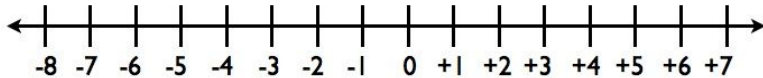


ScienceCraft

Topic 2: Mechanics

Part One: One-Dimensional and Two-Dimensional Motion

One-Dimensional Motion: Basic Introduction



- ✗ Two types of measurements in physics:
 - ✗ **Vectors:** Direction and magnitude
 - ✗ **Scalars:** Magnitude and no direction

- ✗ Three different quantities for movement:
 - ✗ **Speed**
 - ✗ **Velocity**
 - ✗ **Acceleration**



Concept One: Speed

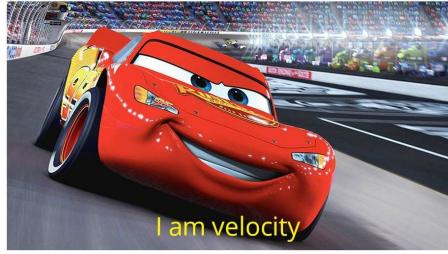


- ✗ Speed is a measurement of how fast an object moves over a period of time
 - ✗ Measured as **total distance traveled** divided by **time**
- ✗ Describes how fast an object is traveling
- ✗ **Scalar** quantity (no direction)

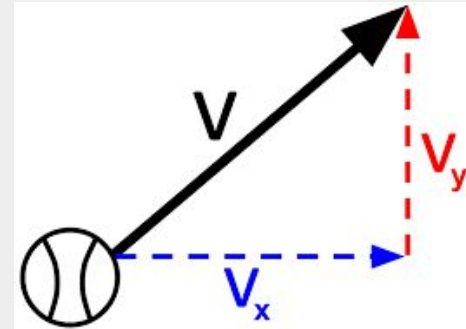


Concept Two: Velocity

Not a single soul: When
you're speed AND direction



- ✗ Velocity is similar to speed, but now it incorporates direction
- ✗ Measured as **total distance traveled** divided by **time**
- ✗ Describes how fast an object is traveling and in what direction (positive and negative)
- ✗ **Vector** quantity (includes direction)



Concept Three: Acceleration

Nobody:

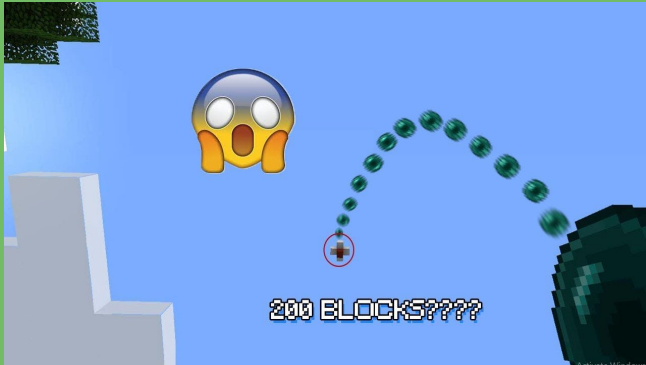
Baby zombies from minecraft:



- ✗ **Acceleration:** a measurement of how fast an object changes its velocity
 - ✗ Example: Traveling from **0 to 60 miles/hour** in **10 seconds**
- ✗ Describes any time an object changes its velocity
- ✗ **Vector** Quantity

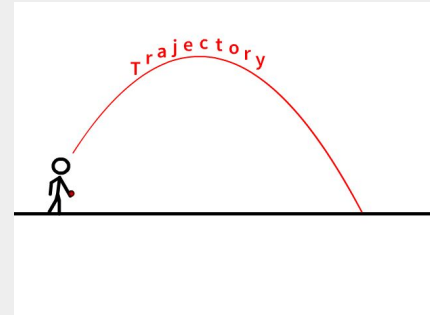


Projectile Motion



- ✗ **Projectile:** Object that is thrown in the air and influenced only by gravity
 - ✗ Throwing a football in the air
 - ✗ Throwing an ender pearl in the air

- ✗ **Projectile Motion:** The motion that an object follows while traveling in the air
 - ✗ Think of a curve or arch
 - ✗ Also known as freefall (in some circumstances)



Pop Quiz

Student: *exists*
Exams:



- ✗ A student playing minecraft factions wants to use a tnt cannon to break into someone's base
- ✗ He wants to make a TNT cannon that can cover **1000** meters in **2 seconds**
 - ✗ What is the **horizontal speed** of the tnt?
 - ✗ In what **direction** is the tnt accelerating?



