

# Lesson 6 - Avicenna and the Story of Inertia

Physics - KS3

Forces and Motion

Mrs Wolstenholme



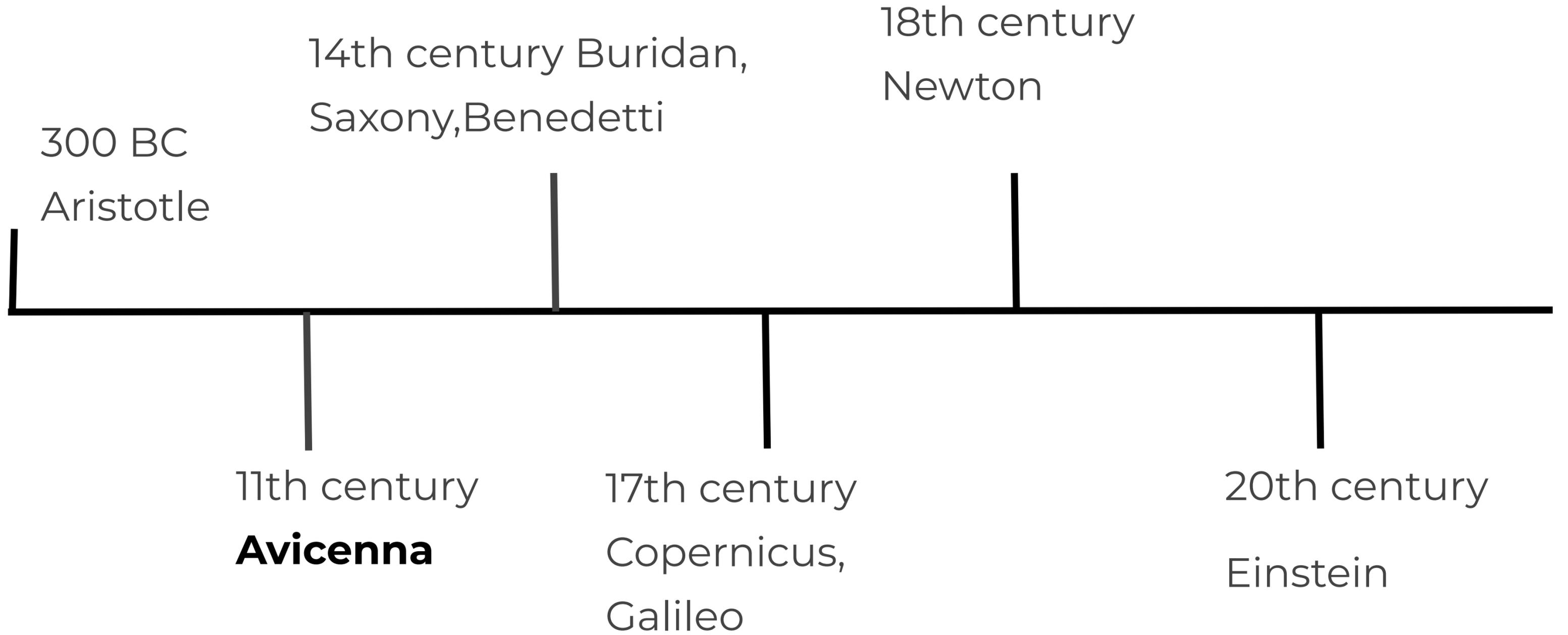
# Avicenna

Ibn Sina

Polymath

medicine, psychology, pharmacology, geology, physics, astronomy, chemistry, philosophy, poetry, theology.





# Aristotle

Moving objects will only keep moving if there is something pushing them



# What did aristotle believe?

## Option 1

Moving objects need to be pushed to keep moving.

## Option 3

Objects never move

## Option 2

Moving objects will keep moving even if there is nothing pushing them.

## Option 4

Objects are always moving.



# How did Aristotle explain why the arrow flew through the air?

## Option 1

The air pushed it backwards

## Option 2

The air pushed it forwards

## Option 3

The air did not affect it

## Option 4

There is no air



# What is the real force of the air on the arrow?

**Option 1**

Air resistance

**Option 2**

Weight

**Option 3**

Thrust

**Option 4**

Push



# Which direction does the air resistance on the arrow act?

**Option 1**

Upwards

**Option 2**

Downwards

**Option 3**

Forwards

**Option 4**

Backwards



# What did Avicenna believe?

## Option 1

A moving object in a vacuum would stop

## Option 3

A moving objects in the air would keep going until something stopped it.

## Option 2

A moving object in a vacuum would keep going until something stopped it.

## Option 4

All moving objects will keep moving forever.



