

Páirc Náisiúnta Néifinne Fiáine

Wild Nephin National Park



Ballycroy Visitor Centre

Space Week 2021

Our Place in Space Trail on Tóchar Daithí Bán

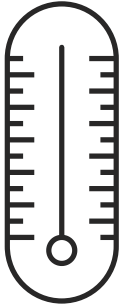


MAYO INTERNATIONAL DARK SKY PARK



Páirceanna Náisiúnta
National Parks

What makes a world habitable?

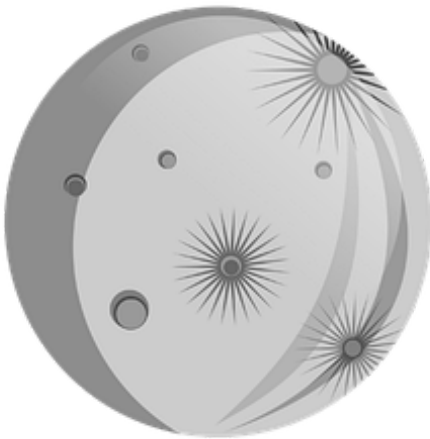


Temperature

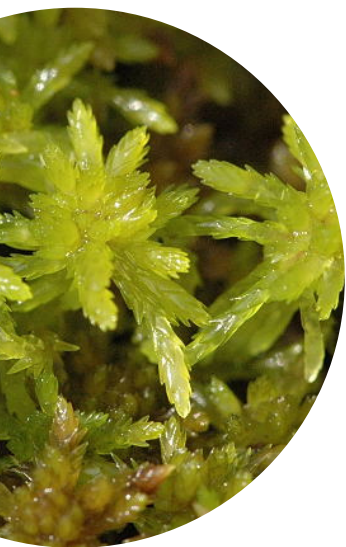
Influences how quickly atoms & molecules move.



Life seems limited to a temperature range of -15 degC to 115 degC . In this range, liquid water can still exist under certain conditions. Only earth's surface is in this range, but the interior of the solid planets & moons may be in this temperature range.



Temperatures on Mercury are extreme. Daytime temperatures can reach 430 degC . As the planet has no atmosphere to retain that heat, nighttime temperatures can drop to -180 degC .



Our Peatland Ecosystems

Increasing temperatures due to climate change will affect plant growth. Species composition and abundances will change.

What makes a world habitable?

Water

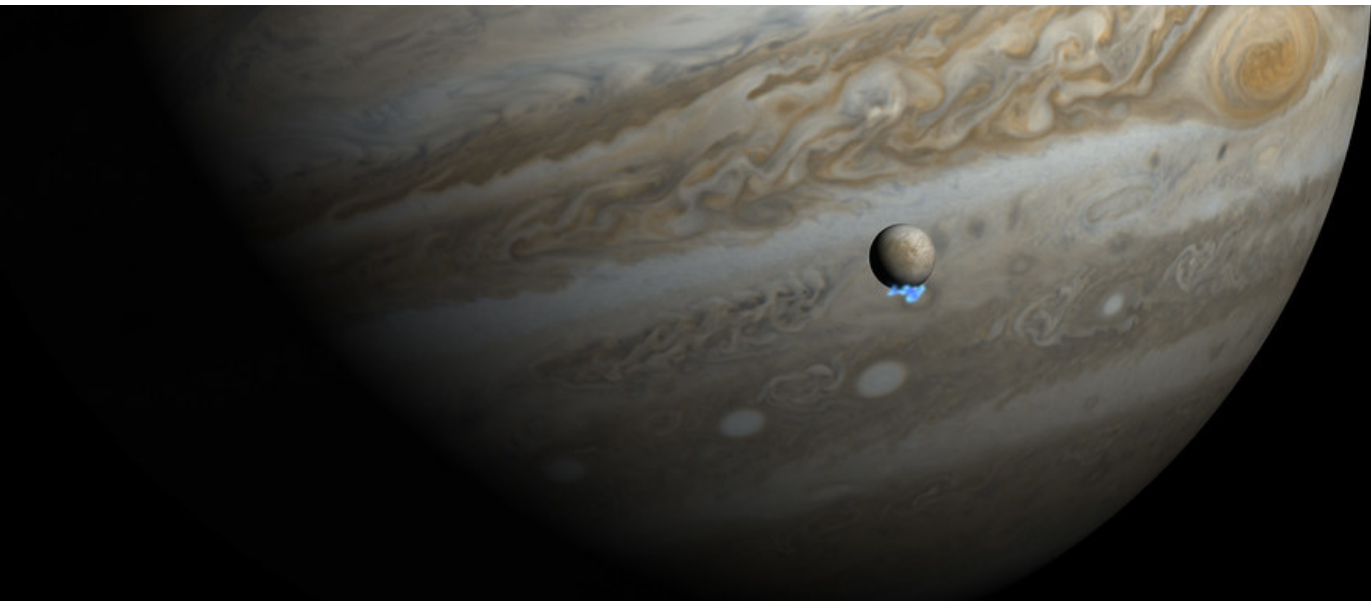
Dissolves & transports chemicals within, to and from a cell.

