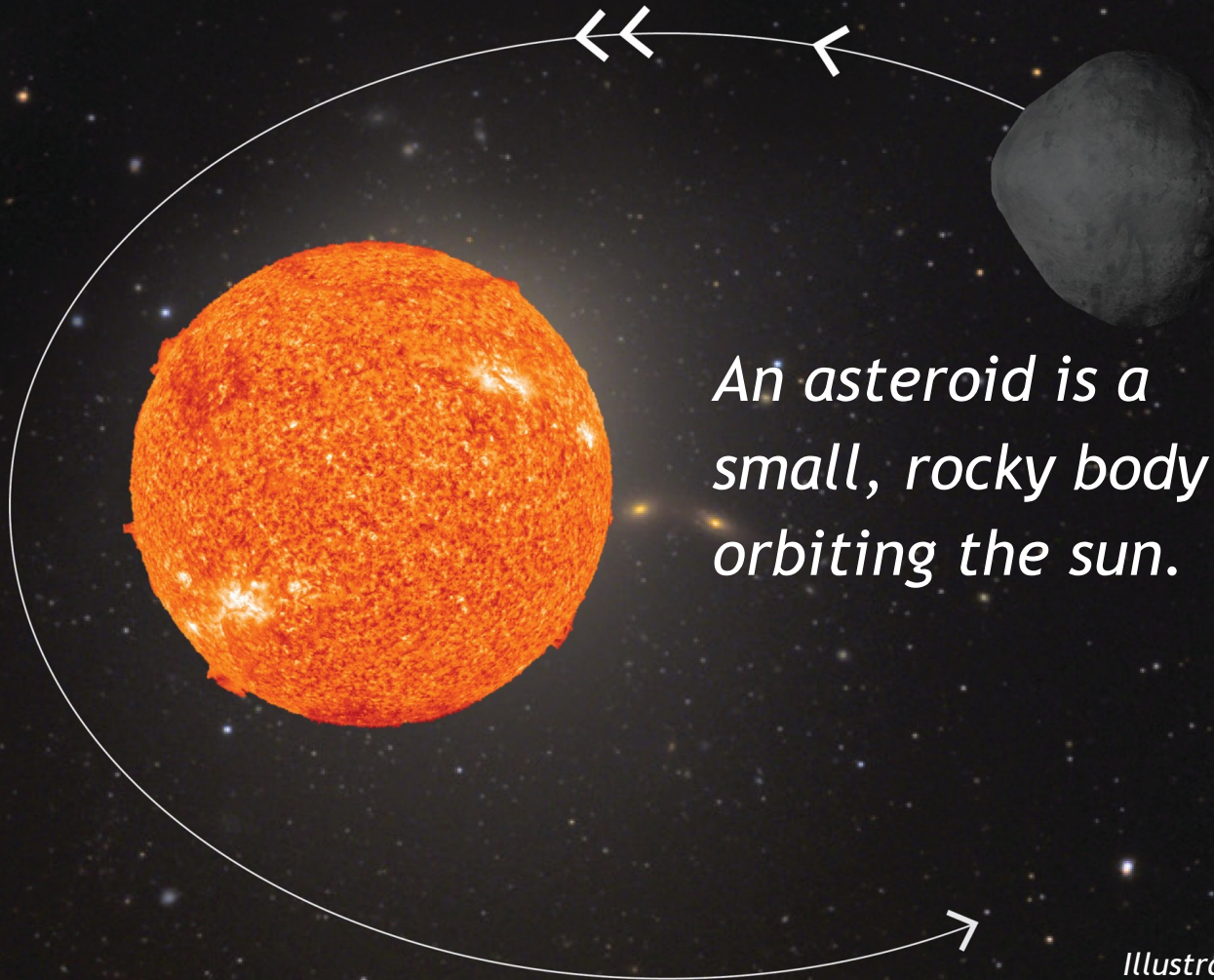


what's an asteroid?

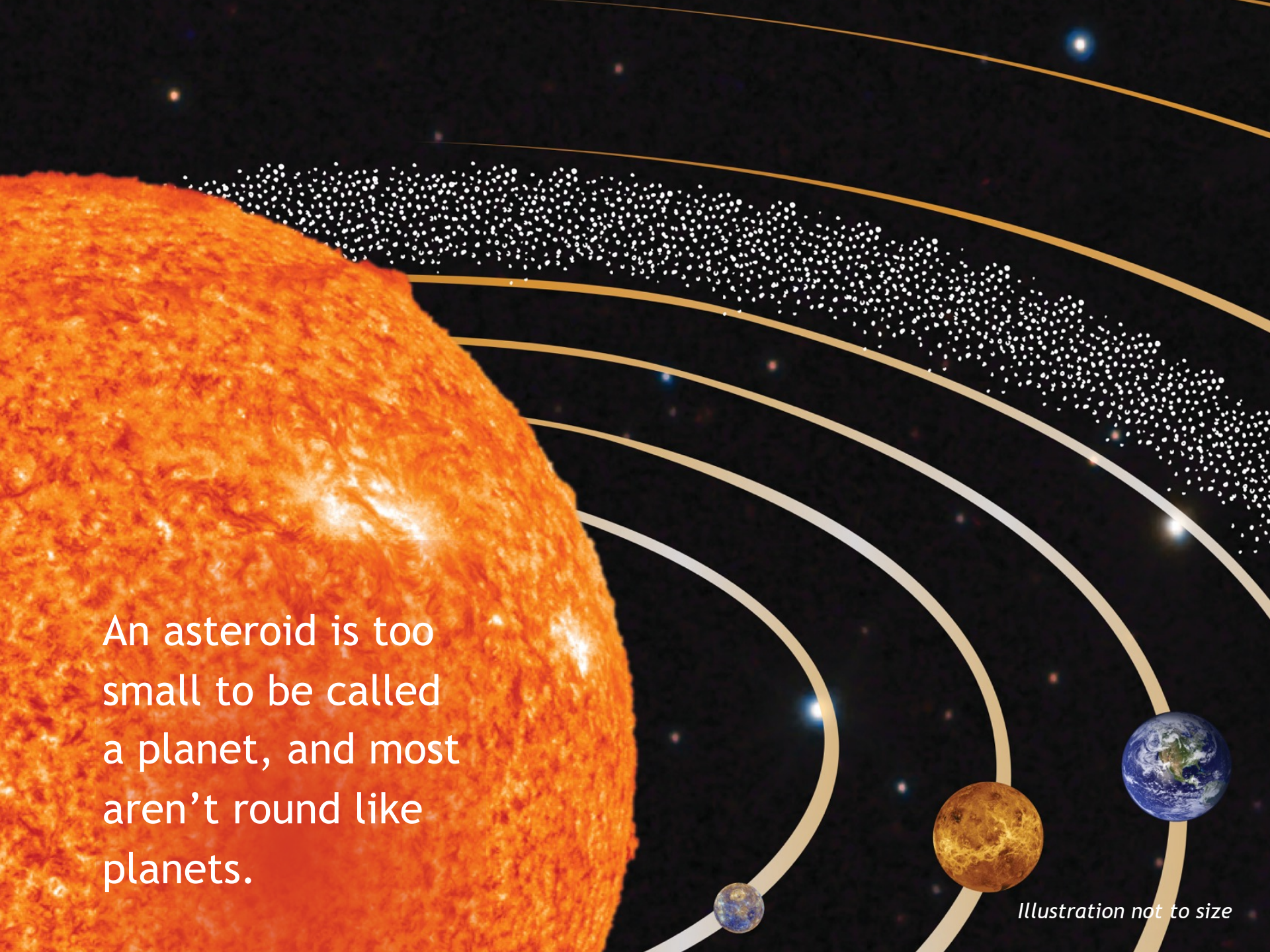


what's an asteroid?



