

# Three Laws of Physics that the Greeks Discovered

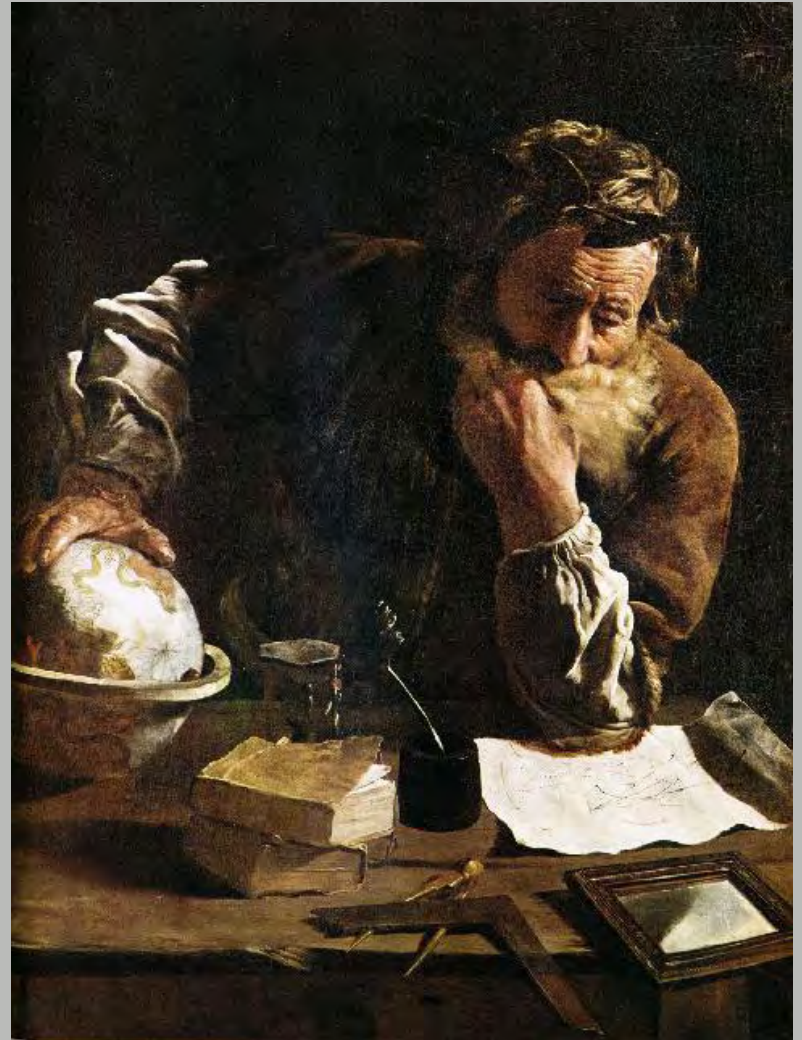


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1. Greek Science – Context #3

# Archimedes

- An ancient Greek mathematician, physicist, astronomer and engineer.
- Born 287 BC in the ancient seaport city of Syracuse - A Greek settlement on the East side of Sicily.
- His father was Phidias, an astronomer, and also perhaps a teacher.



# First recorded event

- Archimedes went with his father to Alexandria Egypt for the winter and sat in on geometry lectures -- known at that time as 'Elements of Euclid'.
- He watched men carry buckets full of water from the Nile for irrigation purposes and dreamed of easier methods for this.



# Back to Syracuse

- Using the knowledge gained from Alexandria, Archimedes proved several new propositions of geometry.
- Gained the nickname “Joyous mathematician of Syracuse”



# The Story of the King's Crown

- King Hiero came to Archimedes with a problem
- He recently got a new crown and suspected that the jeweler had cheated him of gold.



# King's Crown

- The King did not want the crown disturbed
- Archimedes had to ponder this problem for a while, so he had a bath.



