Tiny Rock Sample May Help Solve Mars Moon Mystery

Japan's MMX mission is heading to Phobos to bring back a piece of Mars's lumpy little moon.

A small rover explores the uneven gray surface of Phobos with Mars in the background.

A Japanese-led space **mission** blasted off on Monday, October 19, to visit Phobos, the larger of Mars's two moons, according to BBC Newsround. The mission is called Mars Moons Exploration, or MMX. It is run by Japan's space agency, Jaxa, which is like Japan's NASA.

The spacecraft is traveling from Earth to Phobos. If the plan works, a **rover** will land there in August 2027. A rover is a small robot made to explore a place. It will scoop up a tiny **sample**, which means a bit of rock and dust from the **surface**.

That would be a first. No mission has ever brought home a piece of one of Mars's moons. The sample is expected to come back to Earth in 2031. The landing spot is planned for a desert in South Australia. The sample will be only 10 grams, about as heavy as a dry tea bag.

That may sound too small to matter. Scientists say it is not. Dr. Chrysa Avdellidou of Leicester University told BBC News that it is "worth every gram." Scientists can study tiny bits of rock with special tools. They can look for clues about what the moon is made of, and where it came from.

The big question is how Phobos and Deimos began. Deimos is Mars's other moon. Scientists have two main ideas. One idea is that the moons formed from

debris, or broken pieces, after Martian rock smashed apart. The other idea is that they are asteroids, which are rocky space objects, from the outer Solar System.

Phobos and Deimos are very different from Earth's Moon. Our Moon looks round in the sky. Phobos is about 20 kilometers, or 12 miles, wide. Deimos is about 10 kilometers, or 6 miles, wide. BBC Newsround describes them as shaped like lumpy potatoes. Imagine trying to land gently on a small, uneven rock far from home.

The mission connects to something simple: crumbs can tell a story. A crumb on a plate can show what someone ate. A tiny rock from Phobos may show whether Mars's moons were born near Mars, or traveled in from farther away. That is why a tea-bag-sized sample can be a big deal.

Written from reporting by BBC Newsround.

THINK IT THROUGH

1. **Do you think it is worth sending a spacecraft so far away for a sample as small as a dry tea bag? Defend your answer.**

> **A strong answer:** A strong answer weighs the small size of the sample against the rare chance to learn something new about Mars's moons.

2. **Which origin story would be more surprising to you: that Phobos came from broken Martian rock, or that it began as an asteroid? Explain why.**

> **A strong answer:** A strong answer compares the two possibilities and uses reasoning about how objects move and change in space.

3. **Before you trusted scientists' answer about where Phobos came from, what would you want them to show or explain?**

> **A strong answer:** A strong answer considers evidence, tools, uncertainty, and how scientists can support a claim.

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E	T	N	L	V	E	R	S	M	S	D	U
E	S	E	S	V	O	Z	O	P	D	E	M
T	R	U	N	T	I	U	N	W	V	N	M
E	P	O	H	R	D	O	E	D	I	N	R
E	N	O	T	E	B	E	R	S	C	S	E
K	W	W	S	V	T	D	B	U	S	M	E
E	N	T	I	A	S	T	E	R	O	I	D
M	A	I	N	N	M	N	C	F	I	S	I
O	P	A	N	C	L	P	I	A	U	S	O
E	I	U	R	R	O	O	L	C	D	I	B
F	S	E	R	X	R	O	V	E	R	O	O
L	M	N	R	U	N	E	A	V	E	N	G

