



**ASTROEDU**

Peer-reviewed Astronomy Education Activities

# Creating Asteroids

**Fun learning activity to build asteroids  
using clay.**

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**AGE**

4 - 10

**LEVEL**

Pre-school, Primary, Middle School

**TIME**

1h30

**GROUP**

Group

**SUPERVISED**

Yes

**COST PER STUDENT**

Medium Cost

**LOCATION**

Small Indoor Setting (e.g. classroom)

**CONTENT AREA FOCUS**

Astronomy

**ASTRONOMY CATEGORIES**

Planetary systems

**CORE SKILLS**

Developing and using models, Communicating information

**TYPE(S) OF LEARNING ACTIVITY**

Structured-inquiry learning, Modelling, Fun activity

**KEYWORDS**

Asteroids, Minor bodies, Near Earth Object, NEO, Planet Formation



## GOALS

Learn about the characteristics of asteroids.  
Learn how asteroids are formed in our Solar System.

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## LEARNING OBJECTIVES

Participants will learn that asteroids are large boulders found in our Solar System orbiting the Sun by looking at images of asteroids and discussing in the classroom.

Participants will demonstrate how planetary bodies, including asteroids, are formed through the grouping of small particles using clay.

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## EVALUATION

At the end of the session, when all the asteroids have been put to dry, revisit the questions and topics discussed in the introduction. Specifically, let the students explain:

What is an asteroid?

How are asteroids formed?

Students can explain this using the example of how they created their own model asteroid from clay.

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## MATERIALS

- Images of asteroids (provided)
  - Clay (a handful per participant)
  - Paint brushes
  - Paint
  - Table lining/protector
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## BACKGROUND INFORMATION

### What is an Asteroid?

Asteroids are boulders orbiting the Sun, with sizes ranging from some hundred metres to several kilometres. An asteroid is called a meteorite if it hits the Earth. If it completely evaporates in the Earth's atmosphere before crashing on the surface, it's called a meteor. People usually refer to meteors as 'shooting stars'. Most meteorites are composed of silicates or a mixture of iron and nickel. In the past, some huge meteorites have struck Earth. Sixty-five million years ago, almost 90% of animal species were eradicated (including dinosaurs) when a meteorite hit Yucatan, Mexico. Luckily, this happens very rarely! We owe this to Jupiter, which attracts many asteroids with its gravitational pull.

### Asteroid Ida

#### How are asteroids formed?

Dust particles in the early Solar System collided, forming larger clumps, known as planetesimals. These could grow by attracting more dust with their gravitational fields; some grew large enough to form the planets. Others remained, becoming the asteroids. Some of these asteroids collided with each other (and the early planets), fragmenting into smaller asteroids. Some of the collisions were slow enough that the asteroids merged, producing oddly shaped asteroids.

#### Where are asteroids located?

Many asteroids form large rings or belts around the Sun. There are two asteroid belts in our Solar System: the main belt (or simply called the asteroid belt) between Mars and Jupiter, with thousands of asteroids (see picture below), and the Kuiper belt, named after its discoverer, a disk-shaped region that extends outside of Neptune's orbit and contains countless asteroids and many dwarf planets, of which Pluto is the most famous.

Most asteroids are found in the asteroid belt; however, there are asteroids that are not in that orbit, and they are called Near Earth Objects (NEO). Sometimes these NEOs can reach our planet Earth.

#### Why are asteroids important to study?

Asteroids are part of a group known as minor bodies. Asteroids, comets and meteoroids can provide valuable information about the evolution of our Solar System

Additionally, there are small bodies called meteoroids, remnants of the formation of the Solar System. These meteoroids can be as small as a grain of rice. Meteoroids constantly meet Earth, producing what we see on Earth as 'shooting stars'.

#### Is it true that an asteroid can hit Earth?

An asteroid 10 kilometres in diameter hit the Earth 65 million years ago. This asteroid impact on the Earth is assumed to be one of the reasons why the dinosaurs became extinct.

## Comets

You can also tell the students about comets. Comets are like dirty snowballs or icy lumps of mud. They consist of a mixture of ice (from water as well as from frozen gases) and dust. Like asteroids, comets revolve around the Sun. However, their orbits are strongly elongated compared to planets. That is, they occasionally get very close to the Sun, and at times they get very far away. When they cross a planet's orbit, they could collide with it. This happened, for example, in 1994, when the comet Shoemaker-Levy collided with planet Jupiter and broke into pieces. When comets come close to the Sun in their orbit, the ice in their core melts and evaporates. This results in a beautiful tail, which can be clearly seen in the night sky if the comet passes close enough to the Earth. In 2061, Halley's Comet will once again come close to the Earth. It orbits our Sun once every 76 years. Remember to mark its arrival on your calendar!

## Halley's Comet

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### FULL ACTIVITY DESCRIPTION

#### Step 1

Show the students a photo of an asteroid. Ask the students: Who knows what this is?

#### Asteroid Ida - See Attachments for download

Follow up with questions to start a conversation. Ask questions like: What is an asteroid made of? Where are asteroids usually located?

The teacher can use key words mentioned by the students like: rocks, space, orbits, dinosaurs, shooting stars or meteorites to lead the conversation and explain the key questions described in the background information.

The teacher can use the images in the background section to lead the conversation and explain the questions in the background information.

#### Step 2

Tell the students that they will be making their own asteroids. Ask the students to take a piece of clay the size of their fist. Let them divide it into smaller pieces and place these fragments on a table. Keep an eye on younger students while they handle the clay to ensure that they do not ingest it.

#### Step 3

Take the larger piece of clay and start attaching the smaller pieces slowly one by one. Attach all the pieces carefully so as to not knead the formed shape, and continue until all the small clay pieces are used.

#### Step 4

Let the students hit the clay chunk with the knuckle of a finger a few times.

### **Step 5**

After washing their hands, students can take a brush and paint the asteroid in their favourite colour.

### **Step 6**

Leave the asteroid to dry for a day. Now you have your own asteroid!

### **Step 7**

Explain to the students that asteroids really form this way: little pieces clump together to form one giant rock. Planets also form this way. Around every young star is a disc of little pieces of dust, out of which planets and asteroids form.

In this activity, the students have learned about asteroids through discussion and by moulding their own asteroids using clay. Grouping small fragments of clay highlights the role of gravity in solar system formation. The small fragments represent the planetesimals, or small dust particles, in the formation of objects in our Solar System. Some of these particles have accumulated to become asteroids, while others have not.



## **CURRICULUM**



## **ADDITIONAL INFORMATION**



## **CONCLUSION**

In this activity, students familiarise themselves with asteroids. They discuss and build their own model asteroids. They learn how asteroids are formed in the Solar System. At the end of the activity, each student has their own model asteroid made from clay.

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## **ATTACHMENTS**

- [Asteroid Ida](#)
- [The Antiope Doublet](#)

## **ALL ATTACHMENTS**

[All attachments](#)

## **CITATION**

Perez, A.; Nava, T. S., 2017, *Creating Asteroids*, [astroEDU](#), [doi:10.14586/astroedu/1642](https://doi.org/10.14586/astroedu/1642)

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## **ACKNOWLEDGEMENT**

Universe Awareness

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