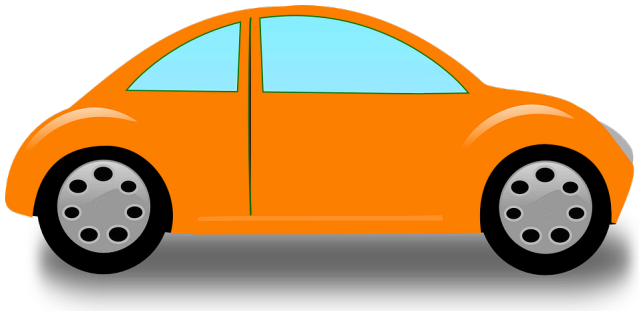
Sizing Up Space

What's a Light-Year?

Imagine a car travelling at a constant speed of 100 km/h, now imagine the car can keep going the same speed for an entire year. There are 8760 hours in a year, so in one year the car travels 876,000 km. We could call this distance a "car-year" and use it to measure great distances, such as the distance from the Earth to the Moon. If we did, we would find that the distance from Earth to the Moon is 0.44 car-years.

But space is BIG, we need something bigger than a car-year to measure the really huge things. We need something fast! So we use light, it's the fastest thing in the universe. Light travels at 300,000,000 metres per second! Light is made up of photons, now imagine instead of a car, we have a little photon travelling at the speed of light for an entire year. At 300 million metres per second, that little photon can cover about 9.5 trillion kilometres in a year. We can use other units of time for shorter distances, like light-hours, light-minutes, and even light-seconds.



Object	Car-Years	Light-Time
Moon	0.44	≈ 1 light-second
Sun	171	≈ 8 light-minutes
Saturn	1710	80 light-minutes
Neptune	5130	4 light-hours
Proxima Centauri	45,359,667	4.2 light years
Orion Nebula	14,039,896,801	1300 light years
Messier 57 (The Ring Nebula)	24,839,817,418	2300 light years
Messier 3 (Globular Star Cluster)	367,197,300,958	34,000 light years
Messier 31 (The Andromeda Galaxy)	26,999,801,541,023	2,500,000 light years

Yes, that's correct, it would take more than 45 million years to drive a car to the nearest star and almost 27 trillion years to drive to the closest major galaxy. Space is really BIG!!

Based on the full-dome planetarium movie entitled "Sizing Up Space" by Ott Planetarium.