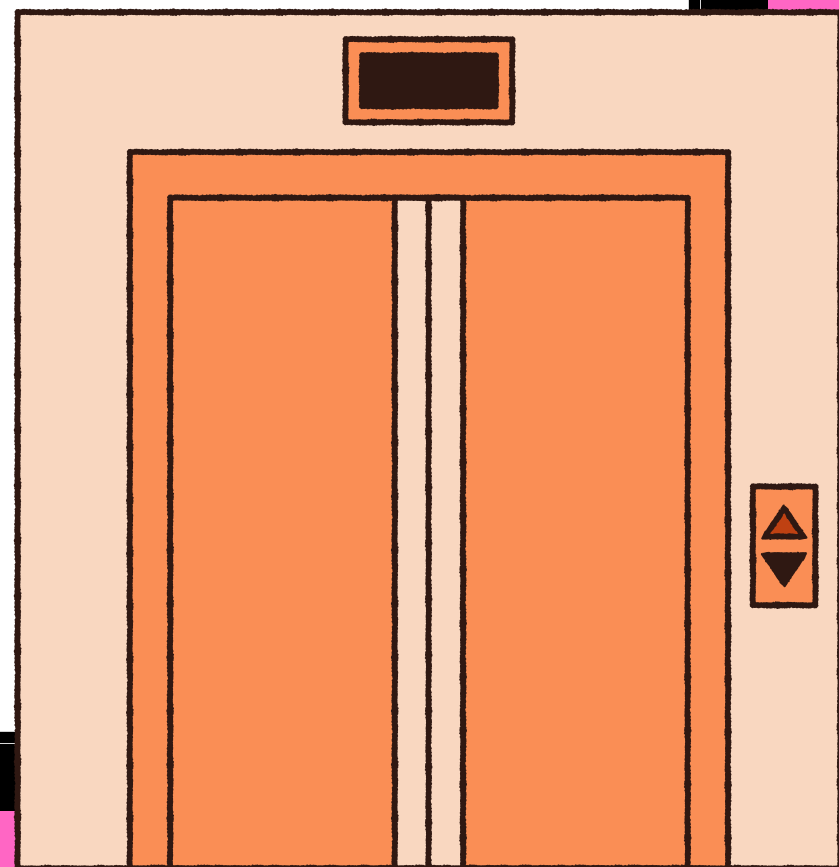


THE PHYSICS PUZZLER



Imagine you are in an elevator with a bathroom scale on the floor. The elevator cable suddenly snaps, and the elevator starts to free-fall. While falling, you decide to stand on the scale.

What will the scale read while you and the elevator are in free fall? Explain why this happens using physics principles.



SOLUTION



*When the elevator cable snaps, the entire system (you, the scale, and the elevator) begins to free-fall under gravity with an acceleration of **$g = 9.8\text{m/s}^2$** .*

In free fall, both you and the scale accelerate downward at the same rate, meaning there's no normal force pushing up on you from the scale. The normal force is what a scale measures as "weight."

*Since there's no normal force acting on you during free fall, the scale will show a reading of **zero**.*

The scale only registers weight when there's a force pressing down on it. In free fall, you're effectively in a state of weightlessness because you and the scale fall together, so the scale can't push back against you to show any weight.