

# *St Aiden's Homeschool*



## *Our Solar System*

Earth

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## Earth



*The Earth seen from space*



### **Earth Facts**

- *The Earth is the only planet we know to have life on it.*
- *The Earth is the third planet from the Sun.*
- *The Earth is the only planet we know that has liquid water on the surface, but scientists are trying to find others.*
- *The Earth's axis is tilted which is why we have four different seasons.*
- *The Earth is 4.6 billion years old*

Earth is the planet we live on. It is the only planet in the Solar System with liquid water on its surface. It is also the only planet we know to have *life* on it.

## Earth : The Water Planet

**Seventy percent of the Earth's surface is covered by water. The remaining 30 percent is covered by mountains, volcanoes, deserts, plains, and valleys.**

Earth is the third closest planet to the Sun. It has an atmosphere made up of many different gases, but mainly it is nitrogen and oxygen. The atmosphere gives us air to breathe. We live on the planet Earth.

The Earth orbits around the Sun. It takes one year to go around the Sun one complete time. The Earth also rotates, or spins, on its axis. It takes one day to spin around one complete time. The Earth's axis is not straight up and down, but tilted a little bit. This tilt is responsible for us having seasons. Otherwise, the temperature would be pretty much the same all year long.

## How big is the Earth?

The Earth is nearly 13,000 km wide. It's the largest *terrestrial planet* in the Solar System.

The Earth's mass is about 5,973,700,000,000,000,000,000 kg. That's a lot. But it is little compared with Jupiter (319 Earths) and tiny compared with the Sun (335,789 Earths) or other stars!

## What is its surface like?

The Earth's surface is made of rock. Most of it is underwater, but not all. Islands of rock rise up out of the water. The biggest islands are called *continents*, of which there are seven: North America, South America, Europe, Asia, Africa, Australia, and Antarctica. The largest bodies of water are called *oceans*, of which there are four: Pacific, Atlantic, Indian, and Arctic. Some authorities classify the Southern as a fifth ocean.



*Anawhata beach, west of Auckland, New Zealand*

The Earth's surface is made up of huge *plates*. They are like huge jigsaw pieces made of rock. These plates move very, very slowly, carrying the continents with them. They can rub beside each other, push against each other, or even move away from each other. If there are gaps between them, hot molten rock can rise up and make *volcanoes*. Where the plates rub or push against each other, *earthquakes* may happen. When two plates push each other's rock upwards, *mountains* are formed.



*Zabriske Point, Death Valley National Park, California*

Earth has many kinds of *environments*. It is cold and icy in places like Antarctica. It is hot and dry in deserts like the Sahara in Africa and Death Valley in the United States. It is cold and dry in deserts like Siberia in Russia. Where it is warm and wet, rainforests grow.

## Why is there life on Earth?

Wherever we have looked on Earth, we have found living things. They may be very small, like *bacteria*, but they are there. We have found bacteria where it is very cold, very hot, very deep, very high or very dark.

*Galileo being deployed after being launched by the Space Shuttle Atlantis*



What all living things on Earth seem to need is *liquid water*. Wherever you can find some water, there are almost always living things there too, even if you can't see them. If we find liquid water somewhere else in the Solar System, scientists think we might find some living things there too. If we don't, there is always the rest of the universe to explore!

There is another possibility. All the living things we know need liquid water. But maybe somewhere else there are living things that don't need water. Perhaps we will need to learn how to recognize them.

## What about the Earth's moon?

Earth has one moon we call... the Moon! Sometimes it is called by its name in Latin, *Luna*, so we don't get confused with other planets and their *moons*. The Moon has also been called Selene (pronounced "suh-LEE-nee") which is Greek for moon.

Recently we have also found some other objects that seem to go around the Earth. The largest one, called Cruithne (pronounced "cru-EE-nyuh"), is three miles wide. It *orbits* (goes around) the Sun in a way that makes it appear to orbit Earth.

When Earth was young, a comet hit Earth and split off a section of the Earth that is now the moon.

