Newton's Laws

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1 Newton's Laws

1.1 The 3 Laws

Law 1: Things have mass, and they sit still when net force is 0.

Law 2: $\Sigma F = ma$

Law 3: Push + pull = 0

1.2 Law 1

Mass is an abstract concept, artificially defined to measure how hard it is to move an object. Therefore, under a different scenario, it is possible to use another definition of mass. For now, we will look at every object as a point mass.

A point mass is an object without a shape.

1.3 Law 2

This is the only useful formula, with variations like:

$$a = \frac{\Sigma F}{m}$$

$$m = \frac{\Sigma F}{a}$$

Use this formula at your convenience.

1.4 Law 3

Just remember to draw a pair of arrows when drawing free body diagrams. This concept will be especially useful while understanding conservation of momentum.

2 Question:

1. If all objects accelerate towards Earth at the same rate, why does it hurt more to be hit by an iron ball than to be hit by a football?