Aristotle

The Justification of a Science of Nature

Parmenides v Heraclitus

P: What **is** cannot **not be**

Therefore reality cannot change. The mind alone can grasp reality **as it is**. Reality cannot be as it appears to the senses.

H: Everything is in flux and *both* **is** *and* **is not**.

The senses are the most reliable route to reality.

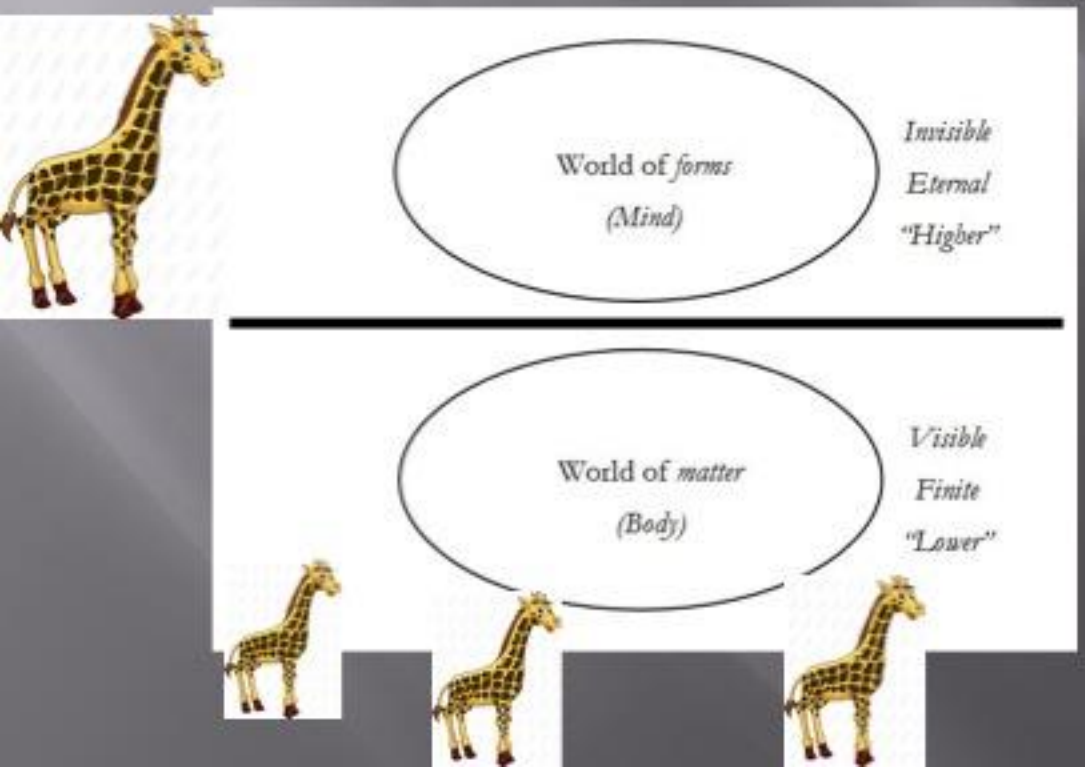
Plato's Solution

- Forms, the abstract ideas of the things we are able to recognise in the world, are stable and changeless. These are accessible to the mind. This intellectual space is the world of **being**, of Parmenidean super-reality.

- The objects of the senses are in continual flux. The physical objects in the world are subject to constant change. This is the Heraclitan world of **becoming,** accessible to the senses.

But where are the forms?

- Plato said the forms (ideas) existed in a realm beyond the material world that we could only get to by a journey of the mind…



Archetypes in the world reached by the mind: Goodness-itself, justice-itself, the table-itself, the human-being itself, the giraffe-itself

Material examples in the world of the senses: A good person, a just person, a human being, a giraffe

Aristotle's Challenge: The Third Giraffe Argument

Aristotle (his pupil) says…

- Sorry, Plato, I know you're a mate, but truth is bigger than friendship. There is no world of the forms. There is no 'human-being-itself' there is no 'giraffe-itself', there are just individual human beings and giraffes.