ASTEROID DEBRIS MISSION ROVER SAMPLE SURFACE

UNEAVEN

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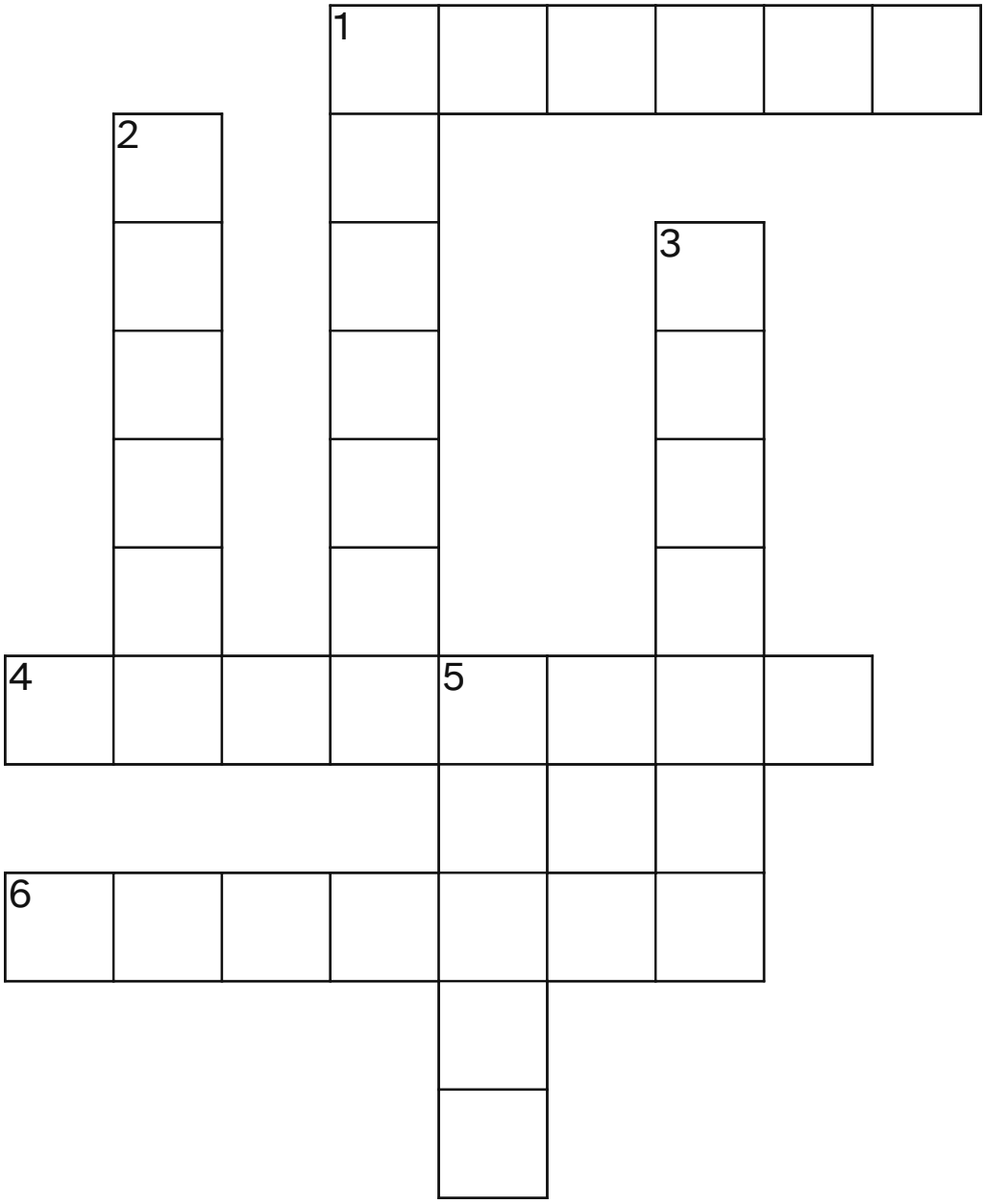

ACROSS

1 Small bit collected for study

4 Rocky space object that travels around the Sun

6 Bumpy and not flat

DOWN

1 Outside or top part of something

2 Broken bits left after a crash

3 Planned space trip with a special goal

5 Small robot that drives around to explore

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— answer key

E	T	N	L	V	E	R	S	M	S	D	U
E	S	E	S	V	O	Z	O	P	D	E	M
T	R	U	N	T	I	U	N	W	V	N	M
E	P	O	H	R	D	O	E	D	I	N	R
E	N	O	T	E	B	E	R	S	C	S	E
K	W	W	S	V	T	D	B	U	S	M	E
E	N	T	I	A	S	T	E	R	O	I	D
M	A	I	N	N	M	N	C	F	I	S	I
O	P	A	N	C	L	P	I	A	U	S	O
E	I	U	R	R	O	O	L	C	D	I	B
F	S	E	R	X	R	O	V	E	R	O	O
L	M	N	R	U	N	E	A	V	E	N	G

