

Learning Guide



Space Junk

We hope you enjoyed learning all about space junk, the dangers it poses, and how we might get rid of it. Extend your learning with this print-ready Learning Guide!



What's in this Learning Guide?

Get Set to Listen

Answer TRUE or FALSE statements before and after listening to the episode.

Vocabulary

Discussion Questions

CCSS.ELA-Literacy.SL.3-8.1, SL.3-8.3

Writing Prompts

CCSS.ELA-Literacy.W.3-8.1, W.3-8.2, W.3-8.3, W.3-8.4, W.3-8.7, W.3-8.8

Design a Space Junk Collector

CCSS: SL.3-5.2, W.3-5.2, W.3-5.7, SL.3-5.4; NGSS: 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3

Space Junk Poster

CCSS.ELA-LITERACY.SL.3-5.2, W.3-5.2, W.3-5.8, SL.3-5.4; C3 Social Studies: D2.Civ.4.3-5

Careers in Space Cleanup: Project

Career & Technical Education (CTE) Connection; CCSS.ELA-LITERACY.SL.3-5.2, W.3-5.2, W.3-5.7, W.3-5.8, SL.3-5.4

Who's Responsible: Debate

CCSS.ELA-LITERACY.SL.3-5.1, SL.3-5.2, SL.3-5.3, SL.3-5.4, W.3-5.1, W.3-5.8; C3 Social Studies: D2.Civ.4.3-5, D2.Civ.10.3-5

Additional Resources & Book List



The Children's Hour
kids public radio

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<https://www.childrenshour.org/space-junk/>



Get Set to Listen

1. Before listening!

Read each statement and write TRUE or FALSE based on what you already know.



2. After listening!

Based on what the experts said in the episode, write TRUE or FALSE.



Before Listening	TRUE or FALSE?	After Listening
	1. Satellites always come back to Earth as soon as they stop working.	
	2. Space junk moves very slowly through space.	
	3. Scientists can easily see and track every piece of space junk.	
	4. Some satellites can maneuver to avoid space junk.	
	5. Scientists are developing ways to collect and remove space junk.	
	6. The United States is responsible for all the space junk.	
	7. Space junk can only be a problem for astronauts and never affects people on Earth.	

What did you learn?



Get Set to Listen

Answer key

1. FALSE. Some satellites can remain in orbit for hundreds of years.
2. FALSE. Space junk can travel at extremely high speeds.
3. FALSE. Many small pieces are difficult or impossible to track.
4. TRUE
5. TRUE
6. FALSE. Several countries have contributed to the amount of space debris.
7. FALSE. Space junk can also affect Earth's atmosphere, airplanes, and people on the ground.



Vocabulary

Listening for Words

1. Make a four-column chart and label the columns “I don’t know,” “I’ve seen or heard, but don’t know the meaning,” “I think I know the meaning,” and “I know the meaning.”
2. Write the vocabulary word in the column that describes how well you know the meaning of the word.
3. Listen to [the episode](#). Note how the speaker uses the words.

Matching Words with Definitions

1. Print and cut apart the word and definition cards.
2. Spread out the word cards so you can see them all. One by one, attach a definition card to each word card.

Writing with New Words

After working with the words and definitions, write a one-page essay or story that uses at least three of the words.

space junk

Human-made objects that no longer have a useful purpose in space.

satellite

A human-made object that travels around Earth or another body in space.



Vocabulary

orbit

The path an object follows around another object in space.

debris

Broken pieces or scattered remains.

collision

A crash between two objects.

Kessler syndrome

A chain reaction of collisions that creates more and more space debris.



Vocabulary

atmosphere

The gases surrounding Earth.

gravity

The force that pulls objects toward each other.

propulsion

A system or force that makes something move.

megaconstellation

A large group of satellites operating together in space.



