Considering Seasonal Differences in the Sun’s Apparent Daily Motion

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| TABLE V.12 Developing powerful ideas about seasonal differences in the details of the Sun’s apparent daily motion | | | |
| Sketch of set up | Evidence | Powerful Idea | Relevant Vocabulary |
| <http://solar-center.stanford.edu/AO/sunrise.html> |  | The Sun seems to rise north of east (spring, summer), directly east (spring and autumn equinoxes), and south of east (autumn and winter) in the northern hemisphere. |  |
| <https://www.teachengineering.org/lessons/view/cub_pveff_lesson01> |  | The Sun’s apparent highest maximum angular altitude (angle α) in the sky occurs at the summer solstice; the Sun’s lowest maximum angular altitude occurs during the winter solstice. |  |
| <https://earthsky.org/astronomy-essentials/how-far-does-sun-move-on-your-horizon-each-day> |  | The Sun seems to set north of west (spring, summer), directly west (spring and autumn equinoxes), and south of west (autumn and winter) in the northern hemisphere. |  |
| <http://hosting.astro.cornell.edu/academics/courses/astro201/sun_rise.htm> |  | During spring and summer, the Sun is visible above the horizon for a longer duration (more than 12 hours) than not visible below the horizon;  On the spring and autumn equinoxes, the Sun is visible above the horizon for the same duration, 12 hours, as not visible below the horizon; During autumn and winter, the sun is visible above the horizon for a shorter duration (less than 12 hours) than not visible below the horizon. |  |
| <https://www.weather.gov/cle/seasons> |  | During summer, the Sun’s maximum altitude is higher, the Sun’s rays shine down more directly through the atmosphere, and the duration of daylight is longer than during winter. |  |

Sketch: Sun, gnomon, shadow during spring equinox Diagram of tilted Earth in orbit

Sketch: Sun, gnomon, shadow during summer solstice Diagram of tilted Earth in orbit

Sketch: Sun, gnomon, shadow during autumn equinox Diagram of tilted Earth in orbit

Sketch: Sun, gnomon, shadow during winter solstice Diagram of tilted Earth in orbit