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# SURVIVAL SCIENCE

## Volume 1 Lesson 1

# PHYSICS...

the study of  
matter, energy,  
and motion...



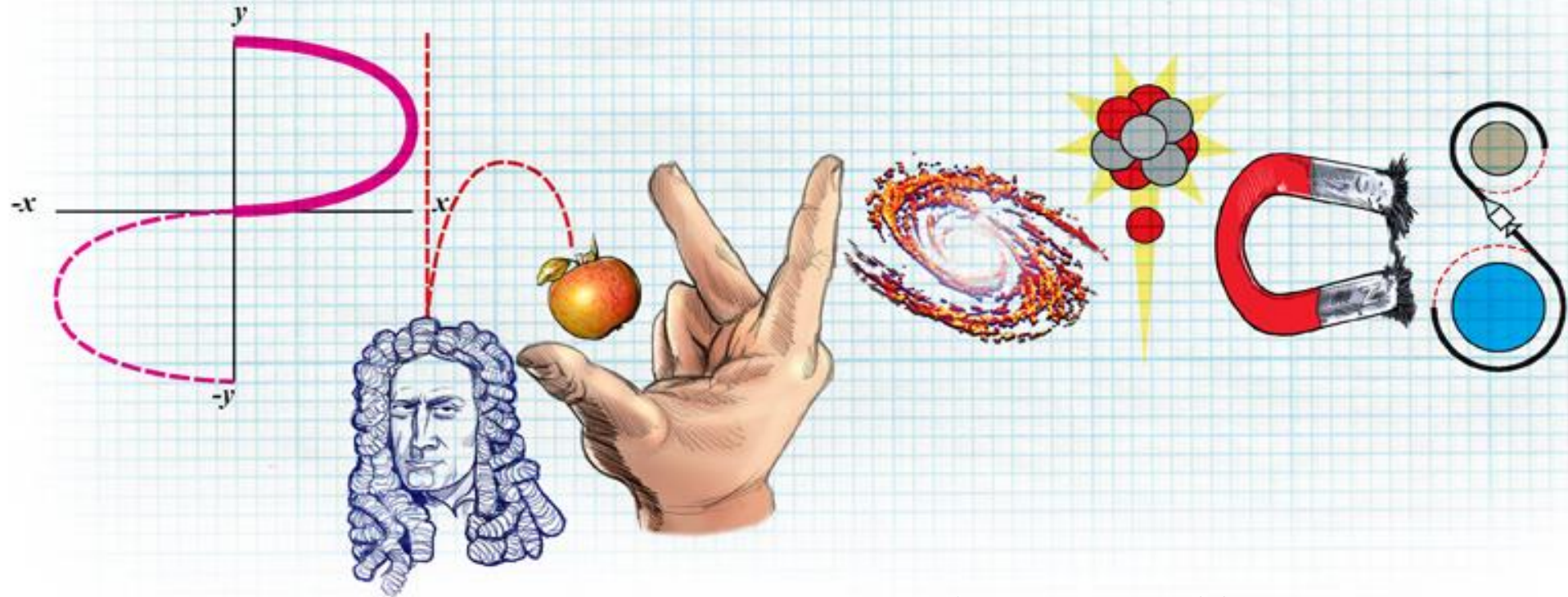
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**MATTER** – something that has  
mass and takes up space.

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**ENERGY** – the ability to do **WORK**

# Physics describes our natural world, our creations such as inventions, and OUR WORK!



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# FOR WE ARE GOD'S WORKMANSHIP

WE ARE GOD'S  
WORKMANSHIP  
CREATED IN  
CHRIST JESUS  
FOR GOOD  
WORKS

**GENESIS 1:27** God created man in his image,  
in the image of God he created them...

**EPHESIANS 2:10** For we are his workmanship,  
created in Christ Jesus for good works, which  
God prepared beforehand, that we should  
walk in them.