Discussion Questions

1. What kinds of things have humans left in space?
2. Why do you think satellites are important?
3. Do you think pollution can happen in space? Why or why not?
4. What do you think happens to a satellite when it stops working?
5. Why is space junk dangerous?
6. Why is it difficult to track all of the space junk around Earth?
7. Why does the International Space Station sometimes have to move out of the way of space junk?
8. What is Point Nemo, and why is it used as a spacecraft graveyard?
9. What are some ideas scientists have for cleaning up space junk?

Group Discussion Strategies

Think Pair Share:

1. Individually, student writes down their answer to a question.
2. Students pair up and tell each other their answers.
3. Teacher calls for volunteers to share with the whole class their answer (and/or their partner's answer). Teacher notes key words/phrases on board.

Round Robin:

1. Teacher poses one question (written on top of a large page) to students, who are assembled into small groups of 3 or 4.
2. Students take turns brainstorming the answers. The recorder of the group writes down all answers.
3. The leader reads the group's ideas to the entire class. Teacher moderates.



Writing Prompts

Narrative Prompts

1. Write a story set in the future when the Earth's orbit becomes too crowded with space junk. What are the consequences, and how do they affect life on Earth?
2. Write a newspaper article about the space junk problem. Include:
 - A headline
 - A drawing
 - Three facts about space junk
 - An interview with a pretend scientist
 - One proposed solution

Informational/Expository Prompts

1. What is space junk and why is it dangerous?
2. What is the Kessler syndrome? What could happen if it occurs?
3. What are some ideas scientists have for cleaning up space junk?
4. Why is it difficult for countries and companies to agree on who should clean up space junk?
5. What are the benefits of satellites that make having them in space worthwhile? What are some of the problems?

Opinion/Persuasive Prompts

1. Who do you think should be responsible for cleaning up space junk—the country or company that put it there, or everyone who uses space?
2. Should there be international rules about space junk? What should those rules be?
3. If you were in charge of cleaning up space junk, what would you do? Include:
 - What the problem is
 - What your solution would do
 - Who would be responsible
4. What do you think space travel will look like 50 years from now? Will there be more space junk, less space junk, or both? Why?



Design a Space Junk Collector

Listen

- [Part 1: What is Space Junk and Why Is It a Problem?](#)
 - [\(segment 7:46-12:14 + segment 15:09-19:56\)](#)
- [Part 2: Protecting Ourselves from Space Junk](#)
 - [\(segment 25:25-31:02\)](#)
- [Part 3: Collecting Space Junk: Who Should Be Responsible?](#)
 - [\(segment 33:56-39:04\)](#)

Your Mission

Imagine you are a space engineer! Your mission is to design a machine or spacecraft that can collect space junk and help keep Earth's orbit clean.

Draw

Draw what your spacecraft or machine would look like. Label important parts of your design, such as: robot arms, nets, sensors, solar panels, engines, collection containers, etc.

My machine is called _____



Design a Space Junk Collector

Explain

1. How does your machine find, catch, collect, or move space junk? _____

2. How does your machine avoid creating more debris while cleaning up space? _____

3. What is one problem it might encounter, and how would you solve it? _____



Space Junk Poster

Listen

- [Part 1: What is Space Junk and Why Is It a Problem?](#)
 - [\(segment 7:46-12:14 + segment 15:09-19:56\)](#)
- [Part 2: Protecting Ourselves from Space Junk](#)
 - [\(segment 25:25-31:02\)](#)
- [Part 3: Collecting Space Junk: Who Should Be Responsible?](#)
 - [\(segment 33:56-39:04\)](#)

Your Mission

Create a colorful and informative poster that teaches others about space junk and why it is important to keep Earth's orbit clean.

Your poster should include:

- ☐ **What is space junk?**
Explain what space junk is in your own words.
- ☐ **Why is space junk dangerous?**
Explain how space junk can harm satellites, spacecraft, astronauts, or Earth.
- ☐ **One way to prevent space junk**
Describe one thing people, companies, or governments can do to create less space junk.
- ☐ **One possible solution**
Describe an idea for cleaning up space junk that is already in orbit.
- ☐ **A picture or diagram**
Draw Earth, satellites, space junk, or your own space-cleaning invention.
Add labels to help explain your drawing.



