The WONDER WEEKLY

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Tasmania is one of the best places in the world for radio astronomy. The very important role played by the University of Tasmania's radio telescopes in exploring near and deep space was the focus of *The Wonder Weekly* on July 27, 2020. You can find all past editions here: www.utas.edu.au/underwood-centre/publications-and-resources/the-wonder-weekly

SPACE ROCK

COMETS, asteroids and meteoroids.

No doubt you have heard of all three, and you know they hang out in space, but do you know what the differences are between them?

Both comets and asteroids are the remnants from the dawn of our solar system about 4.6 million years ago.

Like asteroids, comets orbit the Sun, but consist mostly of ice chunks and frozen gases coated with dust and rock - a bit like dirty cosmic snowballs.

When a comet orbits closer to the Sun, it heats up, and a cloud of gases called a coma forms around the nucleus, or centre of the comet.

This cloud can grow as large as three million kilometres across.

The pressure of sunlight and solar winds (which we talked about in the February, 28, 2022 edition of *The Wonder Weekly),* then forms a tail of dust and gases that stretches away from the Sun for millions of miles.

Most comets, and there are billions of them, travel a safe distance from the Sun.

In fact some are so far away from the Sun (100,000 times further away from the Sun than Earth), that they can take 30 million years to complete one orbit.

But others crash straight into the Sun or just get too close and break up and evaporate.

Asteroids and meteoroids are both made of rock or metals; what is different about them is their size. Meteoroids range in size from as small as a grain of dust to one metre-wide objects.

Asteroids are bigger than the largest meteoroids.

They range in size from objects that are less than 10 metres across, to the largest asteroid in our solar system, Vesta, which is 525km in diameter.

That's of course unless you still believe the much larger Ceres is an asteroid.

Ceres, long considered the largest asteroid at 939km in diameter, has been upgraded to dwarf planet status.

Most asteroids can be found within "the main asteroid belt", orbiting the Sun between Mars and Jupiter.

Asteroids that come close to Earth are called Near Earth Objects (NEOs).

The University of Tasmania manages three radio telescopes in Tasmania, and three mainland telescopes and keep a close eye on NEOs.

Last year University scientists tracked a 330-metre asteroid called Nereus, which came within 3.9 million kilometres of Earth, or about 10 times the distance between the Earth and the moon.

The research team collaborates with the NASA Deep Space Network to observe near-Earth asteroids and other objects floating around in space, including things like leftover parts from rockets.

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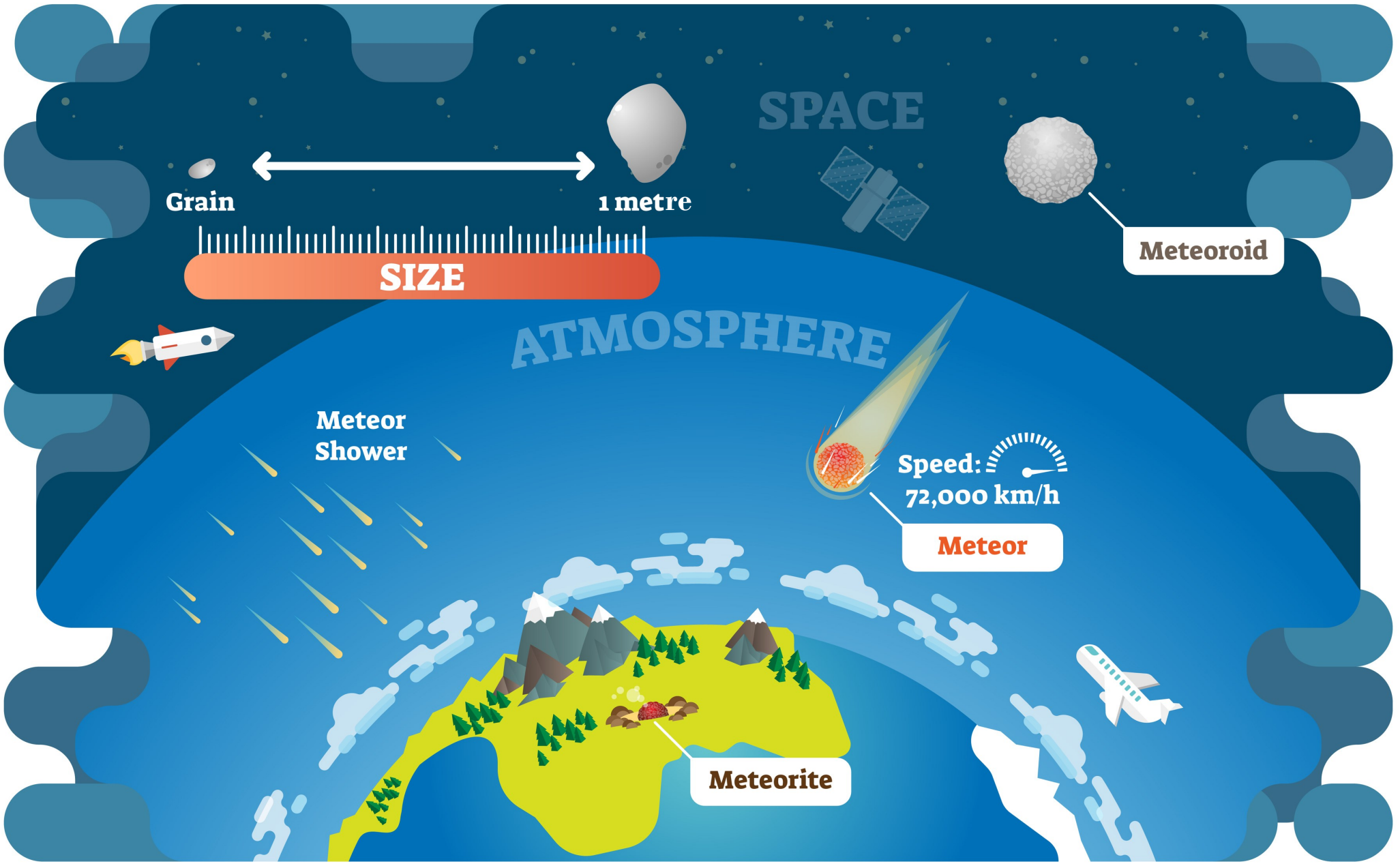

Meteoroid to meteorite

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We have established what a comet, an asteroid and a meteoroid are, but how does a meteoroid differ from a meteor and a meteorite?

They are really the same space rocks at different stages.

Meteoroids are floating around in space, but when these rocky objects enter the Earth's atmosphere and burn up they are called meteors.

If they don't burn up entirely and make it to the surface of the Earth, these rocks are called meteorites.

That's easy enough to understand, but let's return to Ceres, the asteroid that became a dwarf planet, or perhaps it was never an asteroid at all.

Ceres was first discovered in 1801, and was in fact originally considered to be a planet.

At the time no one knew asteroids existed.

Ceres was reclassified in the 1850s, after astronomers discovered dozens of other objects in similar orbits and realised they were dealing with a new phenomenon - asteroids.

Ceres was reclassified again in 2006 by the International Astronomical Union (IAU) as a dwarf planet.

But why?

Let's make it your challenge to find out.

While you're at it, you might like to research why Pluto was demoted by the IAU from being classified as a planet to a dwarf planet?

Present your findings in a creative way.

Children's University Tasmania members can earn stamps in their passport for this challenge at the discretion of their school/ hub coordinators.

Find 10 differences in the mirror image