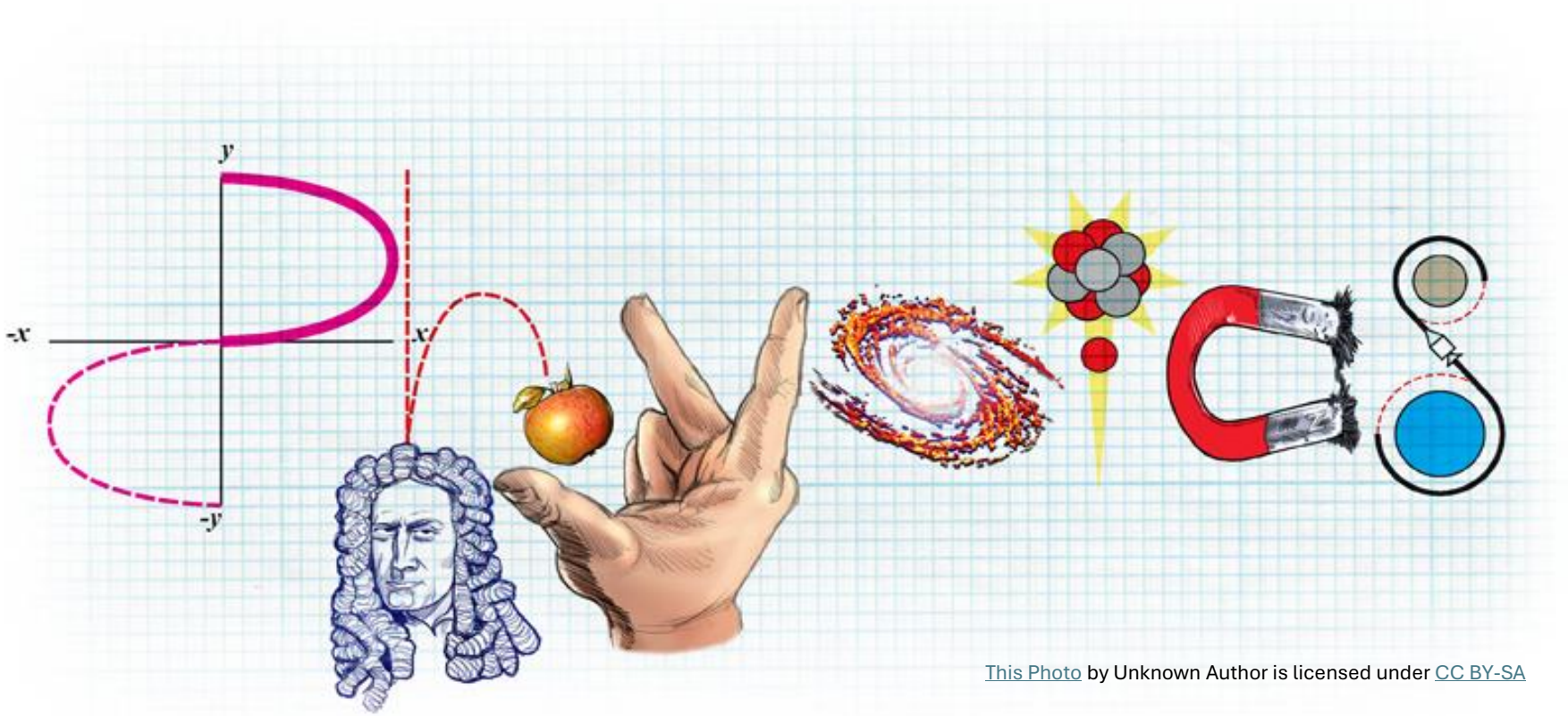


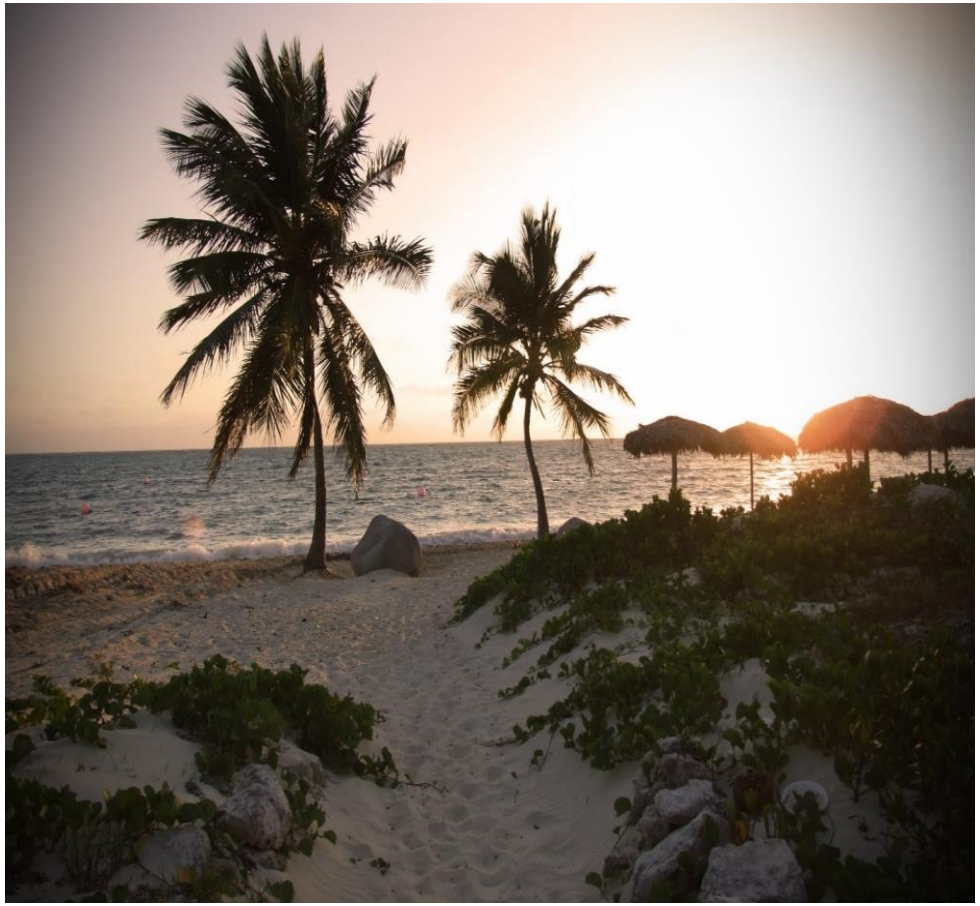
SURVIVAL SCIENCE

Volume 1 Lesson 2

WHAT IF …

What if…you were stranded on a disserted island and had no gear:

1. How would you improve your survivability?
2. What knowledge could you **leverage**?
3. What has God given you to make surviving possible?



