

THE STANDARD

Potential Energy in Systems

Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.



PS3.A · Definitions of Energy

A system of objects may also contain stored (potential) energy, depending on their relative positions.

Energy doesn't only live in motion. When two objects pull or push on each other across a distance, the system stores energy in their arrangement. Lift a ball higher above Earth and you store more gravitational potential energy. Push two like-pole magnets closer and you store more magnetic potential energy. **Change the arrangement, change the stored energy.**



Developing and Using Models

Develop a model to describe unobservable mechanisms.

Students build models to show something they can't see: stored energy. The model can be a drawing, a diagram, a labeled photo, or a written description. **What makes it count as a model is that it shows the two objects, the distance between them, and how the stored energy changes when that distance changes.**



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.

The energy isn't in the ball. It's in the ball-and-Earth system. That shift, from "the object has energy" to "the system stores energy in the arrangement," is the whole point. **Students stop tracking single objects and start tracking pairs and the space between them.**