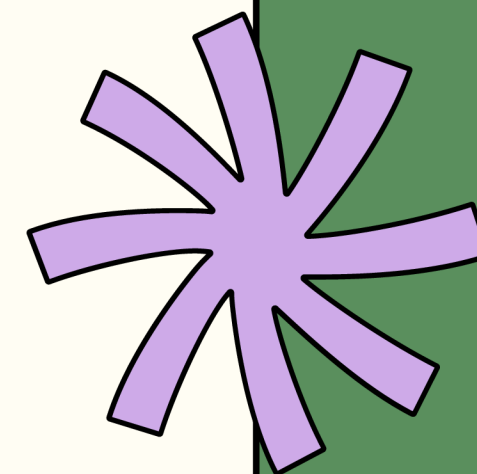
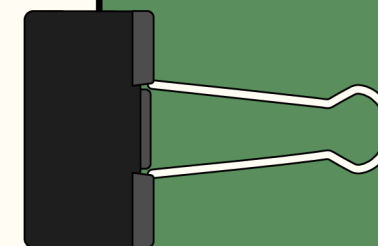
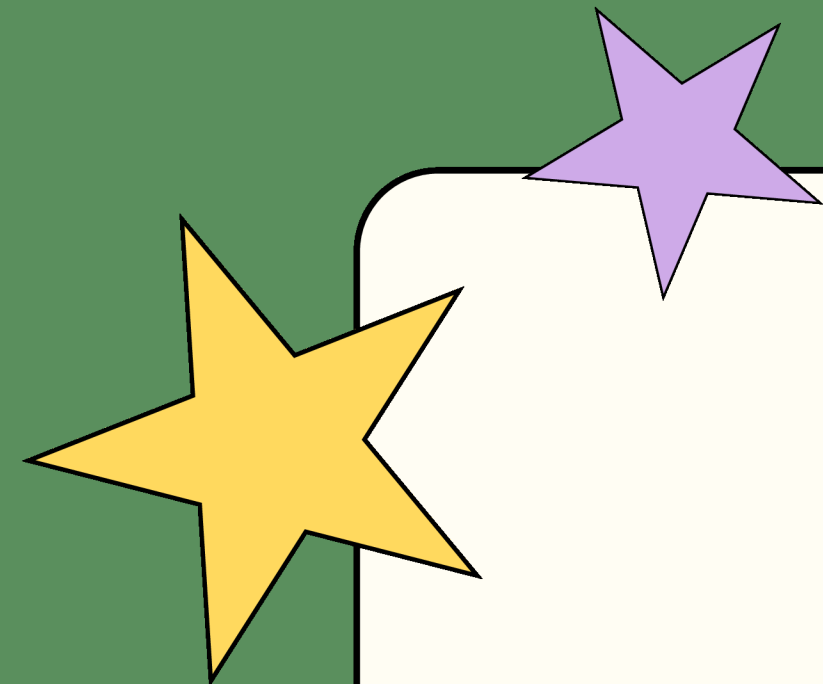