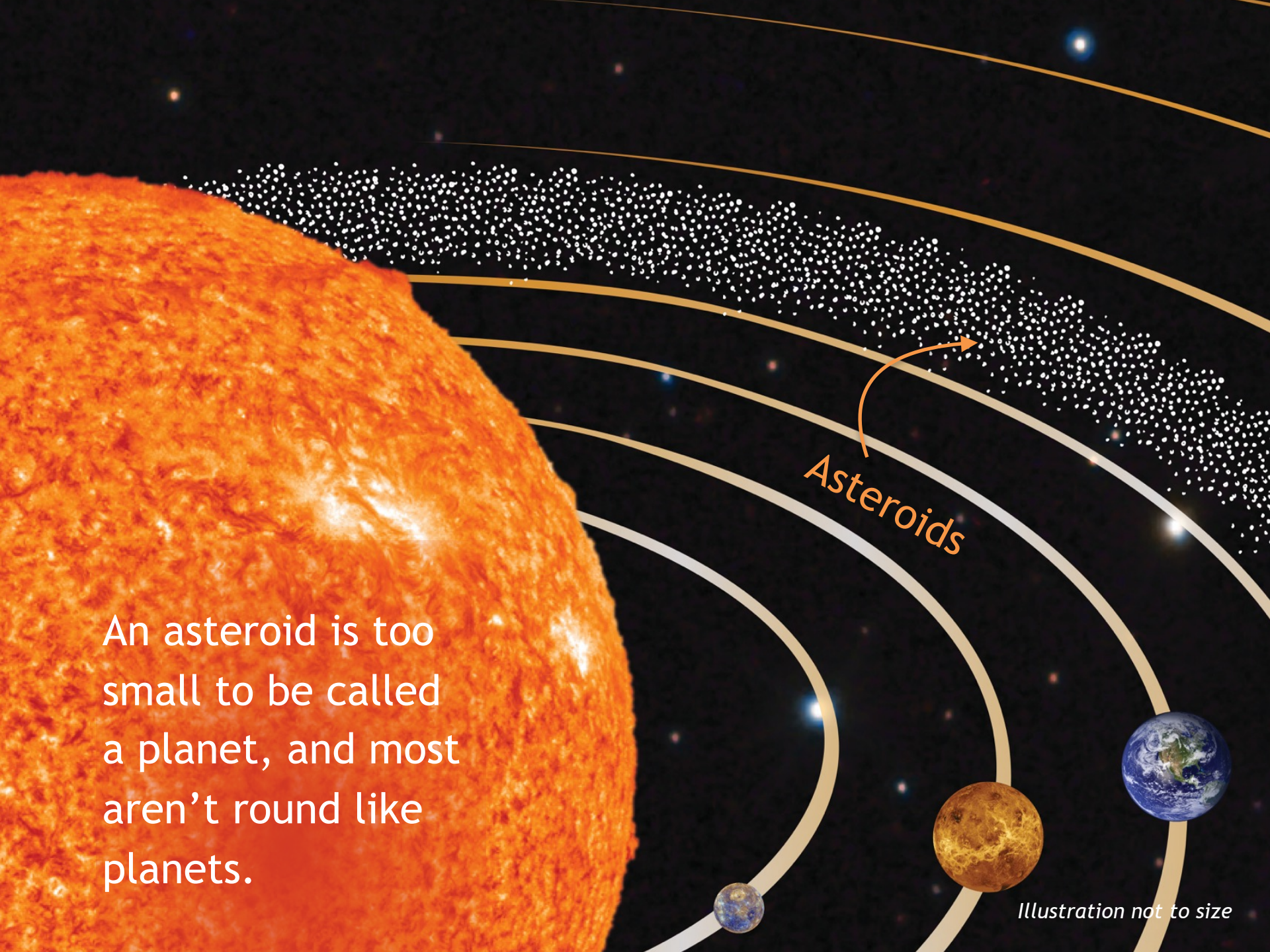
*An asteroid is a
small, rocky body
orbiting the sun.*

Illustration not to size

A diagram of the solar system. On the left is a large, textured orange Sun. Several concentric white elliptical orbits curve around it. A dense band of small white dots, representing an asteroid belt, is located between the orbits of Mars and Jupiter. On the innermost orbit, a small blue and white Earth is shown. On the next orbit, a larger yellowish-brown planet (Mars) is shown. On the outermost orbit, a large blue and white Earth is shown. The background is black with scattered white stars.

An asteroid is too small to be called a planet, and most aren't round like planets.

Illustration not to size

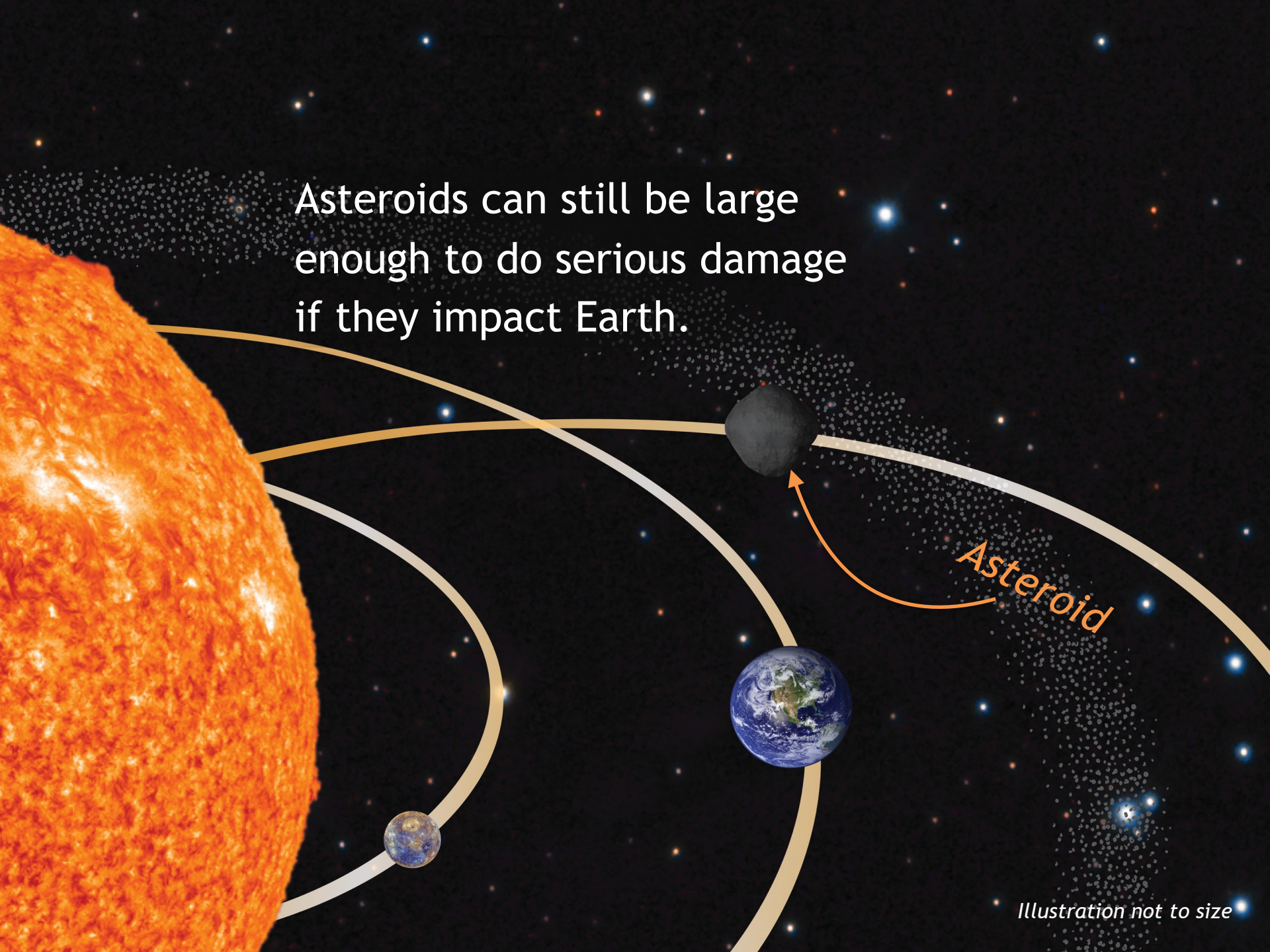
A diagram of the solar system. On the left is a large, textured orange sphere representing the Sun. To its right are several concentric elliptical orbits. The innermost orbit shows a small blue and white planet (Mercury). The next orbit shows a larger blue and white planet (Earth) with a yellowish-brown sphere (the Moon) orbiting it. The next orbit shows a yellowish-brown sphere (Mars). The outermost orbit shown is a wide, dark band filled with many small white dots, representing the asteroid belt. An orange arrow points from the word 'Asteroids' to this band. The background is black with several small white stars.

An asteroid is too small to be called a planet, and most aren't round like planets.

Asteroids

Illustration not to size

Asteroids can still be large enough to do serious damage if they impact Earth.



Asteroid

Asteroids can still be large enough to do serious damage if they impact Earth.



what if they hit?!

Asteroid

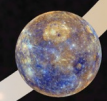
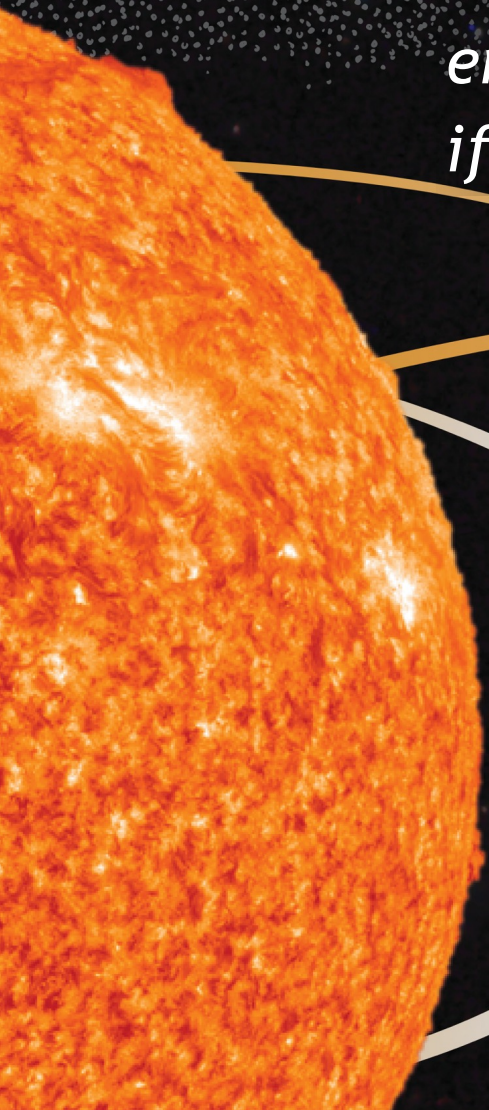


