

Newton's 1st EWSH!

- "An object in motion tends to stay in its present state of motion in a straight line unless acted upon by an unbalanced force."
- i.e. objects like to _____

- (inertia)
- There are a couple conditions of note:
- Forces must be _____ (equal but opposite) or absent
- Motion is _____

in a _____

Examples....

Starting (zoom)	Stopping short
Cars on icy roads	Jacks in the trunk
Ice in drinks	CD's on the dash
Cars on interstate	Pigs in space

Newton's 2nd EWSH!

- "An unbalanced _____ will produce an _____ directly proportional (and in the same direction) to the force and inversely proportional to the _____."
- In formula form: $a = F/m$ or...

$$F = ma!$$

- The most important formula in all physics!
- Note new terms!

Force, mass & acceleration

- Acceleration we know - unit: m/s^2
- Mass we know as the amount of matter in an object, and it's unit is grams or kg
- Force is new!
- They are pushes and pulls, and have the unit from the formula:
- $F = ma$, so $kg \cdot m/s^2 = N$ which stands for Newton!

Let's try a problem!

Andrew shoves a 8.67 kg box across the floor, accelerating it to 2.93 m/s over a 14.0 m displacement. How hard was he pushing?
We know:

Newton's 3rd EWSH!

- "Every _____ has an equal but opposite _____."
- i.e. pushes come in pairs
- There are a couple conditions to note:
- While pushes are paired, they act on different objects!
- Forces paired push oppositely
- Swimming Rowing Jumping

Newton #3, $F = -F$
Therefore, since $F = ma$, then
 $ma = -ma$

Car mileage

Trade in a small car for a newer, larger, more aerodynamic vehicle:

What happens to in-town mileage?

What happens to interstate mileage?

Football player's size

Purpose of linemen

Size of linemen

Purpose of running back

Size of running back...

Get it?

Got it?

Good!

For homework:
Pb A of course!