## How long is a day on this planet?

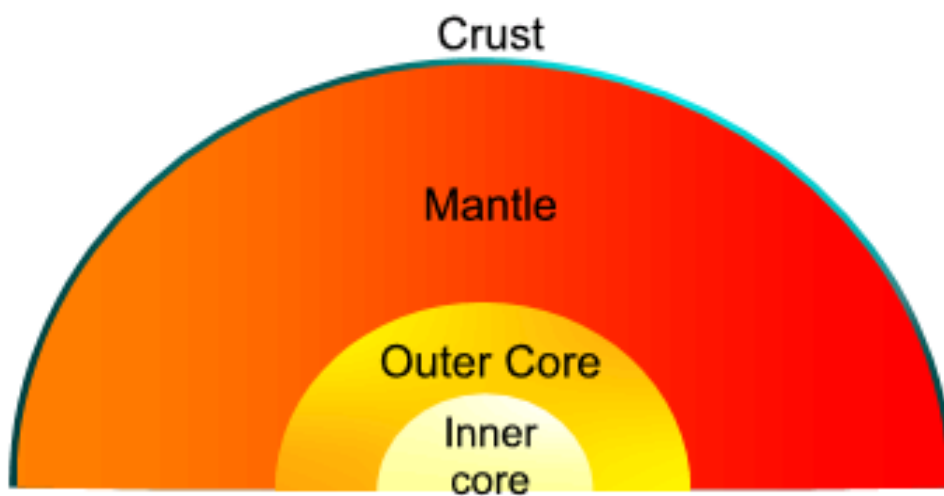
A day on Earth is 24 hours long. That's daytime *and* night time. A 24 hour day is how long it takes the Earth to spin around once. On the half of the Earth that is facing the sun it is daytime and on the half of the Earth that is facing away from the sun it is night-time.

The spin of the earth is also the reason why the sun appears to rise in the east and to set in the west. Although it looks like the sun is moving from the surface of the earth, it is really the surface of the earth that is moving. The reason we do not feel like we are spinning is because the earth is so big compared to the size of people.

## How long is a year on this planet?

A year on Earth is about 365 and 1/4 days long. That's how long it takes the Earth to orbit the Sun once. Approximately every four years we have a leap year. A leap year contains an extra day in our calendar on February 29th in order to account for the 1/4 of a day left over each year.

## What is the Earth made of?



When a planet is made of rock, we call its surface the *crust*. Below the Earth's crust is hot molten rock. It is in a layer called the *mantle*. The hot molten rock is what comes out of volcanoes. It's then called *lava*.

Under the mantle is the *core* of the Earth. We think it is made from solid iron and nickel, surrounded by hot molten iron. The temperature there is very, very hot!

The Earth's crust is very thin compared to the mantle and the core. But it is very thick to us. Nobody has drilled all the way through it yet. Even the deepest underground mines are far away from reaching its deepest base.

## How much does the Earth's gravity pull on me?

It's easy to find your weight on Earth by using a scale. You have weight because the Earth's **gravity** pulls you towards its centre. Normally, the ground or the floor get in the way, making you feel 'stuck' to them.

There are several kinds of scales:

1) Comparing of 2 masses (weights). You put the thing(s) you want to weigh on one pan (like some marbles), and then you put several "weights" on the other pan until the pointer shows that both pans have equal weights on them. Then you look at the pan with the known weights on it, and add them all up. The total is the mass of the thing(s) you want to weigh.



2) A spring balance usually has a hook on it, with a pan. You put the thing(s) you want to weigh on the pan, the spring is pulled, and the greater the weight, the further the spring is pulled. That distance, calibrated in pounds or kilogram (or whatever), is usually shown either on a dial or on a linear scale.



3) There are also electronic scales that give a properly calibrated reading—grocery stores, for example, use these.



*NOTE: Gravity varies slightly depending on the location where you want to get the weight; spring balances and some electronic scales can, in theory, read slightly different weights at different places because of that, but usually in practice that difference is too small to be noticed. But, because the balance type of scales work differently from the spring or electronic types, they will always read the true, correct mass. They would even give the same mass on the Moon, where gravity is much less than on Earth.*

Did you know? that *Sir Isaac Newton* was the first person to realise that the force pulling you down to the ground was the same force that keeps the planets going around the Sun? The story goes that he thought of this when he saw an apple fall from a tree.



