

The Beginnings of Science

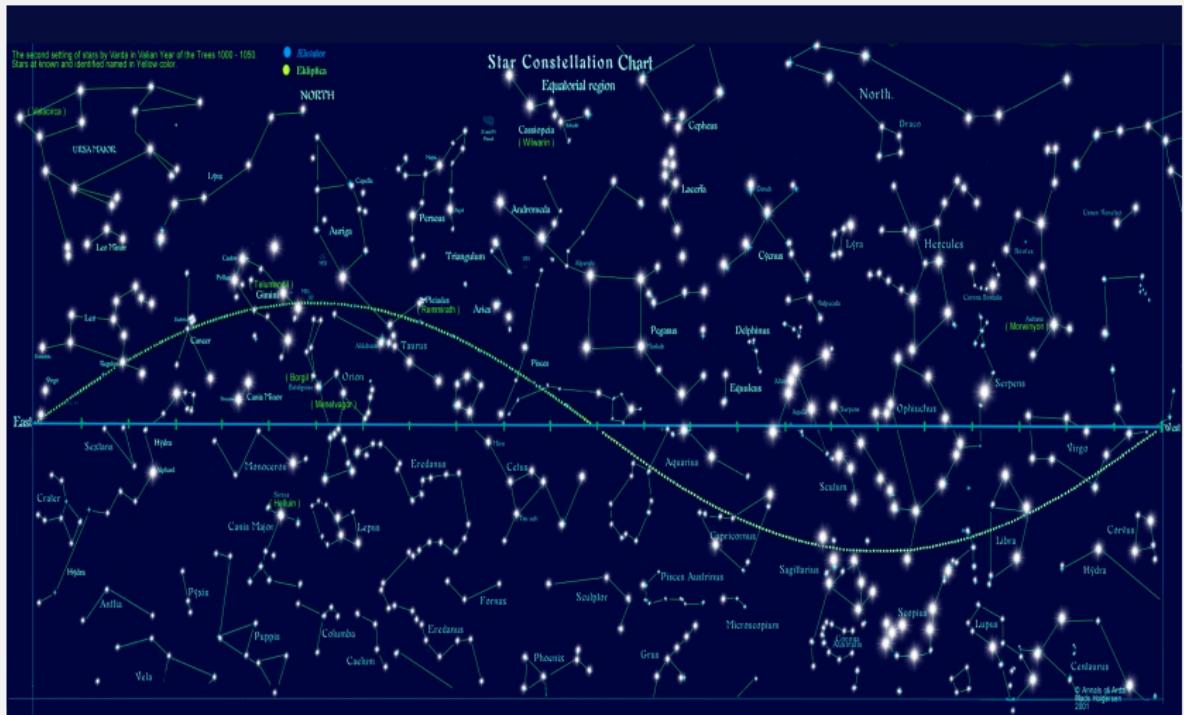
Contributions of the Ancient Greeks

George Matthews

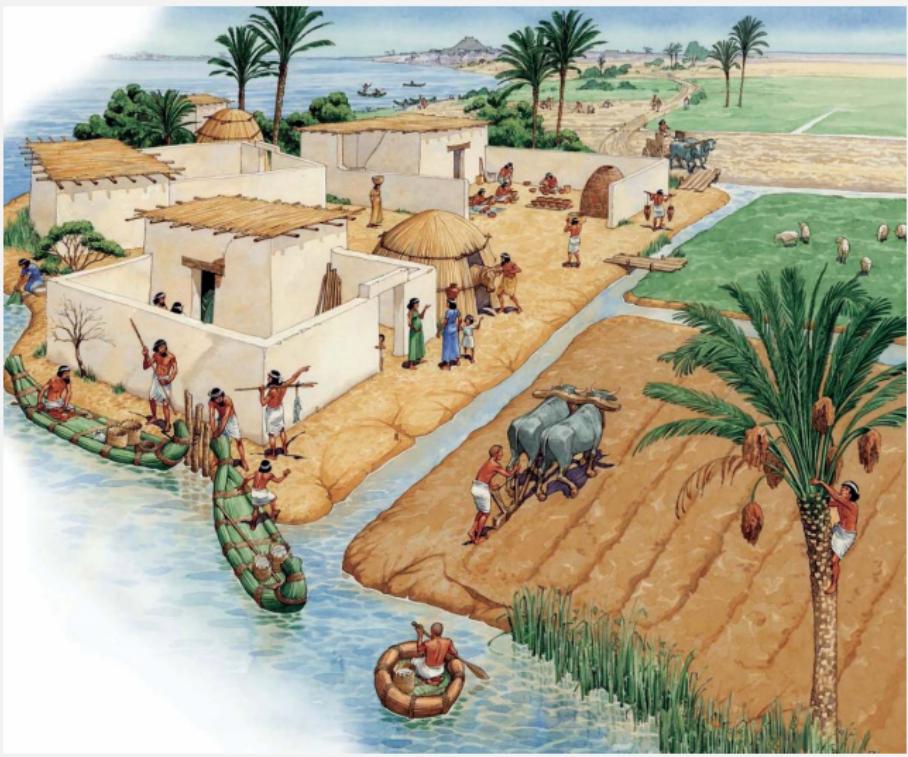
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Stonehenge: England, 3000–2000 BCE



