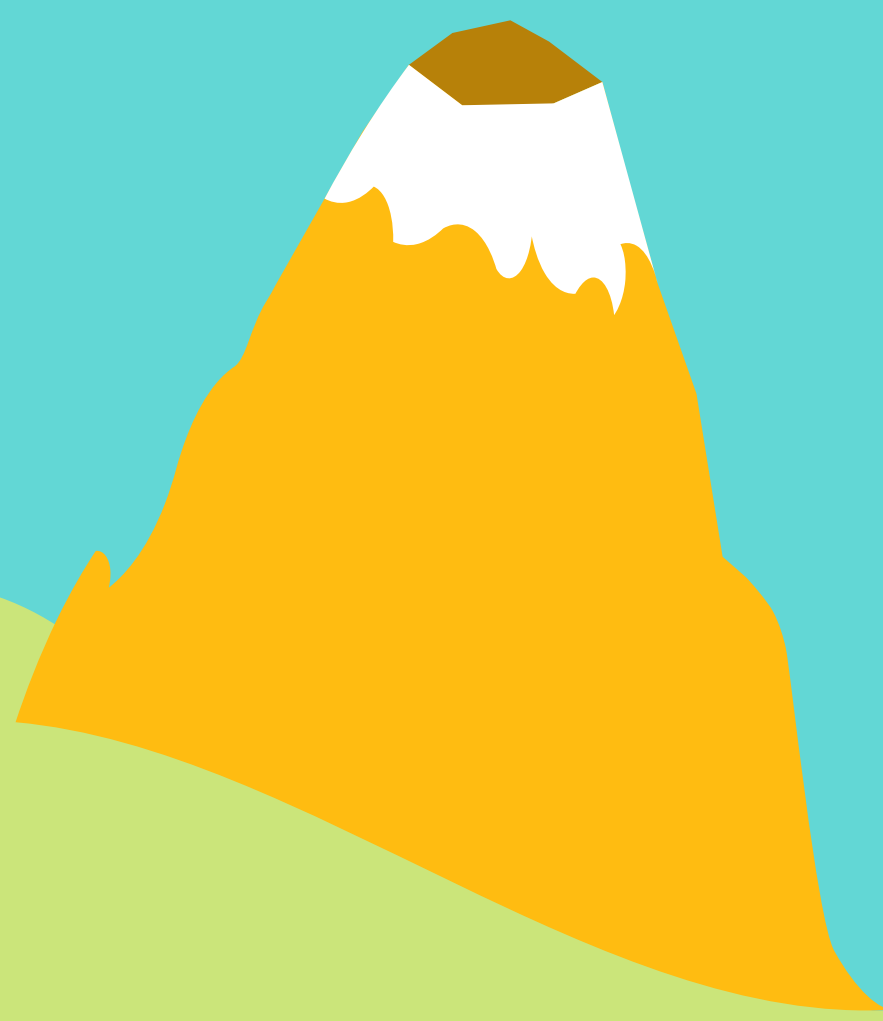
IS ANYONE HOME?

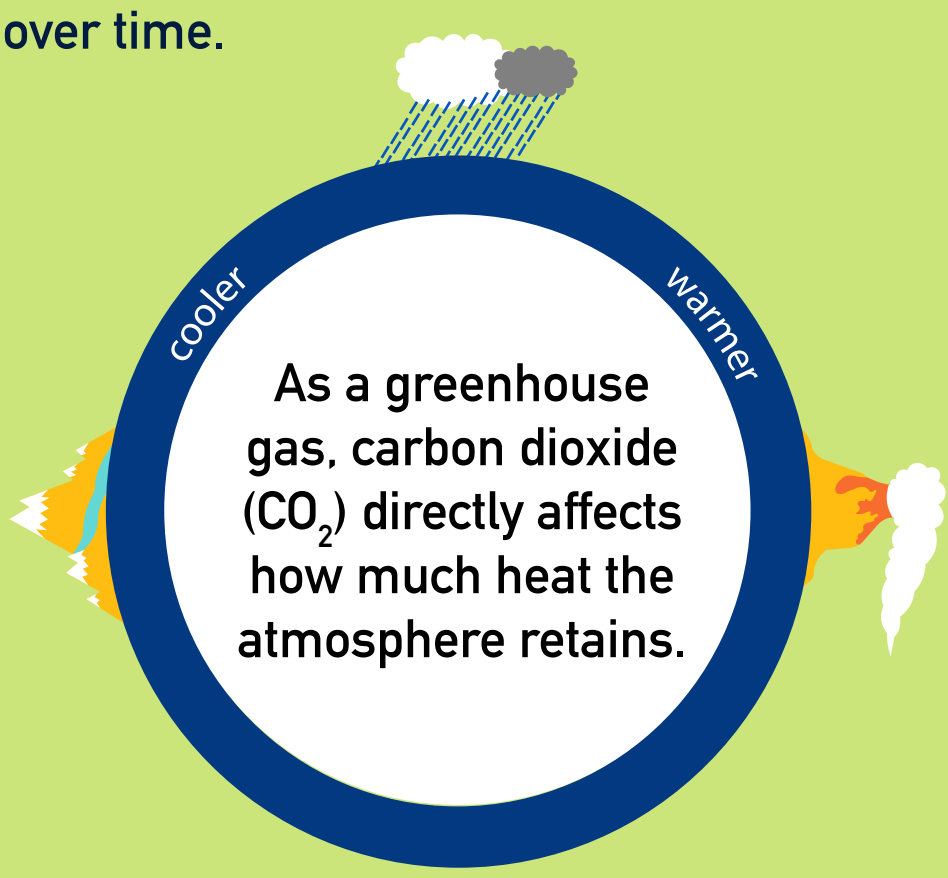
Your guide to exoplanet habitability
(for life as we know it)