Aristotle's solution 1

Common sense: anything that can be a part of the following sort of statement is a 'being' (an 'is-er'!):

X **is** Y

The bronze **is** a statue
Henry **is** a doctor

The doctor **is** in the house

The rabbit **is** grey
The spoonful of sugar **is** making the medicine go down

Heather **is** taller than Ermintrude

Categories of ‘being’ (X is Y)

Things that can bear properties (primary existent things)

Lumps of matter
humans
air, wind, fire, water
doctors
rabbits
statues
minds

Incidental Properties that things can have, (secondary existent things)

being this size
being of this quality
being relatively X to
being in this place
happening at this time
being in this posture
being in this state
being active in this way
Being acted on in this way

Aristotle's Solution 2

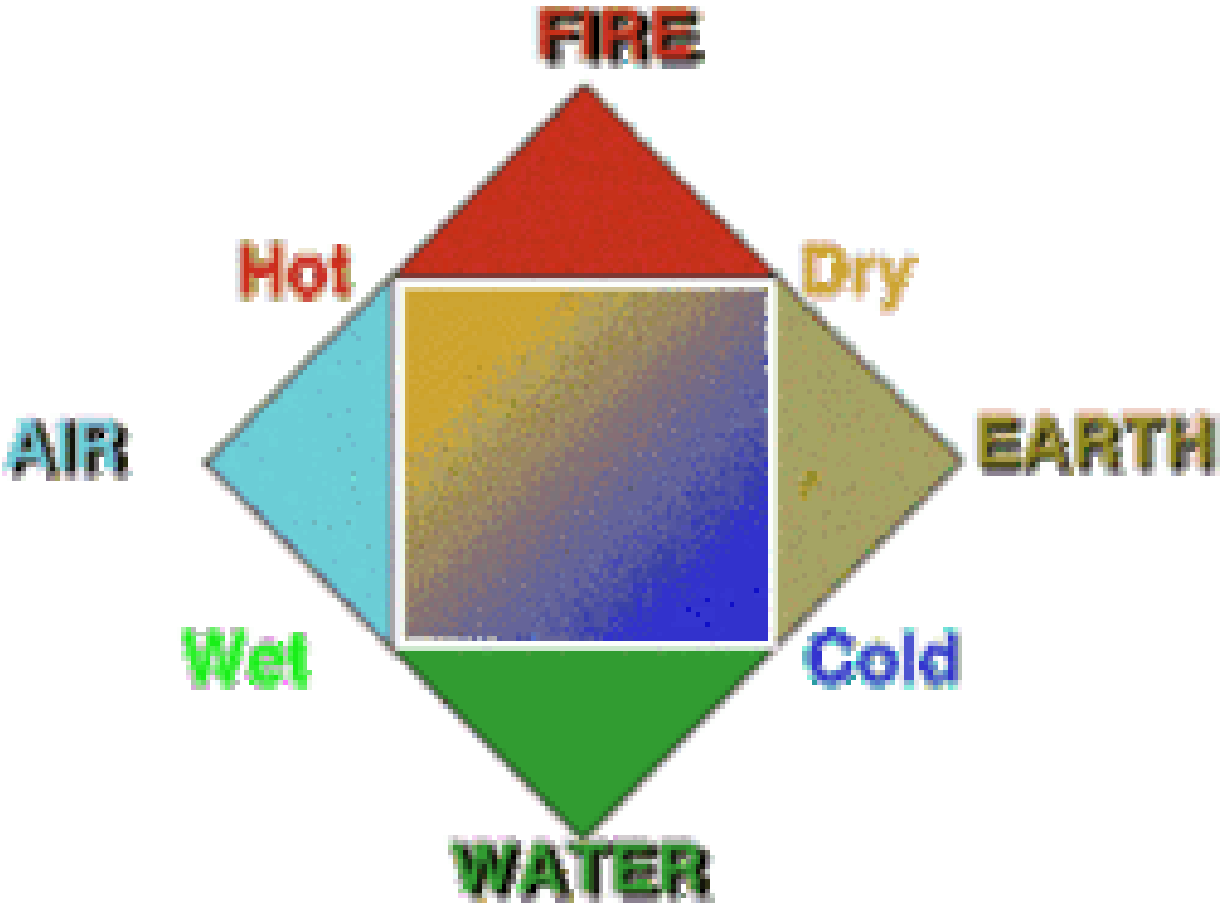
- Things that exist in nature constantly change
- Things that **are** become what they **were not**

  and **cease to be** what they **were**
- But **something** is always **constant** in the process, **underlying** the change.