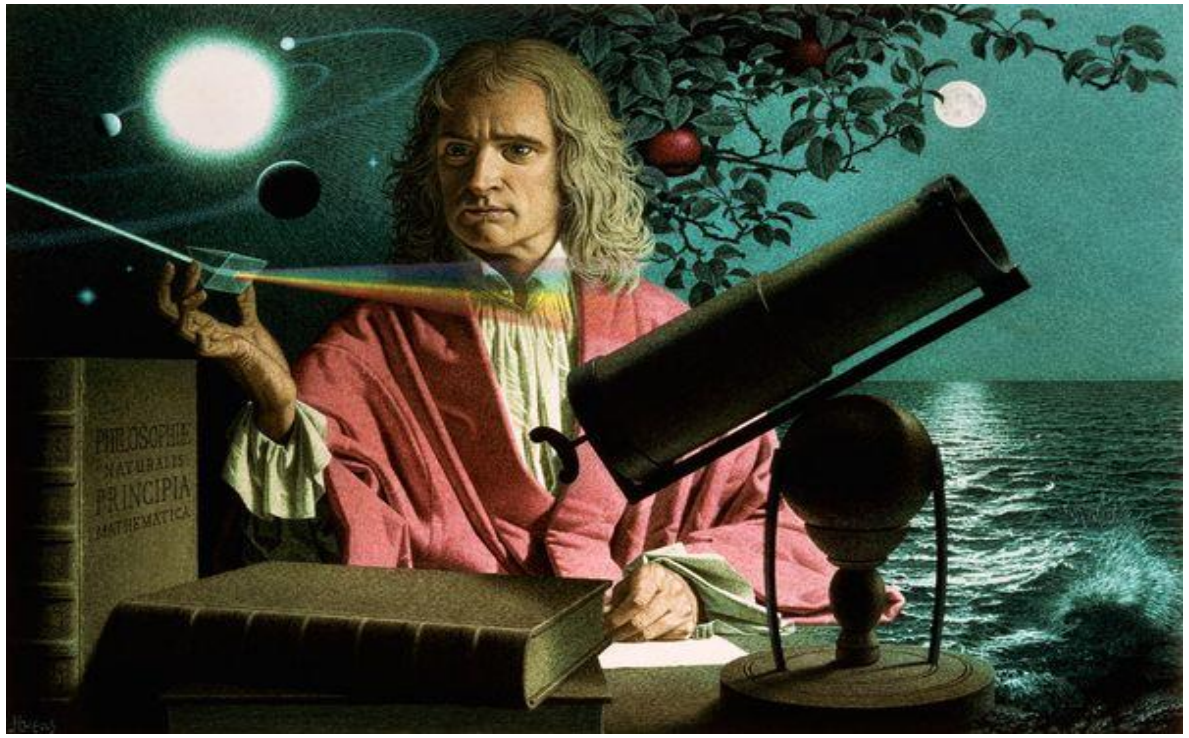
INGENUITY…

A QUALITY OF BEING
ORIGINAL, INVENTIVE,
CREATIVE, AND SMART

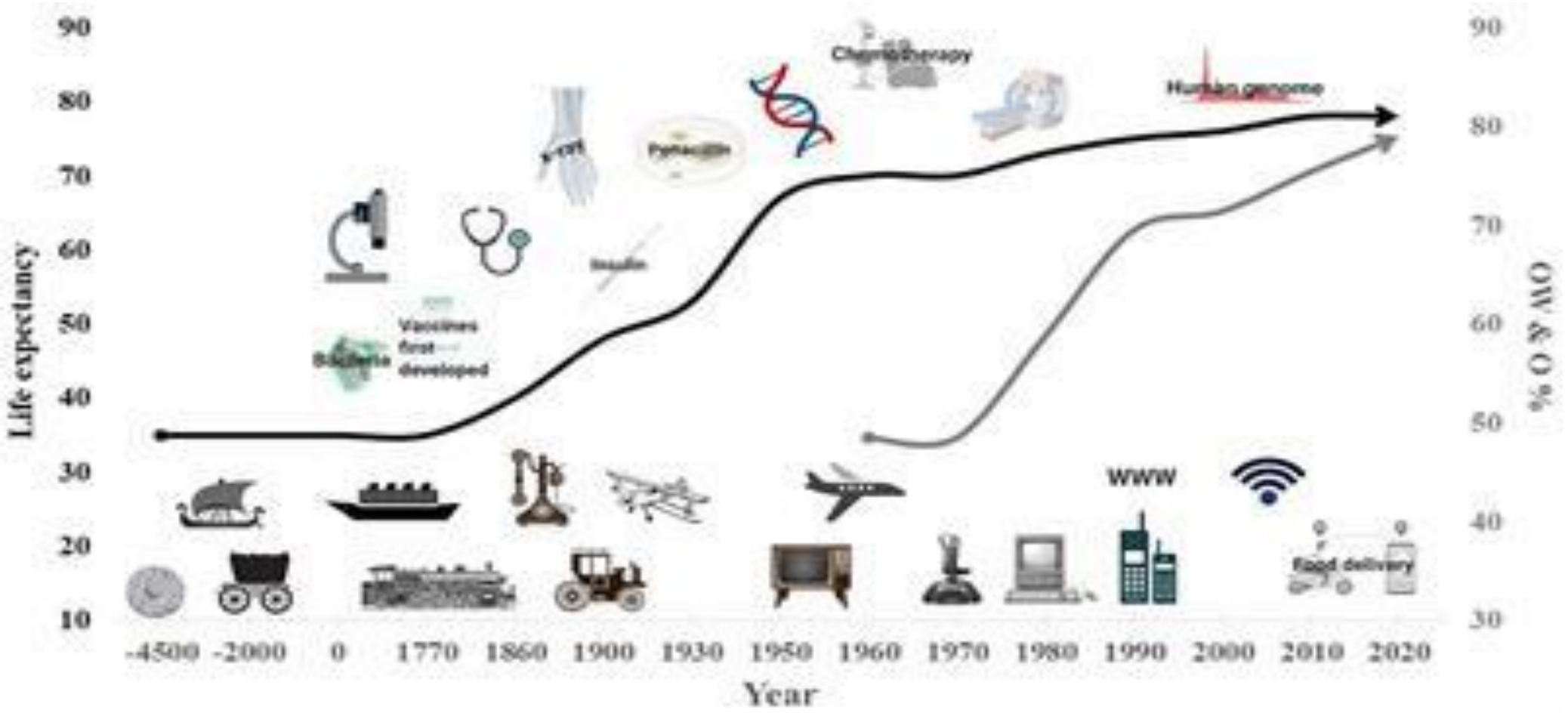
GOD Gave You INGENUITY to Survive!

