

ACTIVITIES for Grades 6-8

BEFORE YOUR VISIT

Online Video: *Journey to the Stars* Trailer and Prelude amnh.org/stars

To prepare for your Museum visit, watch the trailer and the prelude with your students.

Class Discussion: Solar System

Review with students the structure of the Solar System. Ask them:

- What is at the center of the solar system?
Answer: The Sun, our star, is at the center of the Solar System.
What types of planets are there and where are they found?
Answer: There are four inner, rocky planets that orbit closest to the Sun: Mercury, Venus, Earth, and Mars. Beyond the Asteroid Belt, the four outer, gas giant planets are Jupiter, Saturn, Uranus, and Neptune. The Kuiper Belt contains Pluto and other small icy objects. This area of the Solar System begins just inside Neptune's orbit and extends well beyond it.
- What is the largest planet? *Answer: Jupiter*
The smallest? *Answer: Mercury*
The furthest from the Sun? *Answer: Neptune*
The closest? *Answer: Mercury*
- Which is larger: the Sun or the planets? *Answer: The Sun.*
How much of a size difference do you think there is?
Answers may vary depending on students' prior knowledge: the Sun is about one million times larger by volume than Earth. This will be addressed in the Scales of the Universe Activity.

NYS Science Core Curriculum

Major Understandings

Physical Setting 1.1a

- Earth's Sun is an average-sized star. The Sun is more than a million times greater in volume than the Earth.

Physical Setting 1.1c

- The Sun and the planets that revolve around it are the major bodies in the Solar System.

Online Video: *New Horizons Mission to Pluto*

sciencebulletins.amnh.org/?sid=a.v.pluto.20060216

Watch this Science Bulletins video with your class. Ask students to describe what scientists are doing to find out more about the distant reaches of our Solar System.

Answers may include: Scientists are sending the New Horizons spacecraft to the outer reaches of the Solar System to send back images of Pluto and other objects like it.

NOTE: Distribute copies of the **Student Worksheet** before coming to the Museum.

DURING YOUR VISIT

Journey to the Stars Planetarium Space Show (30 minutes)

Before the show, prompt students to do the following:

- Several times during the show, the Sun will be shown along with planets and moons in the Solar System. Notice the relative distances and sizes of these objects.

TIP: Please plan to arrive at the 1st floor space show boarding area 15 minutes before the show starts.

ACTIVITIES for Grades 6-8 (Continued)

DURING YOUR VISIT (Continued)

Scales of the Universe: Investigate Sizes and Distances of Celestial Objects

(25-30 minutes)

When you exit the planetarium show (3rd floor), take the escalator down to the 2nd floor and walk through the gift shop towards the glass windows. You are now on the Scales of the Universe Walkway. Turn left and walk around the central Hayden Sphere (with the glass windows on your right) to the area that displays the planet models—some of the planets are suspended above you (look for Saturn and Jupiter), while others are mounted on the railing.

1. Investigate Sizes of Planets (Use Student Worksheet)

Draw students' attention to all eight planet models. Remind students that the 87-foot Hayden Sphere represents the size of the Sun. Ask students to observe the planets' relative sizes. Read planet information provided on the accompanying panels, and use that information to complete their worksheets.



2. Investigate Sizes of Stars

After students have completed their worksheets, have them walk back a few steps to explore the panel "Stars and Their Sizes," as well as the models above the panel. Explain that the Hayden Sphere now represents the red supergiant star Rigel, and that one of the models represents the size of our Sun in this new scale. Draw their attention to the other models mounted above, representing different stars. Point out to students that stars can vary in size as planets do.



BACK IN THE CLASSROOM

Wrap-Up Activity: Calculate Planetary Size Differences

Have students refer to their completed worksheets for the question "How many Earths can fit in a hollowed-out Sun?" Have them use information they collected on the planets' sizes together with the following equation for finding the volume of a sphere: $v = \frac{4}{3} \pi r^3$ [v =volume, r =radius] to answer the following questions:

- How many Jupiters could fit in a hollowed-out Sun? *Answer*: Over 900 Jupiters*
- How many Earths could fit in a hollowed-out Jupiter? *Answer*: Over 1200 Earths*

** Answers to both questions will vary depending on how many digits of pi are used and how much students round off numbers as they work through the equation.*

Online Activity: Calculate Planetary Distances

amnh.org/resources/rfl/web/starsguide/activities/planetary_distances.html

In this activity, students will use Google Earth and an online calculator to create a scale model of the distances among the objects in the Solar System.

