During a central eclipse, the Moon's umbra (or antumbra, in the case of an annular eclipse) moves rapidly from west to east across the Earth. The Earth is also rotating from west to east, at about 28 km/min at the Equator, but as the Moon is moving in the same direction as the Earth's spin at about 61 km/min, the umbra almost always appears to move in a roughly west-east direction across a map of the Earth at the speed of the Moon's orbital velocity minus the Earth's rotational velocity.

|  |  |  |
| --- | --- | --- |
| Root1 |  | |
|  |  | |  |  | | --- | --- | | Nested1 |  | |
| |  |  | | --- | --- | | Nested2 |  | |
|  |  |
|  |  |
| |  |  | | --- | --- | | Nested3 |  | |

Total solar eclipses are seen on Earth because of a fortuitous combination of circumstances. Even on Earth, eclipses of the type familiar to people today are a temporary (on a geological time scale) phenomenon. Hundreds of millions of years in the past, the Moon was too close to the Earth to precisely occlude the Sun as it does during eclipses today; and over a billion years in the future, it will be too far away to do so.