stars that make up the constellation. Which ones have really bright stars?

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| Constellations | Celestial Bodies |
|---|---|
| ❑ ***Ursa Major*** (the Big Dipper)<br>❑ ***Taurus*** (the Bull)<br>❑ ***Canis Major*** (the Large Dog)<br>❑ ***Cygnus*** (the Swan)<br>❑ ***Pegasus*** (the Flying Horse)<br>❑ ***Orion*** (the Hunter)<br>❑ ***Leo*** (the Lion)<br>❑ ***Scorpius*** (the Scorpion) | ❑ ***A Planet*** (Which one is it?)<br>❑ ***The Moon*** (Which phase is it in?)<br>❑ ***Betelgeuse*** (Star found in Orion)<br>❑ ***Aldebaran Star*** (The red giant)<br>❑ ***The North Star*** (What constellation is it found in?) |

- For more fun! Use a star wheel! You can either make your own by following the instructions HERE. Or you can check one out online HERE.

**Step 4: Use tools to explore**

Our first spacecraft was launched more than 60 years ago! We are continually trying to create new equipment that will allow us to explore the stars, planets, moons, and more. It takes different types of engineers to come up with the right tools for the right jobs!

**Makerspace at your house!** Using items around your house (Legos, string, craft items, toilet paper tubes, etc.) build a large tool an astronaut might use on a mission. Use your imagination! Would you like to design a new rover to explore Mars? Or would you rather design a spacecraft that allows us to explore past Mars? Parents - HERE is a good website that suggests items to be used as well as items to think about such as communication equipment.

Here are some pictures found on Pinterest to help get those ideas going!


- For more fun! Create a video about what your spacecraft/rover/satellite would be used for! In your video, explain what the tools do as well as why astronauts would need them. Feel free to send that video to kbruna@girlscoutsindiana.org! We would love to see what you come up with!

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**Step 5:** Share your sky

Scientists are always communicating with one another! They share ideas and even talk about problems they have encountered. Now that you have learned more about space and the exciting things it holds, share this with your community - just like a scientist!

**Create a space show.** Create a song, a story, or play about space and all the wonders that it holds. You can pretend you are an astronaut exploring a planet or even just sharing facts about the planets. Present or perform for your family!

OR

**Take pictures and make a collage!** Share it along with some of the information you learned with friends, family, and even fellow Girls Scouts! Everyone would love to see what you have been doing! And you might even encourage someone to learn a little more about our amazing solar system!

**Now that I have earned this badge, I can give service by:**

- Sharing my knowledge of our vast universe with friends and family.
- Taking a group of Daises stargazing and showing them how to use scientific tools.
- Teaching Brownies about scale models.

# Solar System Walk Table

| Object | Model & Size | Giant Steps (About 3 feet) to Next Planet or Dwarf Planet | Total Steps = Total Yards from the Sun | Approximate Miles from the Sun |
|---|---|---|---|---|
| Sun | 8-inch ball | 0 | 0 | 0 |
| Mercury | Pinhead (0.03 inches/0.08 cm) | 10 | 10 | 36,000,000 |
| Venus | Peppercorn (0.08 inches/0.2 cm) | 9 | 19 | 67,000,000 |
| Earth | Peppercorn (0.08 inches/0.2 cm) | 7 | 26 | 93,000,000 |
| Mars | Pinhead (0.03 inches/0.08 cm) | 14 | 40 | 142,000,000 |
| Jupiter | Large marble (0.9 inches/2.3 cm) | 95 | 135 | 484,000,000 |
| Saturn | Marble (0.7 inches/1.8 cm) | 112 | 247 | 887,000,000 |
| Uranus | Bead (0.3 inches/0.8 cm) | 249 | 496 | 1,783,000,000 |
| Neptune | Bead (0.3 inches/0.8 cm) | 281 | 777 | 2,794,000,000 |
| Pluto | Pinpoint or smaller | 242 | 1,019 | 3,666,000,000 |

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