

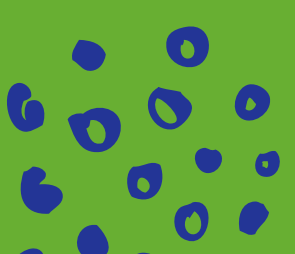




NEXT GEN STEM



**EMPOWERING THE NEXT
GENERATION OF STEM
INNOVATORS**

MEET DANA BOLLES, A SPACE SCIENCE COMMUNICATOR

Dana began working for a space agency in 1995. The first 13 years of her career were as an engineer in **regulatory compliance**, which means she ensured her agency followed state, federal, and local laws and regulations before being allowed to launch. She worked in payload safety, fire protection, and environmental protection. Dana was also the Lead for the logistics team, providing services to payload teams sending experiments to the International Space Station. Dana has worked at three installations of her space agency on both the east and west coast.

Her most recent opportunity is communicating about the exploration of life beyond Earth. Dana's diverse work experience has given her a great appreciation not only for the programs/projects side of her agency but also for the mission support functions. She is responsible for web resources to help others learn about the search for life and she also leads a team of web developers and editors that maintain the space agency's website for the public.

Having been born with no legs, Dana rides an electric wheelchair to be independent. During her education, Dana focused on studying engineering. She thought, "if I can't find useful equipment to help me with activities, I can design it as an engineer." Dana went on to get a Bachelor of Science degree in Mechanical Engineering.



[**CLICK TO WATCH OUR INTERVIEW WITH DANA**](#)

“There were many times along my path when having that dream job seemed unreachable, but with hard work and determination, I achieved my goal... to work for a space agency.”

-Dana Bolles



A DAY IN THE LIFE OF DANA BOLLES

Dana has worked in various areas and programs at her space agency, from engineering in regulatory compliance, to strategic communications.

Can you find terms she has used throughout her career?

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

- Astrobiology
- Communication
- Earth
- Global Education
- Headquarters
- ISS
- Mars
- Microbes
- Mission
- Remote Sensing
- Research
- Rover
- Safety
- Satellites
- Search For Life
- Space Station
- Space Center
- Space Exploration
- Weather Patterns

Please note: some words are found when spelled backwards!



THE SEARCH FOR LIFE

Recently, Dana has been helping her agency best communicate efforts in the Search for Life. Many missions are exploring the habitability of other worlds in our solar system and around other stars. Each mission has research teams made up of engineers and scientists with diverse interests and expertise, including computer engineers, mechanical engineers, aerospace engineers, biologists, astrophysicists, atmospheric scientists, and planetary scientists.

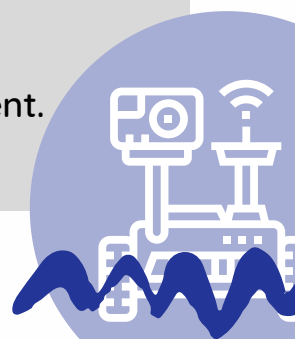
We don't yet have scientific evidence for life in other parts of the universe, but there are some exciting possibilities in the Milky Way galaxy— and even our own solar system! Astronomers have found many potentially habitable planets in the Milky Way using NASA's Kepler telescope. These "Goldilocks" planets are just the right distance from the stars they orbit—not too close and not too far—to allow liquid water to exist on their surfaces, a critical ingredient for life as we know it.

Astrobiology is the study of the origin, evolution, distribution, and future of life in the universe. Astrobiologists use our knowledge about plants, animals, and other living things on Earth to make predictions about what life might be like elsewhere in the universe. They also investigate extreme environments on Earth to develop predictions about where else in the universe we might find life, and what forms it could take. This information gives them clues about where and how to search for life beyond Earth.

On the next page, you can explore some of the adaptations living organisms on our planet have used to survive in extreme environments - places where humans cannot live! Then you can design your own world with an extreme environment, along with an alien life form adapted to survive there.

Imagine a planet or moon with an environment too harsh for people. Is it too hot? Too cold? Too acidic? Color in your landscape and make it look like the environment you imagine.

Now draw a life form that could survive in your imaginary environment. It can be one you see on the example organisms or one you invent!