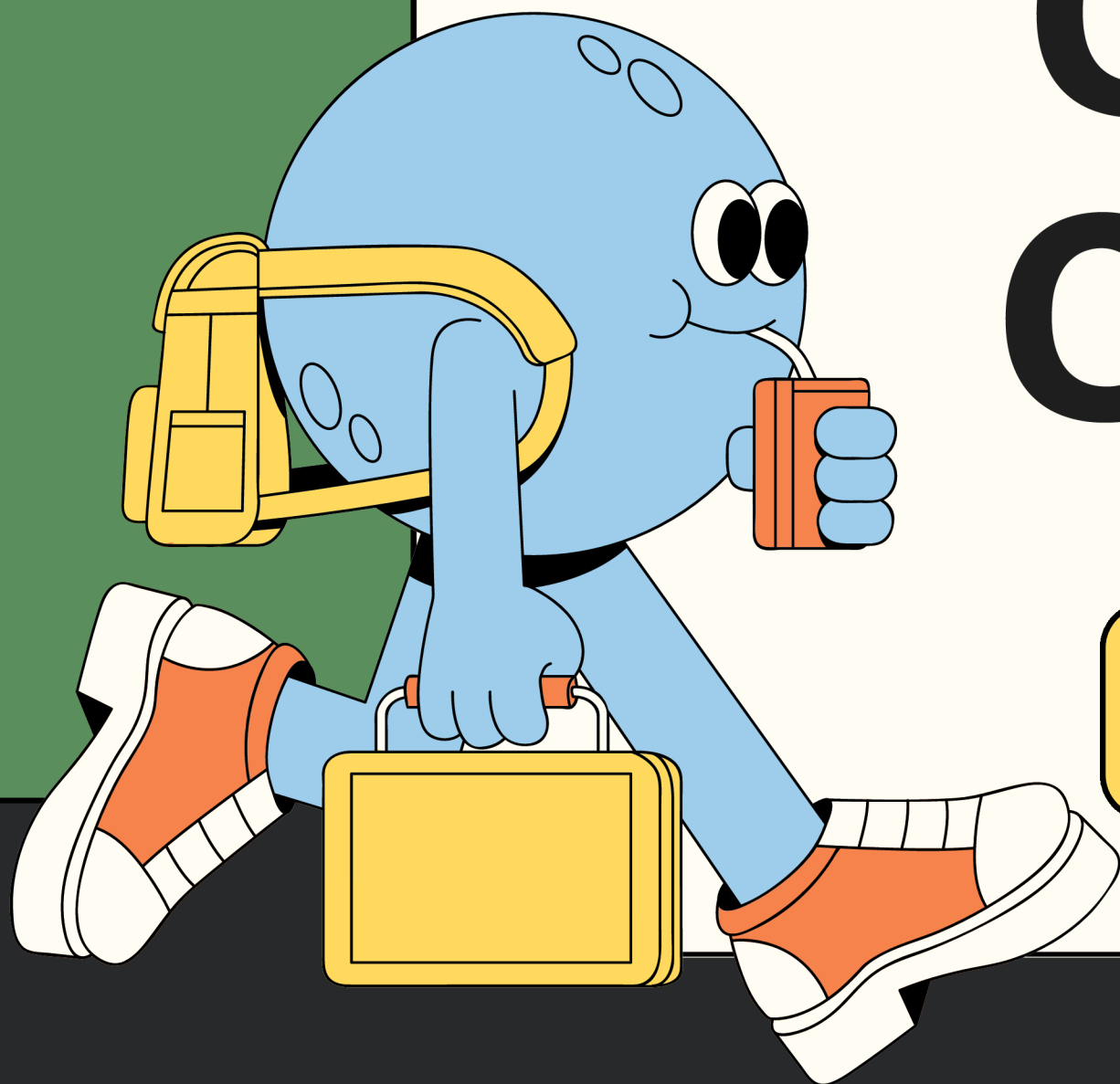
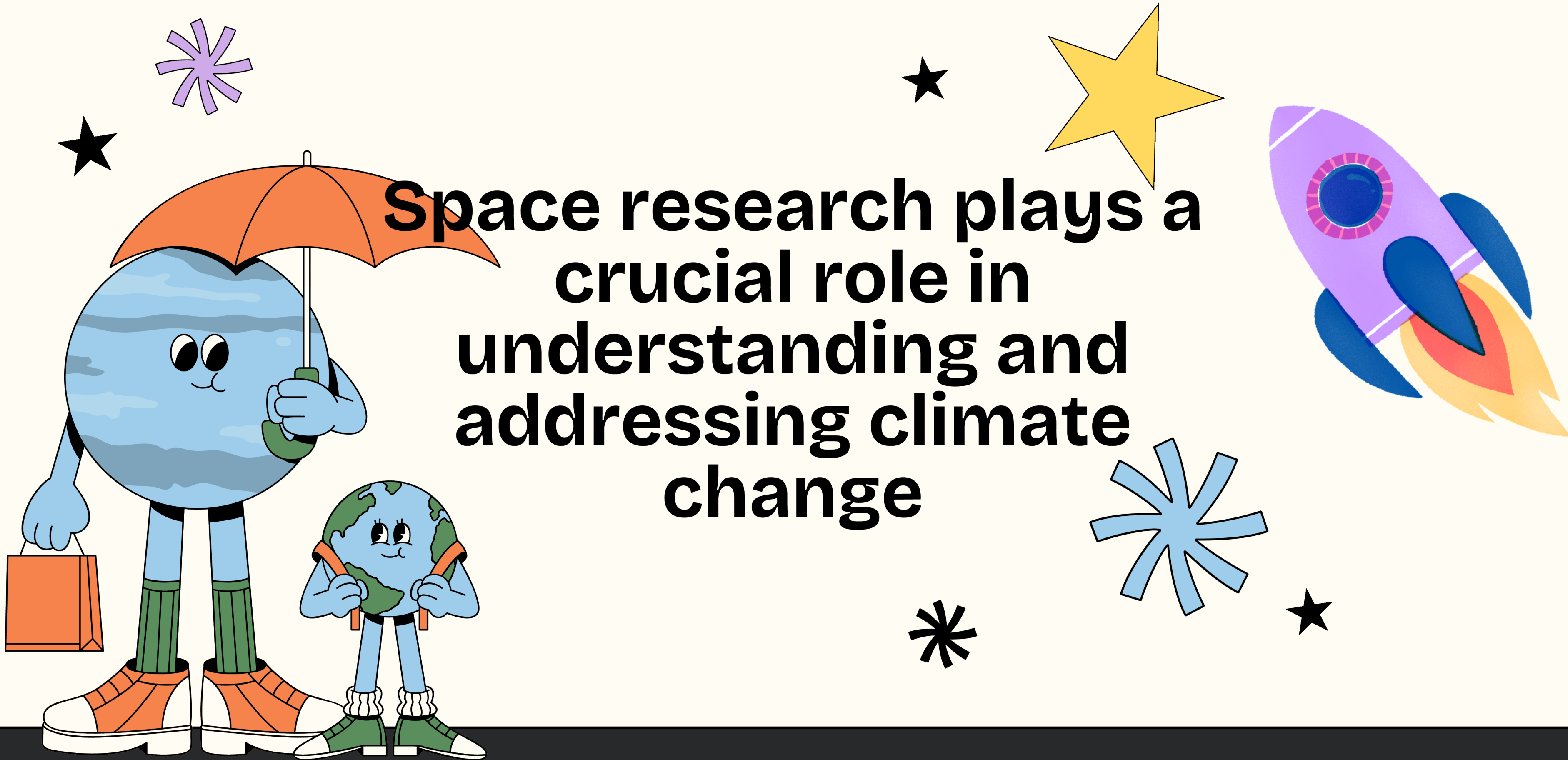