# What is a vacuum?

## Option 1

A place with no air

## Option 3

Something used to clean

## Option 2

A place with no light

## Option 4

A place with no land



14th century Buridan, Saxony, Benedetti

## **Impetus**

1. If we fired an arrow on earth, what causes it to fall to the ground?
2. If there was no gravity, but there WAS air, would it keep moving? Explain your answer
3. If we fired it in a vacuum, but there WAS gravity, what would happen?
4. What would happen if we fired it where there was no gravity and no air?



# What did Galileo say would happen to a moving body if it was undisturbed?

**Option 1**

Get faster

**Option 2**

Move with a constant speed

**Option 3**

Slow down

**Option 4**

Move in the same direction



# What do we now call an 'undisturbed' object ?

**Option 1**

Balanced

**Option 2**

Moving

**Option 3**

Unbalanced

**Option 4**

Fred



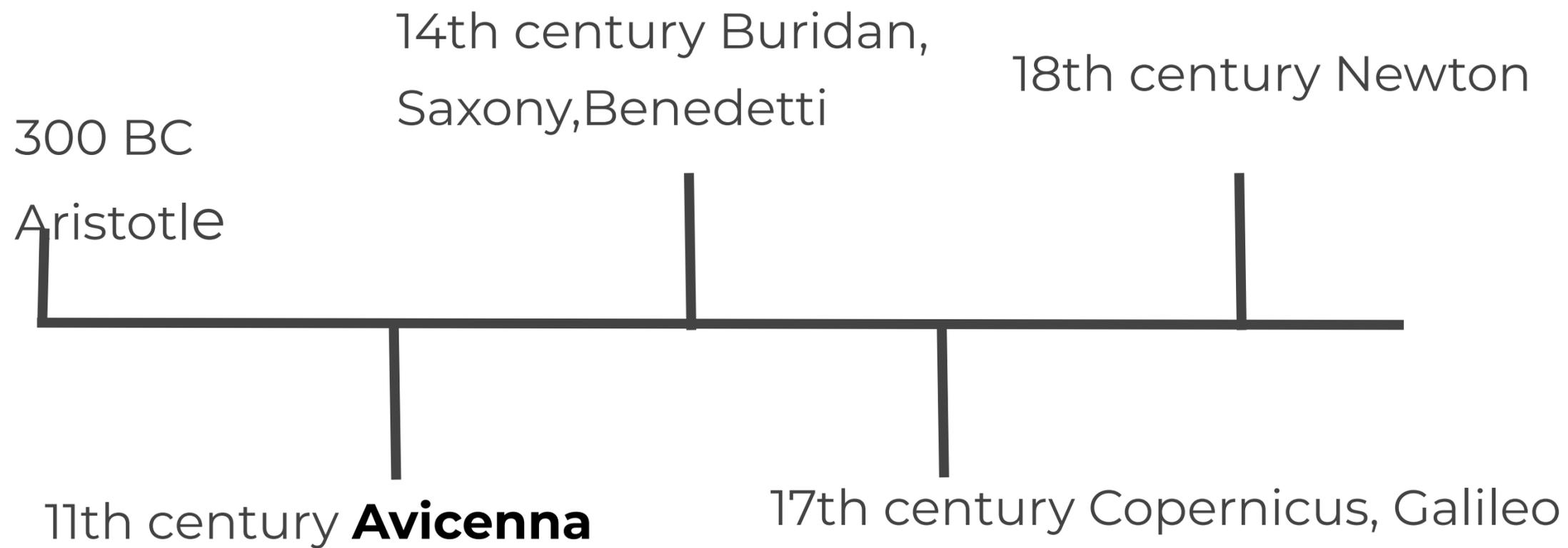
17th century Copernicus, Galileo

A body moving on a level surface will **continue** in the **same direction** at a **constant speed** unless disturbed.

18th century Newton

Every object remains stationary, or moves at a constant speed in a straight line, unless there is an overall force acting on it





**Moving objects will only keep moving if there is something pushing them**

**Every object remains stationary, or moves at a constant speed in a straight line, unless there is an overall force acting on it**

**A body moving on a level surface will continue in the same direction at a constant speed unless disturbed.**

**An object is given impetus, which pushes it forwards until something stops it.**

**A moving object in a vacuum will keep moving until something acted on it to stop it.**



# Comparing ideas

1. What do we call a testable idea in science?
2. What makes scientists change their ideas about why things happen?
3. Compare Newton's explanation of motion with:
  - a. Avicenna's
  - b. Galileo's
4. Who was the first person to think that objects will keep moving unless something acts upon it?



# Scaffold

**Scaffold** - A comparison must have a **similarity** and a **difference**.

**Both cars and motorbikes have an engine, however...cars have four wheels, and motorbikes have two.**

- a. Both Avicenna and Newton thought...however....
- b. Both Galileo and Newton thought...however...