This year you'll try to **LEVERAGE** any resource or natural materials you can find by using them to **INVENT.**

Inventions begin with Adam and Eve's family and have continued on…



Our Focus → Inventions Through Time

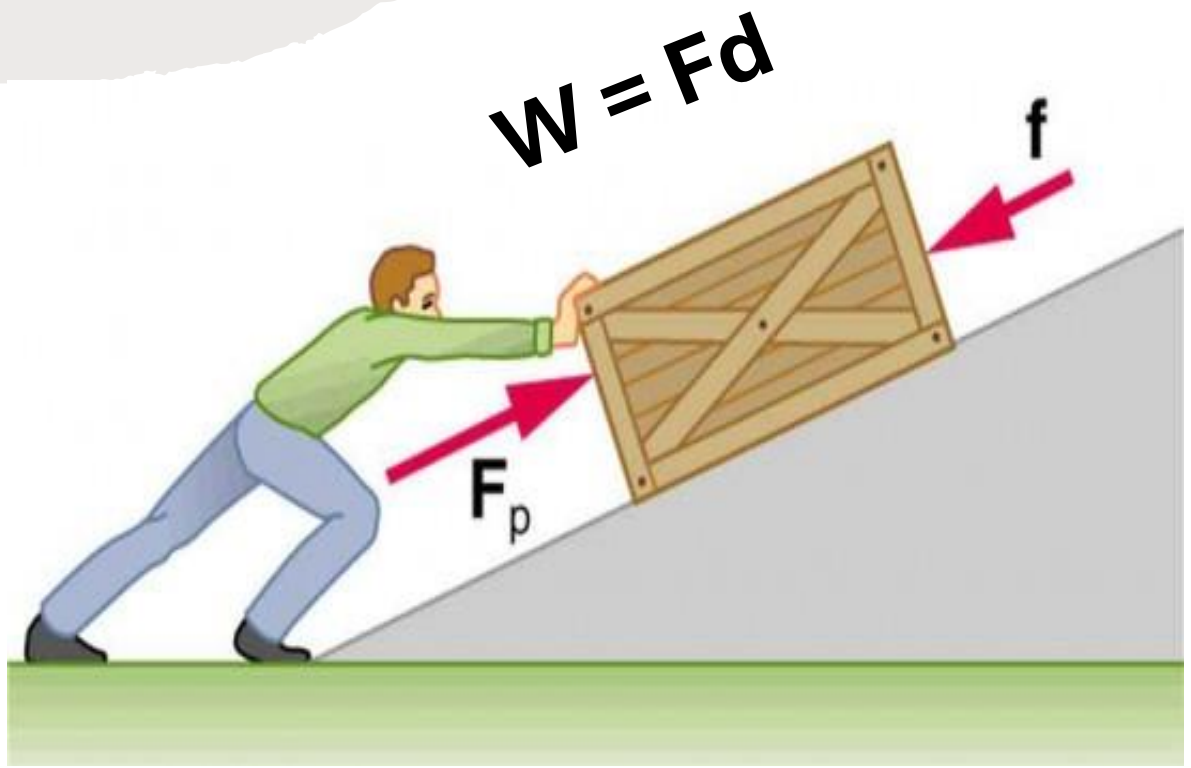


INVENTIONS HELP US WORK

- **WORK –** the transfer of energy

A force acting over a distance equals work.

- **FORCE –** is a push, pull, or lift that alters an objects speed, direction, or shape.
- **DISTANCE –** a measured length



Inclined plane – simple tool

LEVERS PROVIDE LEVERAGE

LEVERAGE – using “something” to maximum advantage. In physics, it’s an exertion of force by means of a lever (simple machine or tool).

Psalms 90:17 Let the favor of the Lord our God be upon us and establish the work of our hands upon us; yes, establish the work of our hands!

MATH SKILLS

What's a kilogram? 1000 grams = 1 kilogram
.1 kg or 100 grams (like a cutie →)

1 kilogram (kg) = ~ 2.2 lbs
So, how much does a 3 kg melon weight in pounds. Let's do the math!

3 x 2.2 lbs = 6.6 lbs

3 kg x 2.2 lbs/1 kg = _____

6.6 kg x lbs/1 kg = _____

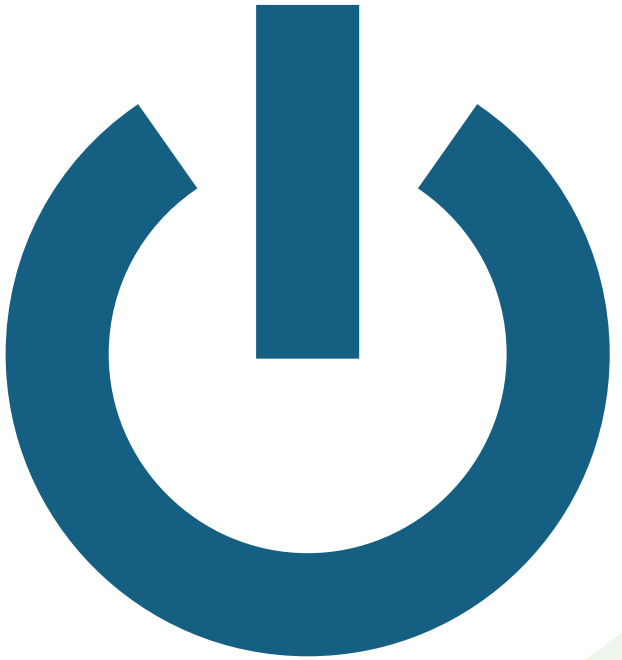
(kg cancel out) **= 6.6 lbs**

MATH SKILLS

$F = m \times \mathbf{a}$

Acceleration (a) due to gravity is **~10 m/s^2**; but, in more advanced physics, **9.8 m/s^2** may be used.