Stellar Scholars

# Climate Change

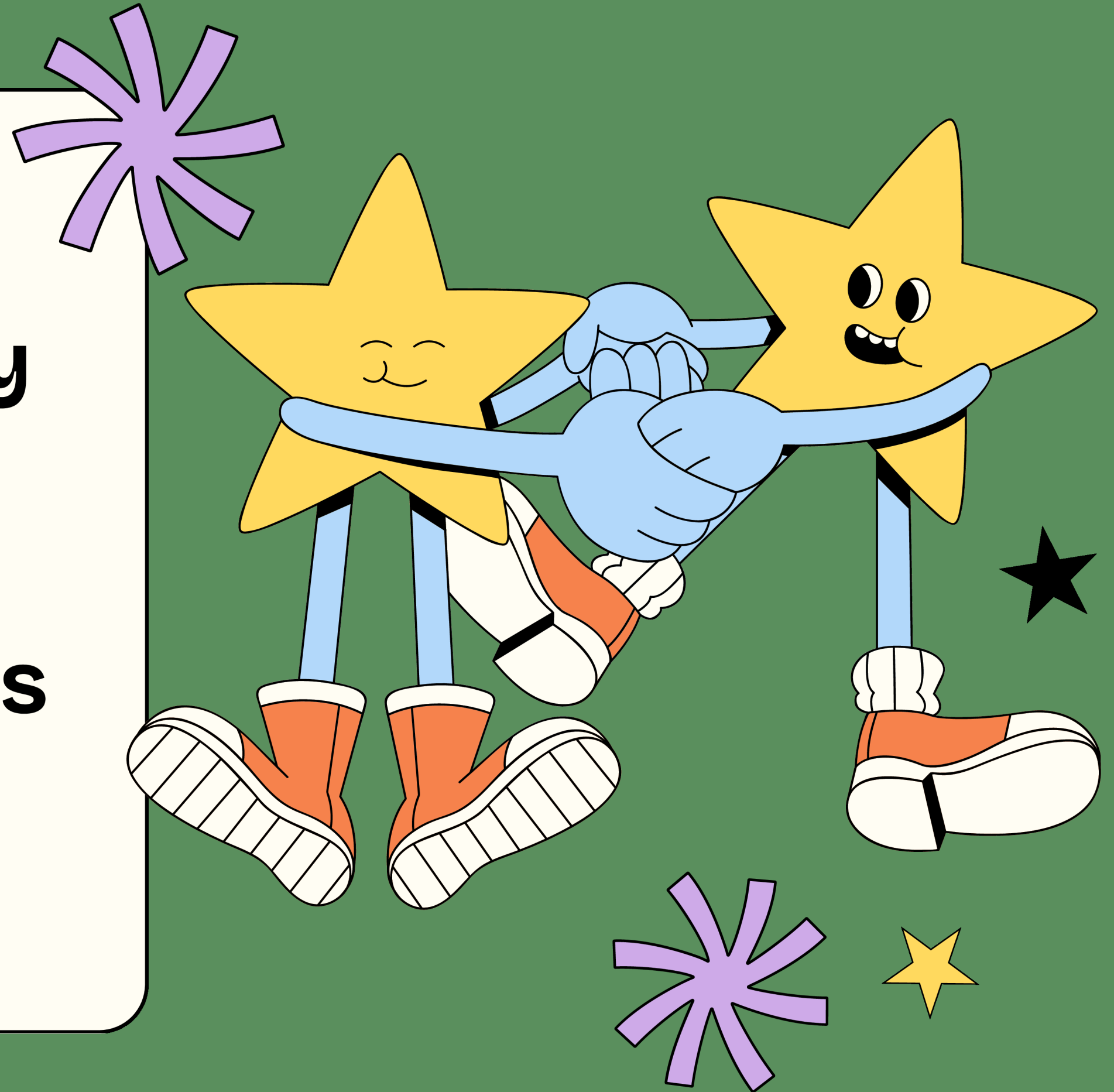

Brought to you by the Allan  
I. Carswell Observatory







**Satellites and  
space technology  
provide critical  
data for  
monitoring Earth's  
climate and  
environment**



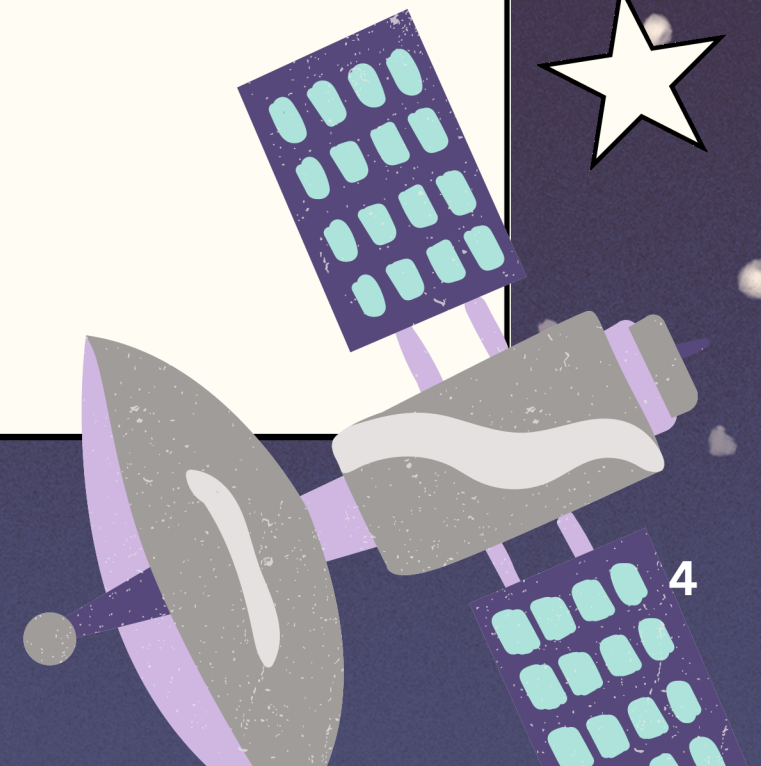




# Introduction

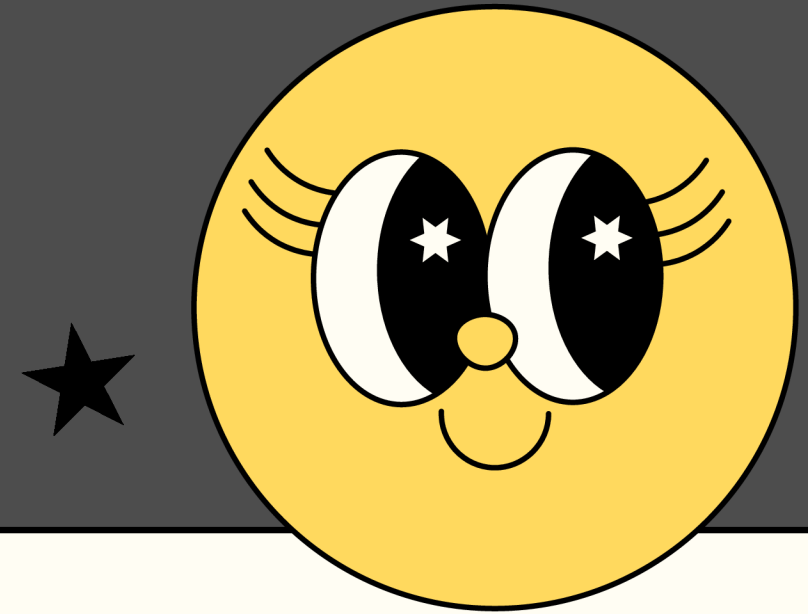


Earth is a planet, too, and NASA plays a major role in Earth science research, with broad expertise on observing our climate from satellites, instruments on the International Space Station, airplanes, balloons, ships and on land





# Monitoring Climate Change from Space



NASA has been studying Earth since its first weather satellite, TIROS, launched in 1960

Scientists were starting to understand that our climate could change quite rapidly, even within a human's lifetime