Careers in Space Cleanup

Listen

- [Part 1: What is Space Junk and Why Is It a Problem?](#)
 - [\(segment 7:46-12:14 + segment 15:09-19:56\)](#)
- [Part 4: How You Can Help Solve the Space Junk Problem!](#)
 - [\(segment 46:29-51:13\)](#)

*Imagine you are an adult working to solve the space junk problem!
Choose one career from the list below. Research the career or use your
imagination to think about how someone in this job could help keep space clean.*

Choose a Career

- [Mechatronics Engineer](#) and [video](#)
- [Satellite Operator](#) and [video](#)
- [Journalist](#) and [video](#)
- [Lawyer](#) and [video](#)
- [Scientist](#) and [video](#)

Your Mission

Find out what someone in your chosen career does. Then explain how they could help solve the problem of space junk.

- What does this person do? _____

- What skills do they need? _____

- How could this job help protect space? _____

- What ideas or technology could they use to solve the problem? _____



Careers in Space Cleanup

Job Fair Share

Imagine you are at a job fair to recruit more people to choose your career. Explain what you do and how it helps clean up space junk.

My job is _____

My job helps space by _____

I need to be good at _____

Draw

Draw a picture of yourself doing your space job. Show what you are doing to help solve the space-junk problem. Be sure to label important parts of your picture.

1-Minute Presentation

In about one minute, tell us:

1. *What career did you choose?*
2. *What do you do?*
3. *How do you help solve the space junk problem?*



Who's Responsible? Debate

Listen

- [Part 1: What is Space Junk and Why Is It a Problem?](#)
 - [\(segment 7:46-12:14 + segment 15:09-19:56\)](#)
- [Part 2: Protecting Ourselves from Space Junk](#)
 - [\(segment 25:25-31:02\)](#)
- [Part 3: Collecting Space Junk: Who Should Be Responsible?](#)
 - [\(segment 33:56-39:04 + 41:21-43:50\)](#)

Who Should Clean Up Space?

Choose or assign an individual or group to each of the following stakeholders:

- Governments
- Space companies
- Scientists
- Astronauts
- Everyone who uses satellites

Each group answers:

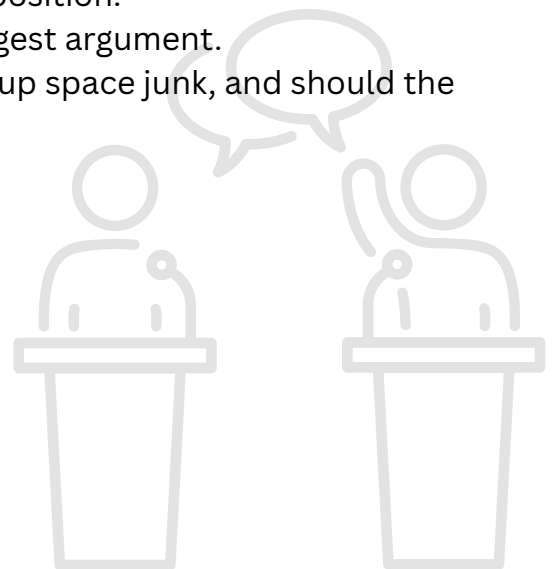
“Why should we—or shouldn't we—be responsible for cleaning up space junk?”

Debate

1. **Listen & Learn** — Listen to the segments, do some research, and take notes.
2. **Choose a Position** — Each stakeholder group develops a claim.
3. **Gather Evidence** — Identify facts from the resources that support their position.
4. **Opening Statement** — Each group presents its claim and reasons.
5. **Response Round** — Groups respond to opposing arguments.
6. **Rebuttal** — Explain why their evidence supports their position.
7. **Closing Statement** — Each group summarizes its strongest argument.
8. **Reflection** — “Who should be responsible for cleaning up space junk, and should the responsibility be shared?”

