

## Newton's Second Law



The acceleration of an object is directly proportional to the new force acting on the object and inversely proportional to the object's mass

MCHS Honors Physics 2014-15

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## Newton's Second Law

- From Newton's first law, we know that an object with no net force acting on it is in a state of equilibrium.
- We also know that an object experiencing a net force undergoes a change in its velocity.
- But exactly how much does a known force affect the motion of an object?



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## Newton's Second Law Relates Force, Mass and Acceleration

- Force is proportional to mass and acceleration
- The relationship between mass, force, and acceleration are quantified in **Newton's Second Law**:

The acceleration of an object is directly proportional to the new force acting on the object and inversely proportional to the object's mass

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## Newton's Second Law Relates Force, Mass and Acceleration

- If equal forces are applied to two objects of different masses, the object with greater mass will experience a smaller acceleration
- Similarly, an object with less mass will experience a greater acceleration.
- In equation form, we can state Newton's law as follows:

$$\Sigma F = ma$$

net force = mass x acceleration

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