MOON

▶ More details about the moon...

ETYMOLOGY

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MOON

☽ About the Moon

- Etymology
- Formation
- Physical Characteristics

☽ The Moon and Earth

- From Earth’s Perspective
- Observation and Exploration
- Astronomy from the Moon
- In Culture

▼ More details about the moon...

Designations

Adjectives: Lunar * selenic

Orbital characteristics

Perigee: 362600 km (356400–370400 km)
Apogee: 405400 km (404000–406700 km)
Semi-major axis: 384399 km (0.00257 AU)
Eccentricity: 0.0549
Orbital period: 27.321661 d (27 d 7 h 43 min 11.5 s)
Synodic period: 29.530589 d (29 d 12 h 44 min 2.9 s)
Average orbital speed: 1.022 km/s
Inclination: 5.145° to the ecliptic
Longitude of ascending node: Regressing by one revolution in 18.6 years
Argument of perigee: Progressing by one revolution in 8.85 years
Satellite of: Earth

ETYMOLOGY

The usual English proper name for Earth's natural satellite is "the Moon". The noun moon is derived from moone (around 1380), which developed from mone (1135), which is derived from Old English mōna (dating from before 725), which ultimately stems from Proto-Germanic *mǣnōn, like all Germanic language cognates. Occasionally, the name "Luna" is used. In literature, especially science fiction, "Luna" is used to distinguish it from other moons, while in poetry, the name has been used to denote personification of our moon.

The principal modern English adjective pertaining to the Moon is lunar, derived from the Latin Luna. A less common adjective is selenic, derived from the Ancient Greek Selene (Σελήνη), from which is derived the prefix "seleno-" (as in selenography).Both the Greek Selene and the Roman goddess Diana were alternatively called Cynthia.The names Luna, Cynthia, and Selene are reflected in terminology for lunar orbits in words such as apolune, pericynthion, and selenocentric. The name Diana is connected to dies meaning 'day'.

FORMATION

Several mechanisms have been proposed for the Moon's formation 4.51 billion years ago, and some 60 million years after the origin of the Solar System. These mechanisms included the fission of the Moon from Earth's crust through centrifugal force (which would require too great an initial spin of Earth), the gravitational capture of a pre-formed Moon (which would require an unfeasibly extended atmosphere of Earth to dissipate the energy of the passing Moon), and the co-formation of Earth and the Moon together in the primordial accretion disk (which does not explain the depletion of metals in the Moon). These hypotheses also cannot account for the high angular momentum of the Earth–Moon system.

The prevailing hypothesis is that the Earth–Moon system formed as a result of the impact of a Mars-sized body (named Theia) with the proto-Earth (giant impact), that blasted material into orbit about the Earth that then accreted to form the present Earth-Moon system. This hypothesis, although not perfect, perhaps best explains the evidence. Eighteen months prior to an October 1984 conference on lunar origins, Bill Hartmann, Roger Phillips, and Jeff Taylor challenged fellow lunar scientists: "You have eighteen months. Go back to your Apollo data, go back to your computer, do whatever you have to, but make up your mind.

The Moon has an external magnetic field of about 1–100 nanoteslas, less than one-hundredth that of Earth. It does not currently have a global dipolar magnetic field and only has crustal magnetization, probably acquired early in lunar history when a dynamo was still operating. Alternatively, some of the remnant

MAGNETIC FIELD

The Moon has an external magnetic field of about 1–100 nanoteslas, less than one-hundredth that of Earth. It does not currently have a global dipolar magnetic field and only has crustal magnetization, probably acquired early in lunar history when a dynamo was still operating. Alternatively, some of the remnant magnetization may be from transient magnetic fields generated during large impact events through the expansion of an impact-generated plasma cloud in the presence of an ambient magnetic field. This is supported by the apparent location of the largest crustal magnetizations near the antipodes of the giant impact basins.

ATMOSPHERE

The Moon has an atmosphere so tenuous as to be nearly vacuum, with a total mass of less than 10 metric tons (9.8 long tons; 11 short tons).[105] The surface pressure of this small mass is around 3×10^{-15} atm (0.3 nPa); it varies with the lunar day. Its sources include outgassing and sputtering, a product of the bombardment of lunar soil by solar wind ions. Elements that have been detected include sodium and potassium, produced by sputtering (also found in the atmospheres of Mercury and Io); helium-4 and neon from the solar wind; and argon-40, radon-222, and polonium-210, outgassed after their creation by radioactive decay within the crust and mantle. The absence of such neutral species (atoms or molecules) as oxygen, nitrogen, carbon, hydrogen and magnesium, which are present in the regolith, is not understood.[108] Water vapour has been detected by Chandrayaan-1 and found to vary with latitude, with a maximum at ~60–70 degrees; it is possibly generated from the sublimation of water ice in the regolith. These gases either return into the regolith due to the Moon's gravity or be lost to space, either through solar radiation pressure or, if they are ionized, by being swept away by the solar wind's magnetic field.

DUST

A permanent asymmetric moon dust cloud exists around the Moon, created by small particles from comets. Estimates are 5 tons of comet particles strike the Moon's surface each 24 hours. The particles strike the Moon's surface ejecting moon dust above the Moon. The dust stays above the Moon approximately 10 minutes, taking 5 minutes to rise, and 5 minutes to fall. On average, 120 kilograms of dust are present above the Moon, rising to 100 kilometers above the surface. The dust measurements were made by LADEE's Lunar Dust EXperiment (LDEX), between 20 and 100 kilometers above the surface, during a six-month period. LDEX detected an average of one 0.3 micrometer moon dust particle each minute. Dust particle counts peaked during the Geminid, Quadrantid, Northern Taurid, and Omicron Centaurid meteor showers, when the Earth, and Moon, pass through comet debris. The cloud is asymmetric, more dense near the boundary between the Moon's dayside and nightside.