**GOD CREATES...**

**GOD KNOWS...**

**GOD WORKED...**

**6 DAYS AND RESTED ON THE 7<sup>TH</sup>**

# The Creation of Adam

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- God created man and woman in His image
- Man was created to work, to create, to use his intelligence
- We are a reflection of God's nature
- This is part of Michelangelo's painting in the Sistine Chapel



# The Beginning of Time...

**TIMELINE: ~4500-4000 BC**  
(~6000 years ago)

Man's work began in earnest after the Fall

It was necessary to work “by the sweat of your brow you will eat...”

**Genesis 3:19a**



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Work requires  
**MOTION**  
through  
applying a  
force.



# LAWS OF MOTION

- **Newton's 1<sup>st</sup> Law** – the **Law of Inertia** which states an object in motion stays in motion, an object at rest remains at rest unless a force acts upon it (**Status Quo**)
- **Newton's 2<sup>nd</sup> Law** – the definition a force which is: **Force = mass x acceleration**  $F = ma$
- **Newton's 3<sup>rd</sup> Law** – for every action there exists is an equal and opposite reaction, also known as the **action/reaction law**.  $\rightarrow \leftarrow$



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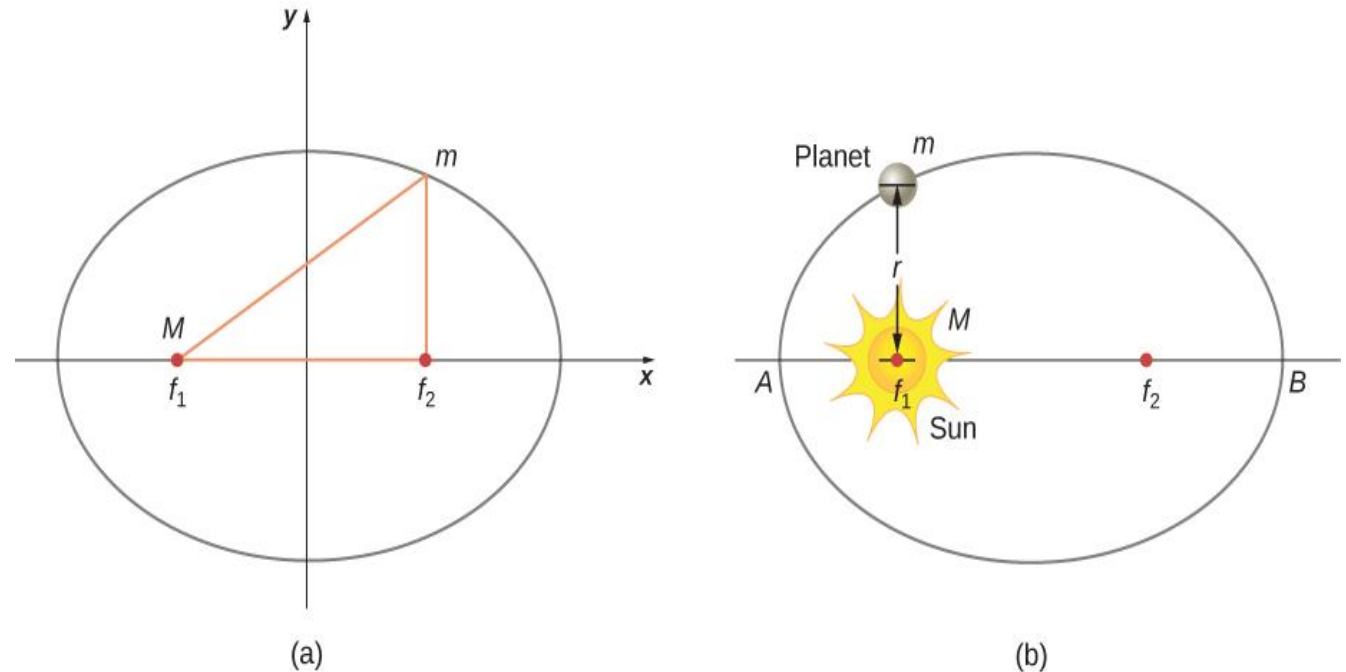
# NEWTON'S 1<sup>ST</sup> LAW

Objects in motion (like a planet) remain in motion;  
Objects at rest, remain at rest, unless a force acts upon it.

