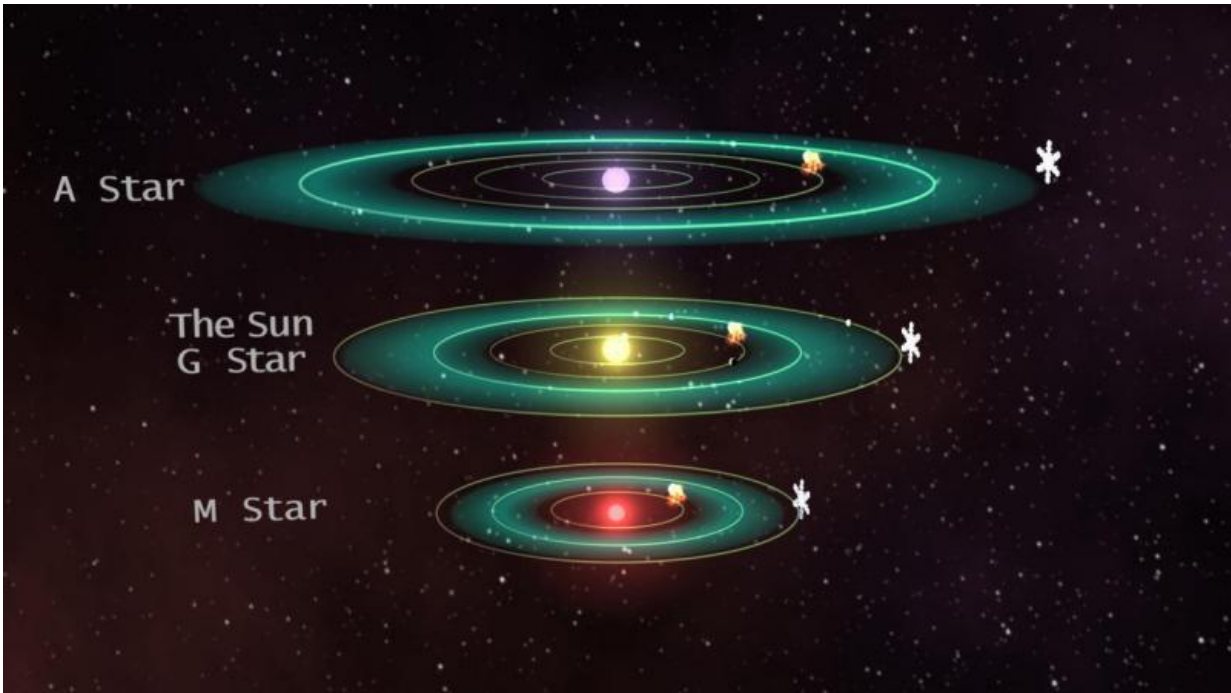


# What is the habitable zone?

June 30 2015, by Fraser Cain



Artist's impression of the habitable zone around variously sized stars. Credit: NASA

The weather in your hometown is downright uninhabitable. There's scorching heatwaves, annual typhoonic deluges, and snow deep enough to bury a corn silo.

The bad news is planet Earth is the only habitable place we know of in the entire Universe. Also, are the Niburians suffering from Niburian

made [climate change](#)? Only Niburian Al Gore can answer that question.