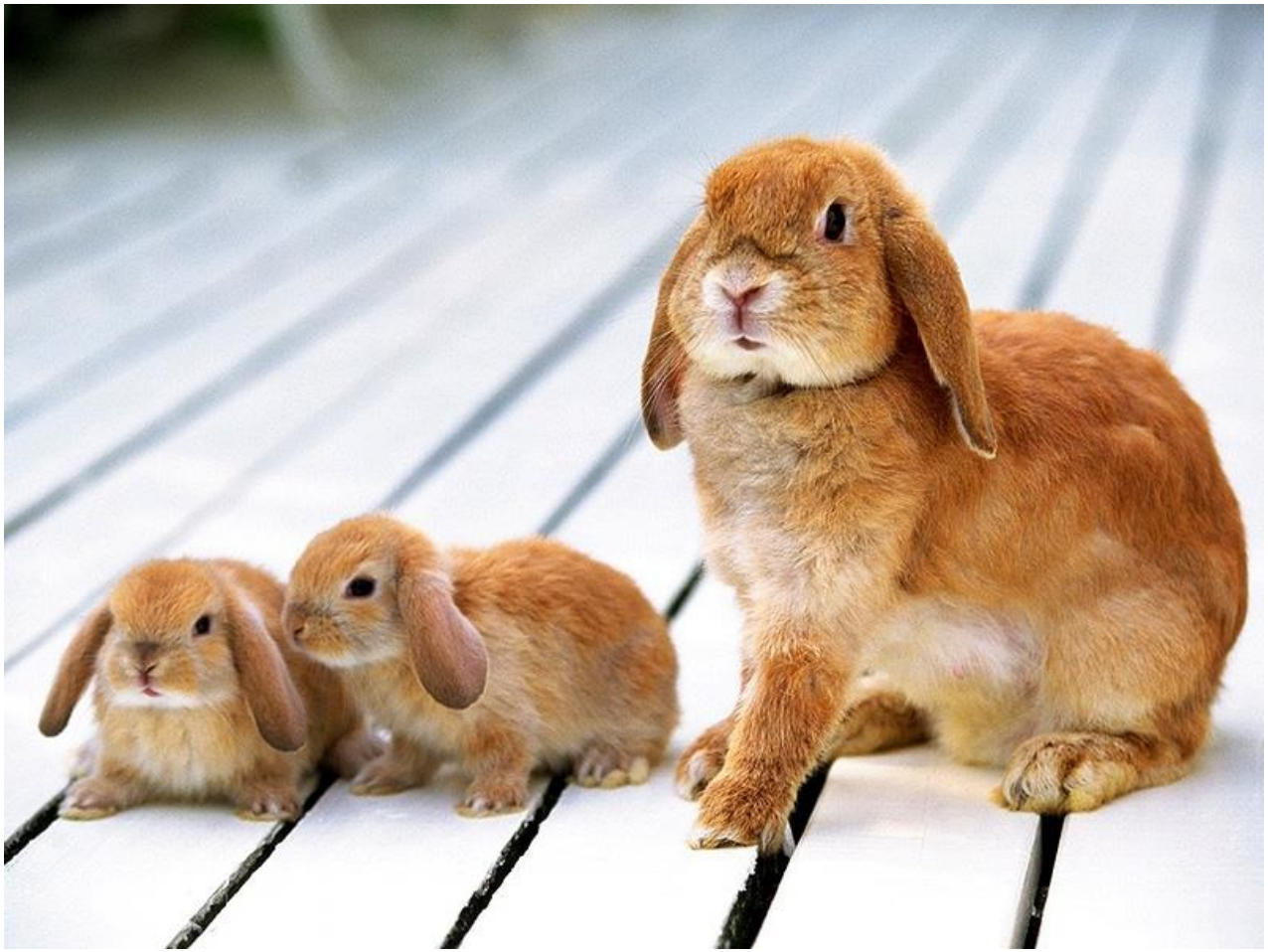
- The holidaymaker comes back from Barbados suntanned.