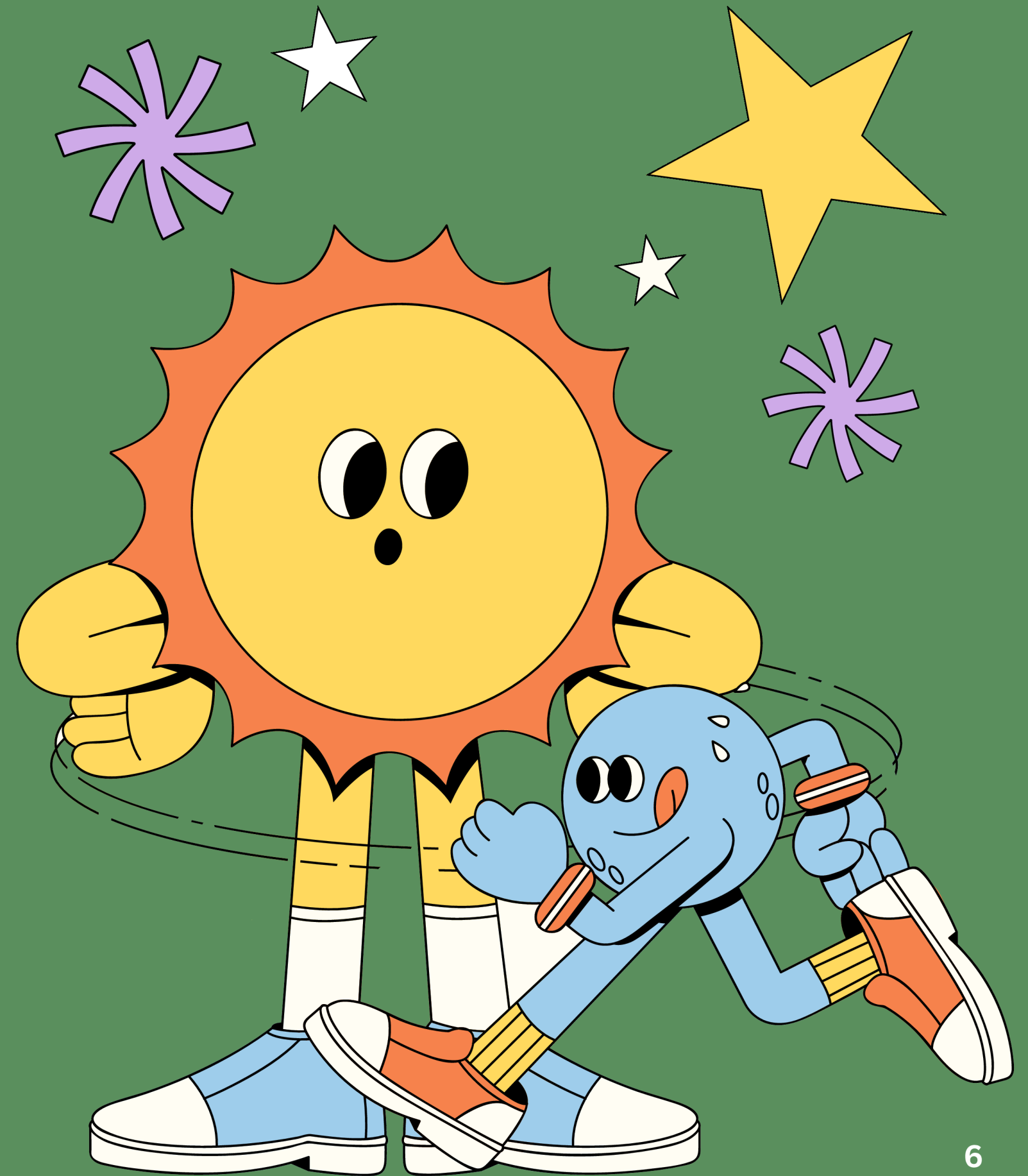
# How Climate Change Is Monitored

NASA takes measurements:

- Snowpack
- Hurricanes
- Wildfires
- Ocean ecology

Including more to add crucial details to our overall understanding from space.

NASA aim's is to provide support for informed decision-making processes in matters of climate change.

