

Wanda Hears the Stars

A Blind Astronomer
Listens to the Universe

ACTIVITY KIT

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978-1-62354-487-4 English HC
978-1-62354-488-1 Spanish HC
by Amy S. Hansen and Wanda Díaz Merced
illustrated by Rocío Arreola Mendoza
Spanish translation by Gabriela Carrión Zayas

About the Book

Growing up in Puerto Rico, Wanda Díaz Merced wanted to learn everything she could about the stars. But in college she started losing her sight. Wanda found a way to keep doing science: she learned to hear the stars using sonification, which converts data into sounds. Listening to those chimes and drumbeats, she made new discoveries about the universe. Today Wanda is a leading advocate for inclusive science.

About the Authors

Amy S. Hansen is an award-winning science writer who has published more than thirty books. Her favorite part of her job is finding out the answers to mysteries.

Wanda Díaz Merced believes that science is for everyone! As a blind astrophysicist, she studies the stars by turning data into sound. She is a leading advocate for multisensorial data, which increases access to information, and has spoken before the UN and given TED talks about the need for more inclusive science.

About the Illustrator

Rocío Arreola Mendoza is the illustrator of *Sea of Constellations*, *Paula's Patches*, and other picture books for children. She is also a freelance illustrator and the cofounder of Cúrcumas, a women-led creative studio. She lives with her family in northern Mexico.



Discussion Questions

Use these conversation starters to get kids thinking and learning.

Pre-reading

1. After looking at the cover of the book and reading the title and subtitle, ask kids what they think *Wanda Hears the Stars* is about. Write their responses on chart paper.
2. What do kids know about the stars? If they wanted to become an astronomer, astrophysicist, or other scientist studying the cosmos, how would they pursue that goal?

Post-reading

1. Revisit the predictions kids made before reading. What predictions (if any) were correct? Did *Wanda Hears the Stars* surprise them?
2. What are some of the questions Wanda asked her family about stars after seeing a meteor shower? Do the students know the answers to these questions? Where could they find the answers?
3. Wanda lost her eyesight as an adult. What are some tools she used to adapt to life without being able to see? Why was it important to her to continue studying the stars? Turn to "Learning to Get Around" in the back matter to learn more about how Wanda achieved her goals with the help of NASA disability coordinator Denna Lambert.
4. How does data sonification work? What did Wanda hear in the starbeat that other scientists had missed?
6. What message does Wanda share with her audience at the end of the book? Why is it important to her not just to do science, but to share her work with students and the public?
7. Turn to "A Note from Wanda" in the back of the book. What advice does Wanda have for readers? Invite kids to share about a time they had to keep trying in order to succeed or achieve a goal.



Listen to the Stars

Use this activity to explore data sonification from the stars and beyond!

Materials

- Writing materials for each student
- A projector or other system to play audio and video for students
- A laptop or computer for each student
- For the optional extension, stereo speakers or a set of stereo headphones for each student

Procedure

1. Reread the end of *Wanda Hears the Stars* together. What do students think it would be like to attend a talk by Wanda Díaz Merced?
2. As a class, watch one of Wanda's TED Talks, "How a Blind Astronomer Found a Way to Hear the Stars | Wanda Díaz Merced" www.youtube.com/watch?v=-hY9QSdaReY or "Listen to the Stars: Wanda L Díaz Merced at TEDxWesterfordHighSchool" www.youtube.com/watch?v=wbTLCA1Qd4.
3. Invite students to share their reactions to the video. Was there anything that surprised them in Wanda's presentation? Do they think the book did a good job of portraying what Wanda's talks are like?
4. Discuss the data sonification samples played in Wanda's talks. What do the sounds represent? How does Wanda use this data to make discoveries about the stars?
5. Explore some image sonification examples at NASA's Hubble Sonifications page: <https://science.nasa.gov/mission/hubble/multimedia/sonifications>. What can students hear in these data samples? How are they similar to or different from music? Invite students to use the "Hearing Hubble" activity at the bottom of the website to create their own data sonifications and share them with the class.
6. **Optional extension:** Try this math sonification classroom exercise from the Perkins School for the Blind! www.perkins.org/resource/sonification-sounds-meaning-activity.