EXTREME ADAPTATIONS

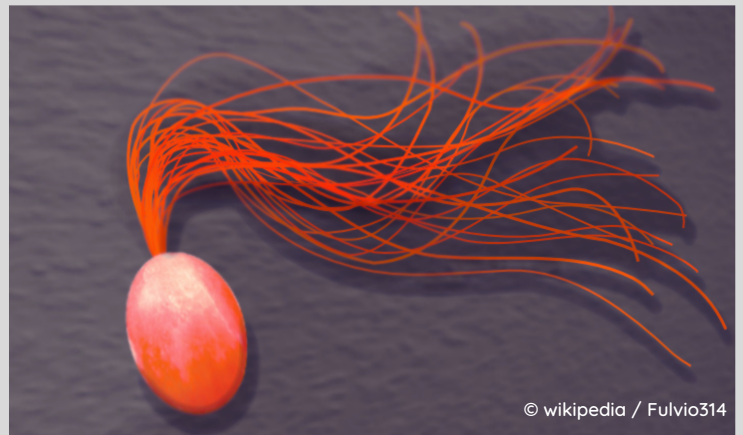
These organisms live in extreme environments on Earth where humans cannot survive. Could alien life look something like this?



© Kenneth Ingham

SNOTTITES

These microbe colonies flourish in very acidic environments. Snottites are single-celled bacteria that live in colonies in dark, wet caves. “Snotties” look like small stalactites but have the consistency of mucus. They get their energy through chemosynthesis of volcanic sulfur, and their waste is highly acidic. Some planets, such as Venus, have toxic clouds and atmospheres. They may be the perfect place to look for life forms that love acidic environments!



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RUSHING FIREBERRY

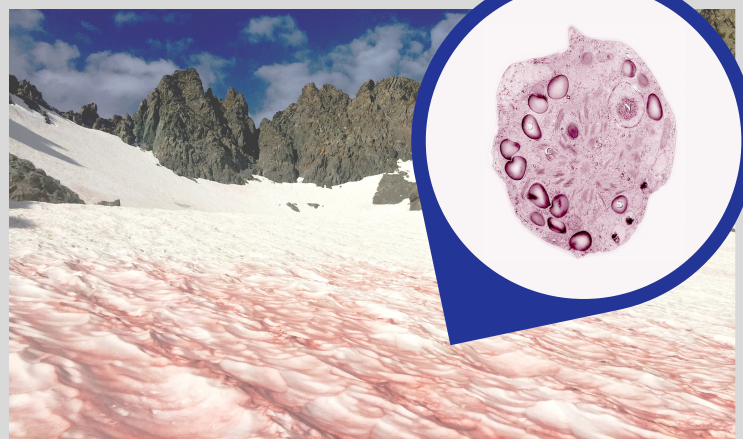
The hotter the better for this organism! The rushing fireberry can survive the burning temperatures of deep-sea volcanoes. It grows best at 100 degrees Celsius, and when conditions are good, it quickly reproduces and increases its population. Some potentially habitable planets in other solar systems (exoplanets) might be closer to their sun than Earth is to ours, so scientists want to learn more about how organisms can survive in extremely hot places.



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TARDIGRADE

This eight-legged micro-animal is one of the most durable life forms on Earth. Tardigrades can endure freezing temperatures, high pressure, and very dry air, sometimes by entering a state of suspended animation. As a research experiment, tardigrades were exposed to the radiation and vacuum of space for ten days—and they survived! NASA researchers are studying tardigrades to understand what alien forms of life might be like.



SNOW ALGAE "WATERMELON SNOW"

For many years people thought the reddish color on high alpine snowfields was caused by a mineral, but researchers have discovered that it's actually huge colonies of algae. Snow algae grow in the freezing water created by melting snow. The algae look and even smell a little like watermelon! Scientists are trying to determine if Jupiter's icy moon Europa might have the right mix of conditions to harbor forms of life that tolerate cold.