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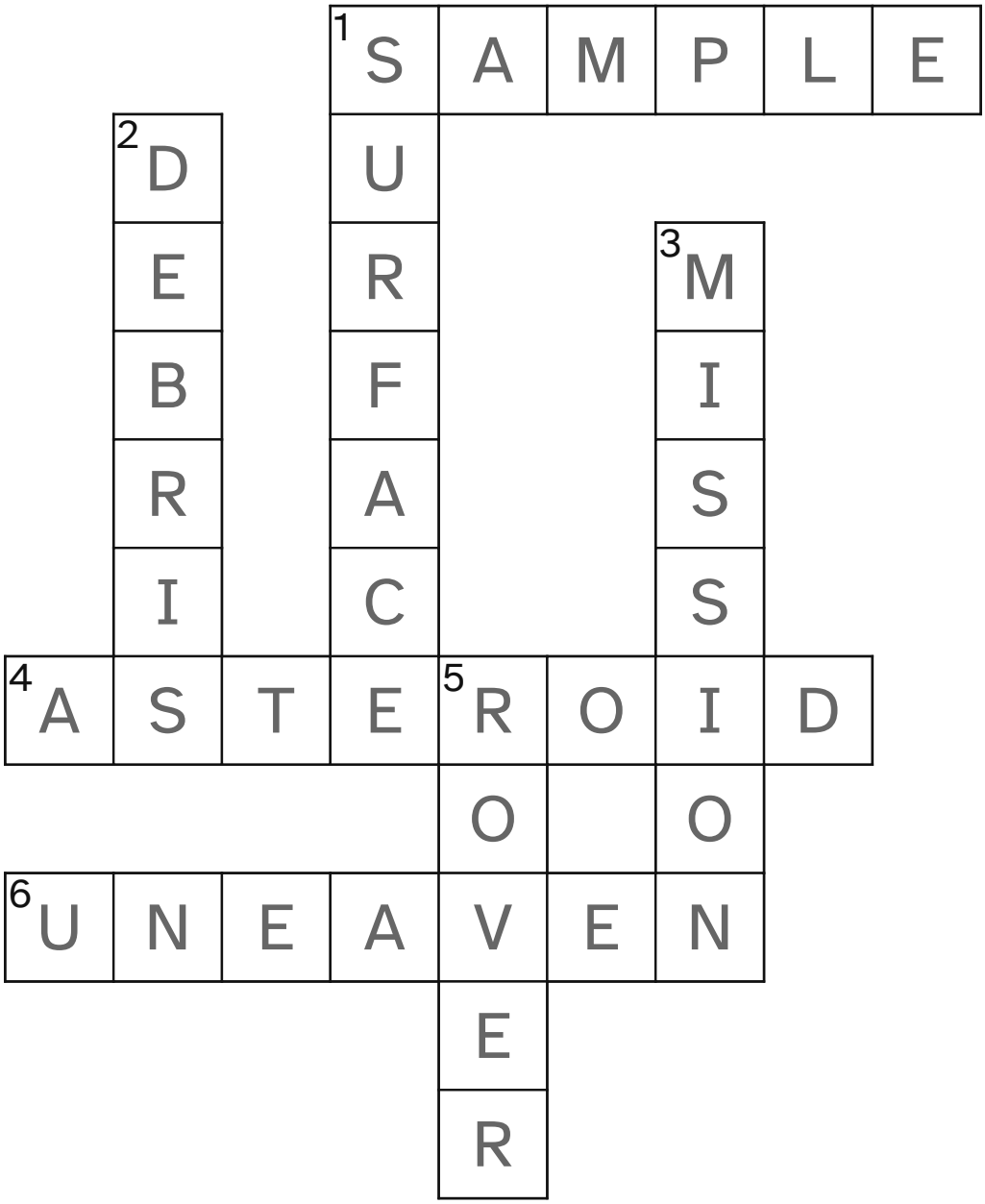

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Where this came from

This article was written for 3andB from the reporting below. It is not a reprint — the wording is ours and the facts are theirs.

BBC Newsround

"Mission to solve Mars moon mysteries"

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