THE STANDARD

Cycling of Earth's Materials

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

DCI — DISCIPLINARY CORE IDEA

ESS2.A · Earth's Materials and Systems

> *All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.*

Rocks aren't permanent. They're just one stage in a cycle. A volcanic rock can break down into sand. Sand can get buried and packed into sandstone. Sandstone can get cooked and squeezed into a different rock entirely. Cooked deeper, it melts into magma and starts the loop over. **Two energy sources drive the whole thing: the sun (weathering, water moving sediment) and Earth's internal heat (volcanoes, mountain-building, melting).**

SEP — SCIENCE & ENGINEERING PRACTICE

Developing and Using Models

> *Develop and use a model to describe phenomena.*

Students aren't memorizing a chart of rock names. They're building a model that shows how matter moves between forms and where the energy comes from at each step. The model is the thinking. **If a student can point at their diagram and trace one atom from a lava flow to a beach to a buried layer to magma again, they're doing the science.**

CCC — CROSSCUTTING CONCEPT

Stability and Change

> *Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.*

A rock looks stable. On a human timescale it basically is. Stretch the timescale to millions of years and that same rock is in motion: breaking down, getting buried, melting, recrystallizing. The cycle is what changes. The material is what stays. **Stability and change live in the same system, depending on how far back you zoom.**