Illustration not to size

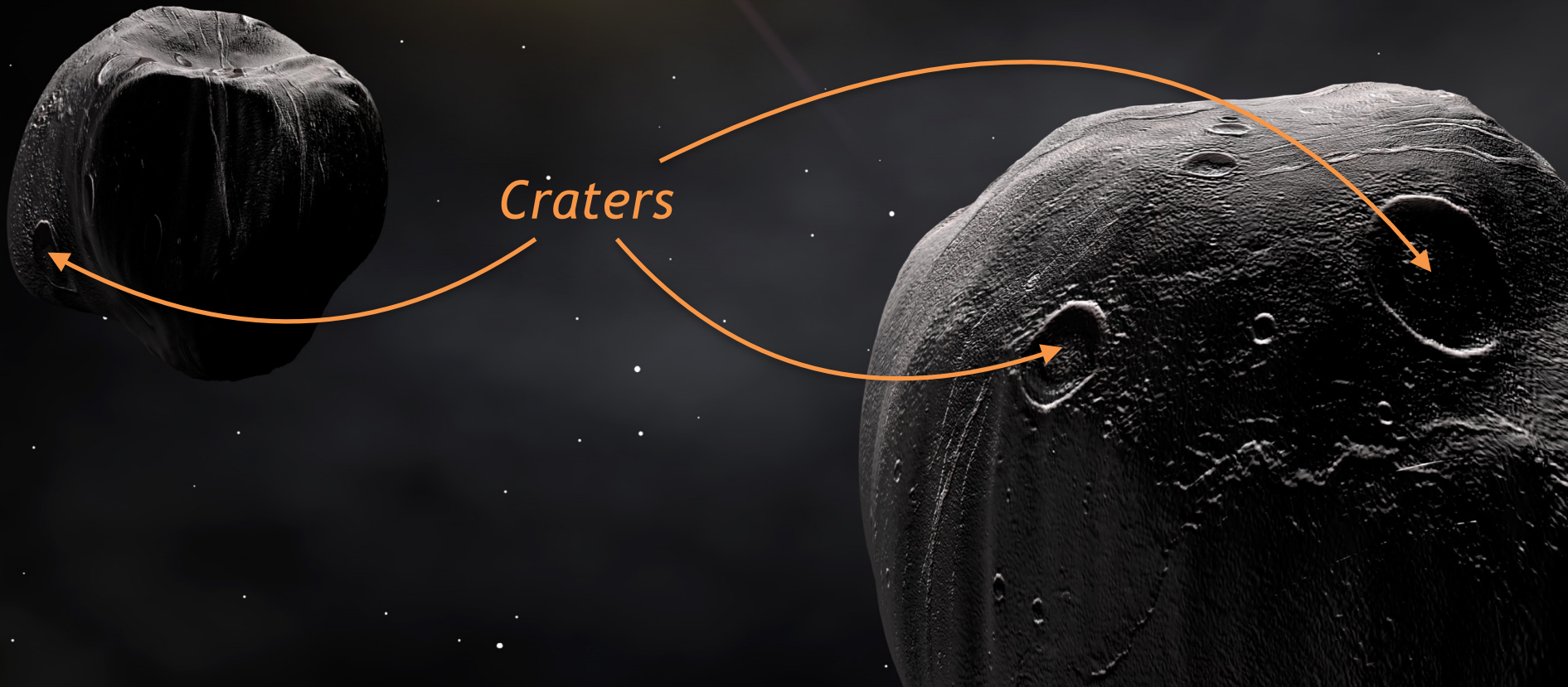
asteroid anatomy

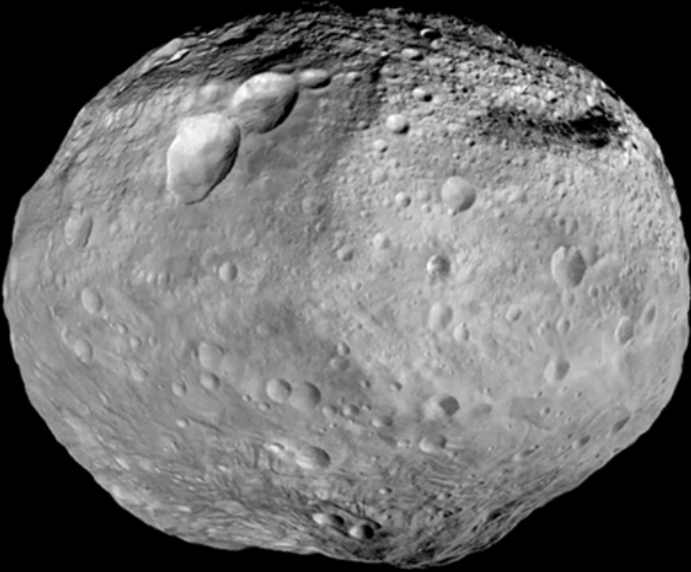
Although varying in shape, size and material, nearly all asteroids are rough, lopsided, and covered in craters.



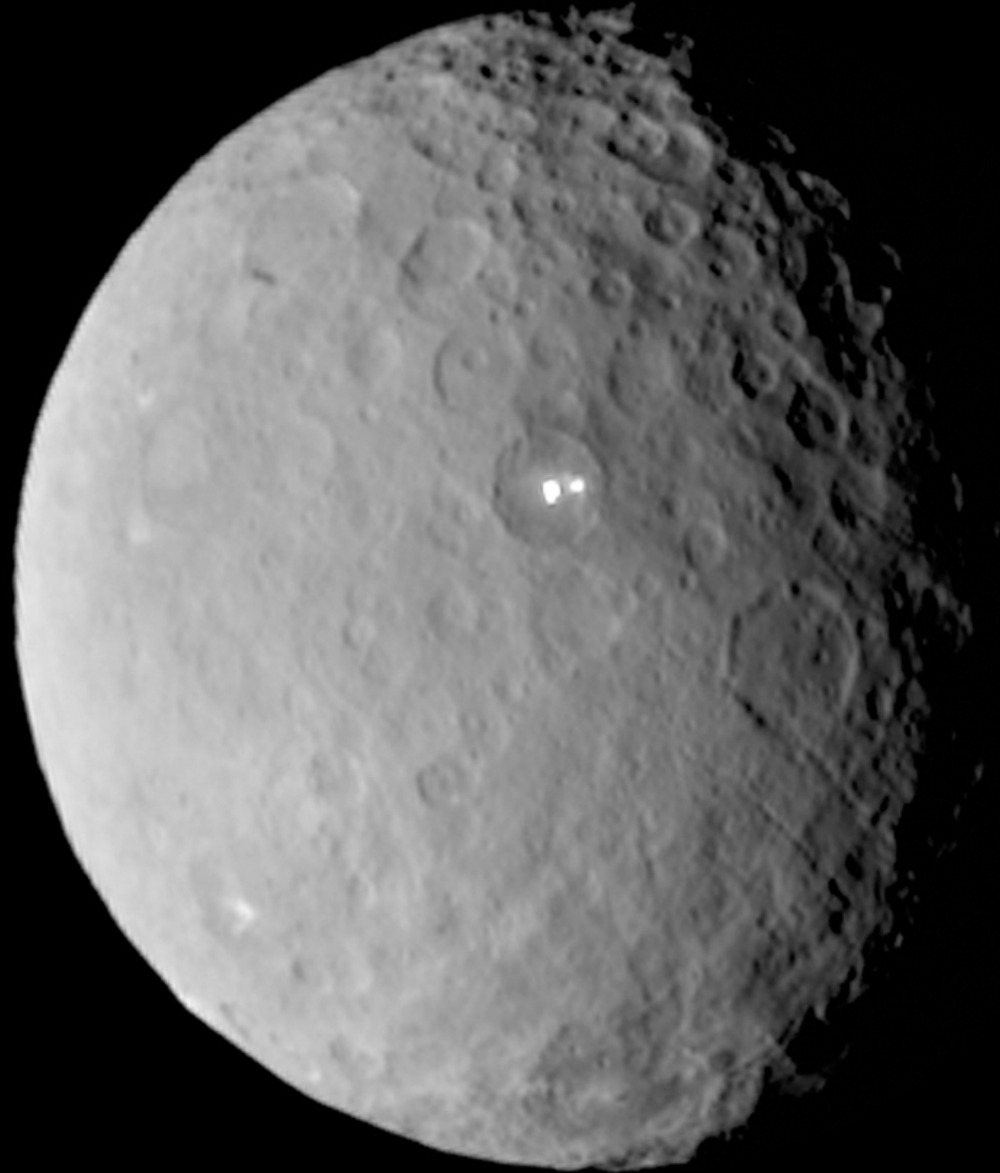
asteroid anatomy

Although varying in shape, size and material, nearly all asteroids are rough, lopsided, and covered in craters.



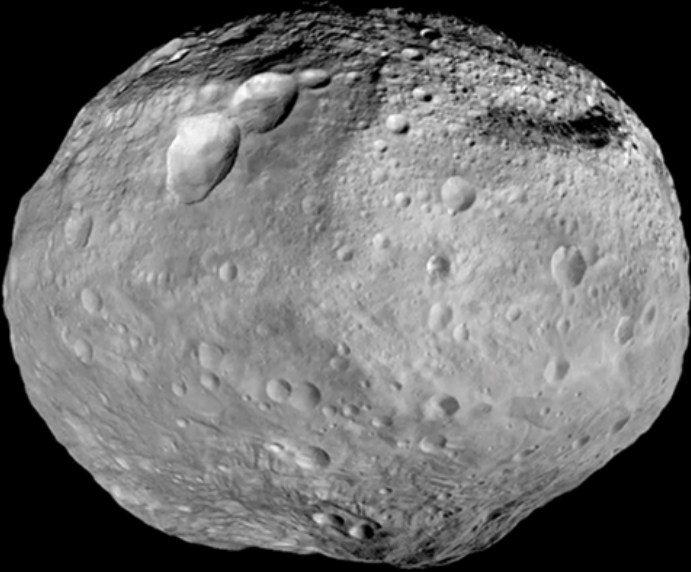


Vesta



Ceres

Only a few of the largest asteroids have enough gravity to pull them into spherical shapes.