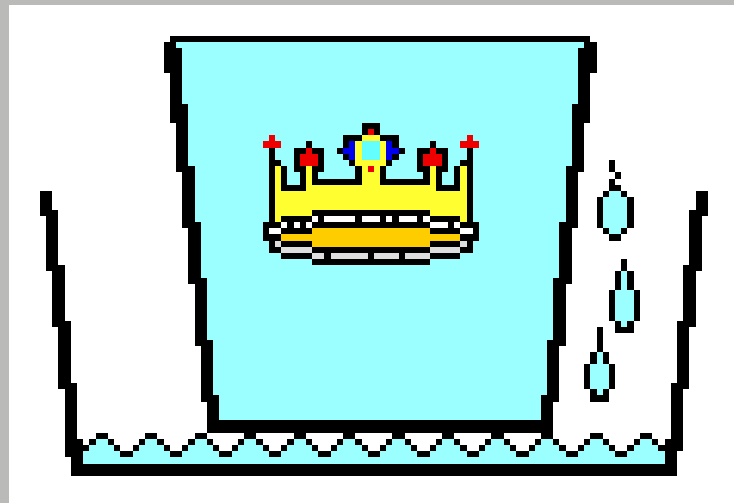
# Eureka!!!

- As Archimedes entered the water he noticed that if more of him entered the water the higher the water level was.
- So he figured out that the water displaced would equal the volume of the object (crown).





- This was useful to Archimedes since he knew that water was approximately 19 times less as dense as gold.
- So if he weighed the water displaced by the crown and multiplied it by 19, he should get the weight of the crown.



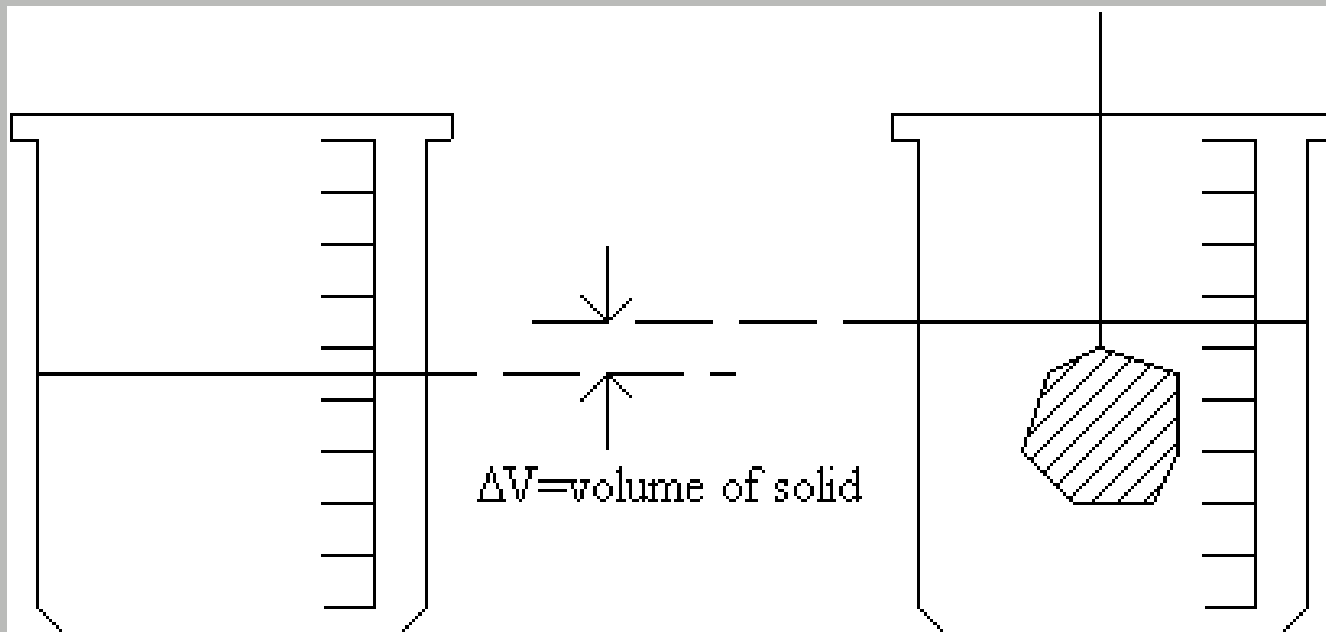


- Turns out the weight of the crown was significantly less
- Proving the Jeweler a thief
- Two endings to the story
  - Jeweler was abolished
  - Jeweler was beheaded