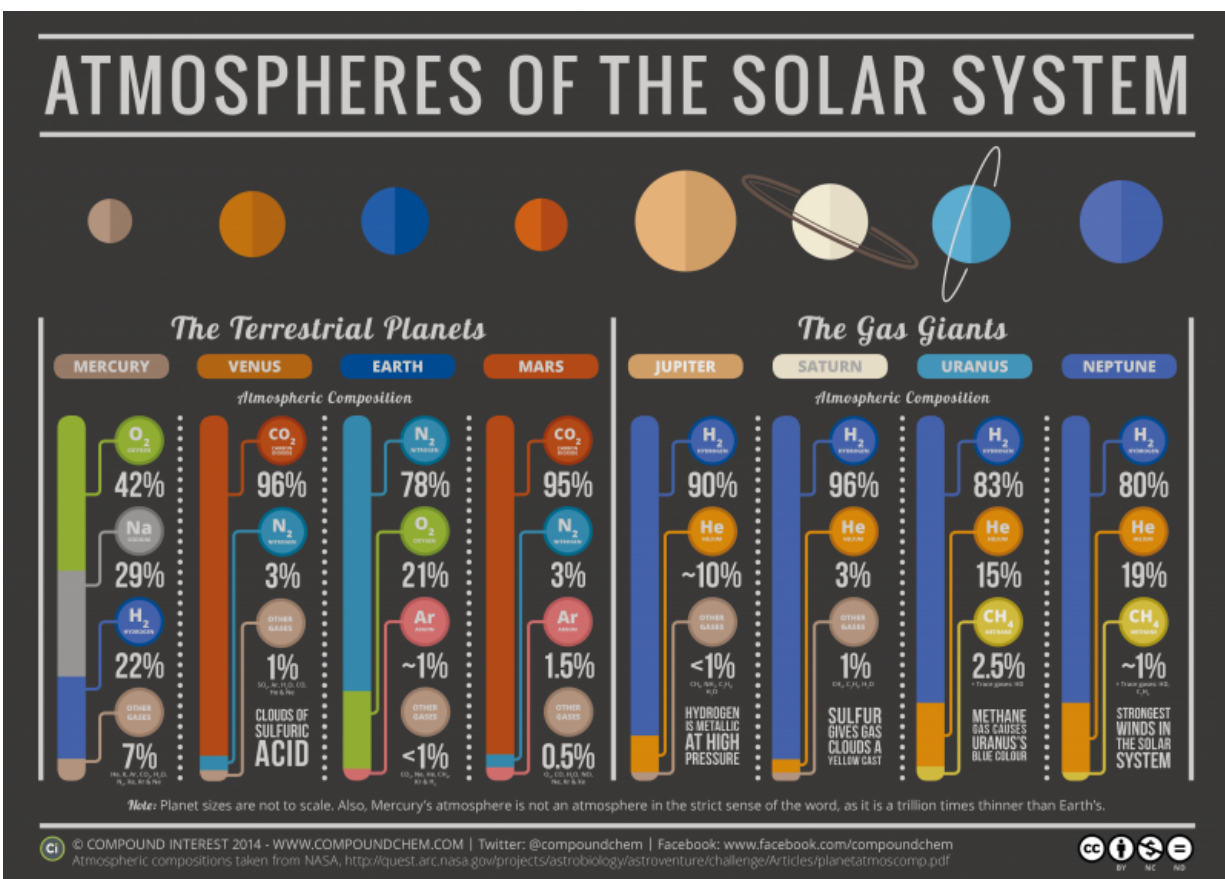
We as a species are interested in habitability for an assortment of reasons, political, financial, humanitarian and scientific. We want to understand how our own climate is changing. How we'll live in the climate of the future and what we can do to stem the tide of what our carbon consumption causes.

There could be agendas to push for cleaner energy sources, or driving politicians towards climate change denial to maintain nefarious financial gain.

We also might need a new lilypad to jump to, assuming we can sort out the travel obstacles. The thing that interests me personally the most is, when can I see an alien?

The habitable zone, also known as the "Goldilocks Zone", is the region around a star where the average temperature on a planet allows for liquid water with which to make porridge. It's that liquid water that we hunt for not only for our future uses, but as an indicator of where alien life could be in the Universe.

Problems outside this range are pretty obvious. Too hot, it's a perpetual steam bath, or it produces separate piles of hydrogen and oxygen. Then your oxygen combines with carbon to form carbon dioxide, and then hydrogen just buggers off into space.



“The Chemistry of the Solar System” by Compound Interest’s Andy Brunning

This is what happened with Venus. If the planet's too cold, then bodies of water are solid skating rinks. There could be pockets of liquid water deep beneath the icy surface, but overall, they're bad places to live.

We've got this on Mars and the moons of Jupiter and Saturn. The habitable zone is a rough measurement. It's a place where liquid water might exist.