For illustration, we'll use both to calculate the force one melon could give.



MATH SKILLS

REMEMBER: F = ma Force = mass x acceleration

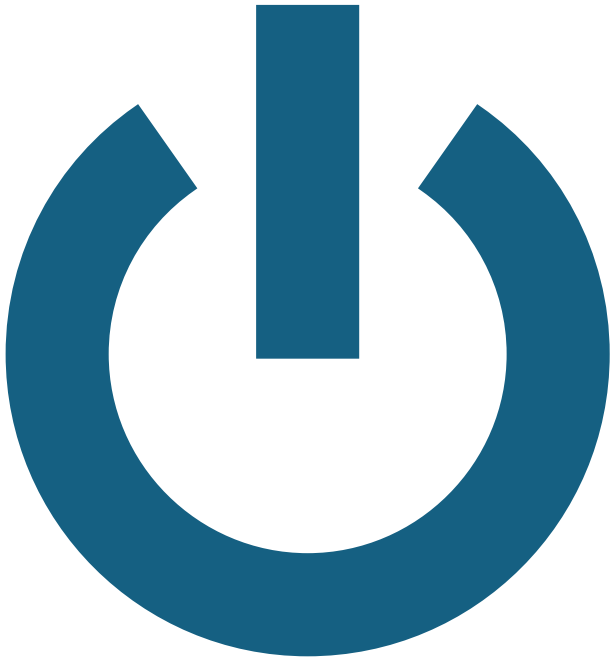
If we look at the mass of a melon rather than a “cutie”

Mass = 6.6 lbs or 3 kg

F = ma

F = 3 kg x 9.8 m/s^2 or 3 kg x 10 m/s^2

F = 29.4 kgm/s^2 or 30 kgm/s^2



ANSWER: 29.4 Newtons of force (~30 N) must be used to suspend a 6.6 lb melon against the force of gravity.