Resources

- [Tips on making class debates meaningful.](#)
- [Holding Debates in the Classroom: Upper Elementary.](#)
- [How to Hold a Classroom Debate](#)





Additional Resources

[The Trouble with Space Junk](#)

An informative article from the Museum of Science.

[Are We Trashing Space?](#)

An article from The Planetary Society.

[Space Junk!](#)

This National Geographic Kids article lists 20 seriously strange things you'll find in space.

[What Is Space Junk?](#)

An easy-to-read article from Earth.org Kids.

[Space Debris](#)

A host of resources from NASA.

Videos

[What Is Space Junk?](#)

Find out in this 15-minute Blue Studios video for kids. Jump to minute 1:30 to skip the long intro.



Book List

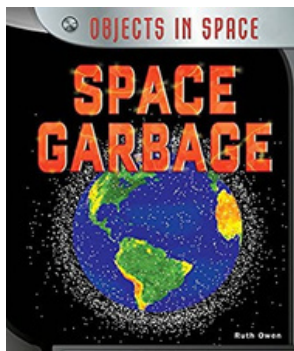


Beware! Space Junk! (Spacemice #7)

by Geronimo Stilton

MouseStar 1 is surrounded by floating, dangerous space junk. The spacemouse finds the source of the junk: very wasteful aliens. Even worse, robots that the aliens threw away have started to rebel. Can the spacemice restore harmony before the robots take over?

ages 7-10



Space Garbage

by Ruth Owen

Learn about space junk and the dangers it poses in this informative book full of comprehensive text, fact boxes, and amazing photographs.

ages 6-12



Space Junk

by Richard Hantula & Isaac Asimov

What happens to all those pieces of rockets and space shuttles that break off during space missions? Do they ever come back to Earth, or do they float eternally in outer space? Space Junk investigates humankind's impact as we continue to leave not only our footprints on the Moon but also our trash in outer space.

ages 7-11



Space Junk: The Breakdown

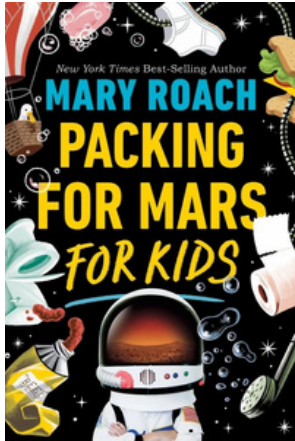
by Virginia Loh-Hagan

Break down the science of space junk in this hi-lo scaffolded text. This title layers decoding strategies with comprehension skills to ensure students can access the text as they build content knowledge. Features a dyslexia-friendly font and accessible design.

ages 10-13



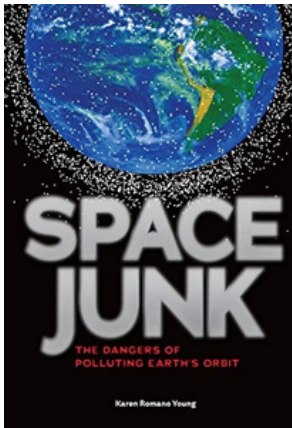
Book List



Packing for Mars for Kids

by Mary Roach

Acclaimed and hilarious science writer Mary Roach asks the questions children ask in this young-reader adaptation of her best-selling book.
ages 8-14



Space Junk: The Dangers of Polluting Earth's Orbit

by Karen Romano Young

This book teaches about the dangers of space junk collisions and what scientists are trying to do about them.
ages 11-18



Dr. Space Junk vs. The Universe

by Alice Gorman

Pioneering space archeologist Alice Gorman examines the artifacts of human encounters with space. From Elon Musk's red Tesla to hopeful messages from Earth sent into deep space, what does the junk we leave in space say about us?

14+