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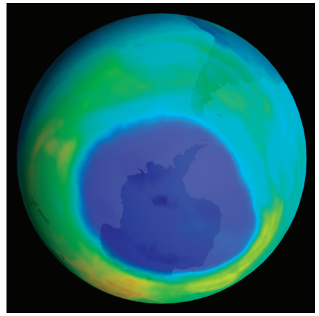
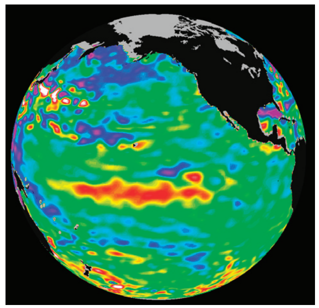
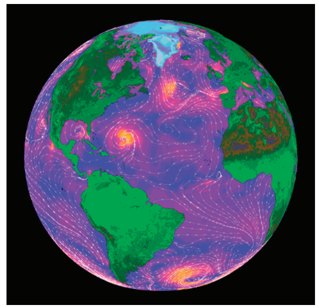
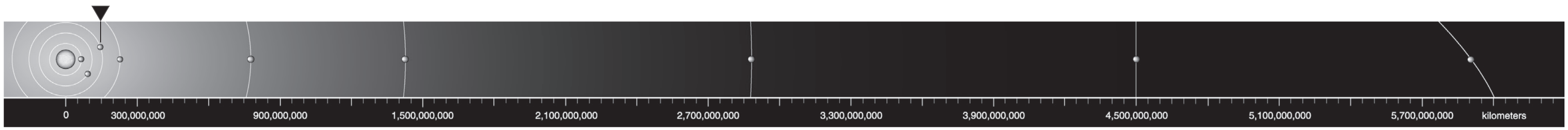
Earth









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Earth

Earth, our home planet, is the only planet in our solar system known to harbor life — life that is incredibly diverse. All the things we need to survive exist under a thin layer of atmosphere that separates us from the cold, airless void of space. Earth is made up of complex, interactive systems that are often unpredictable. Air, water, land, and life — including humans — combine forces to create a constantly changing world that we are striving to understand.

From the vantage point of space we are able to observe our planet globally, as we do other planets, using sensitive instruments to understand the delicate balance among its oceans, air, land, and life.

Some facts are well known. Earth is the third planet from the Sun and the fifth largest in the solar system. Earth's diameter is just a few hundred kilometers larger than that of Venus. The four seasons are a result of Earth's axis of rotation being tilted 23.45 degrees with respect to the plane of Earth's orbit around the Sun. During part of the year the northern hemisphere is tilted toward the Sun and the southern hemisphere is tilted away, producing summer in the north and winter in the south. Six months later, the situation is reversed. During March and September, when spring and fall begin, both hemispheres receive roughly equal amounts of illumination from the Sun.

The ocean, which covers nearly 70 percent of Earth's surface, has an average depth of about 4 kilometers (2.5 miles). Fresh water exists in the liquid phase only within a narrow temperature span — 0 to 100 degrees Celsius (32 to 212 degrees Fahrenheit). This temperature span is especially narrow when contrasted with the full range of temperatures found within the solar system. The presence and distribution of water vapor in the atmosphere is responsible for much of Earth's weather.

Near the surface, an ocean of air that consists of 78 percent nitrogen, 21 percent oxygen, and 1 percent other ingredients envelops us. This atmosphere affects Earth's long-term climate and short-term local weather, shields us from nearly all harmful radiation coming from the Sun, and protects us from meteors as well — most of which burn up before they can strike the surface as meteorites. Earth-orbiting satellites have revealed that the upper atmosphere actually swells by day and contracts by night due to solar heating during the day and cooling at night.

Our planet's rapid spin and molten nickel–iron core give rise to a magnetic field, which the solar wind distorts into a teardrop shape. (The solar wind is a stream of charged particles continuously ejected from the Sun.) Earth's magnetic field does not fade off into space, but has definite boundaries. When charged particles from the solar wind become trapped in Earth's magnetic field, they collide with air molecules above our planet's magnetic poles. These air molecules then begin to glow and are known as the aurorae, or the northern and southern lights.

Earth's lithosphere, which includes the crust (both continental and oceanic) and the uppermost, rigid mantle, is divided into huge plates that are constantly moving. For example, the North American plate moves west over the Pacific Ocean basin, roughly at a rate equal to the growth of our fingernails. Earthquakes result when plates grind past one another, ride up over one another, collide to make mountains, or split and separate. The theory of motion of the large plates of the lithosphere is known as plate tectonics. Developed within the last 40 years, this explanation has unified the results of centuries of study of our planet.

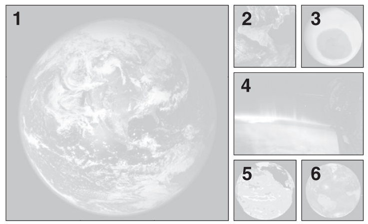
FAST FACTS

Mean Distance from the Sun	149.60 million km (92.96 million mi) (1 astronomical unit)
Orbit Period	365.26 days
Orbit Eccentricity (Circular Orbit = 0)	0.0167
Orbit Inclination to Ecliptic	0.00005 deg
Inclination of Equator to Orbit	23.45 deg
Rotation Period	23.93 hr
Successive Sunrises	24.00 hr
Equatorial Radius	6,378 km (3,963 mi)
Mass	5.9737×10^{24} kg
Density	5.515 g/cm^3
Gravity (Global Average)	9.8 m/sec^2 (32.15 ft/sec^2)
Atmosphere Primary Components	nitrogen, oxygen
Surface Temperature Range	–88 to 58 deg C (–126 to 136 deg F)
Known Moons	1
Rings	0

SIGNIFICANT DATES

1960 — NASA launches Tiros, the first weather satellite.
1972 — Landsat 1 is launched, the first in a series that continues today. The images are used in agriculture, geology, forestry, regional planning, mapping, and global change research.
1992 — Topex/Poseidon, a U.S.–France mission, begins measuring sea-surface height; the data revolutionize understanding of the ocean's role in weather and climate.
1997 — The U.S.–Japan Tropical Rainfall Measuring Mission is launched. It includes the first spaceborne instrument to provide three-dimensional maps of storm structure.
1999–2005 — A series of Earth-observing satellites is launched to provide complementary data sets on Earth's system: Terra (land, oceans, atmosphere), Aqua (water cycle), Aura (atmospheric chemistry), and Gravity Recovery and Climate Experiment (gravity fields). Planned are CloudSat (clouds) and the Cloud–Aerosol Lidar and Infrared Pathfinder Satellite Observations mission (aerosols, clouds).

ABOUT THE IMAGES



1 A true-color NASA satellite mosaic of Earth.

2 A view from orbit of the 2002 eruption of Mt. Etna, Sicily.

3 The 2003 Antarctic ozone hole was one of the largest ever recorded.

4 Astronauts aboard the space shuttle took this photograph of the Aurora Australis. Aurorae are caused when charged particles from the Sun interact with Earth's magnetic field.

5 Satellites track El Niño in the Pacific; red and yellow in this color-coded image indicate warmer ocean water.

6 A false-color image generated from radar data. Orange indicates fastest wind speed; arrows indicate wind direction.

FOR MORE INFORMATION

solarsystem.nasa.gov/planets/profile.cfm?Object=Earth

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