

# The Earth

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An Exceptional Planet

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## An Exceptional Planet

With elaborate research endeavors astronomers are searching for other planets in different star systems. Among all previously found planets and exoplanets no other earthlike planet has been found so far.

Physical, chemical and astronomical conditions on our home planet offer us a set of unique living conditions. Below is a list of 12 scientific features that impact our thoughts about the origin of the earth.

### Necessary conditions for the habitability of the earth

**1. The correct distance from the sun:** We are moving around our central star with a distance of approximately 90 million miles (150 million km). The amount of light and heat radiated by the sun and the earth's distance to the sun are fine tuned in such a way that the temperatures on earth vary mostly between 32 °F and 100 °F (0 °C and 40 °C). These are exactly the narrow limits required to sustain the biochemical processes in of the body cells and thereby create the optimal conditions necessary to maintain life – especially human life.

**2. The correct speed of rotation of the earth:** If the earth's rotation around its axis were considerably slower, then the temperature differences between night and day would be extreme. Temperatures would climb to intolerable heights during the day because of the prolonged influx of heat, and the surface would be dried out. On the other hand, it would become very cold at night.

If the earth rotated at an appreciably higher speed, then the small differences between night and day would have a negative effect on weather cycles and our climate. In addition, the increased centrifugal forces would cause atmospheric gases to escape into space.

**3. The correct length of the year:** The length of the year suits plant life cycles. The seasons are the correct length to ensure that there is enough time for growth between sowing and reaping, and the winter is not too long for man and animal to be able to subsist on stored supplies. The corresponding cycles on other planets make survival impossible. It is hard to imagine a year which is 84 years long as on Uranus, or lasting only 88 days as on Mercury.

**4. The correct inclination of the earth's axis:** The angle that the earth's axis makes with the plane of its orbit around the sun, is of crucial importance for life-sustaining conditions. Scientific calculations show that the optimum inclination of the earth's axis lies in the narrow interval between  $23^\circ$  and  $24^\circ$ . Is it a coincidence that the actual angle is exactly  $23.5^\circ$ ? If this angle were larger, the contrast between summer and winter would be much greater.

**5. The correct size of the moon:** The tides are caused by the moon, and the inter-tidal zones are the habitat of a wide variety of organisms. If the moon were too small, tidal-effects would be negligible, and if it were appreciably larger, the resulting high tides would



constantly result in catastrophic floods. The moon's size is just right and is an absolute necessity for stabilizing the inclination of the earth's axis.

**6. The correct mass and size of the earth:** These two quantities are closely related, and their respective values make it possible for the earth to retain its atmosphere. The force of gravity on the surface is just right to ensure this, whereas it is too low on the moon. The specific gravity of the earth is  $5.517 \text{ g/cm}^3$  making it the densest of all the planets of our solar system. If its diameter were 20 % less, then its mass would have been only half its present value. Therefore because of the much smaller gravitational acceleration most of the gases of the atmosphere would escape into space. On the other hand, if the diameter of the earth were 25 % greater, then the mass of the earth would be doubled, air pressure would be much higher, and our body weight would increase by 25 % (causing even greater strain on our joints and skeleton).

**7. The unique composition of the atmosphere:** Oxygen is essential for the existence of higher forms of life. With a proportion of 21 % the atmosphere owns the correct percentage of oxygen. If the percentage had been appreciably larger, say more than 50 %, then man would suffer from oxygen poisoning (lung damage, reduced heart performance,

changes in the retina of the eye, and reduced blood activity in the brain and the kidneys). And if the percentage of oxygen were too low, then body cells would suffer from a lack of oxygen. The brain is especially sensitive in this respect. On the other hand, if the percentage were as low as 10 %, it would not be possible to light a fire (e.g. furnaces, industry plants). The existing quantity of nitrogen is of crucial importance for living organisms. It ensures sufficient absorption of harmful radiation, the correct dilution of oxygen, and the correct thickness of the atmosphere.

**8. The correct density of the atmosphere:** If the air were less dense, we would be subjected to fatally large doses of ultra-violet and X-rays, and meteors that now burn up in the atmosphere would impact the earth's surface. The density of the atmosphere depends on the mass of the earth, and on the surface temperature. Because of its reduced gravity, a smaller earth would not have been able to retain the required amount of air and water. The mass and gravitational attraction of the earth is exactly correct for holding the required quantities of oxygen, nitrogen, and carbon dioxide. The ambient temperatures are evened out, reducing extreme conditions, and the weather cycles can proceed accordingly.

**9. The required quantity of ozone:** Only a small part of the invisible ultra-violet rays of the sun penetrate down to the surface of the earth, thanks to a very special property of the atmosphere. In the stratosphere, 6 to 30 miles (10 to 50 km) high, ozone is found in extremely small quantities only. But this tenuous veil of ozone is however essential for life on earth, because it absorbs practically all the injurious ultra-violet rays.

**10. The surface of the earth:** The earth is remarkably smooth, even when the highest mountains

and the deepest ocean trenches are taken into consideration. If the earth could be reduced to a sphere having a diameter of one meter, the unevenness would be only one millimeter above and below sea level. This means that fairly large areas of land surface are inhabitable.

**11. The earth's magnetic field:** The magnetic field of the earth is not only very useful for navigation, but it also produces the magnetosphere located well above the stratosphere and serves as a protective shield by deflecting the injurious solar radiation known as the solar wind.