SURFACE

CARBON CYCLE

The carbon cycle is a planet's way of recycling carbon atoms. The process involves the atmosphere, oceans, volcanoes, and other factors that change over time.



The carbon cycle causes carbon dioxide levels in the atmosphere to rise and fall.

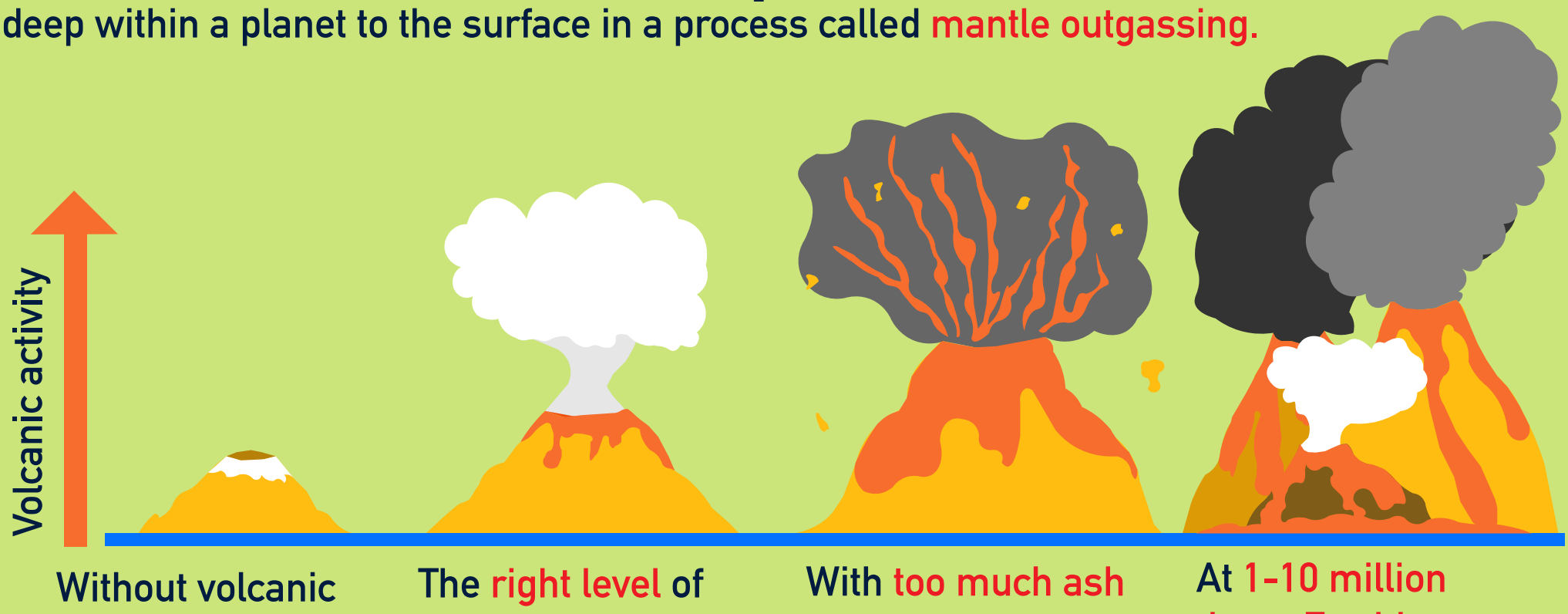
PLATE TECTONICS

The plates carry important elements that have settled on the seafloor.

As the plates move into the interior and melt, these elements are then brought back to the surface by volcanic activity.

VOLCANISM

Volcanoes bring important elements like CO_2, nitrogen, and water from deep within a planet to the surface in a process called mantle outgassing.



Without volcanic activity putting CO_2 in a planet's atmosphere, it will likely be too cold for life.

The right level of volcanic activity supports life by delivering important elements to the surface.

With too much ash in an atmosphere, sunlight could be blocked from the surface, affecting life.

At 1-10 million times Earth's current volcanic activity, vast lakes of lava may form on the surface.

SOURCES

Based on "Impact of Space Weather on Climate and Habitability of Terrestrial Type of Exoplanets," Airapetian et al. (2019).
Specific contributions from Ravi Kumar Kopparapu, Wade Henning and Joshua Schlieder.

NASA