The path of the sun through the constellations of the zodiac



Ancient Sumer



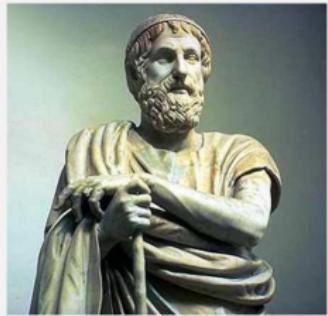
Ancient Babylon – mid-1st millennium BCE



ancient Greece

Thales

- ◆ “Water is the basic principle of everything.”
- ◆ Gave first naturalistic account of the world.
- ◆ Relied on experience and observation to come up with general claims.



7th Cent BCE

Pythagoras

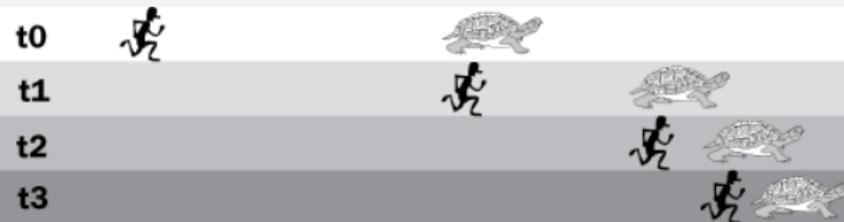
- ◆ “All things are number.”
- ◆ Beauty, symmetry and proportion are inner nature of all things.
- ◆ Leader of vegetarian, mystical cult in Sicily.
- ◆ Disturbed by the discovery of irrational numbers.



560-500 BCE

Zeno

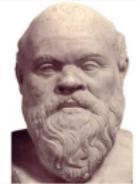
- ◆ “Motion and change are impossible.”
- ◆ Developed a series of paradoxes to show that motion and change are illusions.



Achilles and the tortoise

Socrates

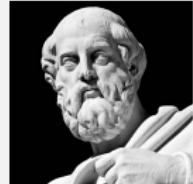
- ◆ “The un-examined life is not worth living.”
- ◆ Socratic method: question and answer method for arriving at truth through dialogue.
- ◆ Executed in Athens 399 BCE for “corrupting the youth.”



469-399 BCE

Plato

- ◆ “Objects of experience are imperfect copies of eternal Forms.”
- ◆ Chief source of knowledge about Socrates, his teacher and friend.
- ◆ Heavily influenced Christian theology and philosophy.



427-347 BCE

Aristotle

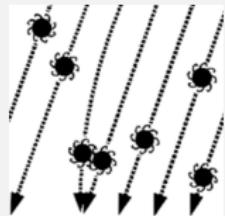
- ◆ “To understand and explain something we must understand its **four causes**.
 - ◆ **material cause**: what it is made of
 - ◆ **formal cause**: what kind of thing it is
 - ◆ **efficient cause**: what brought it to its present state
 - ◆ **final cause**: its purpose



384-322 BCE

Lucretius

- ◆ “The only things that exist are atoms and empty space”
- ◆ There is no soul, free choices happen when atoms "swerve."



99-55 BCE

Archimedes

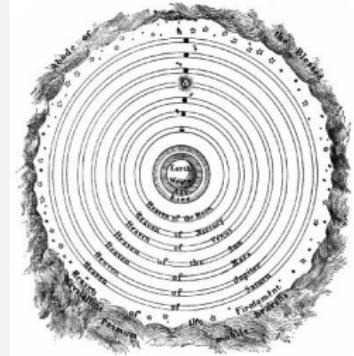
- ◆ Important mathematician, scientist, engineer.
- ◆ Famous for his “eureka” moment in a bathtub.
- ◆ Used simple machines for solving engineering problems.



287-212 BCE

Ptolemy

- ◆ “The universe is a set of nested crystal spheres moving in perfect, circular motion, with the earth at the center.”
- ◆ Ptolemy’s model would hold up for 1500 years.



100-160 CE