

Activity A

Sedna: Planet or not?

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Introduction

There are millions of objects in the universe, ranging from huge stars to dust particles. Somewhere between the two extremes are planets, but when is a planet a planet and when is it a just a big lump of rock? Sedna is a recently discovered object at the rim of the solar system and there is a debate over whether Sedna is the tenth planet or just another space body. In this lesson pupils grapple with this question and use evidence to decide on Sedna's status.

Objective

Pupils will learn about the role of evidence in science by evaluating the evidence provided on the recently discovered Sedna, and deciding whether the evidence supports the idea that Sedna is a planet, an asteroid or whether it is neither planet nor asteroid.

Outcomes

By the end of the lesson:

- All pupils will be able to use the evidence to construct arguments for Sedna being a planet or not.
- Most pupils will be able to evaluate the evidence and use it to support their view on Sedna's status.
- Some pupils will be able to describe the Kuiper Belt and Oort Cloud, which contain millions of space bodies that are not considered to be planets.

Notes for Teachers

In this lesson pupils will need to be given background information on the Kuiper Belt and Oort Cloud, as well as reference material about other planets in the solar system in order for them to compare their ideas of Sedna to what is known about other planets.

Teaching Sequence

- Begin the lesson with a presentation (PowerPoint provided) on Sedna, giving pupils the opportunity to ask questions. The presentation lasts approximately 10 minutes and should include a lot of visual materials in order to motivate and engage pupils in the subject. Before moving on to the next activity, stress that the importance of the lesson is how the answer is decided from the evidence and how the decision is justified.
- Pupils then work in groups of 3 or 4 to consider the first set of evidence cards and arrange them on the activity sheet (columns), to indicate what they think the evidence implies. One person in each group should record the ideas. The teacher can support the activity by talking through their ideas, asking them to justify their reasoning and debate their ideas with one another.
- Groups who finish quickly can be asked whether they have enough evidence to support their ideas, and can be given the second set of evidence cards to consider.
- The plenary with the whole class involves selecting two groups, one to argue for Sedna being a planet and the other to argue against. Each group is asked to report their discussions and final decision, using the notes made by the recorder.
- Finally, reveal that Sedna is not classified as a planet, but that no definition of a planet exists. An important point to make to pupils is that they have been doing what scientists do, namely evaluating evidence, debating ideas and justifying claims.

Sedna Evidence Cards Set 1

Sedna has a highly elliptical orbit.	Sedna is sphere (shaped like a ball).
Sedna only reflects light; it does not emit light.	Sedna is smaller than Pluto.
Sedna is bigger than any of the asteroids that we know about.	Sedna could just about be part of the Oort Cloud.
Sedna does not have an official name, apart from '2003 VB12'.	Sedna was discovered recently.
Sedna has no moon.	Sedna is a red object, almost as red as Mars.
Sedna's surface temperature is approximately -240°C.	Sedna never enters the Kuiper belt.

Sedna Evidence Cards Set 2

Comets have highly elliptical orbits, getting close to the Sun very rarely.	Mercury and Pluto are both less than 5,000km in diameter.
Sedna rotates very slowly, but it does rotate.	Mars has two moons that are believed to be captured comets.
Sedna orbits the sun taking 10,500 years to complete one orbit.	Sedna orbits the Sun at a slow rate.
Pluto is <u>not</u> considered to be a planet by some scientists.	Sedna has no atmosphere.
The closest that Sedna gets to the sun is 76AU (the Earth is 1AU from the sun).	Sedna has no close objects of significant size.
Sedna is larger than any object in the Kupier Belt.	Asteroids are generally irregular shapes.

Pupil activity sheet - Sedna: Planet or not?

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Evidence to suggest that Sedna is a planet	Evidence to suggest that Sedna is not a planet	Inconclusive evidence (supports neither or both ideas)