Part Two: Introduction to Forces and Types of Forces



-

What are Some Types of Forces?

CONTACT FORCE



Muscular Force



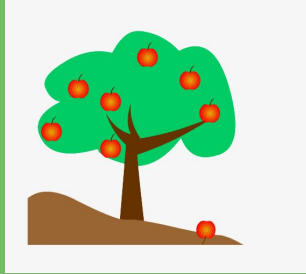
Mechanical Force



Frictional Force

BYJU'S
The Learning App

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✗ **Weight Force:** Non Contact force that pushes a body towards the Earth's surface

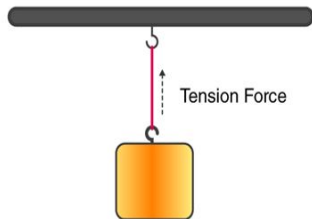
✗ Gravity also pushes objects towards each other, but this force is too small to do anything

✗ **Tension:** The force of something pulling on an object

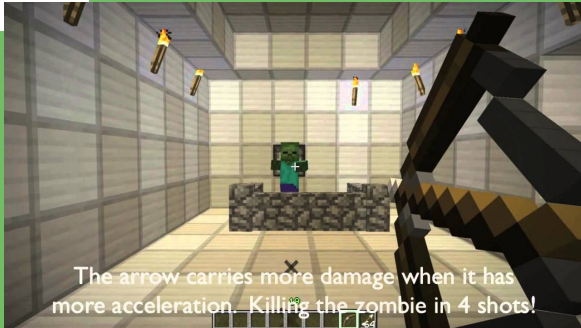
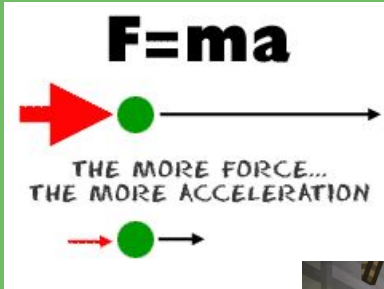
✗ **Normal Force:** The force between two objects that opposes the force of gravity

✗ **Applied Force:** Force applied by an individual

The **normal force** is perpendicular to the surfaces in contact.



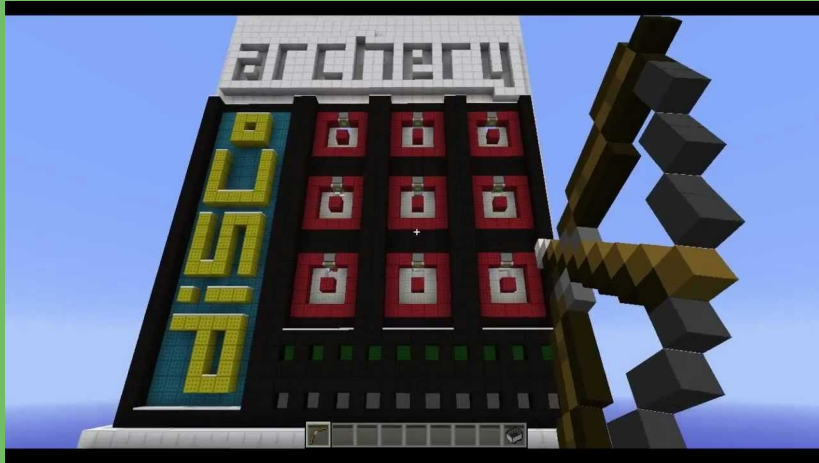
How to Calculate Force (Newton's Second Law)



- ✗ Force can be calculated using a simple mathematical formula:
Newton's Second Law
- ✗ Force = Mass * Acceleration
 - ✗ The more an object accelerates, the more force it has
- ✗ What about mass?
 - ✗ If an object has more mass, it needs more force to accelerate



Pop Quiz Part Two



- ✗ A student playing an archery minigame needs to apply a certain amount of force to hit a target
- ✗ The arrow's mass is 0.5 kg, and the initial acceleration is 40 m/s^2
- ✗ What is the **force** applied on the arrow?
- ✗ What **type of force** is the student applying?