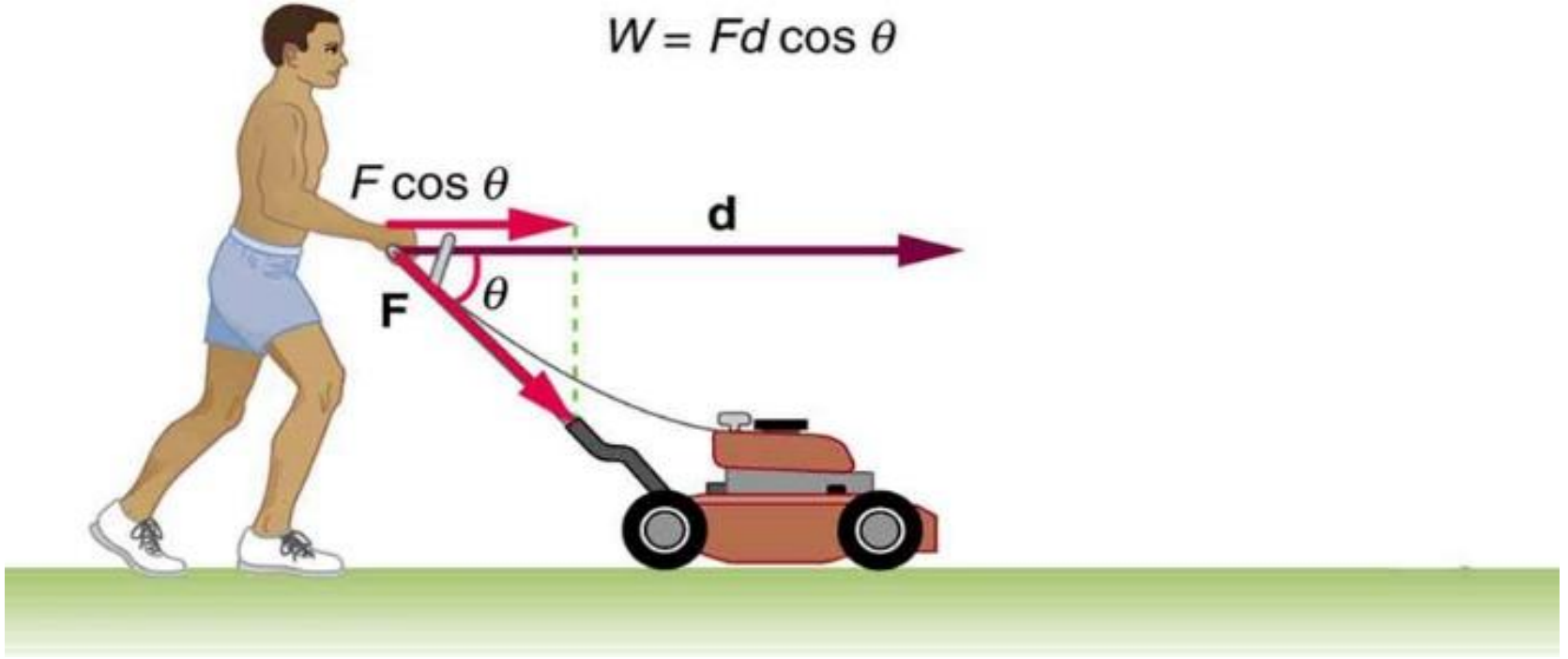
Newton's 3rd Law

What happens if the force isn't equal?

If forces aren't equal & opposite, and one is not strong enough to withstand the force of gravity, or weight like the melon, the object will move, fall, or collapse.

A FORCE IS REQUIRED TO DO **WORK** OR CHANGE MOTION

… the transfer of energy to or from an object via application of force, Work = Force (F) x (d) Distance (aka s → for displacement). W = Fd