Gravity is a very important force. As well as keeping you firmly stuck to the Earth, it keeps the Moon going round the Earth, The Earth going around the Sun and the Sun going around the centre of the Milky Way **galaxy**. Gravity also makes stars and planets a nice round ball shape. In fact without gravity there wouldn't even be a Sun, Moon or Earth because the material that they are made of would just float away into space.

## Who is it named after?

*The Earth seen from the Moon*



### *Did You Know?*

The word earth is used for both planet Earth and soil.  
Other names had been used for Earth such as Gaia and Tellus.

Gaia is the Greek goddess (meaning Mother Earth).

Tellus is the Roman name of the same goddess.



# Fact Sheet

# Earth

Third planet from the Sun



NASA/PLANNING PIA03394

Earth is the only planet whose English name does not derive from Greek/Roman mythology.

The name derives from old English and Germanic. There are, of course, hundreds of other names for the planet in other languages.

## Orbit

Earth is 1 astronomical unit from the Sun. An astronomical unit is 92,955,807 million miles, which is 499 light seconds.

## Orbital Period

365.2 days

## Length of Day

24 hours, or 1 day

## Tilt of Rotation Axis

23.5 degrees

## Size

Average Diameter: 7,918 miles or 12,740 km

## Surface Gravity

32.1  $\text{ft/s}^2$  or  $9.8 \text{ m/s}^2$

## Structure

The Earth is composed of silicate rocks and iron. Its interior contains a core largely made of molten iron, surrounded by a thick mantle of partly molten rock (oxygen, silicon, magnesium and iron), covered by a very thin surface crust (oxygen, silicon, aluminum and iron) that is solid and relatively cool. The Earth is the only planet with a known active plate tectonic system.

## Surface Temperature

Mean temperature: 59° Fahrenheit

Temperature extremes: 136° Fahrenheit (Libya, 1922) to -128° Fahrenheit (Vostok Base, 1983)

## Atmosphere

The atmosphere is primarily composed of nitrogen ( $\text{N}_2$ , 78%), oxygen ( $\text{O}_2$ , 21%), and argon (Ar, 1%). Earth's substantial atmosphere has weather patterns primarily driven by heat from the Sun. On Earth, however, another key factor in the climate is the water cycle, the continual cycling of water.

## Moons

Number of Moons: 1

## Core U.S. Government Research Agencies

The USGS (United States Geological Survey) was established by Congress in 1879 to provide geologic, topographic, and hydrologic information to the Nation. This information comprises maps, data bases, and reports containing analyses and interpretations of water, energy and mineral resources, land surfaces, geologic structures, natural hazards, and the dynamic process of the Earth.

NOAA (the National Oceanic and Atmospheric Administration) was formed in 1970 from agencies that are among the oldest in the Federal government. NOAA has as its mission to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs.

## Measuring, Monitoring & Mapping

There have been numerous space-, air-, and water-borne instruments that have been important in mapping the Earth and learning more about our home planet as a dynamic system of water, geology, climate, air, and life. The following list is just a few of these remote sensing instruments and platforms:

The ASTER instrument on the Terra satellite is being used to obtain detailed images used for glacier monitoring, climatology, volcano monitoring, and a wide range of other purposes.

The LANDSAT satellite system has been gathering a collection of imagery covering most of the Earth's land surface and coastal regions for over 30 years.

Space Shuttle Radar Topography Mission completed Earth's most extensive and detailed global topographic map.

The GOES satellite system collects images used to monitor the weather and climate by a variety of scientists, including the meteorologists who prepare the weather report for the daily news.

The GLORIA sonar system was used to map the seafloor in the United States' Exclusive Economic Zone, a 200 nautical mile zone around the coasts of the U.S. and its territories and possessions.

The air-borne AVIRIS instrument collects hyperspectral images. The primary research done with AVIRIS data have been related to global environment and climate change.

9/20/2005

# Student Activity ~ Earth

**Describe Earth.**

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**How big is it?**

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**What is its surface like?**

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**Why is there life on Earth?**

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**How much would Earth's gravity pull on me?**

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**Who is Earth named after?**

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**Discuss Isaac Newton and Gravity.**

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