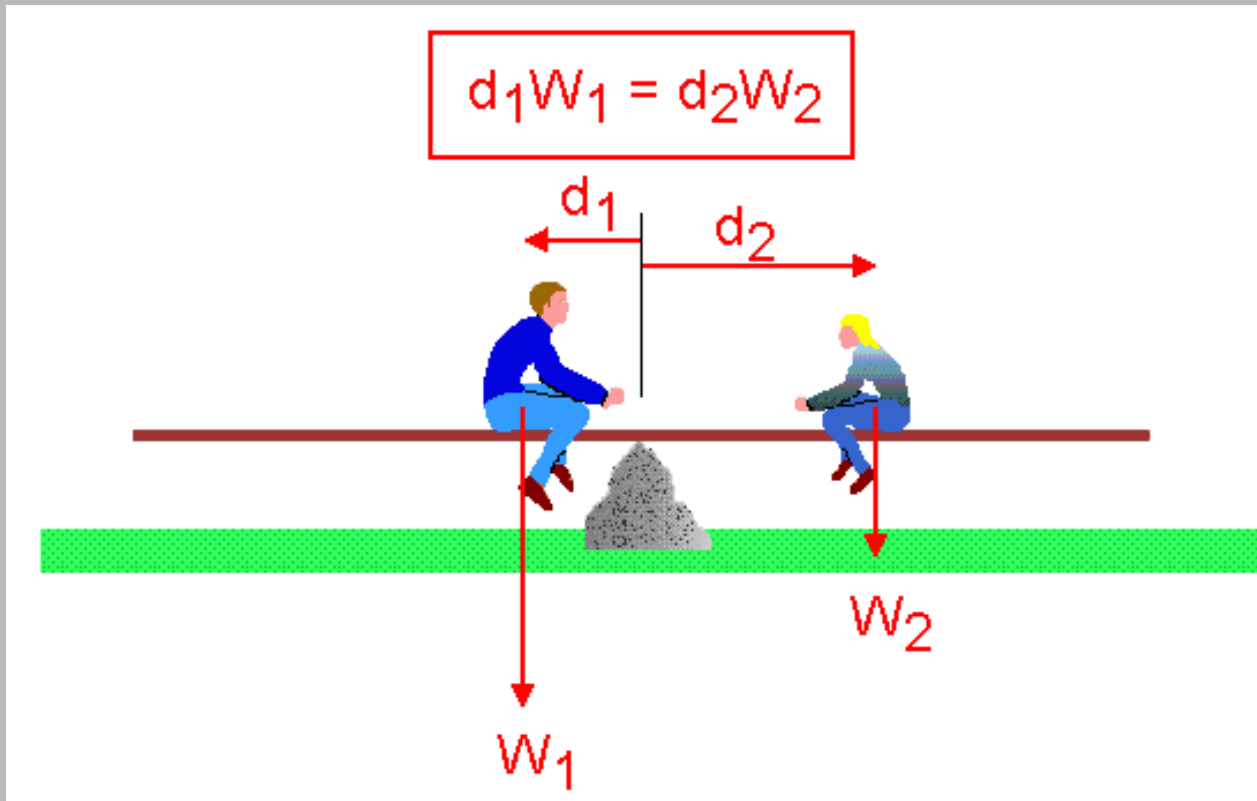
# Archimedes Principle

- “The weight of a body that floats in water with its top at the water's surface is the same as the weight of an equal volume of water”



