

## Force and Motion

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### Newton's First Law

- an object at rest remains at rest and an object in motion remains in motion, unless acted upon by an external unbalanced force.

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### Constant Force

- If a constant force is applied to an object, the object has a constant acceleration.

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## No Unbalanced Forces

- If there are no unbalanced external forces, then there is constant velocity.

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## Summary

- An unbalanced external force on an object causes acceleration.

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## Examples

- Falling object
  - Gravity
- Car stopping
  - Friction in the brakes
- Car speeding up
  - Force from the engine and friction between the tires and the road.

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## Newton's Second Law

- Force is proportional to acceleration
  - The greater the force, the greater the acceleration
- Force is proportional to mass
  - More massive objects need a greater force to accelerate them
- Force can change the direction of motion

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## Newton's Third Law

- To every action there is an equal and opposite reaction
  - Forces always come in pairs
  - In other words, if you push down on the table, the table is pushing back up at you with equal force

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