Newton connected the motion of planets to same causes observed on Earth

The force of **GRAVITY**

Abbreviated = **Status Quo** (staying the same) or **Inertia** (resistance to change)



# NEWTON'S 2<sup>ND</sup> LAW

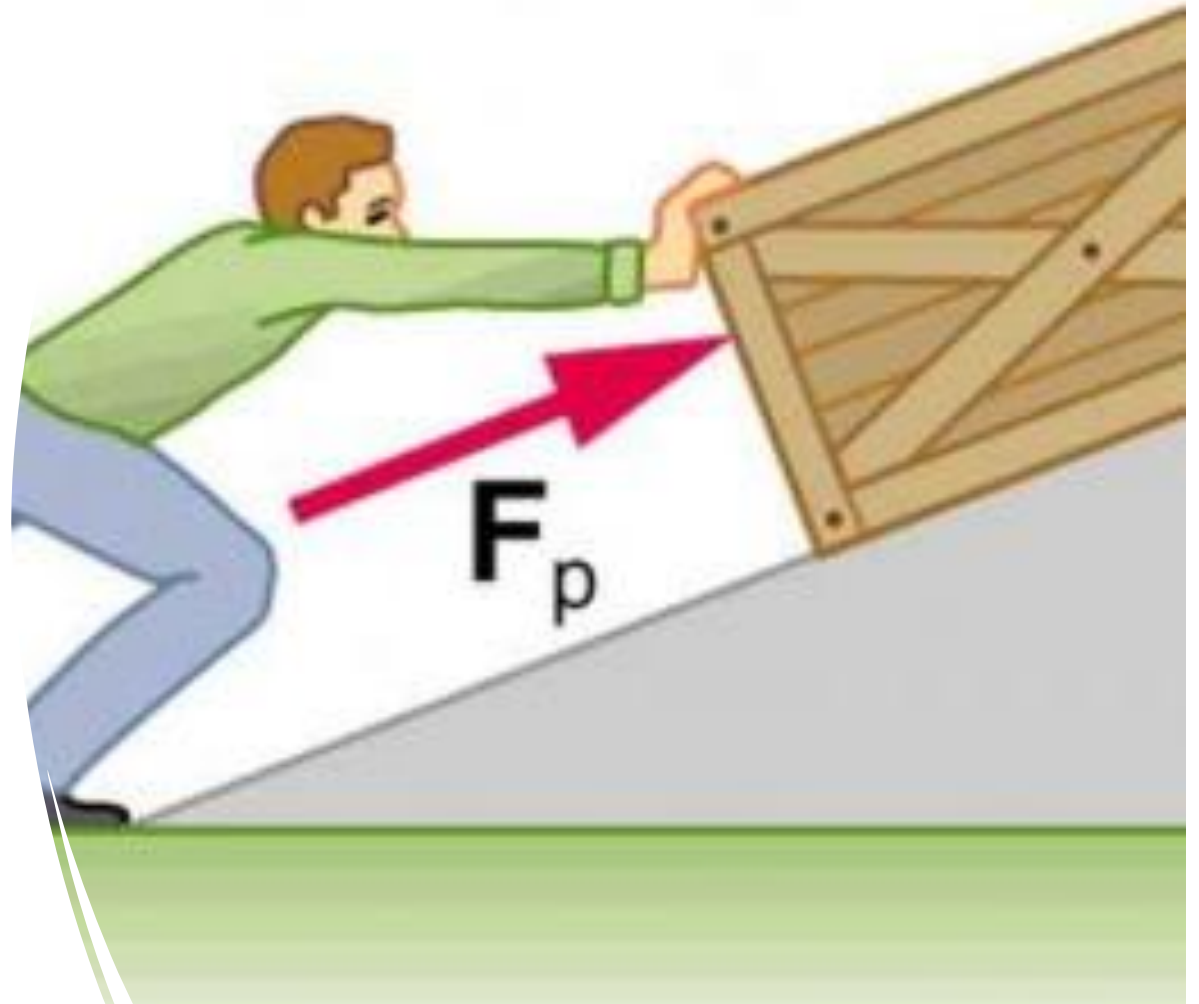
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**FORCE →  $F = ma$**

(Abbreviated)

Force is a cause of change  
and/or applied energy.

