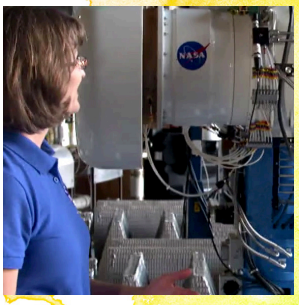
National Aeronautics and Space Administration

Danielle Koch

Aerospace Engineer



Lexile Ranges
Level 1: Less than 810
Level 2: 810-1000L
Level 3: 1010-1200L
Level 4: 1210-1400L

Level 1

Educational Product	
Educators & Students	Lexile Level: 610-800L

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NASA's Danielle Koch is always listening to the sounds around her and thinking about ways to make some of the sounds quieter.

What do you hear right now? Are the sounds pleasant, or are they noisy?

People react to sounds in different ways. If you love airplanes you might think its sound is music to your ears. Other people might complain about the noise coming from the airplane's jet engines and want them to be quieter.

Danielle's job at NASA is to find ways for airplanes to be quieter when they fly. NASA is not only known for its space programs, but it works on things related to aviation as well.

Her job title is aerospace engineer. She is always looking for ways to make things that fly in the sky or in space work better. She calls her work "an engineering journey."

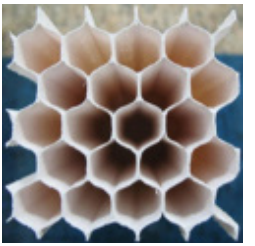
Danielle's journey to make airplane engines quieter has taken her to the top of a mountain range in Oregon, and to sitting on soggy wet soil surrounded by tall grass reeds.

She does much of her research at a dome-shaped NASA laboratory in Ohio. The laboratory's walls and floor are covered with material that keeps sound from echoing in the dome. For Danielle and her fellow researchers, this makes it easier for them to study sound.

So, how do you make a jet engine quieter? It has taken many years to find out. But there are ways. One day Danielle was in a forest and noticed she could hear the wind blowing through the trees.

She wondered what it was in nature that helped her hear quieter sounds. Could she take those ideas to help her make airplanes less noisy?

One idea that worked used honeycomb, the same six-sided structure used by honeybees.



Danielle and her co-workers wrapped a layer of honeycomb material inside a jet engine and tested it. The honeycomb made it quieter.

Danielle thinks other ideas from nature might work. But not every idea works out.

For example, she remembered one time quietly sitting among the tall grass reeds in a wetland area. Is there something about the reeds that acts as a sound insulator, she wondered. She found out there was.

But a sound insulator made of grass reeds would not last long inside a superhot jet engine. Instead, she and her team will see if there is another material they can use.

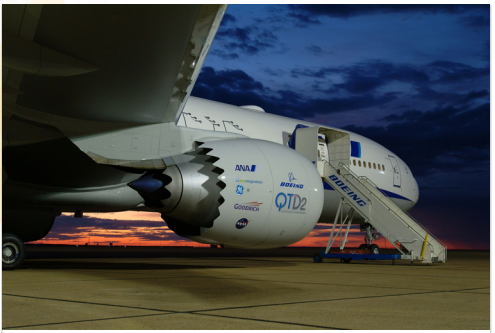
Trying new things, even when success is not guaranteed, is an important part of Danielle's job as aerospace engineer. She must be willing to accept failure, too.

When things are not working as hoped, Danielle takes inspiration from the famous pilot Amelia Earhart.

Amelia often tried risky new things during the early days of aviation. But that did not stop her.

Amelia once wrote a letter to her husband, saying "Please know I am aware of the hazards. I want to do it because I want to do it. Women must try to do things as men have tried. When they fail, their failure must be a challenge to others."

So, how did Danielle wind up at NASA? Her journey started when she was young. She loved math and science. She wanted to know how things worked. She stayed in school, went to college, and studied hard to earn a degree in engineering.



Another way NASA has reduced jet engine noise, which Danielle helped research, is seen on this Boeing 787. The saw-toothed cuts at the back of the engine change how the jet's hot exhaust mixes with cold outside air. That makes the engine quieter.

Credits: The Boeing Company/Bob Ferguson

Now Danielle gets to do what she loves every day. She thinks it is important to tell others about her passion. So, Danielle she spends some of her time talking to younger students. She hopes students will realize how rewarding a career as an engineer can be.

Do you have an interest in how things work? Study hard and perhaps you will become an engineer and come up with new ways to make airplane engines quieter.

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Educators! Guide/assessment files for this reader are at https://www.nasa.gov/stem-content/danielle-koch/