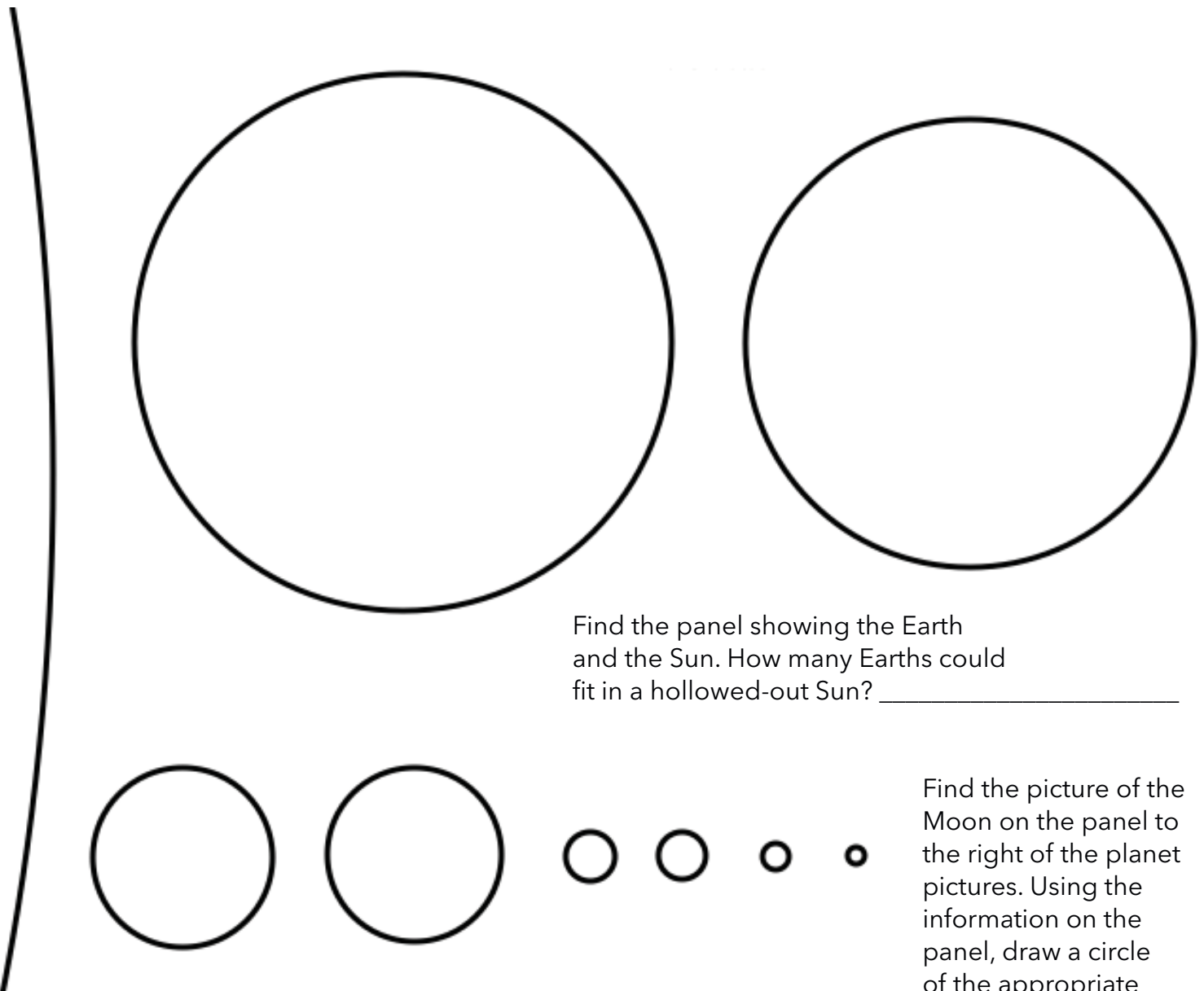


STUDENT WORKSHEET for Grades 6-8

Investigate Sizes and Distances of Celestial Objects

The circles on this page are scaled to accurately represent the relative size of objects in our Solar System. (Notice that one of circles is too large to fit on the page!) Observe the relative sizes of the **planet models and the Hayden Sphere**, which represents the Sun.

Label each circle with the name of the celestial object it represents (use the planet models and the Hayden Sphere to guide you). Then look at the panels that list the actual sizes (diameters) of each object that you've labeled. Record the actual size of each object next to the name.



Find the panel showing the Earth and the Sun. How many Earths could fit in a hollowed-out Sun? _____

Find the picture of the Moon on the panel to the right of the planet pictures. Using the information on the panel, draw a circle of the appropriate size next to the circle that you have already labeled as Earth.

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ANSWER KEY