A force must have mass  
to MOVE something.

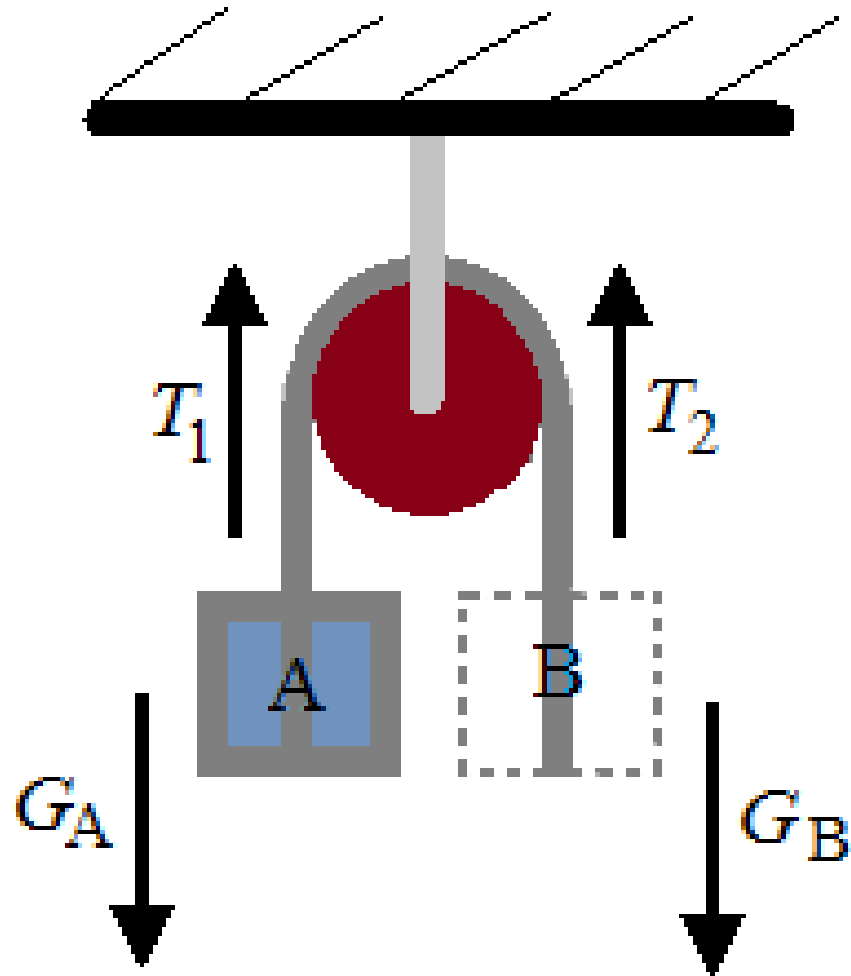


# NEWTON'S 3<sup>RD</sup> LAW

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Forces are equal and opposite direction if an object is not moving or changing

(Abbreviated)



# Scientific Laws are Well Validated

Scientific Laws, like Newton's, are

- Testable
- Repeatable
- Observable
- Generally described by math equations/principles

**THEORIES ARE EXPLANATIONS**



Look, Kid, *I* don't know why. Ask *him* to explain it!

