

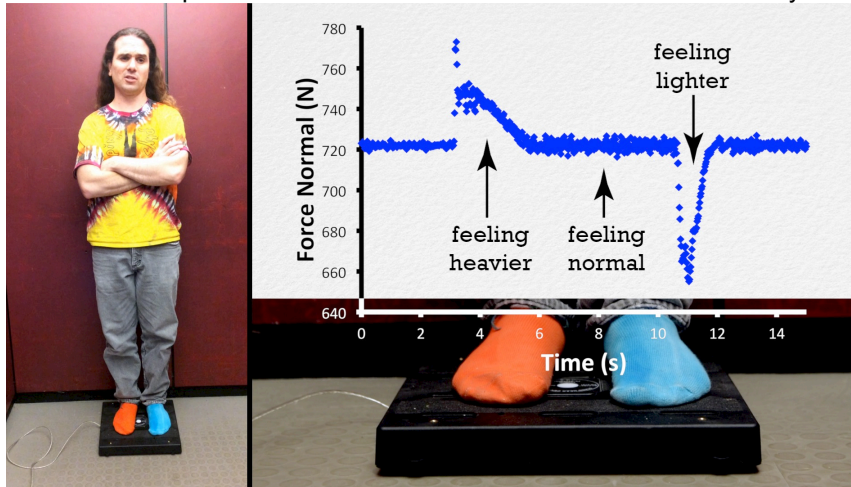


Flipping Physics Lecture Notes:

Do You Feel Your Weight?

No. You do not feel your weight. You feel the force normal acting on you. The normal force acting on you is also called your “apparent weight” because it is what you feel as your weight.

The best example to illustrate this is what a scale measures when you are on an elevator.



- Part 1) The elevator is accelerating upward.
- Part 2) The elevator is moving upward at a constant velocity.
- Part 3) The elevator is accelerating downward.

We can draw a free body diagram to analyze the situation:

$$\sum F_y = F_N - F_g = ma_y \Rightarrow F_N = F_g + ma_y$$

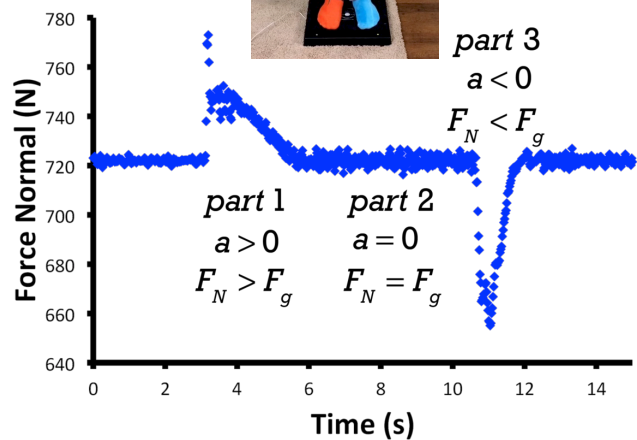
1) $a > 0$ then $ma_y > 0$ and $F_N > F_g$

2) $a = 0$ then $ma_y = 0$ and $F_N = F_g$

3) $a < 0$ then $ma_y < 0$ and $F_N < F_g$

in free fall: $a_y = -g$

$$\Rightarrow F_N = mg + m(-g) = mg - mg = 0 \Rightarrow F_N = 0$$



This is called Apparent Weightlessness, because your force normal is zero and therefore you feel weightless, even though there still is a force of gravity acting on you.