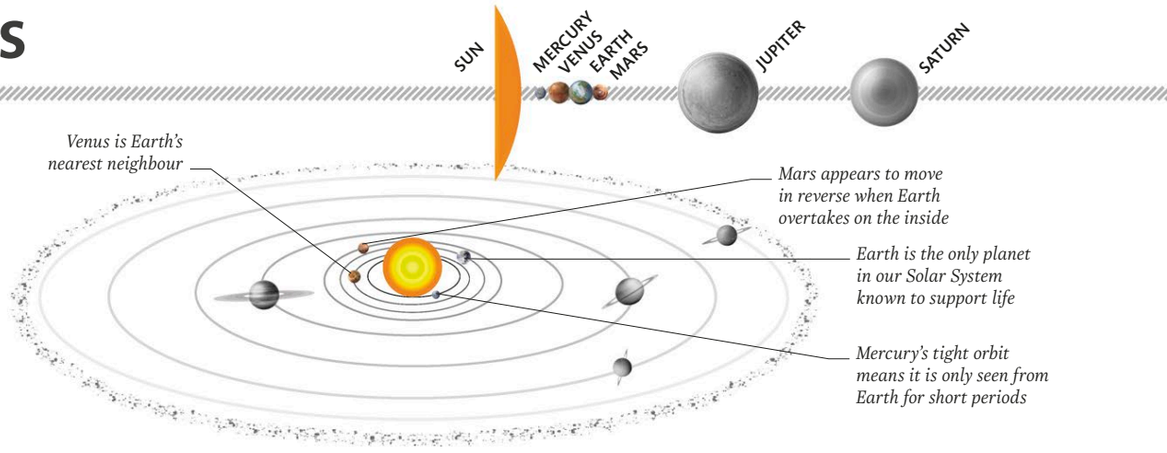
Rocky planets

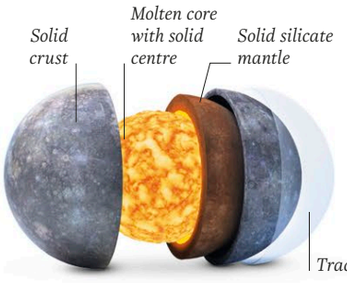


The inner planets

The four planets at the centre of our Solar System – Mercury, Venus, Earth, and Mars – follow orbits that are relatively close to the Sun, separated from the much larger outer planets by smaller rocky bodies in the Asteroid Belt. These worlds formed in a warm, ice-free region of the young Solar System, so their dominant materials are rocks and metals with high melting points.

Mercury

Mercury is the smallest planet, with a heavily cratered surface and practically no atmosphere. Superficially similar to Earth's moon, it bears the scars of huge collisions with rogue asteroids in its distant past, as well as relatively recent widespread volcanic activity.



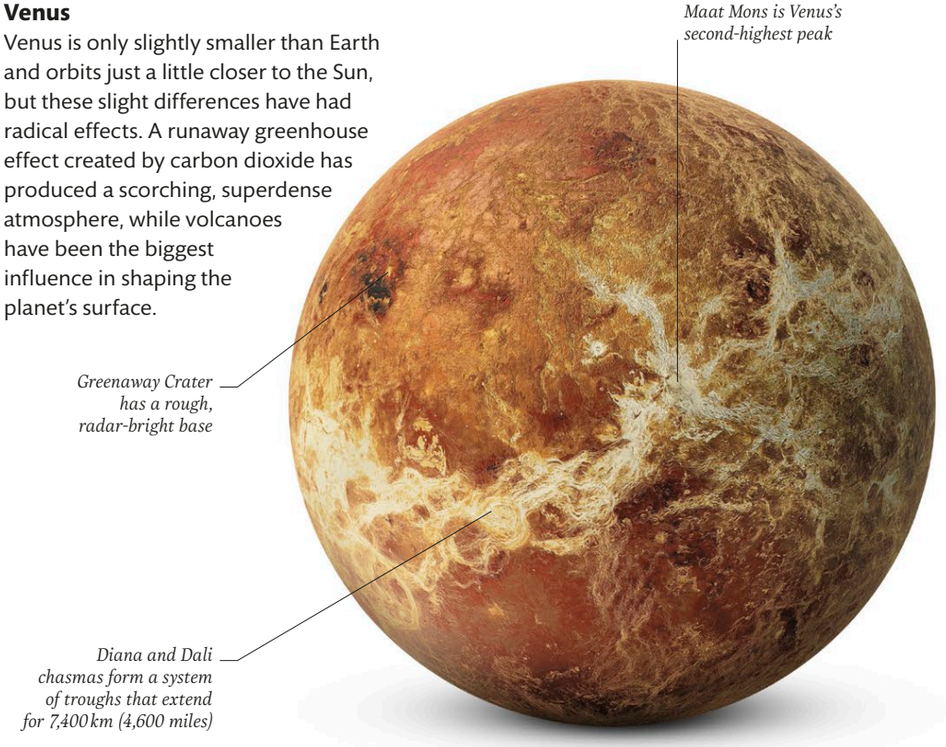
Inside Mercury
Mercury's core is huge compared to its overall size – perhaps because much of its mantle was blasted away by a huge interplanetary collision early in its history.