IMAGINE LIFE BEYOND EARTH

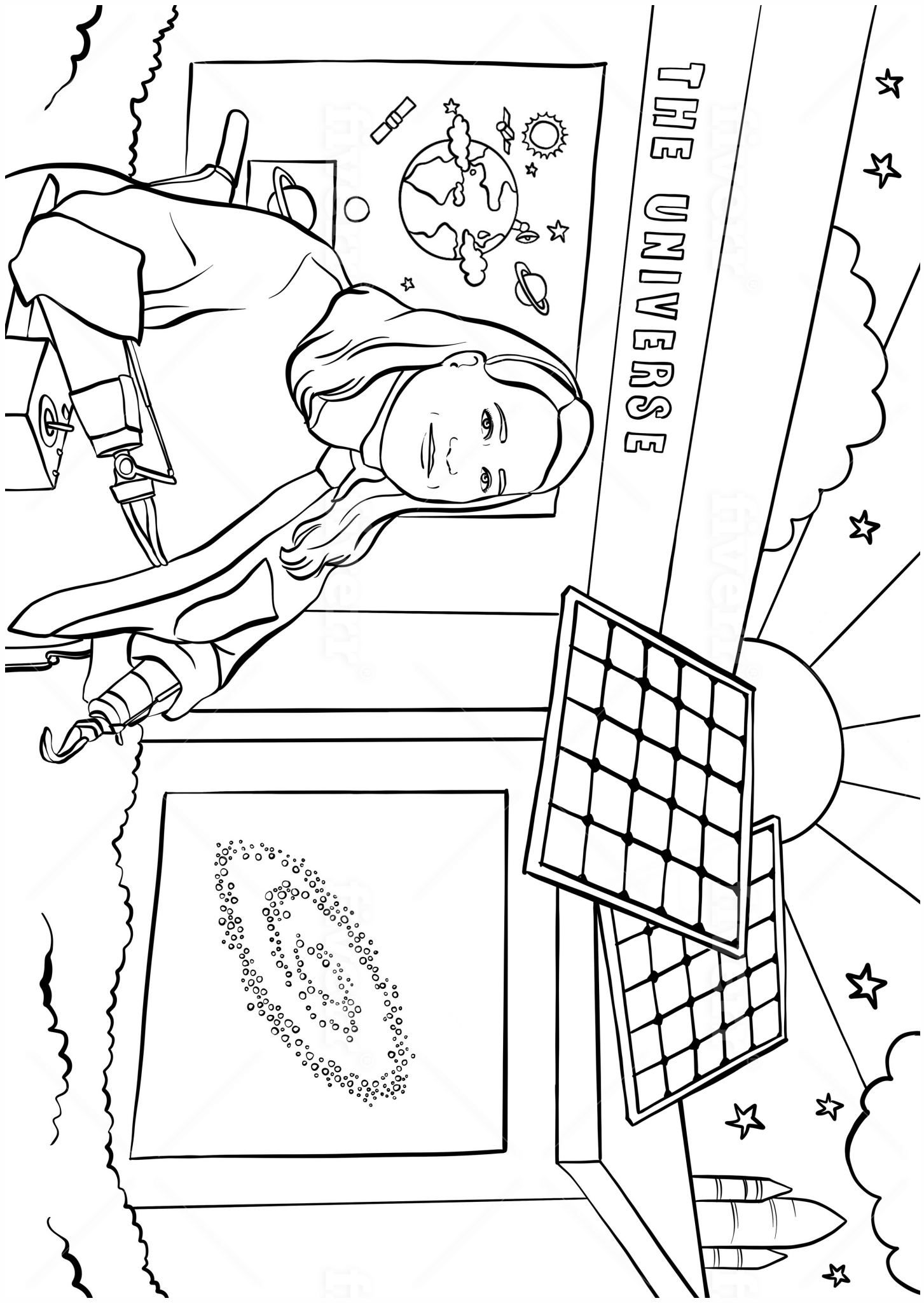
Imagine an alien life form that lives on a far-off world.

Where does your alien live? Is it hot or cold, dry or wet?

How is your alien especially well suited to its environment?



When you imagine life on another planet, you're doing a little bit of science! Researchers use our knowledge about life on Earth to make predictions about what a habitable extraterrestrial planet might be like, and what kind of life could survive there.



THE UNIVERSE