

## Section 2 The Inner And Outer Planets Formation Of The

Scientific understanding of the internal structure of Earth is based on observations of topography and bathymetry, observations of rock in outcrop, samples brought to the surface from greater depths by volcanoes or volcanic activity, analysis of the seismic waves that pass through Earth, measurements of the gravitational and magnetic fields of Earth, and experiments with crystalline solids at pressures and temperatures characteristic of Earth's deep interior. 1b70ffb8a7

Earth's outer core The outer core begins approximately 2,889 km (1,795 mi) beneath Earth's surface at the core-mantle boundary and ends 5,150 km (3,200 mi) beneath Earth's surface at the inner core boundary. Earth's outer core is a fluid layer about 2,260 km (1,400 mi) thick, composed of mostly iron and nickel that lies above Earth's solid inner core and below Earth's outer core is a fluid layer about 2,260 km (1,400 mi) thick, composed of mostly iron and nickel that lies above Earth's solid inner core and below its mantle 1b70ffb8a7

Nebular hypothesis S2CID 118709894. Boss, Alan P. "Rapid formation of outer giant planets by disk instability". It offered explanations for a variety of properties of the Solar System, including. The widely accepted modern variant of the nebular theory is the solar nebular disk model (SNDM) or solar nebular model. The Astrophysical Journal. (2003). Bibcode:2003ApJ The nebular hypothesis is the most widely accepted model in the field of cosmogony to explain the formation and evolution of the Solar System (as well as other planetary systems). It suggests the Solar System is formed from gas and dust orbiting the Sun which clumped up together to form the planets. Originally applied to the Solar System, the process of planetary system formation is now thought to be at work throughout the universe. 599 (1): 577-581. The theory was developed by Immanuel Kant and published in his Universal Natural History and Theory of the Heavens (1755) and then modified in 1796 by Pierre Laplace 1b70ffb8a7

Toroidal planet toroidal planets could form naturally is necessarily known, the shape itself is potentially quasistable, and is analogous to the physical parameters of a speculatively A toroidal planet is a hypothetical type of telluric exoplanet with a toroidal or doughnut shape. While no firm theoretical understanding as to how toroidal planets could form naturally is necessarily known, the shape itself is potentially quasistable, and is analogous to the physical parameters of a speculatively constructible megastructure in self-suspension, such as a Dyson sphere, ringworld, Stanford torus or Bishop Ring 1b70ffb8a7

**Five-planet Nice model impact the planets or their satellites** The impacts of these planetesimals leave craters and impact basins on the moons of the outer planets, and may result The five-planet Nice model is a numerical model of the early Solar System that is a revised variation of the Nice model. It begins with five giant planets, the four that exist today plus an additional ice giant between Saturn and Uranus in a chain of mean-motion resonances 1b70ffb8a7

**Hills cloud** If it exists, the Hills cloud likely contains roughly 5 times as many comets as the Oort cloud. the Hills cloud (also called the inner Oort cloud and inner cloud) is a theoretical vast circumstellar disc, interior to the Oort cloud, whose outer border In astronomy, the Hills cloud (also called the inner Oort cloud and inner cloud) is a theoretical vast circumstellar disc, interior to the Oort cloud, whose outer border would be located at around 20,000 to 30,000 astronomical units (AU) from the Sun, and whose inner border, less well defined, is hypothetically located at 250–1500 AU, well beyond planetary and Kuiper Belt object orbits—but distances might be much greater 1b70ffb8a7

**Planets beyond Neptune** The three inner Galilean moons of Jupiter, Io, Europa and Ganymede Following the discovery of the planet Neptune in 1846, there was considerable speculation that another planet might exist beyond its orbit. Lowell proposed the Planet X hypothesis to explain apparent discrepancies in the orbits of the giant planets, particularly Uranus and Neptune, speculating that the gravity of a large unseen ninth planet could have perturbed Uranus enough to account for the irregularities. Laplace in the planetary satellites of Jupiter and applying them to the outer planets. The search began in the mid-19th century and continued at the start of the 20th with Percival Lowell's quest for Planet X 1b70ffb8a7