Vesta



Ceres

Even Vesta, one of the largest objects in the asteroid belt, isn't totally spherical.

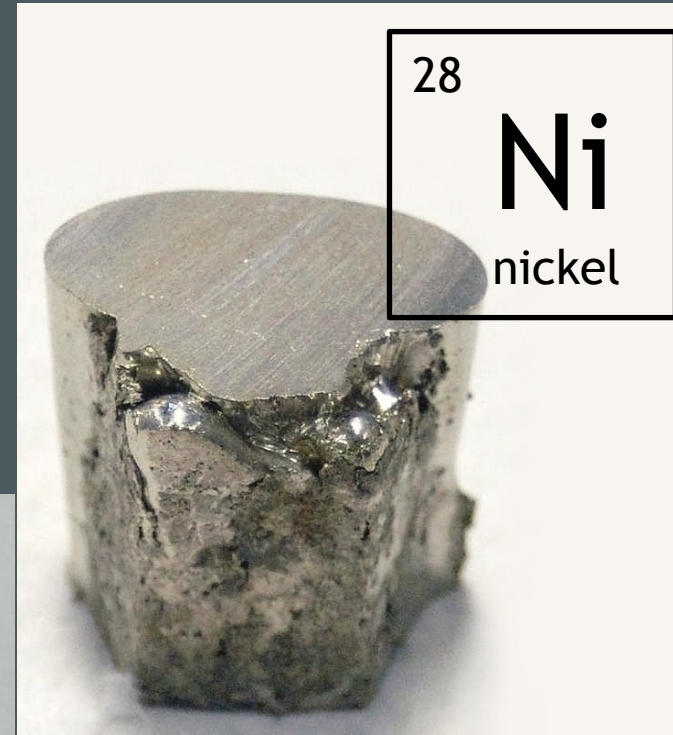
asteroid classification

Scientists use the amount of metal to classify an asteroid.

| | | | | | | | | |
|---------------------------|--------------------------|--------------------------|-------------------------|------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | | | 5 B Boron | 6 C Carbon | 7 N Nitrogen | 8 O Oxygen | 9 F Fluorine | 10 Ne Neon |
| | | | 13 Al Aluminium | 14 Si Silicon | 15 P Phosphorus | 16 S Sulfur | 17 Cl Chlorine | 18 Ar Argon |
| 28 Ni Nickel | 29 Cu Copper | 30 Zn Zinc | 31 Ga Gallium | 32 Ge Germanium | 33 As Arsenic | 34 Se Selenium | 35 Br Bromine | 36 Kr Krypton |
| 46 Pd Palladium | 47 Ag Silver | 48 Cd Cadmium | 49 In Indium | 50 Sn Tin | 51 Sb Antimony | 52 Te Tellurium | 53 I Iodine | 54 Xe Xenon |
| 78 Pt Platinum | 79 Au Gold | 80 Hg Mercury | 81 Tl Thallium | 82 Pb Lead | 83 Bi Bismuth | 84 Po Polonium | 85 At Astatine | 86 Rn Radon |
| 110 Ds Darmstadtium | 111 Rg Roentgenium | 112 Cn Copernicium | 113 Uut Ununtrium | 114 Fl Flerovium | 115 Uup Ununpentium | 116 Lv Livermorium | 117 Uus Ununseptium | 118 Uuo Ununoctium |

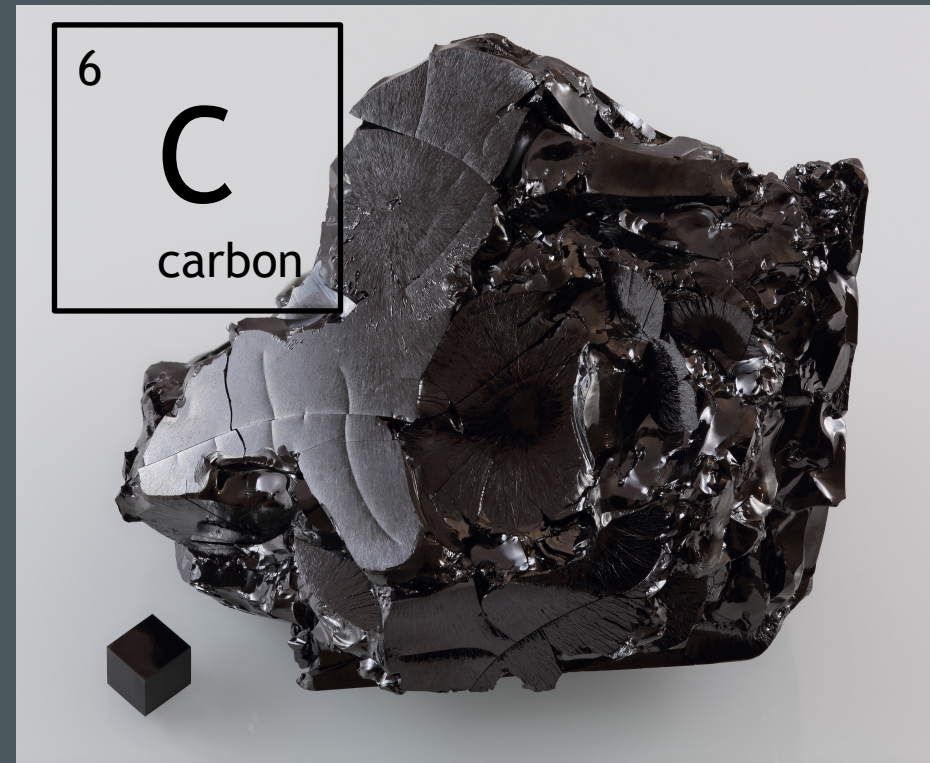
asteroid elements

An asteroid with greater mass and gravity has more iron and nickel in its makeup.



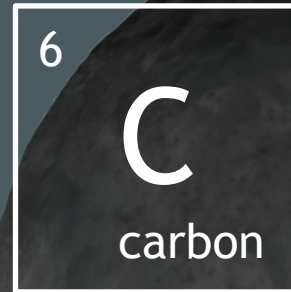
asteroid elements

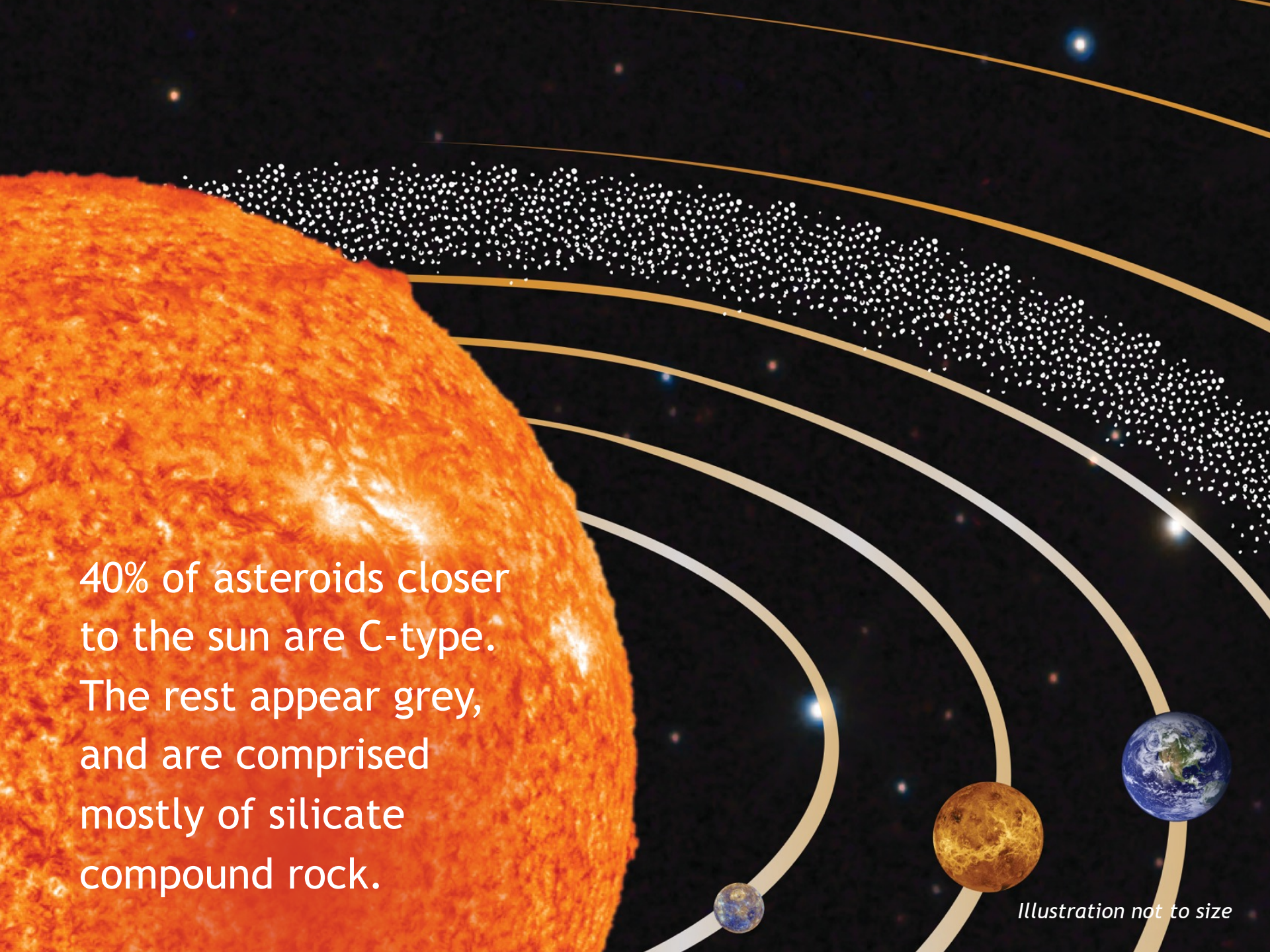
Asteroids further away from the Sun more commonly contain large quantities of carbon.



asteroid elements

These are called “C-type asteroids,” and their surfaces appear black.