Although life can go dormant during dry periods, for life to be sustained water needs to be regularly available. Only Earth's surface has water, though Mars once had surface water and still has water ice in polar ice caps.

Subsurface deposits of ice are found on Mars and some moons, which melt to produce water.



Jupiter's moon Europa has a vast ocean beneath its outer shell of ice.

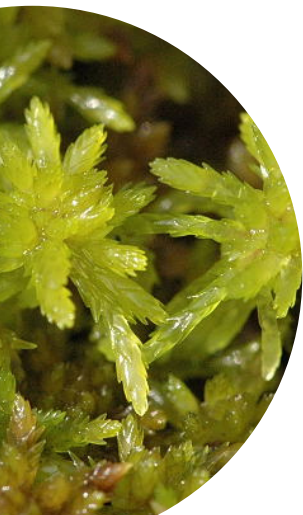


Artist's impression showing water vapour plumes on Jupiter's moon Europa

(c) Hubble ESA

Our Peatland Ecosystems

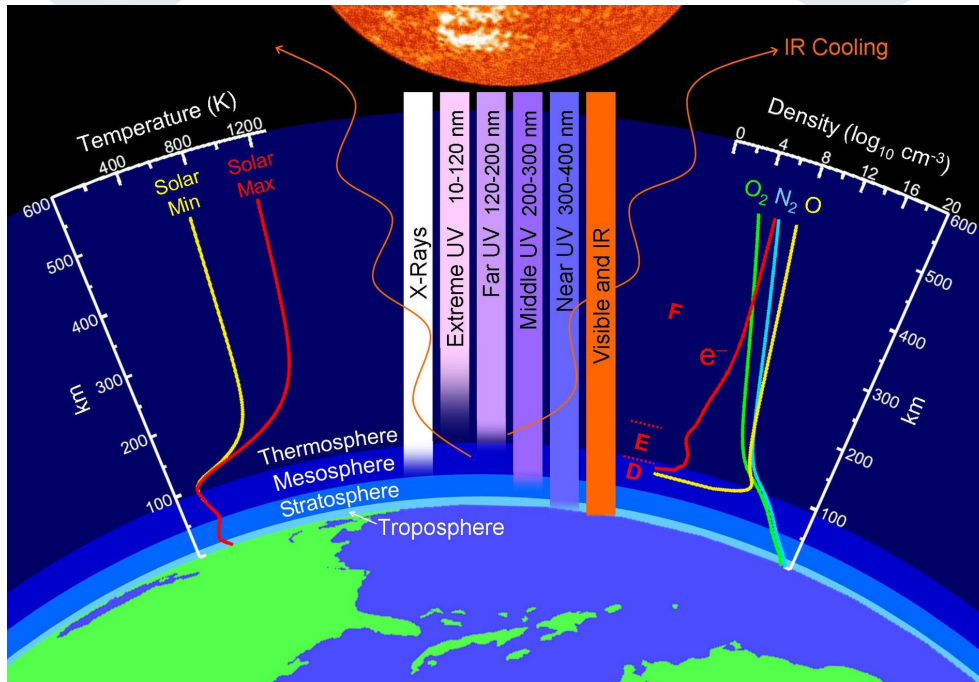
Optimal rainfall for blanket bog development is 1,200mm or more per year. Annual rainfall for this part of Mayo is approximately 2,000mm!



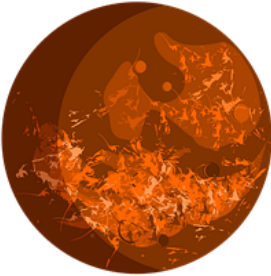
What makes a world habitable?

Atmosphere

Traps heat, shields surface from harmful radiation, provides chemicals needed for life such as nitrogen and carbon dioxide.