# Law of the Lever

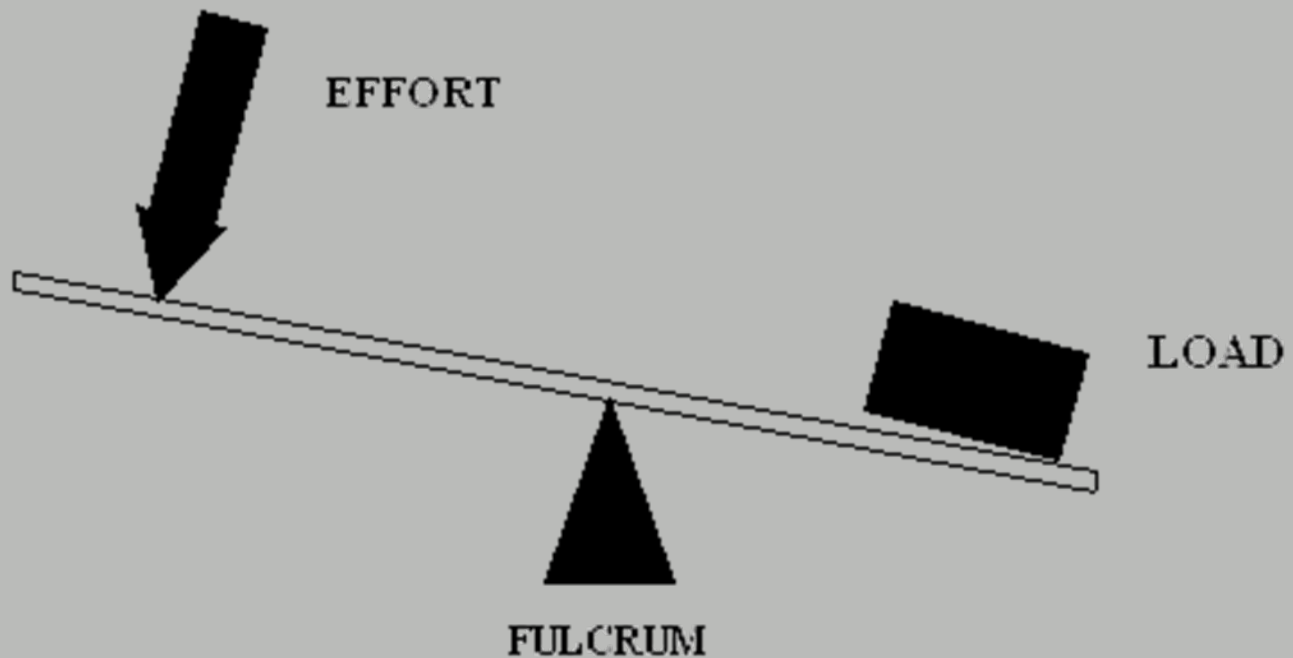
- Obviously the lever was already invented, but Archimedes was the first to formally (mathematically) explain them.



