

# Unit 04 – The Moon: Phases and Patterns

**Goal:** To understand the geometry of lunar phases and learn how to "read" the Moon's surface like a map.

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## Unit 4 — The Moon: Phases and Patterns

0:00–0:10 – Maria and Highlands

- Reflection, Not Shadow:
  - phases are *not* caused by Earth's shadow (that's an eclipse).
  - They are caused by our changing view of the Moon's "day side."

0:10–0:15 – Tidal Locking

- Synchronous Rotation
  - The Moon rotates exactly once for every one orbit around Earth.
  - Analogy: Imagine walking around a chair while always keeping your face pointed at the seat. You have to spin your body once to complete the circle.

0:15–0:35 – The Lunar Cycle: The Geometry of Light

- The 29.5-Day Cycle
  - The "Terminator" (15 mins)
    - craters look like deep pits and mountains look like jagged peaks

0:35–0:40 – The Far Side of Moon

- The Far Side: Debunking the "Dark Side" myth
  - It gets just as much sunlight as the front.

0:40–0:55 – Human Exploration of Moon

0:55–1:00 – The Moon Illusion

- The "Ponzo Illusion"
  - When the Moon is near the horizon, our brains compare it to trees and houses, making it look "huge."
- The Daytime Moon: How to find the Moon during the day using SkySafari.

### Moché References:

- *Chapter 10: The Moon*
  - Diagrams: waxing/waning, geometry of phases
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**Optional Homework: observe the Moon!**

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## Unit 04 – The Moon: Phases and Patterns

### Fast Facts Handout: Moon, The Earth's Companion

<b>Feature</b>	<b>Detail</b>
<b>Average Distance</b>	238,855 Miles
<b>Lunar Cycle Duration</b>	29.5 Days (New Moon to New Moon)
<b>Gravity</b>	1/6th of Earth's (A 150lb person would weigh 25lbs)
<b>The Terminator</b>	The line between light and dark where shadows are longest
<b>Tidal Locking</b>	The Moon rotates once for every one orbit (we see only one side)
<b>Maria</b>	Dark, "seas" made of ancient volcanic basalt

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