THE STANDARD

Wave Interactions with Materials

Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

DCI
DISCIPLINARY CORE IDEA

PS4.A · Wave Properties

> *A sound wave needs a medium through which it is transmitted.*

When a wave hits something, one of three things happens. It bounces back (reflected), it sinks in and turns into heat or motion (absorbed), or it passes through (transmitted). What the material is made of decides which one wins. A mirror reflects light. Black paint absorbs it. Glass lets it through. **The same three options apply to sound, water waves, and every other wave students will meet.**

SEP
SCIENCE & ENGINEERING PRACTICE

Developing and Using Models

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

Students aren't memorizing a list of materials. They're building a model (a drawing, a sim, a written description) that shows where a wave hits, where it goes, and why. The model is the thinking. **If a student can sketch the wave path at a window and label which part bounces, which part heats up the glass, and which part keeps going, they're doing the standard.**

CCC
CROSSCUTTING CONCEPT

Structure and Function

> *Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.*

The behavior is the function. The material is the structure. Smooth and hard reflects. Soft and porous absorbs. Clear and even transmits. Once a student sees that the inside of a material is what dictates wave behavior, they can predict it for a material they've never met. **That's the whole point of Structure and Function.**