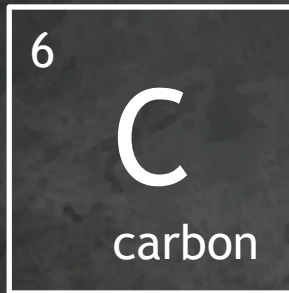
A diagram of the solar system. On the left is a large, textured orange sphere representing the Sun. To its right is a horizontal band of white dots representing the asteroid belt. Several curved lines represent the orbits of planets. On the right side, the Earth is shown on its orbit, with the Moon orbiting it. A smaller Earth is shown on an inner orbit. The background is black with scattered white stars.


40% of asteroids closer to the sun are C-type. The rest appear grey, and are comprised mostly of silicate compound rock.

Illustration not to size

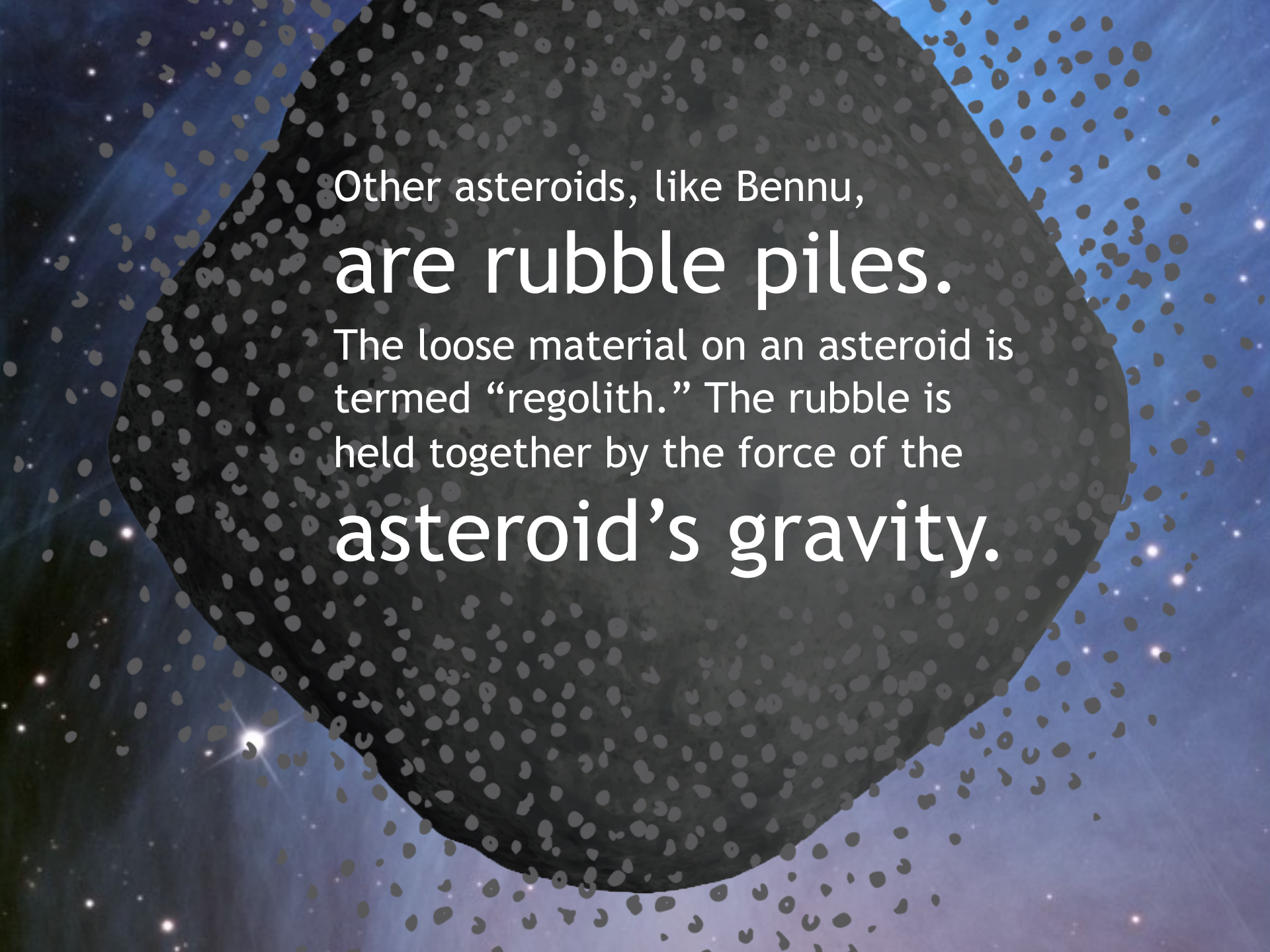
Bennu

the target asteroid for NASA's OSIRIS-REx mission, is one of the rare carbonaceous asteroids that orbits near the Sun.



A large, dark, irregularly shaped asteroid is the central focus of the image. It has a rough, textured surface with various shades of grey and black. The asteroid is set against a vibrant blue background filled with numerous small, bright white stars. The lighting on the asteroid is soft, highlighting its irregular shape and surface details.

Most asteroids are solid,
because they were molten
at some point in time.



Other asteroids, like Bennu,
are rubble piles.

The loose material on an asteroid is termed “regolith.” The rubble is held together by the force of the
asteroid’s gravity.

asteroids in orbit

Most asteroids are orbiting the Sun in the 19,400,000-mile wide asteroid belt between Jupiter and Mars.

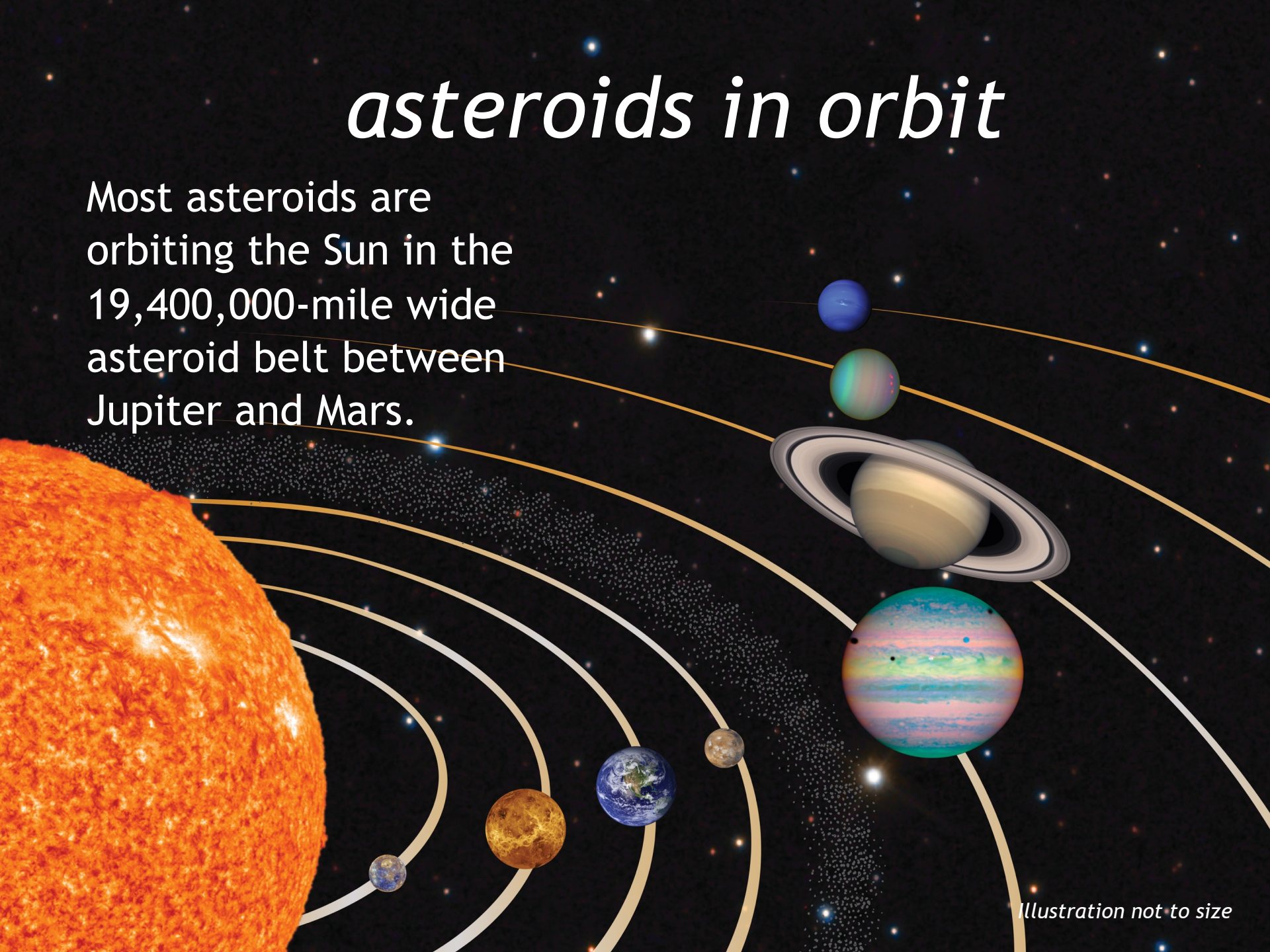


Illustration not to size

asteroids in orbit

Most asteroids are orbiting the Sun in the 19,400,000-mile wide asteroid belt between Jupiter and Mars.