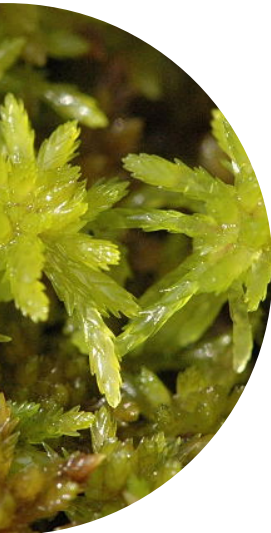


Earth and Venus are the right size to hold a sufficient sized atmosphere. Earth's atmosphere is several 100kms thick. It keeps the surface warm and is protection from radiation and small to medium sized meteorites! Mars' atmosphere is 1/100th that of Earth's, too small for significant insulation and shielding.



Venus's atmosphere is 100 times thicker than Earth's. It's made almost entirely of greenhouse gases making the surface too hot for life. The four giant planets, Jupiter, Saturn, Uranus and Neptune are completely made of gas.

Our Peatland Ecosystems



Ireland's peatlands are equivalent to rainforests as they absorb and store large amounts of carbon dioxide. These "carbon sinks" are ideal for helping tackle climate change and mitigate the effects of climate breakdown.

What makes a world habitable?



A steady input of light or chemical energy allow cells to run chemical reactions that sustain life. The inner planets get too much sunlight for life and the outer planets get too little. Most solid planets and moons have energy-rich chemicals.

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Energy

Organisms use light or chemical energy for life processes.

Organisms die when there is too little sunlight or too few chemicals (e.g. iron and sulphur). Too much light energy can make a planet too hot or if there are too many harmful rays (e.g. ultraviolet).



Our Peatland Ecosystems

Chemicals for good plant growth are in short supply in peatlands. Some plants have managed to survive in these conditions such as sundew, a carnivorous plant. This plant traps small flies on their leaves and absorbs nitrogen and phosphorous from their decomposing prey.

What makes a world habitable?

Nutrients

Used to build and maintain an organism's body



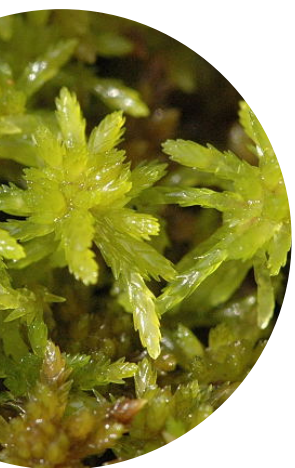
Without chemicals to make proteins and carbohydrates, organisms cannot grow. Planets without systems such as water cycles and volcanic activity don't have the necessary processes to deliver nutrients and chemicals needed to support life. All solid planets and moons have the same general makeup, so nutrients are present on those. Earth has a water cycle, an atmosphere and volcanoes that circulate nutrients. Venus and Mars also have nutrients and ways to circulate them!



Too many nutrients aren't a problem, but if the circulation systems are too active it can interfere with an organism's ability to acquire enough nutrients. This is the case with the constant volcanism on Io, Jupiter's moon, or the churning atmospheres of the gas planets, Jupiter, Saturn, Uranus and Neptune.

Our Peatland Ecosystems

Deer grass has long needle like leaves with brownish grass like flowers at the tip. In winter the leaves die back from the tips. All the nutrients in the plant are recycled and stored over winter in underground bulbs ready for spring growth.



Earth - Pale Blue Dot

This photograph was taken on February 14th 1990 by Voyager I from a distance of over 6 billion kilometres.

(c) NASA/JPL-Caltech

The text below is from Carl Sagan's book *Pale Blue Dot*. As the spacecraft Voyager I was departing our planetary neighborhood for the fringes of the solar system, it turned around for one last look at its home planet. Caught in the centre of scattered light rays (a result of taking the picture so close to the Sun), Earth appears as a tiny point of light, a crescent only 0.12 pixels in size.

Look again at that dot. That's here. That's home. That's us. On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives. The aggregate of our joy and suffering, thousands of confident religions, ideologies, and economic doctrines, every hunter and forager, every hero and coward, every creator and destroyer of civilization, every king and peasant, every young couple in love, every mother and father, hopeful child, inventor and explorer, every teacher of morals, every corrupt politician, every "superstar," every "supreme leader," every saint and sinner in the history of our species lived there - on a mote of dust suspended in a sunbeam.



Our Earth is precious, it sustains us!

Let's help protect it; all its beautiful landscapes and nature, including our wonderful peatlands!