Spanish Word Search

Name: _____

Date: _____

F	T	M	Q	É	C	O	R	L	C
A	Ó	L	B	U	A	H	Í	L	Í
S	N	E	Ñ	B	M	C	V	Q	U
C	O	Q	U	Í	B	M	I	R	A
I	R	T	F	A	I	P	C	É	R
N	Ú	A	H	V	Ó	Ñ	T	L	R
A	R	R	C	I	E	L	O	F	I
N	D	L	P	R	J	Í	R	Ú	B
T	H	Ó	L	A	T	V	I	M	A
E	S	T	R	E	L	L	A	G	E

ESTRELLA
COQUÍ
CIELO

MIRA
ARRIBA
FASCINANTE

CAMBIÓ
VICTORIA



Further Reading

Make connections and enrich the learning experience with these additional resources!

About Wanda

"How a Blind Astronomer Found a Way to Hear the Stars | Wanda Díaz Merced" www.youtube.com/watch?v=hY9QSDaReY.

"Listen to the Stars: Wanda L Díaz Merced at TEDxWesterfordHighSchool" www.youtube.com/watch?v=wbtLTCA1Qd4.

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Gonzalez-Espada, Wilson Javier. "Listening to the Whispers from the Stars." *Ciencia Puerto Rico*. Oct. 1, 2013. <https://www.cienciapr.org/en/monthlystory/listening-whispers-stars>.

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About Women in Science

100 Women: Seven Trailblazing Women in Science: <https://www.bbc.com/news/science-environment-41861232>.

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Johnson, Katherine, and Charnelle Pinkney Barlow. *One Step Further: My Story of Math, the Moon, and a Lifelong Mission*. National Geographic Kids, 2021.

Larson, Kirsten W., and Katherine Roy. *The Fire of Stars: The Life and Brilliance of the Woman Who Discovered What Stars Are Made Of*. Chronicle, 2023.

Robeson, Teresa, and Rebecca Huang. *Queen of Physics: How Wu Chien Shiung Helped Unlock the Secrets of the Atom*. Sterling Children's Books, 2020.

Van Vleet, Carmella, Dr. Kathy Sullivan, and Nicole Wong. *To the Stars: The First American Woman to Walk in Space*. Charlesbridge, 2016.

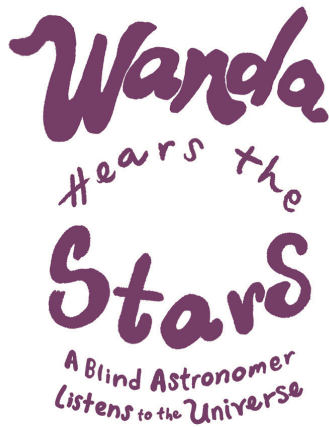
About Disability and Accessibility

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D'Antonio, Maria Rosaria, Lina Canas, and Wanda Díaz Merced. "Inspiring Stars: The IAU Inclusive World Exhibition." *Proceedings of the International Astronomical Union* 13, no. S349 (Dec. 2018): 470–473. doi:10.1017/s1743921319000620.

Fritsch, Kelly, Anne McGuire, and Eduardo Trejos. *We Move Together*. AK Press, 2021.

Napper, Kristine. *A Kids Book about Disabilities*. A Kids Co., 2020.



Further Reading

Make connections and enrich the learning experience with these additional resources!

Brauner, Diane. "Sonification Summary Page."
Perkins School for the Blind. <https://www.perkins.org/resource/sonification-summary-page>.

Pimentel, Annette Bay, and Nabi H. Ali. *All the Way to the Top: How One Girl's Fight for Americans with Disabilities Changed Everything*. Sourcebooks, 2020.

About Space and the Stars

Chin, Jason. *Your Place in the Universe*. Neal Porter Books, 2020.

Gater, Will. *The Mysteries of the Universe*. DK Children, 2020.

Gladstone, James, and Yaara Eshet. *A Star Explodes: The Story of Supernova 1054*. Owlkids, 2023.

Paul, Miranda, and Sija Hong. *Beyond: Discoveries from the Outer Reaches of Space*. Millbrook Press, 2021.

The Radio JOVE Project: <https://radiojove.gsfc.nasa.gov/index.php>.

"What Are Radio Waves?" NASA. Last modified Oct 16, 2023. https://www.nasa.gov/directorates/heo/scan/communications/outreach/funfacts/what_are_radio_waves.

"Sonifications" NASA. Last modified March 7, 2025. <https://science.nasa.gov/mission/hubble/multimedia/sonifications>.