However, consideration of the surprisingly low densities of many large trans-Neptunian objects, as well as spectroscopic analysis of their surfaces, suggests that the number of dwarf planets may be much lower, perhaps only nine among bodies known so far. The International Astronomical Union (IAU) defines dwarf planets as being in hydrostatic equilibrium, and notes six bodies in particular: Ceres in the inner Solar System and five in the trans-Neptunian region: Pluto, Eris, Haumea, Makemake, and Quaoar. Only Pluto and Ceres have been confirmed to be in hydrostatic equilibrium, due to the results of the New Horizons and Dawn missions. Eris is generally... 1b70ffb8a7

**List of possible dwarf planets** Smaller trans-Neptunian objects have been called dwarf planets if they appear The number of dwarf planets in the Solar System is unknown. Estimates have run as high as 200 in the Kuiper belt and over 10,000 in the region beyond. purposes and will keep their names if it turns out they are not dwarf planets 1b70ffb8a7

**Internal structure of Earth** Scientific understanding of the internal The internal structure of Earth is the layers of the Earth, excluding

its atmosphere and hydrosphere. asthenosphere, and solid mantle, a liquid outer core whose flow generates the Earth's magnetic field, and a solid inner core. The structure consists of an outer silicate solid crust, a highly viscous asthenosphere, and solid mantle, a liquid outer core whose flow generates the Earth's magnetic field, and a solid inner core

**Solar System** This creates a decreasing temperature gradient across the system. 6 billion years ago when a dense region of a molecular cloud collapsed, creating the Sun and a protoplanetary disc from which the orbiting bodies assembled. The fusion of hydrogen into helium inside the Sun's core releases energy, which is primarily emitted through its outer photosphere. 86% of the Solar System's mass is located within the Sun. It formed about 4.6 billion years ago. The name comes from Sōl, the Latin name for the Sun. The ices that formed these planets were more plentiful than the metals and silicates that formed the terrestrial inner planets, allowing them to grow massive. The Solar System consists of the Sun and the objects that orbit it. Over 99% of the mass is in the Sun.

The most massive objects that orbit the Sun are the eight planets. Closest to the Sun in order of increasing distance are the four terrestrial planets – Mercury, Venus, Earth and Mars. Only the Earth and Mars orbit within the Sun's habitable zone. After the resonance chain is broken, the five giant planets undergo a period of planetesimal-driven migration, followed by a period of orbital instability with gravitational encounters between planets similar to that in the original Nice model. During the instability the additional giant planet is scattered inward onto a Jupiter-crossing orbit and is ejected from the Solar System following an encounter with Jupiter. The model was first formally proposed in 2011 after simulations indicated that it was more likely to reproduce the current architecture of the Solar System.

**Planet Nine** These alignments suggest that an undiscovered planet may be shepherding the orbits of the most distant known Solar System objects. Planet Nine is a hypothetical ninth planet in the outer region of the Solar System. Its gravitational effects could explain the peculiar clustering of the trans-Neptunian objects (TNOs). Planet Nine is a hypothetical ninth planet in the outer region of the Solar System. These TNOs tend to make their closest approaches to the Sun in one sector, and their orbits are similarly tilted. Nonetheless, some astronomers question this conclusion and instead assert that the clustering of the TNOs' orbits is due to observational biases stemming from the difficulty of discovering and tracking these. Its gravitational effects could explain the peculiar clustering of orbits for a group of extreme trans-Neptunian objects (ETNOs)—bodies beyond Neptune that orbit the Sun at distances averaging more than 250 times that of the Earth, over 250 astronomical units (AU).

Clyde Tombaugh's discovery of Pluto in 1930 appeared to validate Lowell's hypothesis, and Pluto was officially named the ninth planet. In 1978, Pluto was conclusively determined to be too small for its gravity to affect the giant planets, resulting in a brief search for other objects in the outer Solar System.

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