

KINEMATICS

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Letter of Recommendation: Saturn

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By MARTA BAUSELLS NOV. 30, 2017



INTRODUCTION: Light travels at 186,000 miles/s.

QUESTIONS: (a) Verify time for sunlight to reach the earth from the sun 93 million miles from the earth is close to 8 min. 20 seconds as mentioned below? (b) Verify time for moon light to reach earth from the moon is close to 1.28 seconds as listed below? Moon is 240,000 miles from earth on average.

HINTS: $x = v t$, 60 seconds/ min., 3600 s./hr.

ANSWERS: (a) $t_{\text{SUN TO EARTH}} = \sim 8 \text{ min.}, 20\text{s.}$

(b) $t_{\text{MOON TO EARTH}} = \sim 1.28 \text{ seconds}$

In astrology, Saturn is considered the master of the universe, signifying responsibility and rites of passage between the big phases of life.

One night in July, my mother was looking at a star that has existed for at least 20,000 years. Her job is to study how stars die — how they expand, then implode. For a week, my phone buzzed nonstop as she flooded the family chat with pictures of the enormous

Chilean telescope where she was working. I had to put her on mute. We all look at the past every day, of course. **It takes**

sun rays eight minutes and 20 seconds to make the journey to our skin.

The moon we see every night is that of 1.28 seconds ago. Some stars in the sky are long dead: By the time their light reaches our pupils, having traveled distances our mind can't even grasp, what we see no longer is. Because I grew up with two physicists for parents, these notions were somewhat familiar to me as a child. On the walls of our Barcelona apartment were framed posters of the Andromeda galaxy; on the shelves sat books with titles like "Black Holes and Time Warps" or "Gravitation." At school, I didn't know how to explain what my parents did, which I barely understood myself — Mom an astrophysicist, Dad a microelectronics specialist, each dealing with phenomena bigger or smaller than the eye can see. Any romanticism or mysticism about space was out of the question.