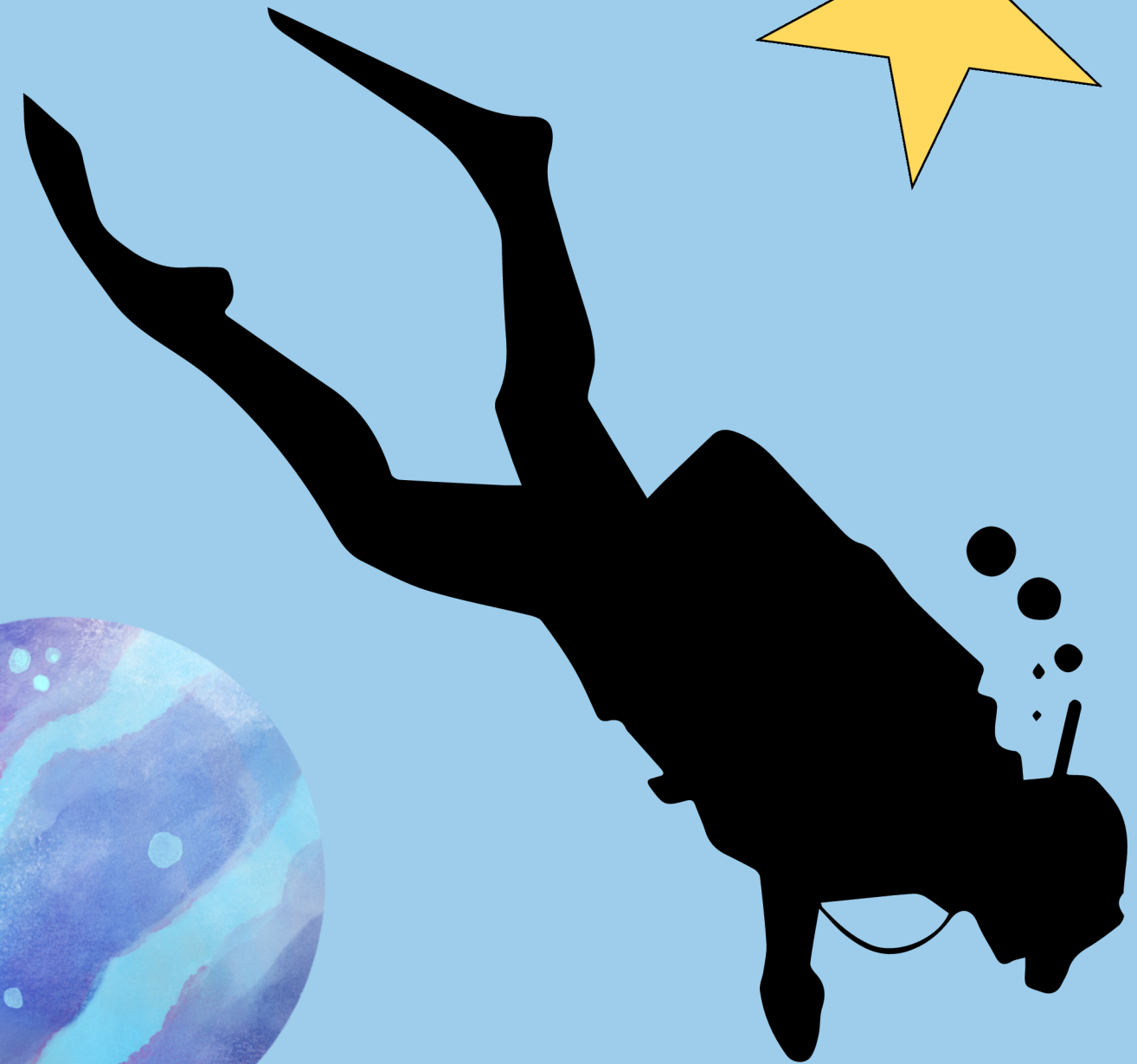
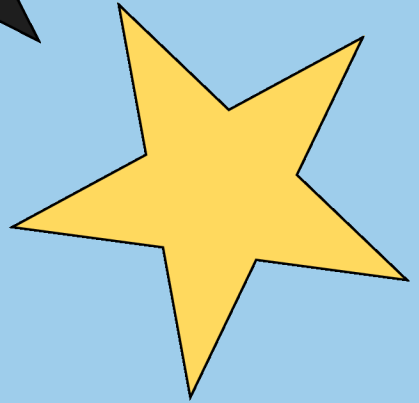
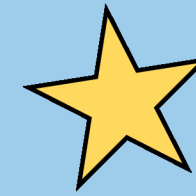
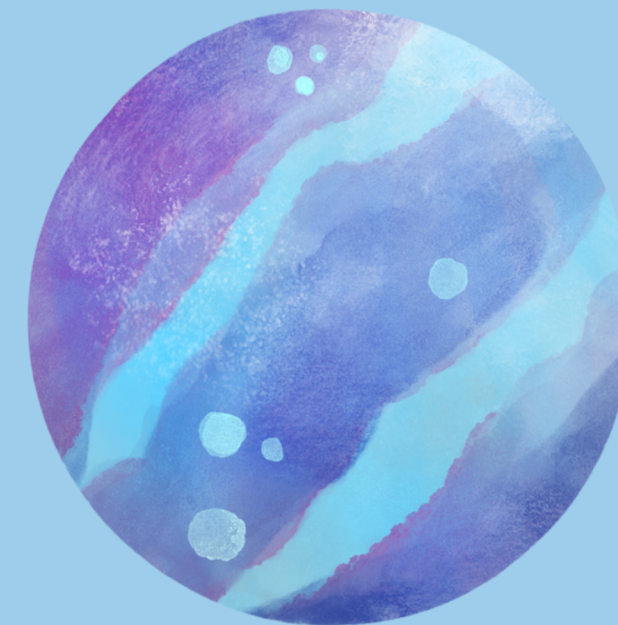
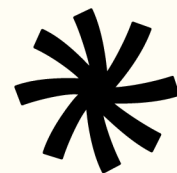




# The Ocean and Climate Change

70% of the planet is covered in water which is why the seas are important drivers of the global climate

The added heat in the air and ocean is also melting ice sheets and glaciers, which adds freshwater to the ocean and further raises sea levels