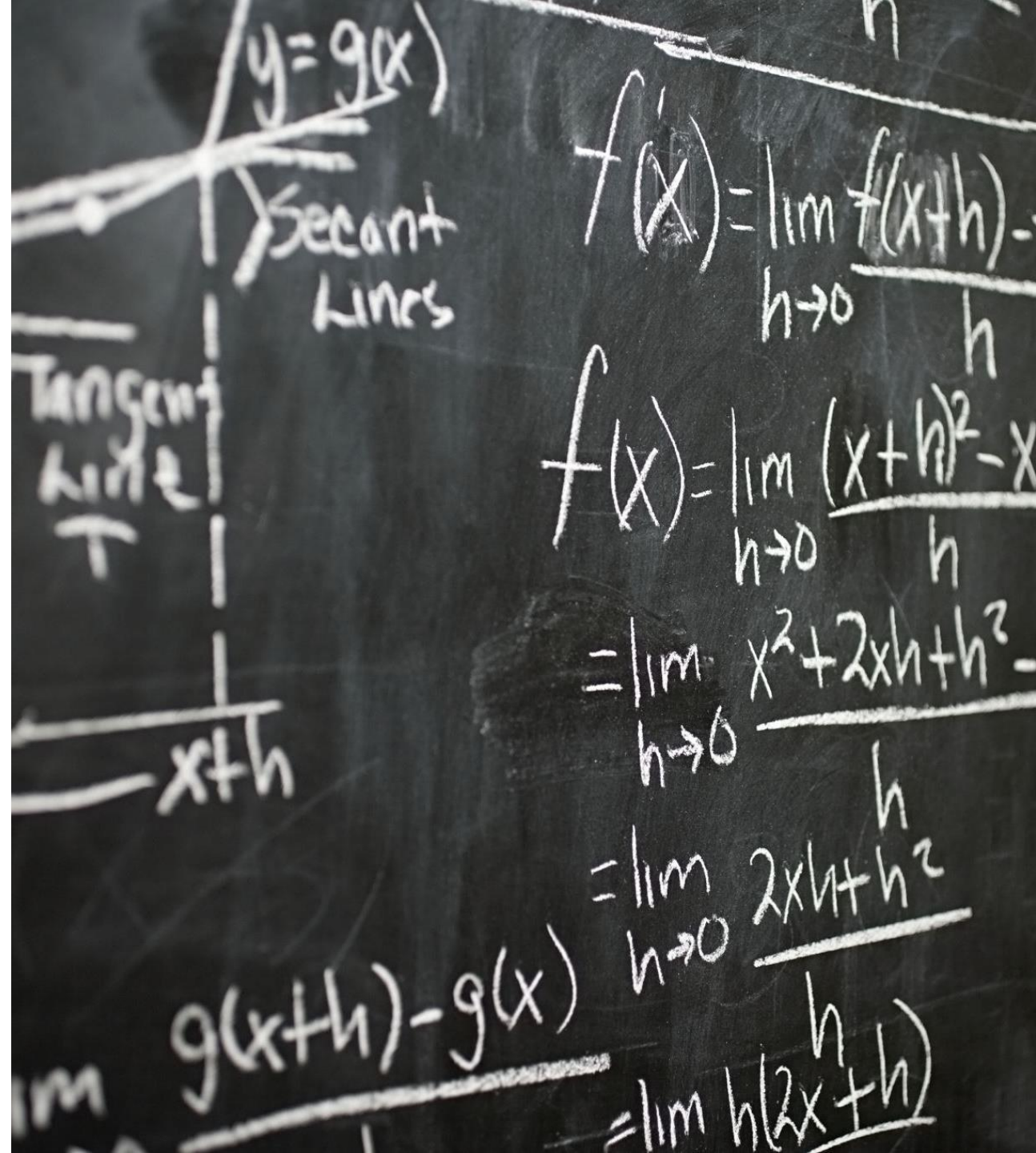
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# APOLOGETICS