Matter and Form – the nature of things

Four Elements -



Matter and Form – the nature of living things



When do we know?

- When we can give an account of something.

- When we can explain the causes of something.

Form as Account

- Explaining what a thing is: definitions

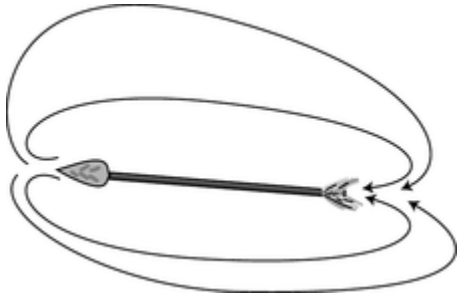
"A human is a rational animal" (genus and differentia)

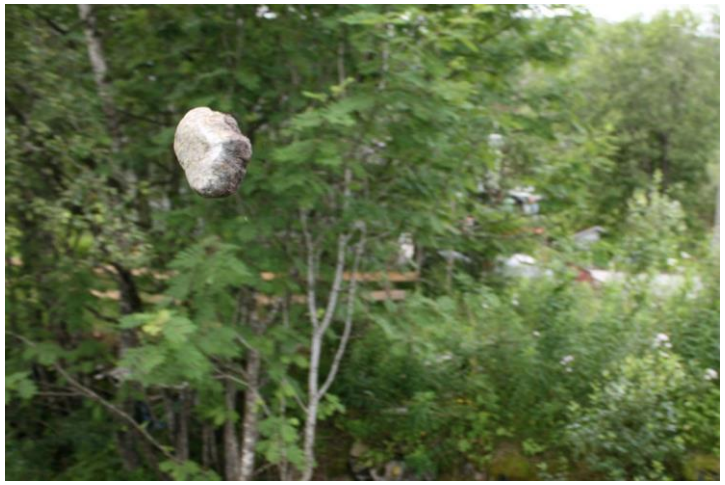
Form as nature, essence, quiddity

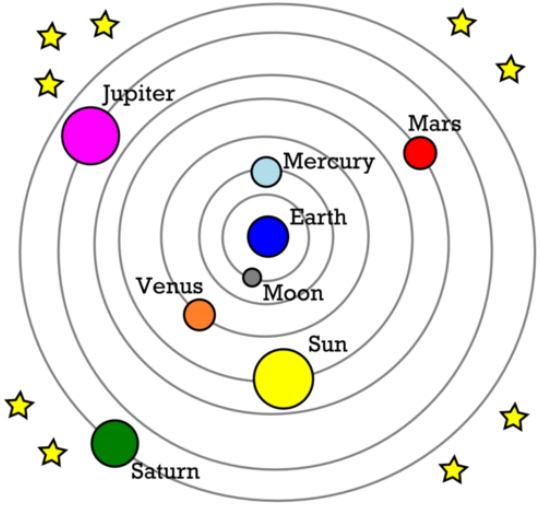
- Listing the natural properties: a human is a rational, social animal, a featherless biped, with the following body parts…. And the following capabilities….
- This is the *nature* of the human
- This is the *being* of the human (essence)
- This is the *what-it-is-to-be-a-human* (quiddity)