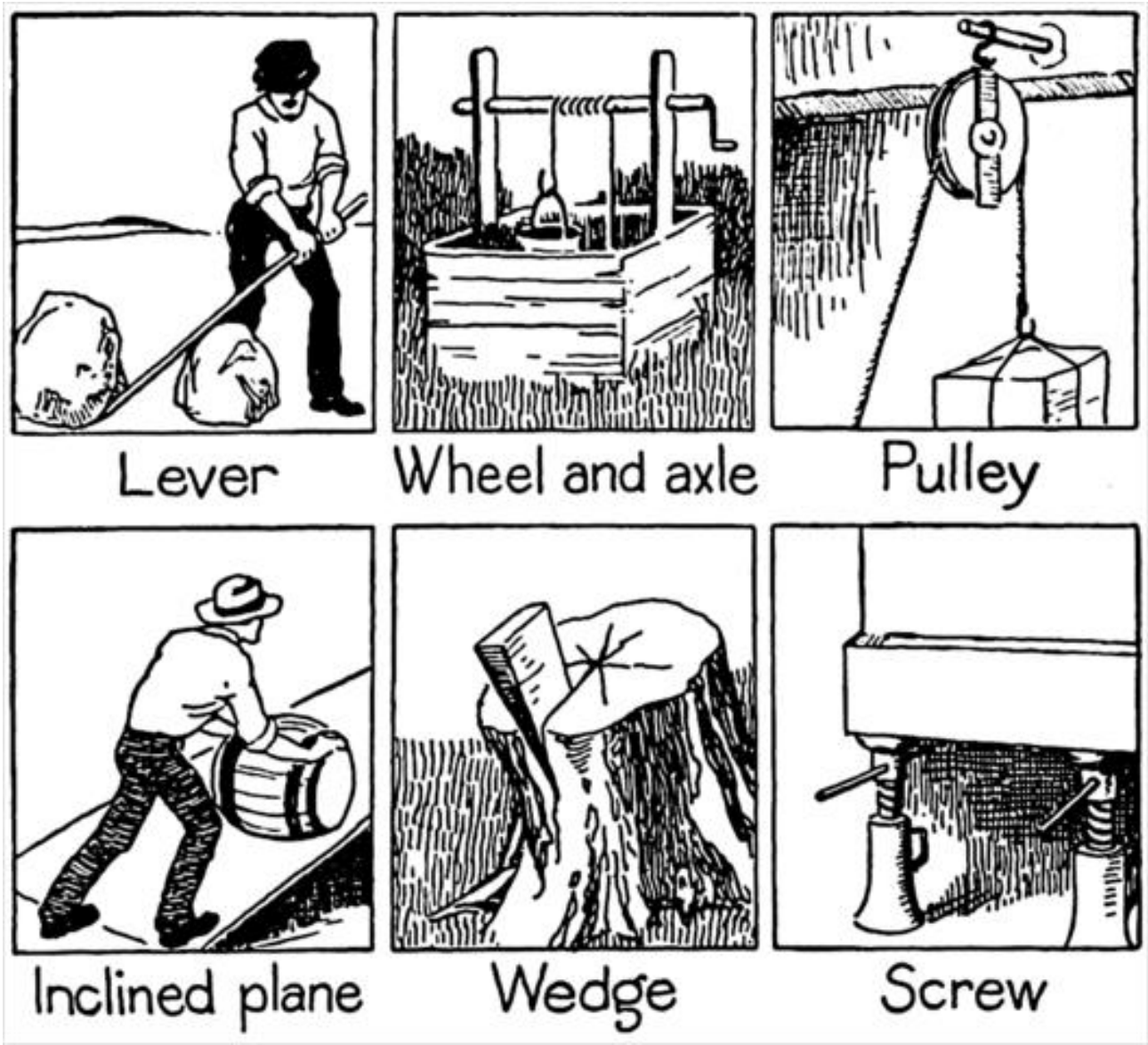


WORK CAN BE DEFINED MATHEMATICALLY

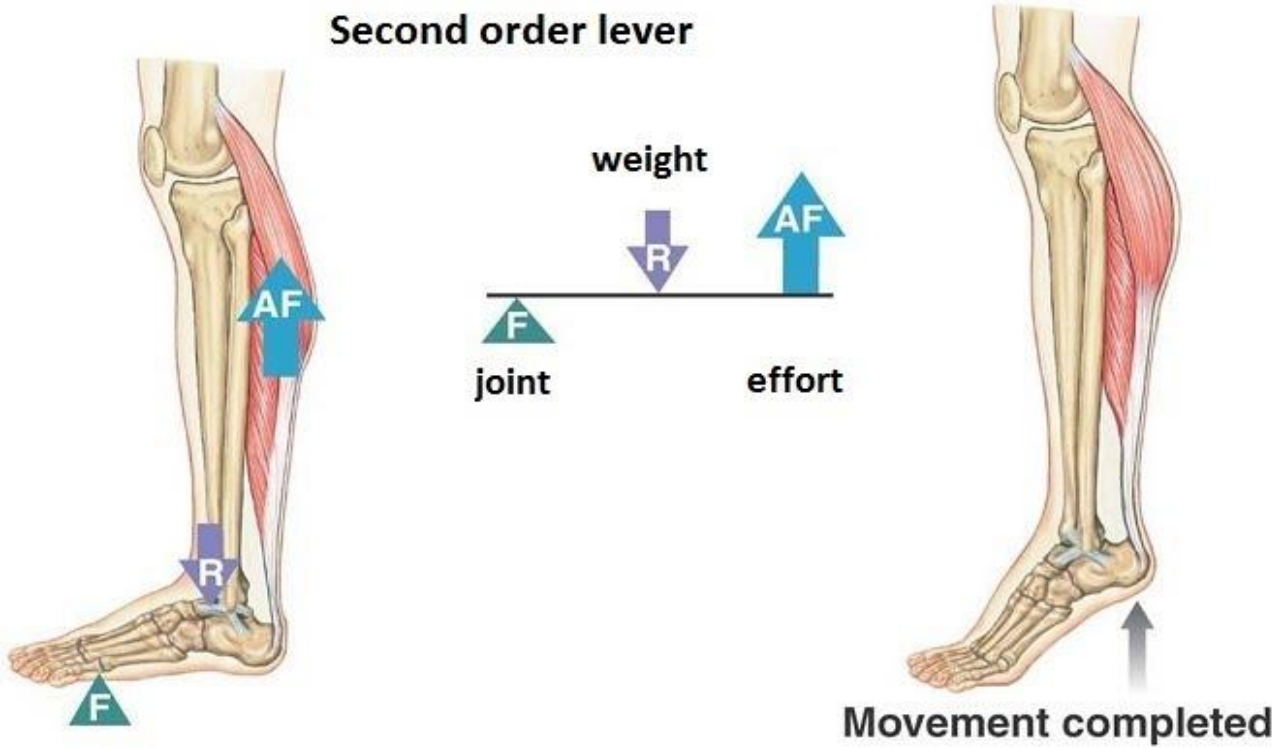
SIMPLE TOOLS/MACHINES PROVIDE A MECHANICAL ADVANTAGE

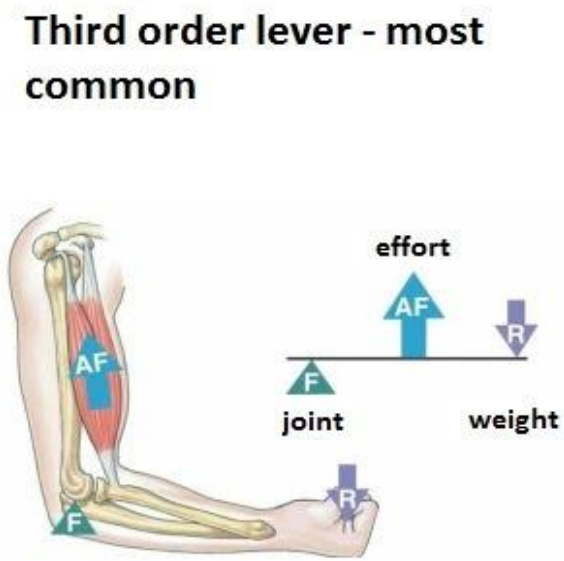
DEFINITION:

