THE STANDARD

Scale Model of the Solar System

Analyze and interpret data to determine scale properties of objects in the solar system.

ANCHORING PHENOMENON

The Solar System You've Never Actually Seen

Every solar system diagram ever printed shows planets in a tidy row, all visible at once. None of them are to scale. If you shrunk the Sun to a basketball, Earth would be a pea about 26 yards away. Jupiter would be a softball at the far end of the football field. Neptune would be a marble a mile down the road. Almost every "picture" of the solar system in their life has been a lie of convenience. The real thing is mostly empty.

> DRIVING QUESTION
>
> *"What does our solar system actually look like, and why does every picture make it look like something else?"*

INVESTIGATIVE 1

Cassini's Photos of Saturn's Rings

The Cassini spacecraft orbited Saturn from 2004 to 2017. It sent back close-up photos of the rings, which from Earth look like solid bands. Up close, the rings turn out to be billions of separate icy chunks, ranging from grain-size to house-size, spread thin across hundreds of thousands of kilometers. From far away: a solid disk. Up close: scattered ice. Same object, different story depending on the scale. Use this to sharpen the scale lens the anchor is pushing on.

> DRIVING QUESTION
>
> *"How can the same object look completely different depending on how close you are to it?"*

INVESTIGATIVE 2

New Horizons' First Real Photos of Pluto

Until 2015, the best image we had of Pluto was a fuzzy smudge a few pixels wide. Then the New Horizons spacecraft did a flyby and sent back high-resolution photos. They showed mountains of water ice, a giant heart-shaped plain of frozen nitrogen, and possible signs of an underground ocean. The "ninth planet" turned into a real place overnight. Same logic as the anchor: a system too far away to see clearly until we sent something there to look.

> DRIVING QUESTION
>
> *"How does the data we have about a solar system object change what we think it is?"*