

Unit 03 – Seasons and the Tilted Earth

Focus: The 23.5° tilt and how it changes the concentration of solar energy.

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0:00–0:05 – The Earth's Axial Tilt and Its Stability

0:05–0:15 – Tilt, not distance, causes the seasons

- Earth is actually *closest* to the Sun in January (Perihelion) and *farthest* in July (Aphelion).
- Distance has almost zero effect on seasons; it is the angle of the light

0:15–0:30 – The Physics of Sunlight

- The Flashlight Analogy
 - Direct vs. Oblique:
 - Shine a flashlight straight at a wall (small, bright circle = Summer)
 - Tilt the flashlight (large, dim oval = Winter).

0:30–0:40 – The Motion of Sun During Maine's Seasons

- Daylight Swing: Why Maine gets 15+ hours of sun in June but only 9 in December.
- The Path of the Sun: Visualizing the "High Summer Sun" vs. the "Low Winter Sun."

0:40–0:50 – Solstices and Equinoxes

- The Standing Still: Defining Solstice (Sun-Stand-Still).
- Equinox: When the Sun rises exactly East and sets exactly West.

0:50–1:00 – The Ocean’s Role: Thermal Lag

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- The Pot on the Stove: Why August is hotter than June. The Atlantic Ocean takes a long time to heat up and a long time to cool down.
- Coastal vs. Inland: Bath is warmer in winter than Bangor.

Moché References:

- *Chapter 1: Understanding The Starry Sky*
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Optional Homework: Observe the position of sunrise or sunset over several weeks.

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Fast Facts Handout: Why Maine Has Seasons

Feature	Comment
Earth's Axial Tilt	23.5 Degrees
Perihelion	Closest to Sun (~Jan 3); Earth is at its fastest orbital speed
Aphelion	Farthest from Sun (~July 4)
Winter Solstice	Shortest day (approx. 9 hours of light in Maine)
Summer Solstice	Longest day (approx. 15.5 hours of light in Maine)
The "Flashlight Effect"	Winter sun hits at a low angle, spreading energy over a larger area
