THE STANDARD

Earth-Sun-Moon System

Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

ANCHORING PHENOMENON

The Summer Heat Paradox

It's 100°F in Texas in July. It's 95°F in Argentina in January. Both are hot summer months in their own hemisphere. But here's the puzzle: Earth is actually closer to the sun in January than in July. If "closer = hotter" were the rule, summer in Texas should be in January, not July. Something else has to be driving the seasons. Students will keep circling back to this until they get tilt.

DRIVING QUESTION

"Why is it summer in Texas in July when Earth is actually farther from the sun than it is in January?"

INVESTIGATIVE 1

A Full Moon and a New Moon, Side by Side

Two photos taken two weeks apart. Same moon, same camera, same sky. One is fully lit and round. The other is invisible (you can only tell where it is because of the stars around it). Same object, totally different look. Use this one to sharpen the geometry the anchor is pointing at: the moon's position relative to Earth and the sun changes what we see, not the moon itself.

DRIVING QUESTION

"If it's the same moon, why does it look completely different from one week to the next?"

INVESTIGATIVE 2

A Solar Eclipse in the Middle of the Day

Footage of a total solar eclipse. The sky darkens in the middle of the afternoon. Birds get confused. Streetlights flicker on. Then a few minutes later, it's back to a normal day. Use this one to sharpen the alignment idea the anchor doesn't reach directly: eclipses happen when the geometry lines up exactly, which is rare and dramatic.

DRIVING QUESTION

"What has to be lined up for the sky to go dark in the middle of the day?"