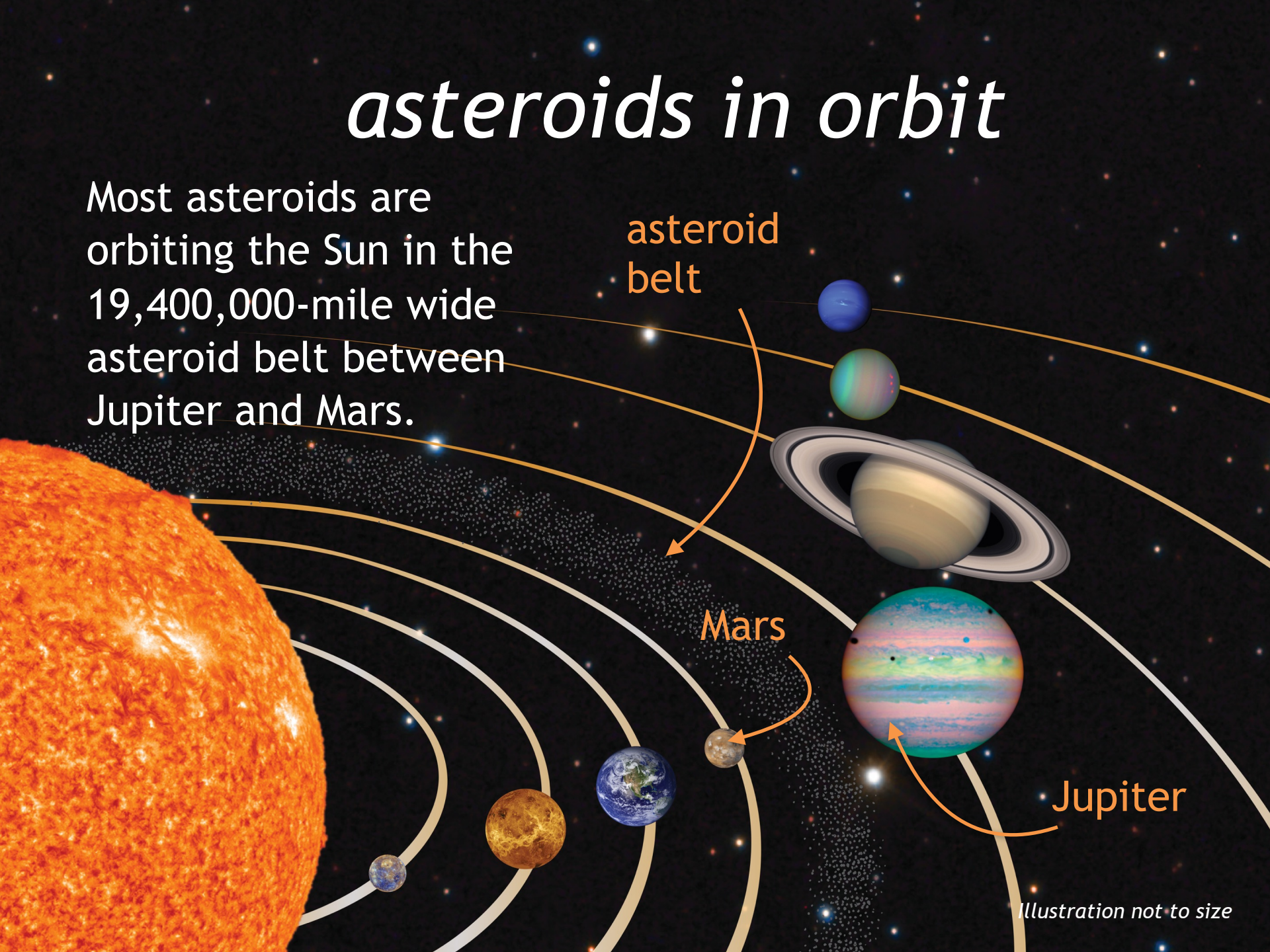


Illustration not to size

how do asteroids get near Earth?

Asteroids experience heat radiated from the Sun,

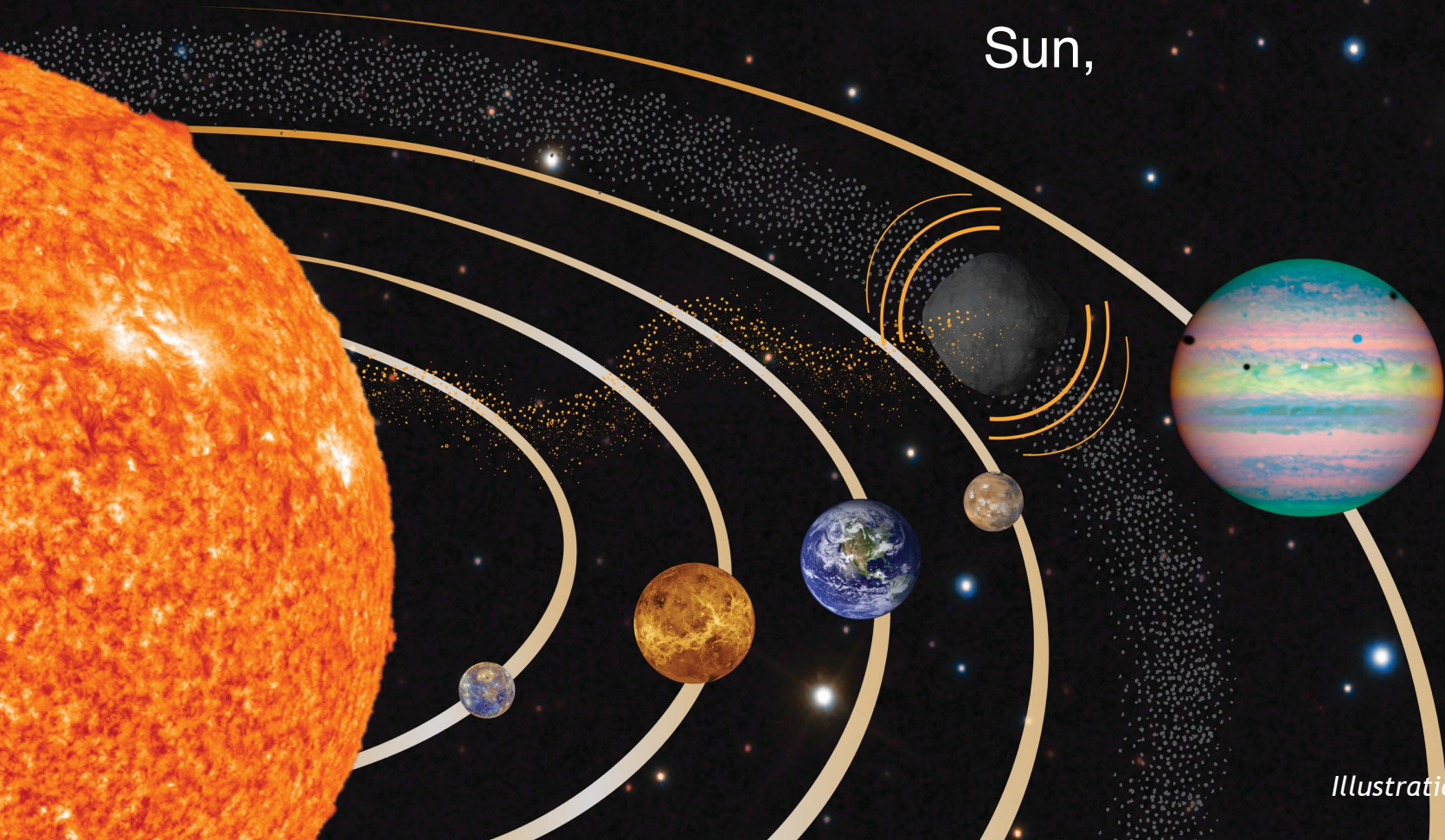


Illustration not to size

how do asteroids get near Earth?

which can push an asteroid closer to planets like Jupiter and Saturn. This pulls the asteroids out of the asteroid belt entirely.

