

GONE TOGETHER MOTION SUMMARY

Motion	km/hr	km/sec	mi/hr	mi/sec	Direction
Moon Orbit	3,300	1.0	2,200	0.6	Counterclockwise**
Earth Rotation	1,670	0.5	1,037	0.3	East Counterclockwise **
Earth Orbit	110,000	30	67,000	19	Counterclockwise around Sun**
Solar System Orbit	864,000	240	540,000	150	Constellation Lyra with star Vega
Local Cluster*	2,124,000	590	1,332,000	370	Constellation Leo
Speed of Light	1,079,252,848	300,000	670,616,629	186,000	

*0.2% (0.002) of the speed of light

**Counterclockwise looking down on the North Pole of Earth

MOON ORBIT

Moon distance (radius, r) from Earth: $r = 363,104 \text{ km} = 238,855 \text{ mi}$

Moon Orbit Circumference (C) around Earth: $C = \pi d = \pi 2r = 2,281,382 \text{ km} = 1,500,726 \text{ mi}$

Moon (sidereal) month: 28.7 days

EARTH ROTATION

Earth diameter at Equator: $40,070 \text{ km} = 24,883 \text{ mi}$

Earth day: 24 hours

Earth Rotation Speed at Equator: $1670 \text{ km/hr} = 1037 \text{ mi/hr}$

At latitude (θ) in degrees ($^\circ$),

$$\text{Rotation Speed} = \cos(\theta) \times \text{Earth Rotation Speed at Equator}$$

At latitude 30° N or S: $\cos(30) * 1670 \text{ km/hr} = .866 * 1670 \text{ km/hr} = 1446 \text{ km/hr}$

At latitude 45° N or S: $\cos(45) * 1037 \text{ mi/hr} = .707 * 1037 \text{ mi/hr} = 733 \text{ mi/hr}$

At latitude 90° N or S: $\cos(90) * 1037 \text{ mi/hr} = 0 * 1037 \text{ mi/hr} = 0$ (you spin, but you do not go anywhere)

City	Latitude	mi/hr	km/h
Longyearbyen, Norway	78.1° N	214	344
Moscow, Russia	55.8° N	583	939
London, UK	51.5° N	646	1040
New York, USA	41.9° N	772	1243
Los Angeles, USA	34.1° N	859	1383
Quito, Ecuador	0.2° S	1037	1670
Rio de Janeiro, Brazil	22.9° S	955	1538
Cape Town, SA	33.9° S	861	1386
Ushuaia, Argentina	54.5° S	602	970

EARTH ORBIT

Earth distance (radius, r) from Sun: $r = 149,000,000 \text{ km} = 93,000,000 \text{ mi}$

Earth Orbit Circumference (C) around Sun: $C = \pi * 2r = 935,720,000 \text{ km} = 584,040,000 \text{ mi}$

Earth year: 365 days

Earth Orbit Speed = $C / (\text{Earth year} * \text{Earth day}) = 110,000 \text{ km/hr} = 67,000 \text{ mi/hr}$

SOLAR SYSTEM ORBIT

Sun distance from the center of the Milky Way: 30,000 light years

Sun Orbit Circumference through Milky Way: 225,000 light years

At 240 km/sec (150 mi/sec), the Sun orbits the center of the Milky Way every 225,000,000 years (a cosmic year). The Sun has orbited the Milky Way only 20 times in 5 billion years.

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LOCAL CLUSTER

The Local Cluster is the 54 galaxies in our 10 million light year gravitational neighborhood. Most are dwarf galaxies, while the Milky Way, Andromeda and Triangulum Galaxy are the largest. The Local Cluster is expanding together as the Universe expands at 0.2 percent (0.002) the speed of light.

LIGHT SPEED

Speed in space is fast. It takes our breath away. To feel or imagine the speed of our Earth is difficult. We watch our Moon and Sun “slowly” travel, but each takes hours to move. It all seems so far away.

Think different. Speed is also here, all around us.

Light travels 299,792 kilometers per second or 286,282 miles per second through a vacuum. The Universe is almost a vacuum, so that is where light really zooms.

Time to get mathematically picky. Light travels 92 kilometers per second or 58 miles per second slower through the atmosphere. So around us, light travels 299,700 kilometers per second or 186,224 miles per second.

With that out of the way, it is more sensible to say light travels about 300,000 kilometers per second or 186,000 miles per second.

But light is not sensible. Depending on how you measure light, physics found that light acts like a wave or a particle, but not both at the same time. Again, the results show a dual nature when light is measured,

In the end, if you close your eyes and turn your face to our Sun, the warmth is touching you at light speed.

If you can see, then particles of light form visions in your eyes. The light may have traveled millions of miles from our Sun or the light may have traveled a few feet from a light bulb. The light was reflected off a red apple or a yellow pencil at light speed.

The light moved faster than our Moon, Earth, Solar System or Milky Way Galaxy. AWESOME

The following irritating, picky values are required while flying a vehicle in space, but do not go too far without more precision in your value.

More accurate number for the speed of light is 299,792.458 kilometers per second or 186,282.397 miles per second

Light speed is 1,079,252,848 kilometers per hour or 670,616,629 miles per hour.

Traveling at light speed, you would travel 7.5 times around our Earth above the equator in one second.

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