# Three types of Levers

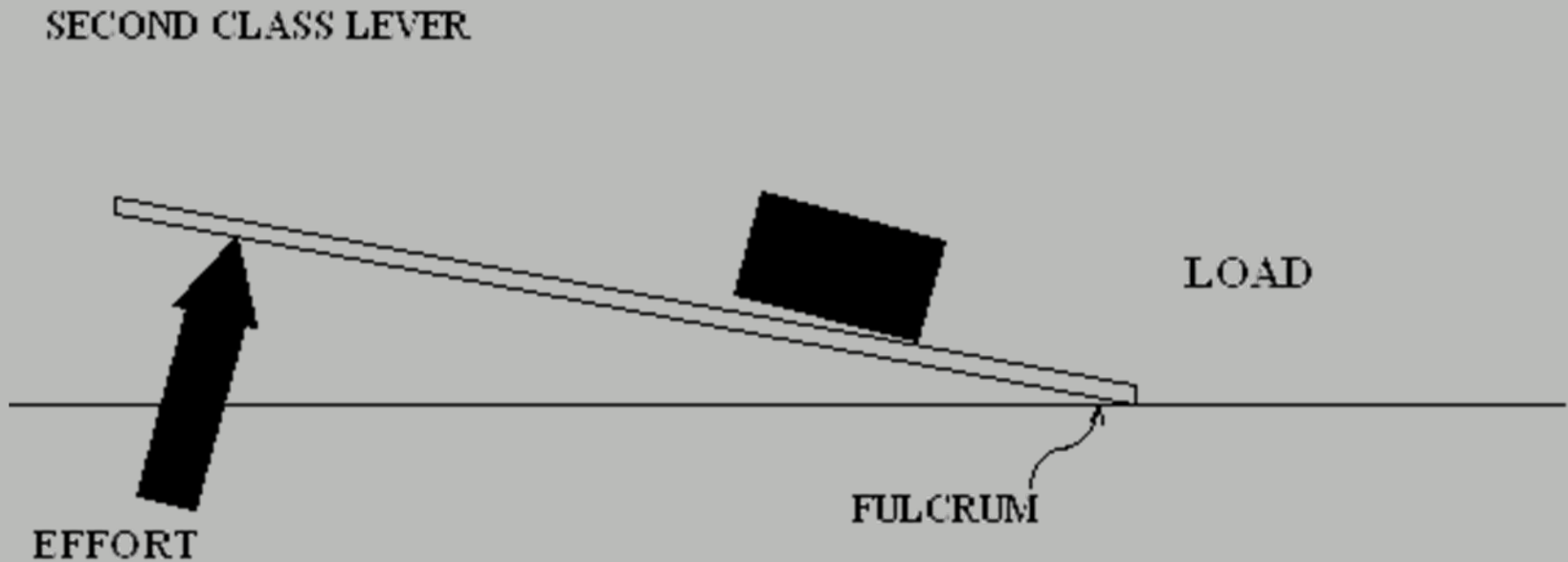
## First Class Lever

- Examples: Scissors, seesaws



# Second Class Lever

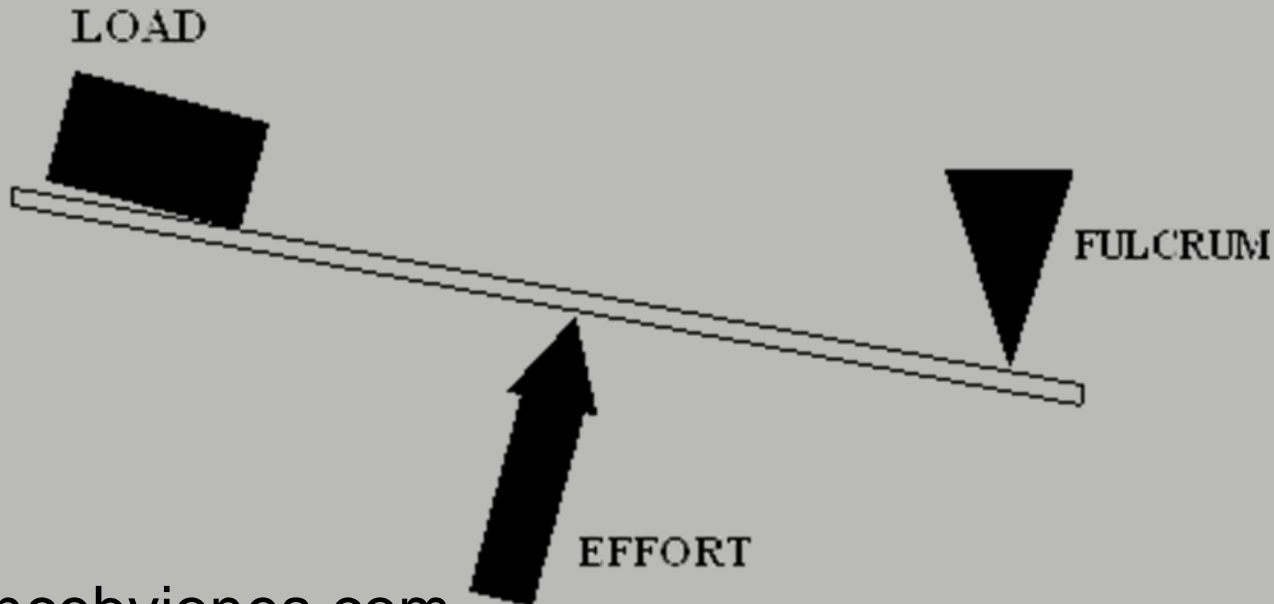
- Examples: Wheelbarrows, foot



# Third Class Lever

- Examples: Your Arm, tweezers, shovel

THIRD CLASS LEVER