**TEST SCIENCE** for truth. Many science theories are mere ideas or speculation.

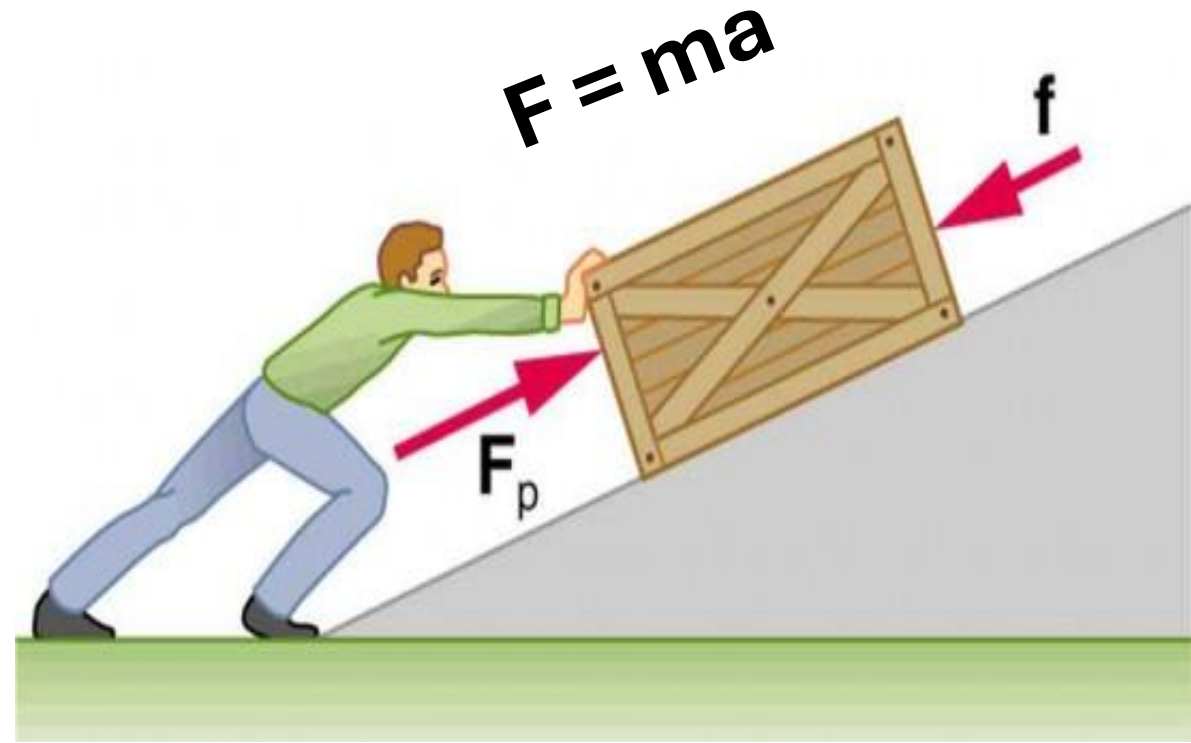
A **THEORY** is **NOT** a “law.” Most theories will never be laws, **INSTEAD** they provide an explanation or guess at what’s happening.

**2 COR 10:5** We demolish arguments and every pretense that sets itself up against the knowledge of God, and we take captive every thought to make it obedient to Christ.



# FORCE REQUIRES MOTION

- **MASS** – inertia or resistance to motion, an amount of matter with weight.
- **ACCELERATION** – a change in motion, positive, negative, or a change in direction.

