

Studying the Solar System

OVERVIEW

Students will engage in activities designed to help them understand that the solar system is not just made up of the Sun and the planets; but it also include objects such as asteroids. These small rocky and metallic bodies provide important information about our solar system.

NYS Science Core Curriculum

PS 1.1c: The Sun and the planets that revolve around it are the major bodies in the solar system. Other members include comets, moons, and asteroids.

BACKGROUND FOR EDUCATOR

When our solar system began to take shape some 4.6 billion years ago, the Sun and planets as we know them today did not exist. Instead, a large disk of gas and dust known as the solar nebula swirled around a developing Sun. Within this disk, countless small objects collided and stuck together, gradually building larger and larger bodies — including the planets in our solar system and other objects in the sky, such as moons, comets, and asteroids. Asteroids are small rocky bodies that orbit the Sun. Most do so in the asteroid belt way out between Mars and Jupiter, but near-Earth asteroids (NEAs) have orbits that come much closer to our planet. Scientists study the minerals found in asteroids for important clues to the formation of our solar system.

BEFORE YOUR VISIT

Activity: Planetary Mysteries

amnh.org/ology/planetology

Have students take a virtual tour of our solar system to explore its many mysteries. Then ask them to put their new-found knowledge to the test by taking the quiz.

Activity: Cosmic Comic Strips

Spark your students' curiosity about the formation of our solar system and asteroids by having them read these comic strips:

- **The Formation of the Solar System**

amnh.org/resources/rfl/pdf/solarsystem.pdf

About 4.6 billion years ago, our solar system came into being. This comic strip explains the processes that led to the creation of the planets and the asteroid belt.

- **Impacts**

amnh.org/resources/rfl/pdf/impacts.pdf

This comic strip shows what can happen — and does happen — when asteroids head for Earth.

Activity: Crash Course: Scientists Wonder if a Space Rock Could Destroy Life on Earth

teacher.scholastic.com/activities/explorations/space/pdf/scienceworld.pdf

Could a space rock destroy life on Earth? Have students read this article to learn more about asteroids, comets, and other space objects and what happens when they collide — with each other and with our planet.

Plan how your students will explore

Beyond Planet Earth using the Student Worksheets. Plan to have students work in small teams of three or four.

Distribute copies of the worksheets to students before coming to the Museum. You may want to review the worksheets with them to make sure they understand what they are to do.

DURING YOUR VISIT

Beyond Planet Earth: The Future of Space Exploration

3rd floor (45 minutes)

Begin your class exploration by reviewing the planets using the Solar System Map (located across from the Introduction Theater). Then have students watch the short film to help them prepare for their exploration of the asteroid section of the exhibition. Have student teams use their Student Worksheets to gather information about asteroids and learn how studying them has helped astronomers develop a better understanding of our solar system.

Arthur Ross Hall of Meteorites**1st floor (20-30 minutes)**

Have students watch the short film in the Meteorite Theater, which presents the role of meteorites and their connection to the history of our solar system. Next, have students touch and observe the Cape York meteorite, the world's largest meteorite on display. Read about how scientists study meteorites to learn about the origin of our solar system more than four billion years ago. Students can also explore craters in the Earth Impacts display, investigate the interactive computer station "Hazards: Impacts in Our Future," and see a model of the 1,200-meter-wide meteor crater, also known as Barringer Crater, located in Arizona. Have students take notes on and draw one of the meteorites on display in the Hall.

BACK IN THE CLASSROOM**Wrap-Up Activity: Asteroids**

Using the evidence they gathered in the exhibition, have each student team develop a case for why scientists should study asteroids. Then have each team make a short presentation to the class. As an extension, you can also have students display their drawings and notes about the meteorite that they focused on in the Arthur Ross Hall of Meteorites.

Welcome to *Beyond Planet Earth*! Today you will be investigating near-Earth asteroids (NEAs). The evidence you collect will help you understand why scientists think it is important to study these “galactic time capsules”.

1. Find the asteroid model

Imagine that you’re on a spacecraft approaching this asteroid. What do you notice about its size and shape?

Touch the model. What does it feel like? _____

What are asteroids? _____

Where are most asteroids found?

What would studying asteroids up-close help scientists understand?

2. Observe the Knowles Meteorite

Touch the meteorite. What does it feel like? What do you think it is made of? How does its size and surface compare with that of the asteroid model?

How do scientists know what asteroids are made of if they have never been to one?

What’s in the Knowles meteorite that makes scientists think it would be a good idea to mine asteroids?

3. Play the Deflecting Near-Earth Asteroids Interactive

What are some ways that we might deflect an asteroid before it hits the Earth?

What would be some of the possible effects of an asteroid impact on Earth?

What is the likelihood of an asteroid impact on Earth?

Welcome to *Beyond Planet Earth*! Today you will be investigating near-Earth asteroids (NEAs). The evidence you collect will help you understand why scientists think it is important to study these “galactic time capsules”.

1. Find the asteroid model

Imagine that you’re on a spacecraft approaching this asteroid. What do you notice about its size and shape?

(Answers may include: irregular shape, very large)

Touch the model. What does it feel like? *(Answers may include: rough, rocky)*

What are asteroids? *(Answers may include: small, rocky bodies that orbit the Sun)*

Where are most asteroids found?

(Answers may include: in the asteroid belt between Mars and Jupiter)

What would studying asteroids up-close help scientists understand?

(Answers may include: Samples could help them understand the formation of the solar system.

Many asteroids contain the original debris from which the planets formed.)

2. Observe the Knowles Meteorite

Touch the meteorite. What does it feel like? What do you think it is made of? How does its size and surface compare with that of the asteroid model?

(Answers may include: cold, irregular shape, bumpy, metallic, smaller than an asteroid)

How do scientists know what asteroids are made of if they have never been to one?

(Answers may include: meteorites have landed on Earth)

What’s in the Knowles meteorite that makes scientists think it would be a good idea to mine asteroids?

(Answers may include: metals such as nickel, cobalt, germanium, platinum, and iridium)

3. Play the Deflecting Near-Earth Asteroids Interactive

What are some ways that we might deflect an asteroid before it hits the Earth?

(Answers may include: robotic cannons, space mirror, impactor, gravity tractor, and atomic bomb)

What would be some of the possible effects of an asteroid impact on Earth?

(Answers may include: tsunamis, giant waves, fire, climate change)

What is the likelihood of an asteroid impact on Earth?

(Answers may include: impacts are rare; astronomers track the skies looking for known objects and locating new ones with even

the smallest chance of impact; studying the movements of asteroids helps scientists plan for how they might be deflected if they

were a threat)