# The Ocean and Climate Change

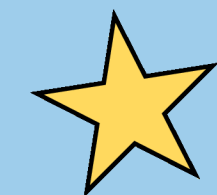
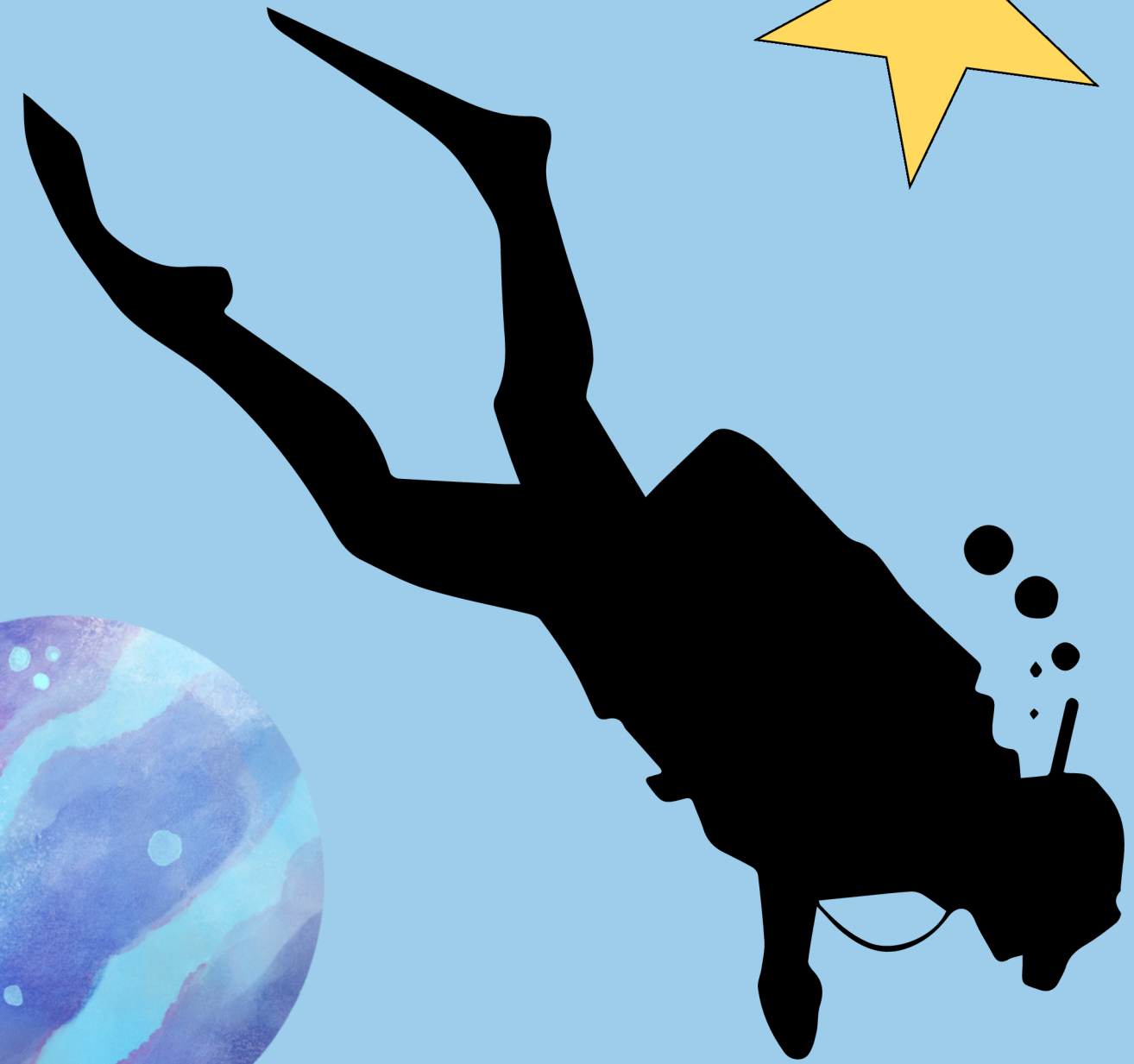
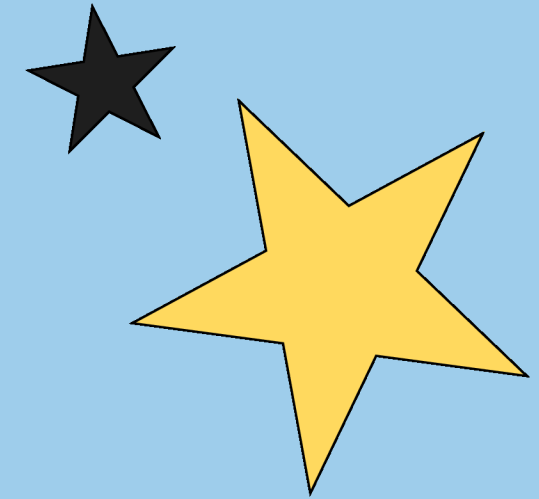
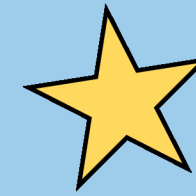
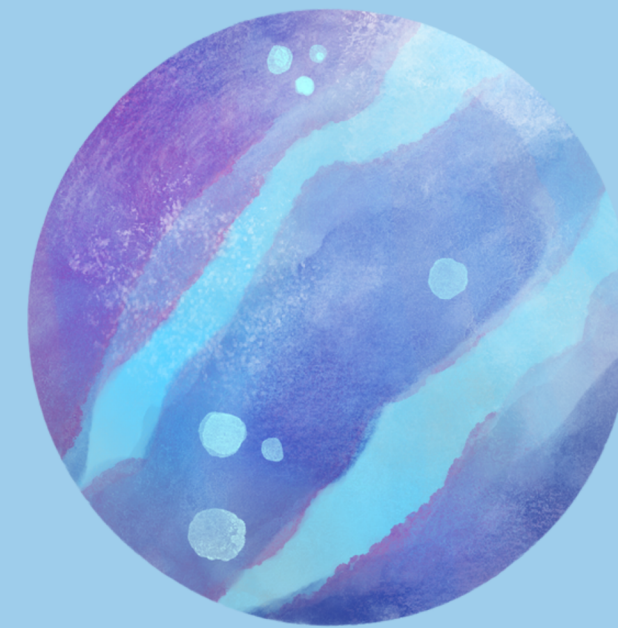
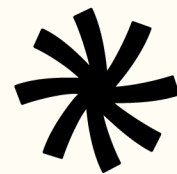
The **Surface Water and Ocean Topography (SWOT)** mission, launched in 2022, and **Sentinel 6 Michael Freilich**, launched in 2020, are **providing views of sea level rise** on top of decades of data from other missions.