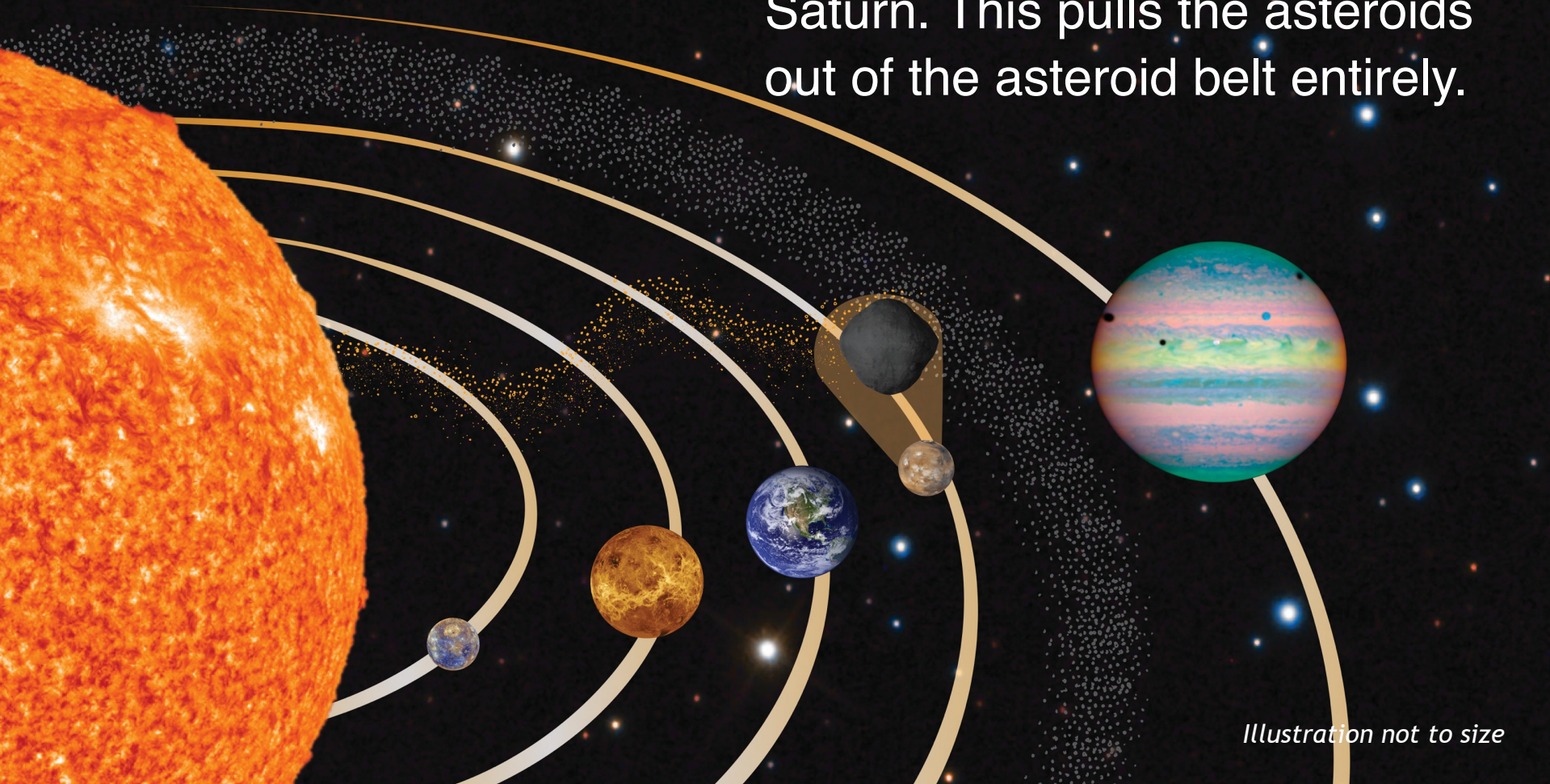


Illustration not to size

how do asteroids get near Earth?

Essentially, the asteroid gets thrown out of the asteroid belt and enters the inner solar system, orbiting near Earth.



Illustration not to size

from asteroid to near-Earth object

These asteroids are aptly named near-Earth objects, or NEOs.

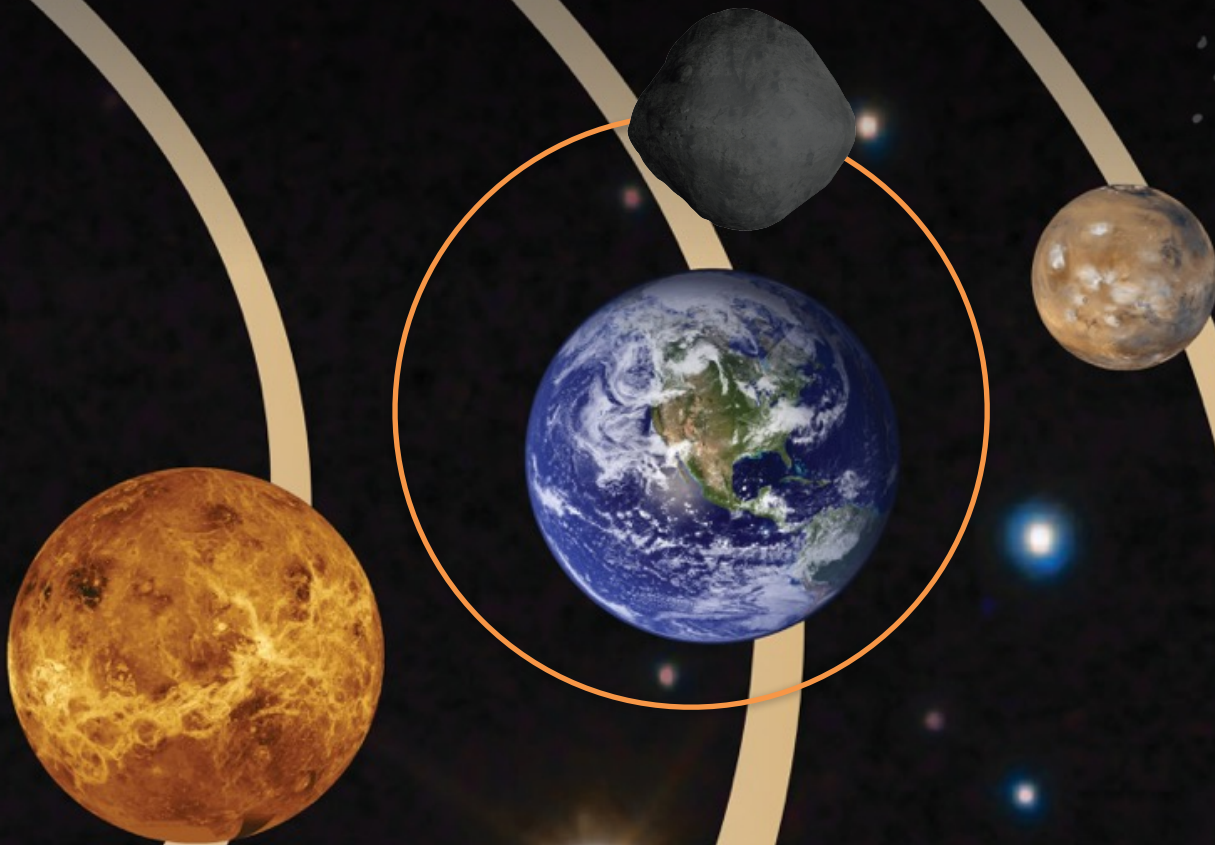


Illustration not to size

from asteroid to near-Earth object

NEOs usually don't last too long in the inner solar system. They impact the Sun, a planet, or get thrown out of the solar system completely.

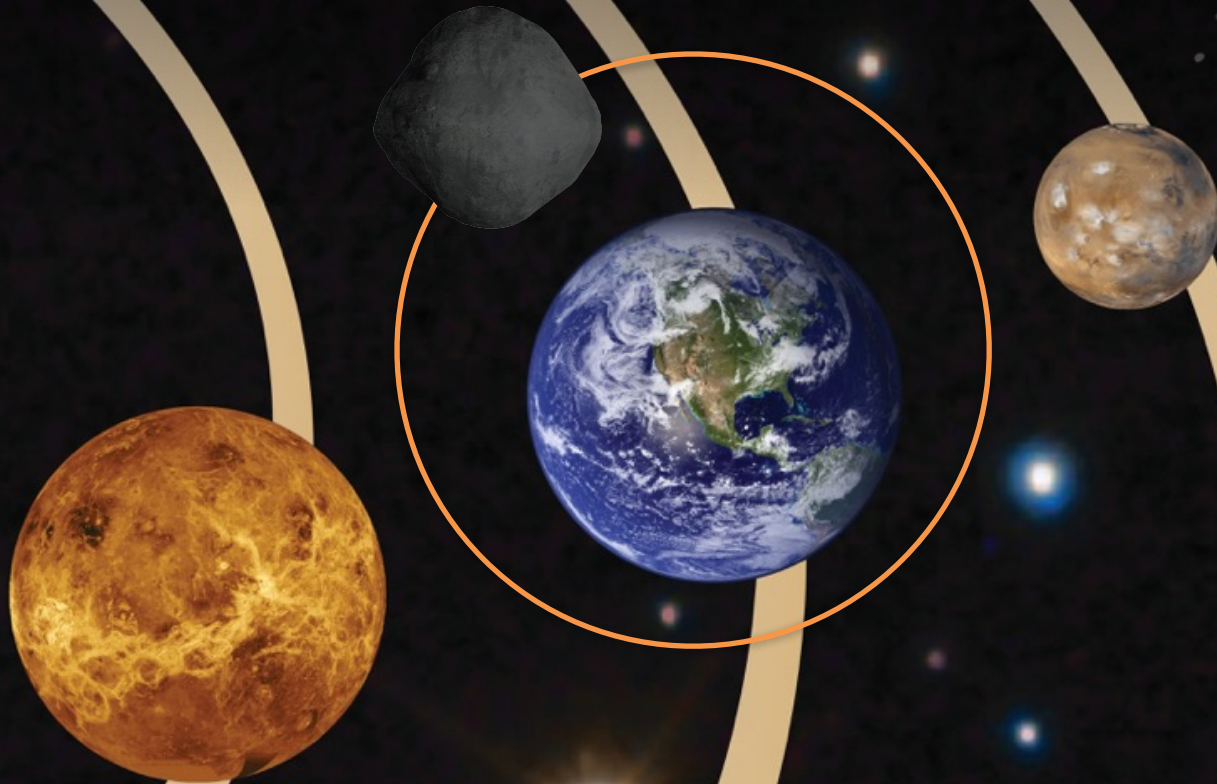


Illustration not to size

from asteroid to near-Earth object

Some NEOs, including Bennu, have a chance of impacting Earth within centuries.






why study asteroids?


Due to their

**size, composition,
and speed,**

asteroids do pose a threat to Earth
upon impact.



