



## Space Science Investigator – Junior

### 1. Model the Solar System

Using about two jars of play-doh or a homemade salt dough (ingredients and instructions listed below) model the solar system by making all of the planets. First, lay out nine pieces of blank paper and label them each with the name of a planet in this order: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Predict how large you think each planet will be by drawing a circle of each planet on their labeled paper. Then, you are going to divide your dough according to the 6-step instructions in the photo below the salt dough recipe. After your planets are made, see whether your predictions matched your figures. Did anything surprise you?

#### Salt Dough Recipe:

- 2 cups all-purpose flour
  - 1 cup salt
  - 1 cup water
1. In a large mixing bowl, stir together the flour and salt
  2. Gradually add in water while stirring and mixing to form a dough with a play-doh like consistency
  3. Form the dough into a ball and knead for about 5 minutes, adding more flour if the dough gets too sticky or more water if it's too dry

#### Step 1

Divide the entire ball of dough into 5 equal parts.

- a. Put 3 parts onto the Jupiter paper.
- b. Put 1 part onto the Saturn paper.

#### Step 2

Cut the piece you have left from Step 1 into 10 equal parts.

- a. Add 7 parts to the Saturn pile.
- b. Put 1 part on the Neptune paper.
- c. Put 1 part on the Uranus paper.

#### Step 3

Cut the piece you have left from Step 2 into 10 equal parts.

- a. Add 2 parts on the Saturn pile.
- b. Add 4 parts on the Uranus pile.
- c. Add 3 parts on the Neptune pile.

#### Step 4

Cut the piece you have left from Step 3 into 10 equal parts.

- a. Add 5 parts to the Saturn pile.
- b. Put 2 parts onto the Earth paper.
- c. Put 2 parts onto the Venus paper.

#### Step 5

Cut the piece you have left from Step 4 into 10 equal parts.

- a. Add 4 parts to the Earth pile.

- b. Add 1 part to the Saturn pile.

- c. Put 1 part onto the Mercury paper.
- d. Put 3 parts onto the Mars paper.

#### Step 6

Cut the piece you have left from Step 5 into 5 equal parts.

- a. Add 2 parts to the Mars pile.
- b. Add the last 3 parts onto the Mercury pile.

Now roll each planet into an even sphere. Compare your model to the predictions you made at the beginning. Did anything surprise you?

At this scale, Pluto would be ~one mile from the Sun and our next closest star would be ~18,000 miles!

"Model the Solar System" is based on "Worlds in Comparison" by the Pacific Science Center's Dennis Schatz and modified by the Astronomical Society of the Pacific.

## 2. Circle the Sun

Your age is the number of orbits you have taken around the Sun, but each planet is a different distance from the Sun, and they all orbit at different speeds. Find out what your age would be on different planets by visiting the website <https://www.exploratorium.edu/ronh/age/> How old are you on Mars? What about Jupiter? Do any of these numbers surprise you?

## 3. Discover the stars

When it's dark and the sky is clear, go on a night scavenger hunt. Find brighter stars and see if you can recognize any constellations. Record in a notebook what stars and shapes you can see, then move onto Step 4 to take a closer look.

## 4. Use the tools to explore

Make a planisphere to help guide you through your star gazing. Go to <https://skyandtelescope.org/astronomy-resources/make-a-star-wheel/> and print out both parts of your planisphere. Cut out the circle in part one, and the white sections of part two. Then, place part 2 on top of part 1 and spin part 1 to match as close as you can to today's date and time. The stars that are revealed should match some of the stars you see in the night sky. Can you find a constellation you hadn't seen before?

## 5. Share your sky

Create and put on a space show. This may be a song, a rap, a skit, a video, a short story, a poem, or whatever medium you use to express yourself. Create something that will inspire and teach others about the wonders of space science, then present or perform it to your family and share it with your friends.

**In order to complete this badge, send a photo or short video of your girl working on Step 4 to [ssmith@girlscoutsoaz.org](mailto:ssmith@girlscoutsoaz.org)**

**Make sure to include your girl's name in the email, and whether we can share your photo or video on social media! You can purchase Badges at our online store**

**<https://www.girlscoutshop.com/SOUTHERN-ARIZONACOUNCIL>**