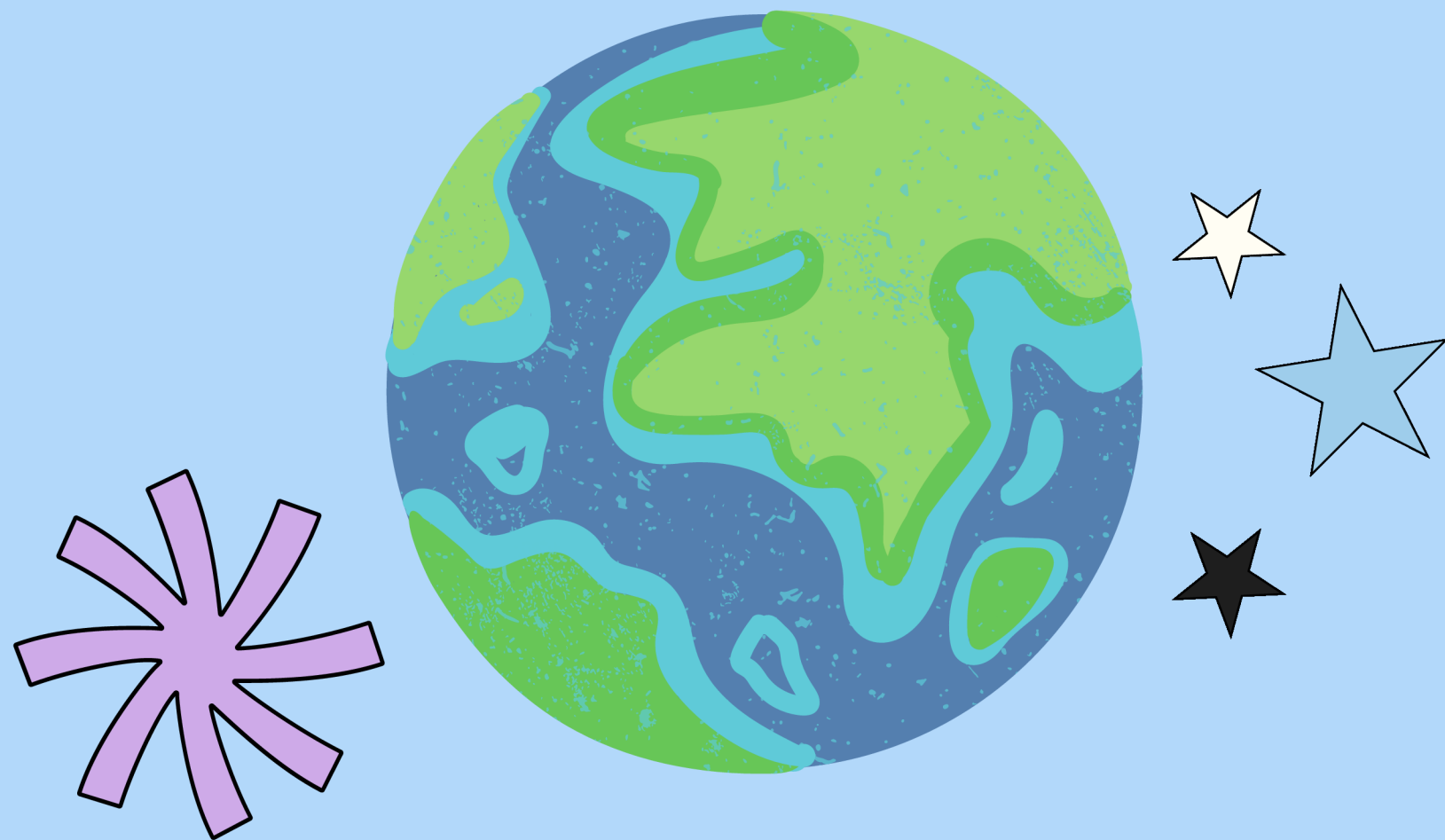


# The Ocean and Climate Change

NASA utilizes space-based satellites equipped with radar altimeters to monitor ocean changes by measuring **sea surface height, ocean currents, and heat storage on a global scale**

These satellite missions collectively provide critical data that enhance our understanding of ocean dynamics and their impact on global climate patterns.





# Why is monitoring the ocean important for climate change?

- **Ocean warming is altering hurricanes**
  - Hurricanes need warm water to form and strengthen
- **Ocean acidification and heating are altering marine ecosystems**
  - Carbon dioxide and heat are both absorbed by the ocean as greenhouse gas levels increase
- **Sea ice is thinning and shrinking**
  - Melting sea ice impacts global temperatures.
- **Ocean circulation may be changing**
  - Ocean currents are vital transporters of heat around the planet



# Space Research: Renewable Energy and Sustainability

**The Sun is the most energetic object in our solar system.** Space research helps us convert the Sun's energy into electricity. Solar power has revealed the Sun's limitless potential to power an increasingly technological society.



# Space research provides invaluable insights into climate change.

Continued investment in space technology is essential for a sustainable future.