# Famous Quote

- “Give me a place on which I can stand ... and I can move the Earth.”

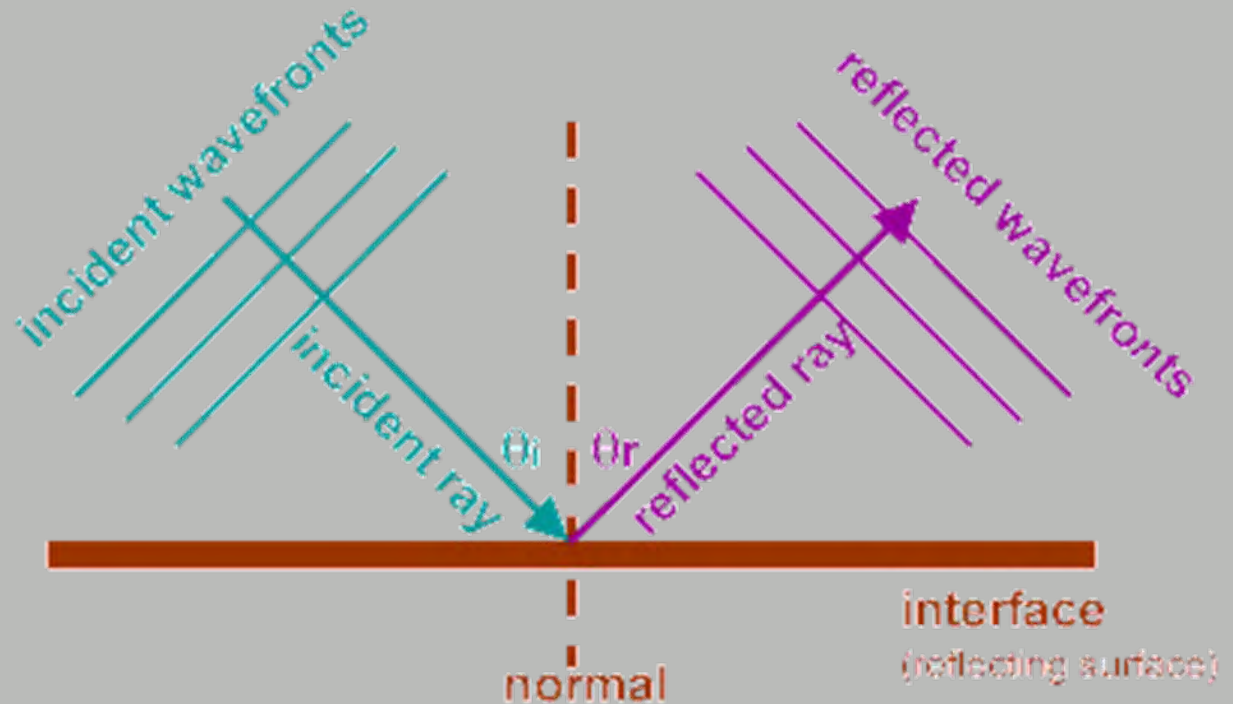




# Law of Reflection

<http://physics.ham.muohio.edu/waveapplets/RefTest.html>

- The incoming 'ray' when hitting a surface at a certain angle will reflect with the same angle



