THE STANDARD

Improving Designs

"Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved."

ANCHORING PHENOMENON

The Tower That Keeps Falling on the Third Floor

Each group builds a paper-and-tape tower as tall as they can, then a fan or a gentle table shake tests it. Almost every tower fails the same way: it folds right where the second section meets the third. Same materials, same wobble, same weak spot. Elementary students will want to know why it always breaks in that one place, and how to stop it.

DRIVING QUESTION

"Why does the tower keep failing in the same spot, and what one change would fix it?"

INVESTIGATIVE 1

One Change at a Time: The Fair-Test Showdown

Two groups both want a stronger tower base, but one widens the base AND adds tape while the other only widens the base. When the wide-and-taped tower wins, nobody can say why. Use this challenge to sharpen the anchor's question: if you change two things at once, you never learn which one actually helped.

DRIVING QUESTION

"If we want to know what really made the tower stronger, how do we set up a test that gives us a clear answer?"

INVESTIGATIVE 2

Find the Failure Point Before You Fix It

Before changing anything, groups run the same wind test three times and watch closely for exactly where and when the tower gives out. They mark the weak spot with a sticky dot. This challenge zooms in on the anchor: you can't improve a design until you've found the precise place it fails.

DRIVING QUESTION

"Where exactly does our prototype fail, and how do we pinpoint it before we start changing things?"