While most of
asteroids in space
are not on a
trajectory to crash
into Earth,



While most of
asteroids in space
are not on a
trajectory to crash
into Earth,

some have a small chance of
hitting Earth within just a couple
of centuries.

A satellite with two blue solar panels is orbiting a large, dark, cratered asteroid. A bright pink laser beam extends from the satellite towards the top of the frame. The background is the blackness of space with some distant stars.

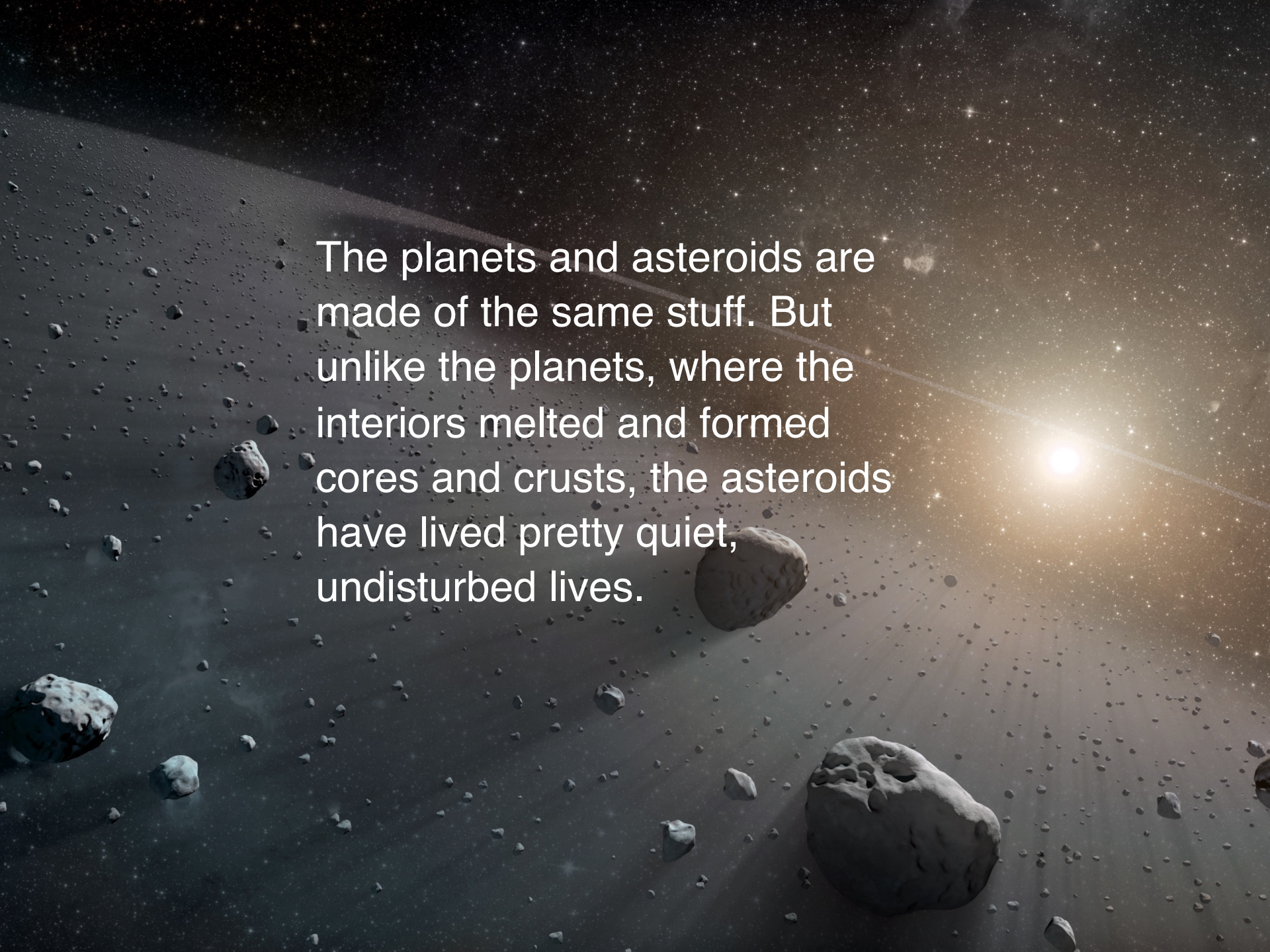
more reasons to study asteroids

In order to come up with a way to redirect asteroids away from Earth, scientists need to learn more about them.

A detailed illustration of an asteroid belt. The scene is set against a dark, star-filled background. A bright sun is visible on the right side, casting a long, thin, golden glow across the field of asteroids. The asteroids themselves are of various sizes and shapes, some with craters and irregular surfaces. The overall atmosphere is one of a vast, desolate space environment.

Additionally,

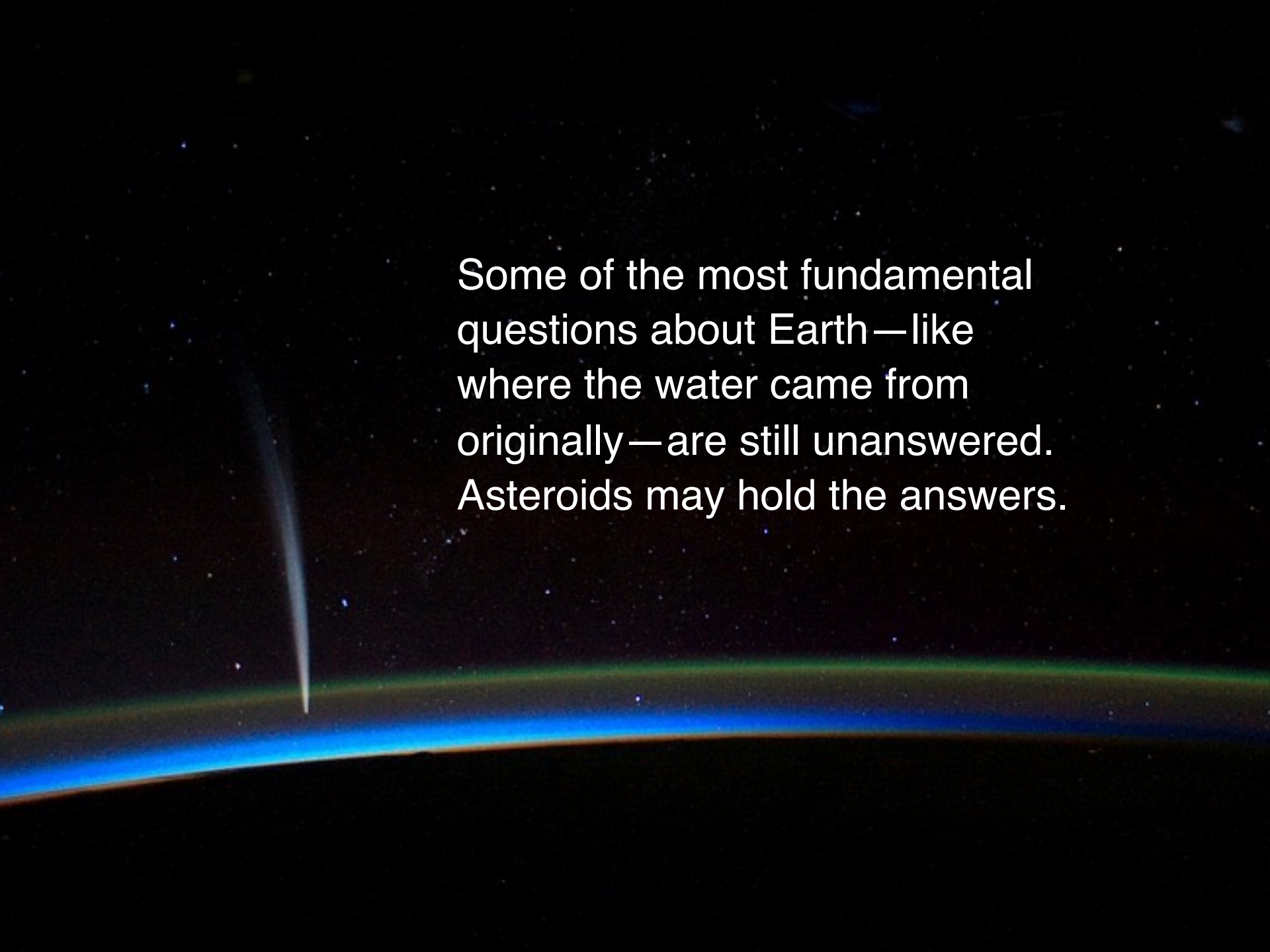
asteroids are leftovers from the
creation of the planets.

A field of asteroids of various sizes and shapes is scattered across a dark, star-filled space. A bright, glowing star is visible on the right side, casting a soft light across the scene. The asteroids are dark and textured, with some showing signs of impact or erosion. The overall atmosphere is one of a quiet, undisturbed celestial environment.

The planets and asteroids are made of the same stuff. But unlike the planets, where the interiors melted and formed cores and crusts, the asteroids have lived pretty quiet, undisturbed lives.

That means we can find samples of the things that went into the planets, before they got mixed, melted and stirred past recognition on Earth.



A photograph of Earth from space, showing the curvature of the planet and the atmosphere. A bright, white, curved streak is visible in the upper left portion of the image, likely representing a meteor or a satellite. The background is a dark, starry sky.

Some of the most fundamental questions about Earth—like where the water came from originally—are still unanswered. Asteroids may hold the answers.

Brought to you by

The University of Arizona

*where more than 52%
of all near-Earth objects,
including asteroids,
were discovered*

[*Learn more about these
discoveries at UA Research*](#)