**12. The earth – a watery planet:** In conclusion we now discuss the most important feature of the earth which is absolutely essential for life, namely water. Without water, no life of any kind could exist. Water is not only found in the oceans, in lakes, and in rivers, but everywhere. In comparison to the wide plains of Mars, the stony deserts of the moon, and the craters of Mercury, the Sahara desert is a wet sponge. Water is found all over the earth, brought by clouds, now here, now there. Sometimes it rains and sometimes it snows, and even when the rains stay away in the deserts, nightly dews still bring moisture.

The **oceans** are unique to the earth. They cover 71 % of the earth's surface. The fact that this amount of water is here in liquid form cannot be over-emphasized. Most of the matter of the universe consists of hot gases (as in the stars), or is deeply frozen (for example on the outer planets). The oceans act as an enormous reservoir of heat. For this reason they have an important moderating effect on the climate. If the earth had less water, then temperature changes would be considerably greater. In addition, the oceans are an important and essential source of food.

The continuous evaporation of water from the oceans, aided by the trade and other winds blowing over thousands of kilometers, irrigates the continents which would otherwise be desiccated. The water cycle enables multiple lifeforms to exist on earth, which would not have been possible without "the weather".

The present ratio between land and water areas on earth is not a random combination. If the quantity of water on earth were 10 % greater, then the sea level would be 300 m higher, flooding most of the continental areas. On the other hand, if the amount of water were less, the land areas would be much greater and the climate much worse, so that large regions would be arid.

After being welcomed on board, airline passengers are usually given information about course, height, and outside temperature. At a height of approximately 33,000 ft. (10,000 m), the temperature of the air outside the cabin is a constant  $-58^{\circ}\text{F}$  ( $-50^{\circ}\text{C}$ ). You may not be aware of this fact, but the low temperature prevailing at heights of 3–12 miles (5 to 20 km), is essential for life on earth. Water vapor freezes at these heights because of the low temperature, and the resulting ice crystals continue to grow until they become so heavy that they fall towards the surface. In this way water is prevented from escaping into space, so that the earth will be wet and not dry out for thousands of years.

Finally we want to mention a very important property of the water, which is an anomaly: i.e., water reaches its greatest density at a temperature of  $39.2^{\circ}\text{F}$  ( $4^{\circ}\text{C}$ ) with a density of 1.0 g per cubic cm, and it becomes less dense at higher as well as lower temperatures. At  $32^{\circ}\text{F}$  ( $0^{\circ}\text{C}$ ) the density of ice is 0.917 g per cubic cm. This is the reason why ice floats on water, which is the only substance that

has these unusual properties. This means that aquatic organisms like fish can survive even the coldest winters in lakes, rivers, and dams. When a body of water freezes, the ice, being lighter, floats on the water, while the heavier water below does not become colder than 39.2°F (4 °C).

## **Our earth is unique**

All in all we can say: The earth is well tempered and supportive to life, with regards to many parameters constructed in an optimal way. We have only mentioned and discussed some of the many conditions that are required for life on earth – the most important and most conspicuous geophysical, mechanical, thermal, and other tangible aspects. Each of the above-mentioned properties makes the earth unique. It is truly remarkable that all requirements are met on this one planet. All these conditions are mutually intertwined, making our planet ideally suitable for living organisms. Any unbiased observer would agree that all these features had been wisely planned and conceived.

The huge number of fine-tuned parameters allows for only one conclusion which we are told in the Bible in Romans 1:20-21:



*“For the invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and Deity; so that they are without excuse: Because, when they knew God, they glorified Him not as God, neither were thankful; but became vain in their imaginations, and their foolish hearts were darkened.”*

To those who think in their own ‘wisdom’ that all things came into being by random processes of evolution, God’s Word says: **“Professing themselves to be wise, they became fools”** (Roman 1:22).

Who is the originator of the universe, the earth and of all life? God the Father transferred to His Son Jesus the assignment for creation. Therefore it is said of Jesus in the New Testament (Colossians 1:16-17): **“He is the image of the invisible God... For by Him were all things created, that are in heaven, and that are in earth, visible and invisible, whether they be thrones, or dominions, or principalities, or powers: all things were created by Him, and for Him: And He is before all things, and by Him all things are held together.”** Therefore in our world there is nothing that wasn’t created by the Lord Jesus. The huge universe with countless millions of galaxies as well as the minutest details of metabolic processes in a living cell is taken into consideration. Jesus not only is the creator and originator of the entire micro- and macrocosms; but He is also the ruler over all of it.

## **A breathtaking thought**

Jesus is the one Who is existing since eternity and Who is the King of the kingdom of heaven. All power is given unto Me in heaven and in earth (Matthew 28:18). Can we perceive the following fantastic

thought? The man on the cross of Calvary and the Creator of this world and of all life is the same person! In His unfathomable love to us He let Himself be crucified and He didn't fight back so the door of heaven could be opened for us. Anyone who is rejecting this will lose all: ***"How shall we escape, if we neglect so great a salvation?"*** (Hebrew 2:3) But whoever receives (accepts) Him, will win all. Jesus said: ***"He that hears my word, and believes on Him that sent Me, has everlasting life, ... he is passed from death unto life"*** (John 5:24). Ask the Lord Jesus for forgiveness of all of your sins, so you will be forgiven and not come under the judgment of God. Accept Him as your personal Creator and Savior and follow Him.

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A comprehensive scientific treaty you can find in my book ***"Stars and their Purpose"***. Master Books, USA, 2006, 213 pp., ISBN 10: 0-89051-482-8.

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