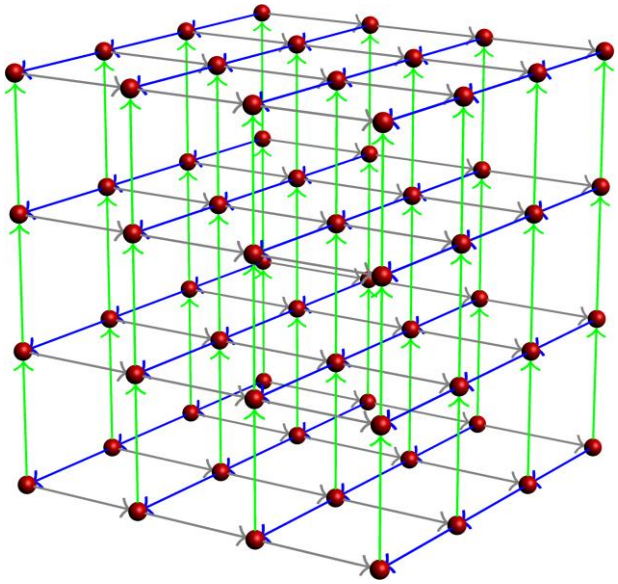
Essential and Incidental (Essence and Accidence)

Why things move









Potential to Actualisation

Natural Motion of the Elements

Time

- The extensionless moment of present perception

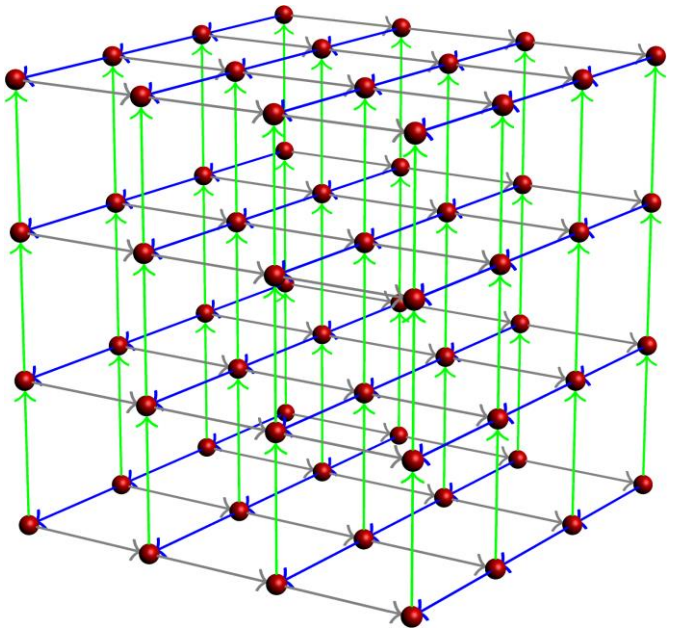
- Time is the number of motion.

Place

- Place is what is contained by body

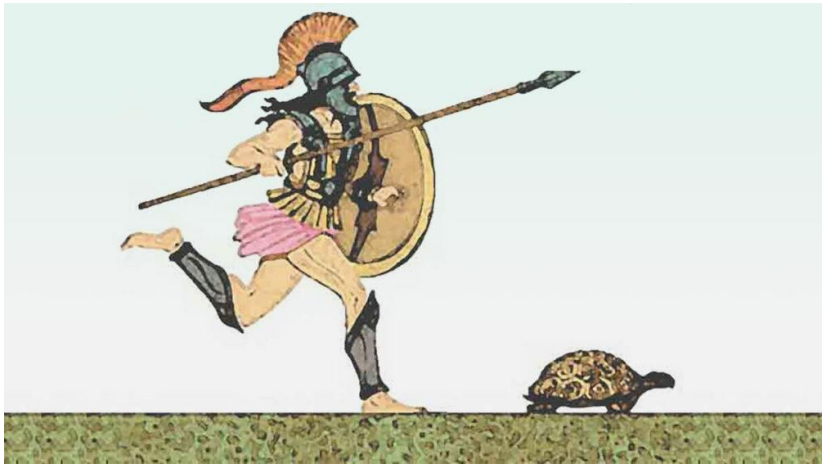
Yes

No



The Problems of Infinity

- Achilles and the Tortoise
- Crossing the floor
- The arrow in flight
- Relative velocities



Explanation: Why do things Happen

- Material Cause (explanation): What sort of stuff is it made of?
- Actualising (efficient) cause (explanation): who or what made it happen?
- Formal Cause (explanation): what sort of thing is it?
- Final cause (explanation): why? What for?

Standard Science 300 BCE – 1600 CE