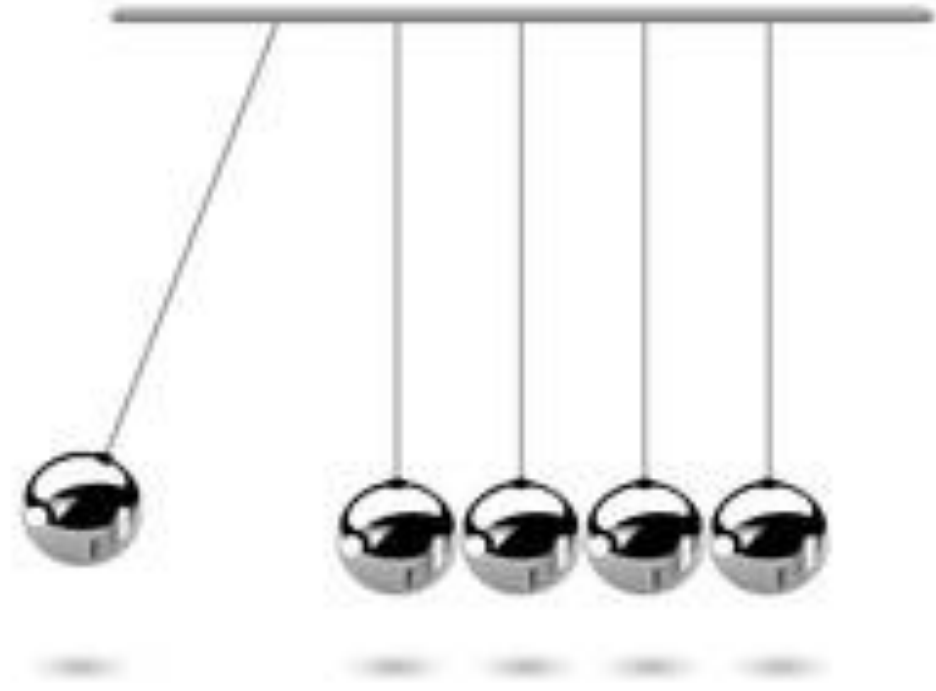


# Let's Experiment

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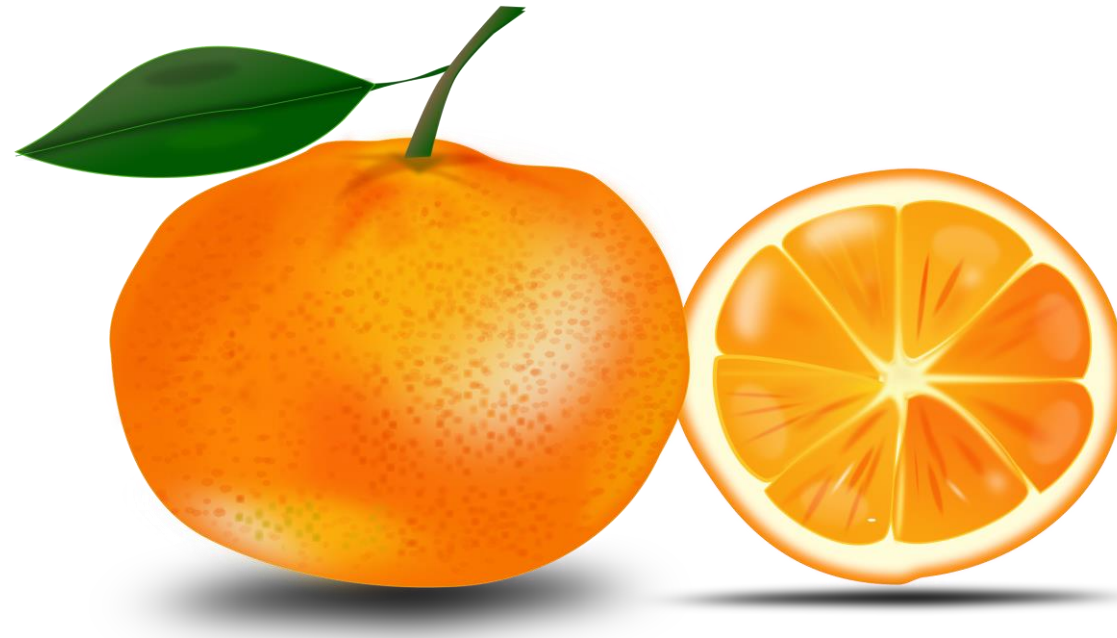
- 1. AT REST (NOTHING MOVING)**
- 2. APPLY A FORCE**
- 3. CAUSE/REACTION**
- 4. EXPERIMENT WITH FORCES**
- 5. EQUAL AND OPPOSITE**

MOMENTUM WILL BE COVERED IN LATER LESSONS...