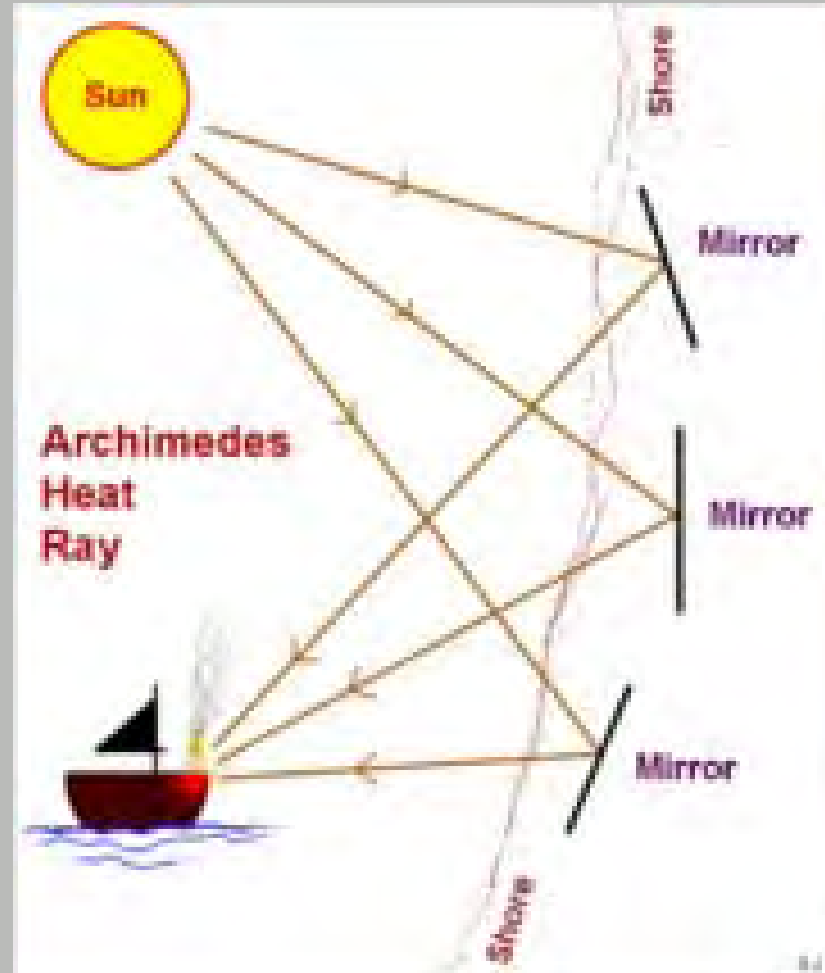
# Law of Reflection

- Archimedes also noticed that he could direct light into a focal point using a concave shaped mirror.
- At this time wars were prominent, especially from the Romans