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



EVEN OUR BODIES ARE DESIGNED WITH LEVERS TO GIVE US MECHANICAL ADVANTAGE





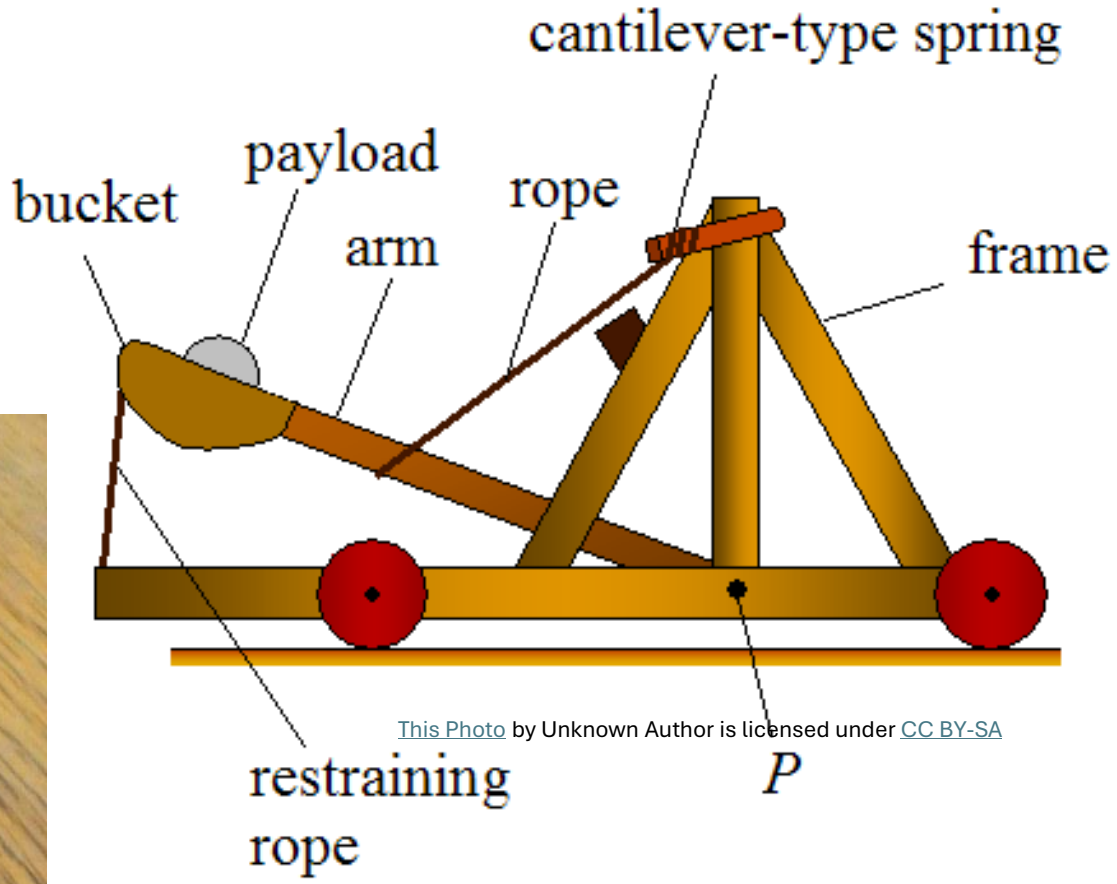
AND GAVE US BOTH INGENUITY (our minds) AND LEVERAGE (or bodies)

SIMPLE TOOLS -

LEVERS
PINS/NAILS & PIVOTS
RODS/CONNECTORS
WEDGES (AXE, KNIFE)
AXLES
WHEELS
PULLEYS
BELTS

BLOWERS/BELLOWS
FULCRUMS
FURNACES
SCREWS
CHAINS/GROOVED BELTS
EYES (HOOKS/EYES)
TENSORS
BEARINGS

A Machine/Tool Lever You Can Make



- Make your own catapult
  - Rubberbands, glue/cap, & sticks

to make, form, or repair (something) with what is conveniently on hand

Ingenuity…
MacGyvered
MacGyvering…

REMEMBER THESE THINGS

LEVERAGE (a hammer):
PHIL 4:13 I can do all things through Christ who strengthens me.
Christ is our source of strength; the force enabling us to do good works. We should leverage our gifts and talents by seeking His will for us.

Learn to lean on Him for strength.