Average diameter	4,879 km (3,032 miles)
Mass (Earth = 1)	0.055
Gravity at equator (Earth = 1)	0.38
Mean distance from Sun (Earth = 1)	0.39
Axial tilt	0.01°
Rotation period (day)	58.6 Earth days
Orbital period (year)	87.97 Earth days
Minimum temperature	–180°C (–290°F)
Maximum temperature	430°C (800°F)
Moons	0

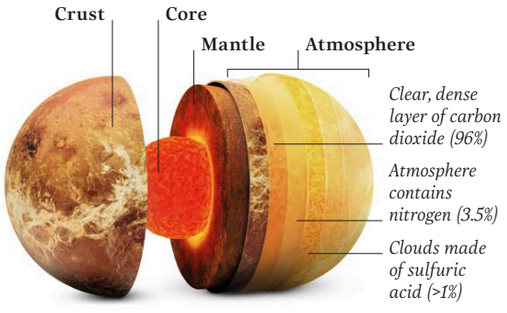
A single day on Mercury lasts 176 days on Earth

Venus

Venus is only slightly smaller than Earth and orbits just a little closer to the Sun, but these slight differences have had radical effects. A runaway greenhouse effect created by carbon dioxide has produced a scorching, superdense atmosphere, while volcanoes have been the biggest influence in shaping the planet's surface.



Average diameter	12,104 km (7,520 miles)
Mass (Earth = 1)	0.82
Gravity at equator (Earth = 1)	0.9
Mean distance from Sun (Earth = 1)	0.72
Axial tilt	177.4°
Rotation period (day)	243 Earth days
Orbital period (year)	224.7 Earth days
Average surface temperature	462°C (864°F)
Moons	0



Inside Venus
A lack of water has prevented the crust from splitting into plates. This traps heat in the rocky mantle, which escapes in occasional worldwide volcanic outbursts.

◂ see also The Cosmos pp.12–13 Giant planets pp.16–17 ▸ Small worlds pp.18–19 ▸

Earth

Our world is the Solar System's largest rocky planet. Although it is structurally similar to its neighbours, Earth's distance from the Sun allows water to exist in liquid, solid, and vapour forms, creating a complex fluid environment on top of the rocky crust – and just the right conditions to support life.

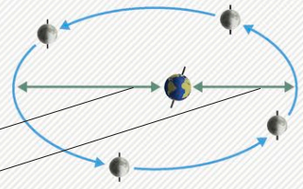
Average diameter	12,742 km (7,918 miles)
Axial tilt	23.5°
Rotation period (day)	23 hours 56 minutes
Orbital period (year)	365.26 Earth days
Minimum surface temperature	–89°C (–128°F)
Maximum surface temperature	58°C (136°F)
Moons	1

THE MOON

Formed 4.5 billion years ago by an interplanetary collision, the lunar surface is a mix of bright, cratered highlands and dark, low-lying lava plains caused by volcanic activity.

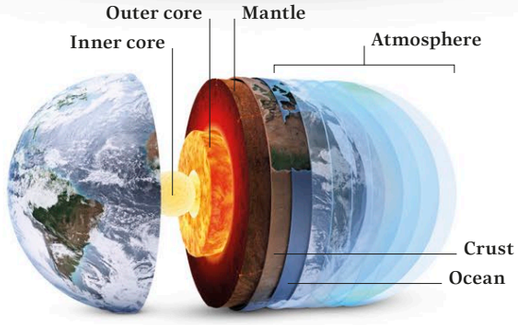
Spin and orbit

The Moon orbits Earth once every 27.3 days. Tidal forces have slowed its spin: it rotates once per orbit, and one hemisphere – the near side – permanently faces Earth.



Phases of the moon

As the Moon orbits Earth, the changing direction affects the amount of sunlight that falls on the near side, and creates a cycle of different phases.



Inside Earth

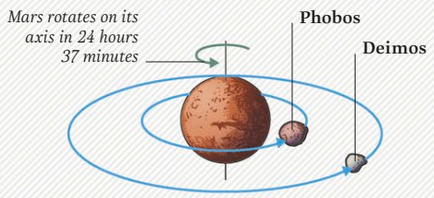
Churning molten metal in Earth's outer core produces a strong magnetic field around the planet, while heat rising through the mantle drives the forces that shape its crust.

Mars

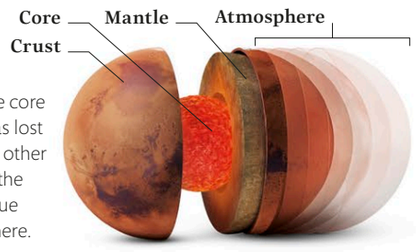
Mars is the planet that is most similar to Earth. Despite a thin atmosphere and a cold, dry surface that is covered in rusty red dust, Mars has icy polar caps, vast amounts of water ice in its soil, and a landscape marked by ancient riverbeds and huge extinct volcanoes.

MARTIAN MOONS

The two small moons of Mars – Phobos and Deimos – may be asteroids captured by the planet's gravity, or fragments of rock from an ancient collision.



Average diameter	6,779 km (4,212.2 miles)
Mass (Earth = 1)	0.11
Gravity at equator (Earth = 1)	0.38
Mean distance from Sun (Earth = 1)	1.52
Axial tilt	25.2°
Rotation period (day)	24.6 hours
Orbital period (year)	687 Earth days
Minimum temperature	–143°C (–225°F)
Maximum temperature	35°C (95°F)
Moons	2



Inside Mars

The small size of the core means that Mars has lost heat faster than the other planets. Heat from the Sun also escapes, due to the thin atmosphere.