

◦ WEIRD SPACE SCIENCE ◦

ROGUE PLANETS

THE
BREAKDOWN

Review Only



VIRGINIA LOH-HAGAN

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BREAK IT DOWN

1. DECODE IT

- Look at each letter.
- Look at letter patterns.
- Blend sounds.
- Try other possible sounds.

2. BUILD VOCABULARY

- Listen to the word.
- Match the sounds to a word you know.
- Look for context clues for words you don't know.
- Look up the meaning in a glossary or dictionary.

3. MAKE CONNECTIONS

- Name other examples.
- Draw the idea.
- Compare ideas.
- Ask questions.

TEST IT OUT

WORDS YOU'LL LEARN

Look over the list of vocabulary words. Are there any you already know?

directly	orphans
Milky Way	rogue
orbit	solar system

GET STARTED

Vowels that are followed by an *r* often sound different. Many unstressed syllables with a vowel + *r* are pronounced “er.”

- Look at the letters.
- Chunk long words to read them.
- Keep vowels + *r* together.
- Try “er” if other sounds do not work.

The word *orbit* has 2 vowel sounds.

It is pronounced: OR-buht.

- The 1st vowel has an *r* after it: *or*.
- The 2nd vowel says “uh”: *-buht*.

Did you know some planets are **orphans**?

This means children with no parents.

BUILD VOCABULARY

Rogue (ROHG) means being out of order.

- A planet or person can be rogue.
- A rogue planet doesn't orbit a sun.
- Other forms: roguish, roguishly, roguishness, going rogue

Orphan planets are also called **rogue** planets.

Rogue means being out of order.



Rogue planets do their own thing.

They don't **orbit** a sun **directly**.

Orbit means move around something.



Directly means in a straight line.

They're free from a "parent" sun.

DECODE IT

The word *directly* has 3 vowel sounds.

- Break it into chunks: dir-ect ly.
- The 1st vowel has an *r* and says "er."
- The 2nd vowel sound is a short *e*.
- The last vowel sound is a long *e*.
- *Directly* is pronounced der-EKT-lee.

There may be more than 50 billion
rogue planets in the **Milky Way**.

This is the galaxy that Earth is in.

Review MAKING connections

Think about large rogue planets.
Larger objects have stronger gravity.
Could humans live on a planet with
3 times as strong of gravity?

- Would human muscles work?
- Would cities be built the same?

Some rogue planets are 3 times bigger than Earth.



Rogue planets are hard to find.

Without a sun, they have no light to reflect.

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Rogue planets are cold and dark.



The process of forming planets is messy.

Space objects bang into one another.



Sometimes the bangs have too much power.

This is what makes planets.



Rogue planets can also form with no bang.

Some are failed stars.



Instead of forming a star, a cloud of gas and dust breaks down. It becomes a rogue planet.

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A **solar system** is a star and the planets and objects that orbit it.

Solar systems can travel too close to one another.



They disturb each other.

Their orbits fling out rogue planets.

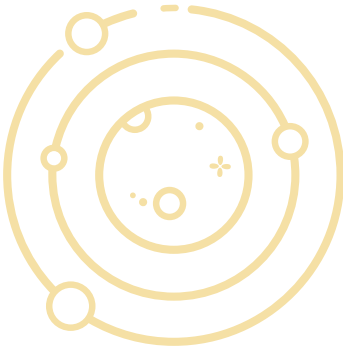
DECODE IT

The word *solar* has 2 vowel sounds.

- Break it into chunks: so-lar.
- The 1st vowel sound is a long o.
- The 2nd vowel has an *r* and says “er.”
- *Solar* is pronounced SOH-ler.

Some rogue planets even have moons.

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Scientists are still learning about
rogue planets.



PUT IT TOGETHER

Detail:

Scientists are still learning about rogue planets.

Detail:

Rogue planets can be planets flung out of their orbits.

Detail:

Rogue planets are cold and dark. Some have moons.

Main Idea:

Rogue planets are planets without a "parent" sun.

Detail:

Some rogue planets are made of material from failed stars.

Detail:

Some rogue planets are formed when space objects bang into one another.

LEARN MORE

BOOKS

Loh-Hagan, Virginia. *Introduction to Space*. Ann Arbor, MI: 45th Parallel Press, 2025.

Loh-Hagan, Virginia. *Weird Science: Space*. Ann Arbor, MI: 45th Parallel Press, 2022.

Tyson, Neil deGrasse. *StarTalk: Young Readers Edition*. Washington, DC: National Geographic Kids, 2018

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GLOSSARY

directly (der-EKT-lee) in a straight line

Milky Way (MIL-kee WAY) the galaxy that contains our solar system

orbit (OR-buht) curved path of an object around a star, planet, or moon

orphans (OR-fuh-z) children without parents

rogue (ROHG) being out of order

solar system (SOH-ler SIS-tuhm) a sun and the objects that orbit it

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Space is so weird! Have you ever wondered why it works the way it does? What is a black hole? Why do meteors look like shooting stars? In *Weird Space Science: The Breakdown*, explore the weird science of our universe.



With *The Breakdown*, complex concepts are broken down alongside visual vocabulary, comprehension support, and decoding strategies, and presented in accessible font.

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Space Junk
Space Signals
Radiation in Space
Rogue Planets



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