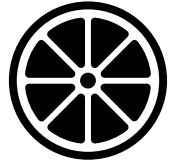
**NEWTONIAN CRADLE**

# An Orange is Matter and has Mass



**MOVING AN ORANGE AT REST REQUIRES FORCE – NEWTON'S  
2<sup>ND</sup> LAW... aka  $F = ma$  (math)**





# ONE NEWTON OF FORCE

A “cutie” orange weighs  $\sim 1/10^{\text{TH}}$  kilogram (.1 kg) or 100 grams. To move/roll a small orange requires approximately .1 Newton of force/push.

To lift a “cutie,” against the pull of gravity of  $9.8 \text{ m/s}^2$ , would require .98 Newtons, rounded to 1 N. We’ll use 1 Newton and  $10 \text{ m/s}^2$  in Lessons 3-18.



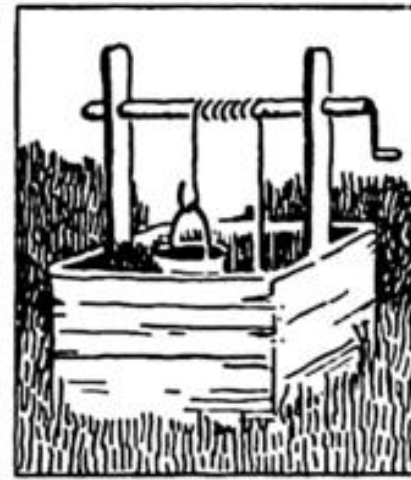
## SIMPLE TOOLS/MACHINES

### **DEFINITION:**

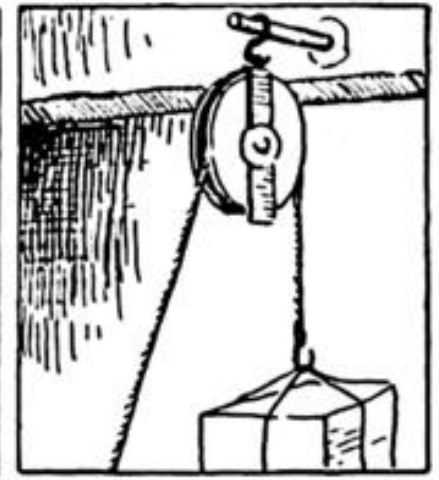
A mechanical device that changes the direction or magnitude of a force



Lever



Wheel and axle



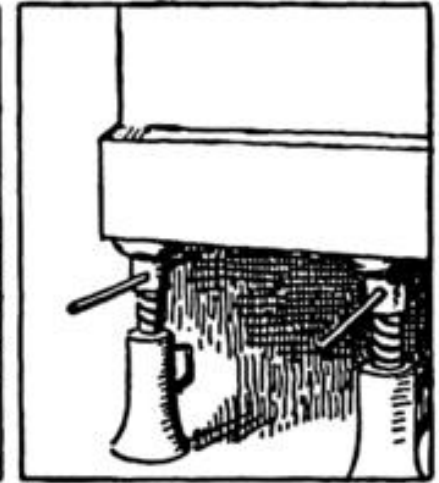
Pulley



Inclined plane



Wedge



Screw

# Simple Machines or Tools Help Us Work

We can do more **WORK**  
We can be better **Workman**  
We can **HELP** others  
if we **WORK** smart and  
use tools to **MOVE** things

Our Ingenuity and Creativity  
allow us to Leverage our  
**WORK/MOTION**



# REMEMBER THESE THINGS



**WORK (hands):**

**COL 3:23 Whatever you do, work heartily as unto the Lord, not unto man.**

There's nothing more liberating than working unto the Lord.

Genuine joy fills a believer whose work is dedicated to God, not man.