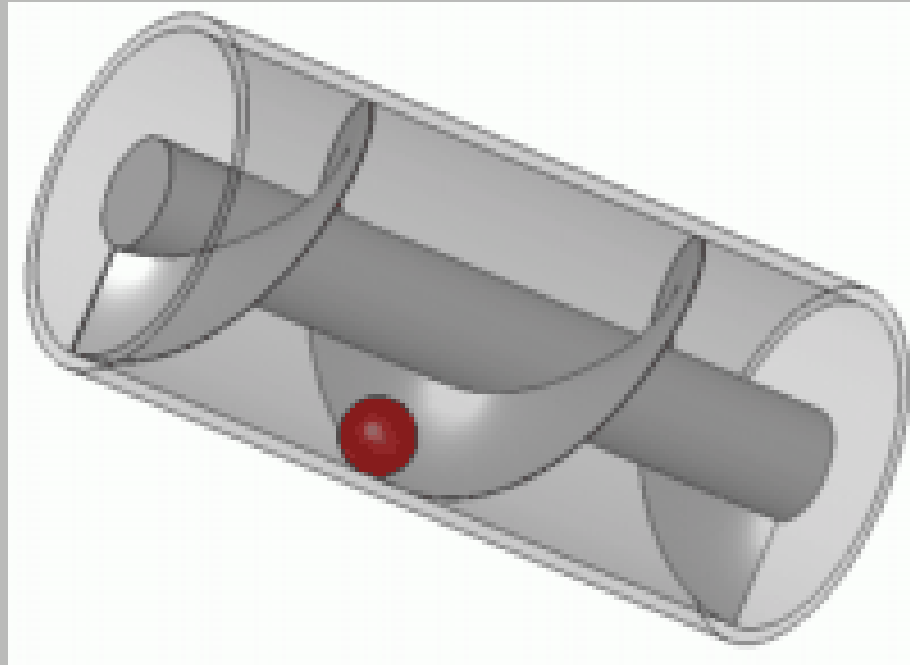
# Death Ray

- Archimedes used the law of reflection to make a “Death Ray” which focused sunlight on incoming enemy ships.
- The mirrors were actually soldiers shields



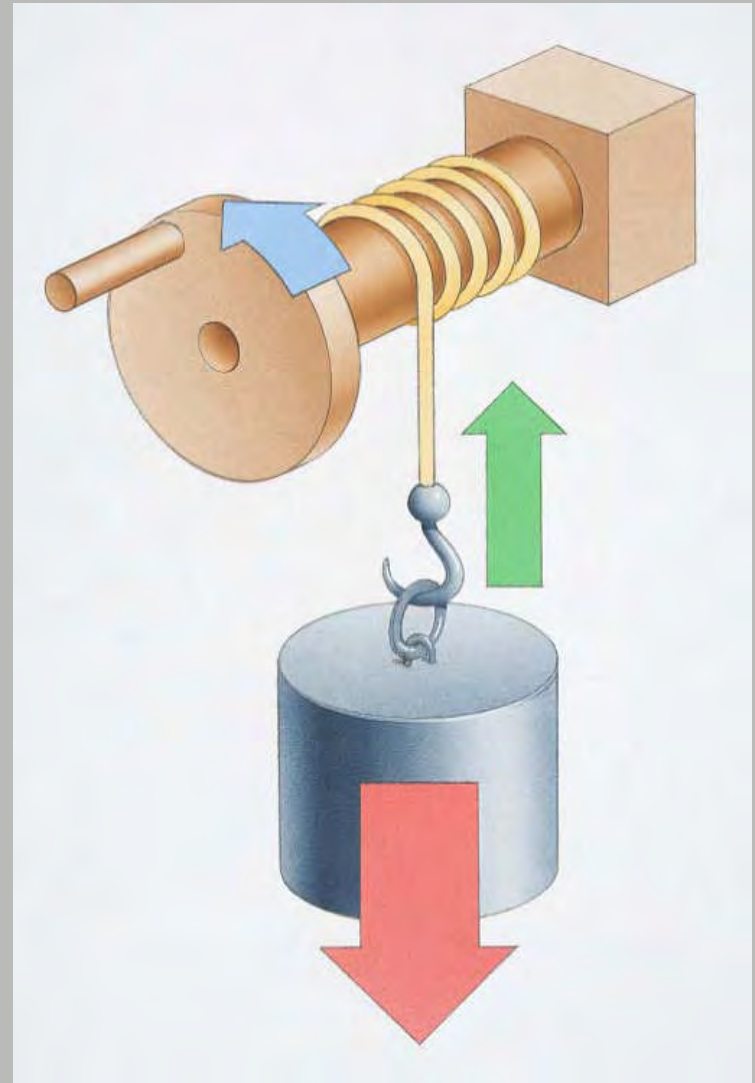
# Other Notable Inventions

- Spiral Pump – Water raising device, developed from ideas from Alexandria



# Wheel and Axle

- And also two types of pulleys



# War Machines



A giant claw



Catapults

# His Death 212 BC



- Killed by a Roman soldier who did not recognize him.
- He was not supposed to be harmed