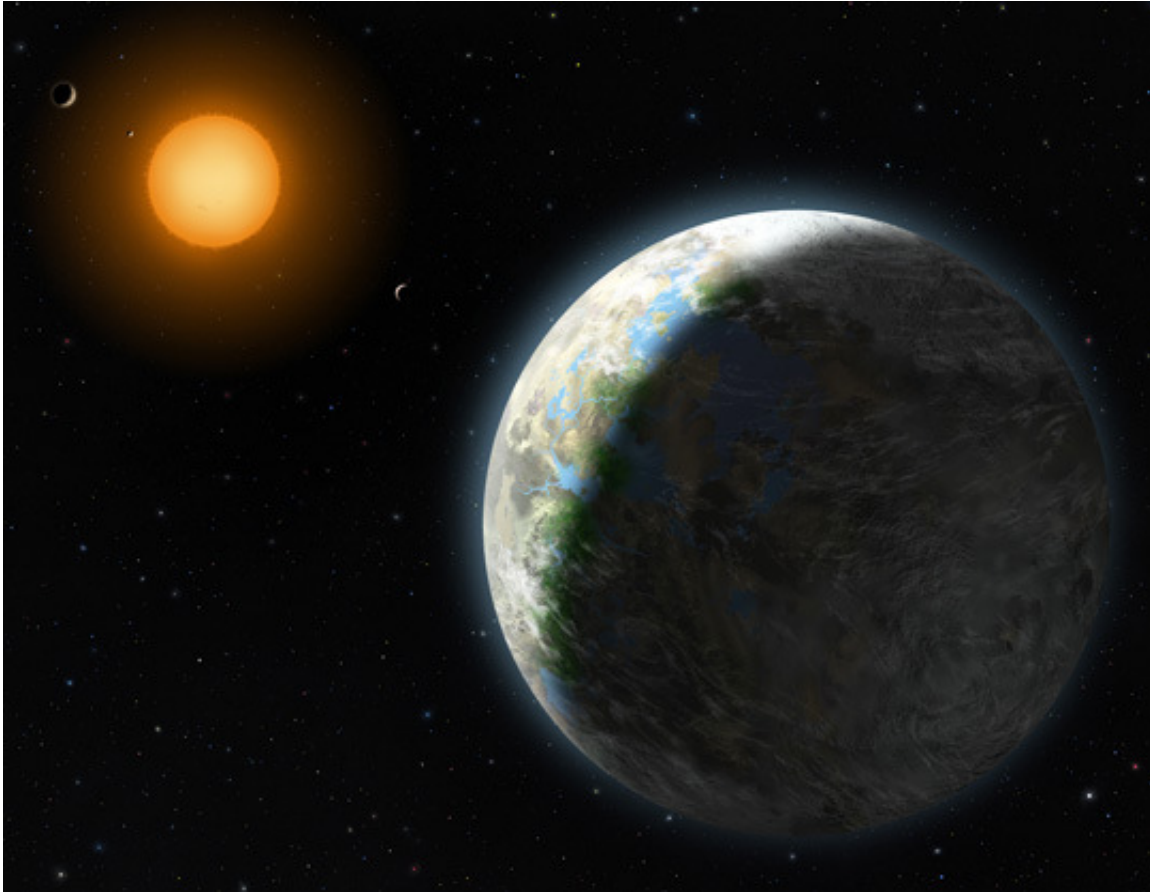
Unfortunately, it's not just a simple equation of the distance to the star versus the amount of energy output. The atmosphere of the planet

matters a lot. In fact, both Venus and Mars are considered to be within the solar system's habitable zone.

Venusian atmosphere is so thick with [carbon dioxide](#) that it traps energy from the Sun and creates an inhospitable oven of heat that would quickboil any life faster than you can say "pass the garlic butter".

It's the opposite on Mars. The thin atmosphere won't trap any heat at all, so the planet is bun-chillingly cold. Upgrade the atmospheres of either planet and you could get worlds which would be perfectly reasonable to live on. Maybe if we could bash them together and we could spill the atmosphere of one onto the other? Tell Blackbolt to ring up Franklin Richards, I have an idea!

When we look at other worlds in the Milky Way and wonder if they have life, it's not enough to just check to see if they're in the habitable zone. We need to know what shape their atmosphere is in.



Artists impression of Gliese 581g. Credit: Lynette Cook/NSF

Astronomers have actually discovered planets located in the habitable zones around other stars, but from what we can tell, they're probably not places you'd want to live. They're all orbiting [red dwarf](#) stars.

It doesn't sound too bad to live in a red tinted landscape, provided it came with an Angelo Badalamenti soundtrack, red dwarf stars are extremely violent in their youth. They blast out enormous solar flares and [coronal mass ejections](#). These would scour the surface of any planets caught orbiting them close enough for [liquid water](#) to be present.

There is some hope. After a few hundred million years of high activity,

these [red dwarf stars](#) settle down and sip away at their fuel reserves of hydrogen for potentially trillions of years. If life can hold on long enough to get through the early stages, it might have a long existence ahead of it.

When you're thinking about a new home among the stars, or trying to seek out new life in the Universe, look for planets in the [habitable zone](#).

As we've seen, it's only a rough guideline. You probably want to check out the place first and make sure it's truly liveable before you commit to a timeshare condo around Gliese 581.

Source: [Universe Today](#)

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