THE STANDARD

Gravitational Interactions

Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

DCI — DISCIPLINARY CORE IDEA

PS2.B · Types of Interactions

> *Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass (e.g., Earth and the sun).*

Gravity isn't an Earth-only thing. Every object with mass pulls on every other object with mass. We just don't notice most of those pulls because the masses involved are too small. When one object is huge (Earth, the Sun, Jupiter), the pull is obvious. Two pencils on a desk pull on each other too. **The effect is just way too tiny to see.**

SEP — SCIENCE & ENGINEERING PRACTICE

Engaging in Argument from Evidence

> *Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.*

Students aren't memorizing that "gravity depends on mass." They're being handed evidence sets (orbital data, falling-object data, tidal patterns) and asked to build a claim, back it with the data, and present it so a peer can push back. The argument is the science. **A claim without evidence isn't an argument, it's a guess.**

CCC — CROSSCUTTING CONCEPT

Systems and System Models

> *Models can be used to represent systems and their interactions, such as inputs, processes and outputs, and energy and matter flows within systems.*

A gravitational system is the Sun and its planets. Or Earth and the Moon. Or Earth and a dropped apple. Students treat each as a system: which objects are interacting, which masses are involved, and what the pull does to the motion. **The system model is the frame that makes the evidence add up.**