

COLLECT INFORMATION ABOUT THE LIFE HISTORY AND CONTRIBUTIONS OF GALILEI GALILEI

Title of the project : Life History and contributions of Galileo Galilei.

Purpose of the project : To know the life history and contributions of Galileo Galilei.

Hypothesis : Italian astronomer Galileo Galilei provided a number of scientific insights that laid the foundation for future scientists. His investigation of the laws of motion and improvements on the telescope helped further the understanding of the world and universe around him. Both led him to question the current belief of the time, that all things revolved around the Earth.

Material : Internet, 9th class physical science text book, Wikipedia article and magazines.

Procedure : We collect information of life history of a famous scientist Galileo Galilei from internet and science magazines. We also collected the contributions of him in various science books. We collected some pictures in Internet.

Introduction :

Galileo Galilei was an Italian astronomer, physicist, engineer, philosopher, and mathematician who played a major role in the scientific revolution of the seventeenth century. He has been called the "father of observational astronomy", the "father of modern physics", and the "father of science". His contributions to observational astronomy include the telescopic confirmation of the phases of Venus, the discovery of the four largest satellites of Jupiter (named the Galilean moons in his honour), and the observation and analysis of sunspots. Galileo also worked in applied science and technology, inventing an improved military compass and other instruments.

Process:

Biography of Galileo Galilei:

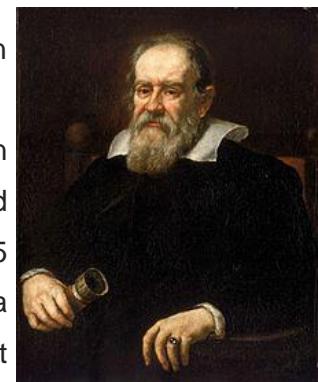
Galileo Galilei was born on 15 February 1564 in Pisa. His father was a musician and although the family were fairly well off they were by no means rich.

In 1581 Galileo started studying medicine at Pisa University. However he soon 'fell in love' with mathematics and he decided to learn to teach mathematics and philosophy. (Much against his father's wishes!) Galileo left the university in 1585 and began privately teaching mathematics. He soon gained a reputation as a brilliant mathematician and in 1589 he became a lecturer in mathematics at Pisa University.

At that time the ancient Greek philosopher Aristotle was held in very high esteem and many people accepted his ideas without question. However Galileo did not. Aristotle said that if two objects, a heavy one and light one both fall from a height the large one will reach the ground first. According to legend Galileo tested the theory by dropping two different weights from the leaning Tower of Pisa. Both hit the ground at the same time.

However many people now believe this famous experiment is a myth. It never actually took place. In any case other scholars had already reached the conclusion that Aristotle was wrong.

However Galileo's criticism of Aristotle irritated the other staff at the university and in 1592 his contract was not renewed. Instead from 1592 to 1610 Galileo taught at the university of Padua.



Then in 1609 Galileo heard of a new invention from Holland. A man named Hans Lippershey (c 1570-1619) had invented the telescope. Galileo made his own telescope and soon improved it.

Using a telescope Galileo was able to see several things invisible to the naked eye. Firstly he could see many stars not visible without a telescope. Secondly the ancient Greeks believed that the Moon was smooth. Looking through a telescope Galileo could see the Moon's surface is actually rough, with mountains and craters. He also discovered 4 small 'moons' orbiting the planet Jupiter. At the time these were astonishing discoveries. Until then nobody knew that any of the other planets, apart from Earth, had 'moons'.

Also in 1610 Galileo discovered that Venus has phases like the Moon.

In 1610 Galileo wrote a book called Siderius Nuncius or the Sidereal Messenger. Also that year he was made mathematician and philosopher of the grand duke of Tuscany (at that time Italy was divided into many small states of which Tuscany was one).

At that time astronomers were debating sunspots. A German named Christoph Scheiner claimed that they were satellites of the sun. In 1613 Galileo argued that sunspots are actually on the surface of the sun.

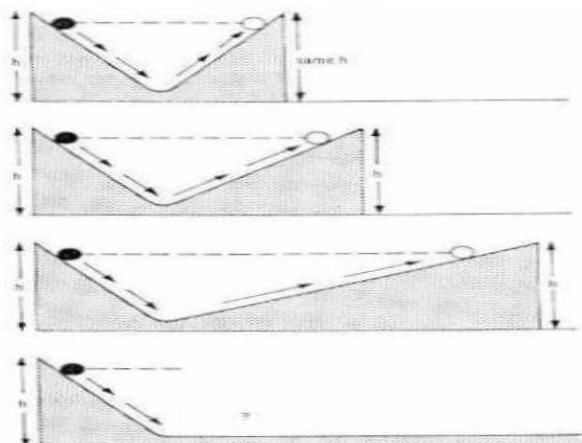
The Catholic Church, which was very powerful and influential in Galileo's day, strongly supported the theory of a geocentric, or Earth-centered, universe. After Galileo began publishing papers about his astronomy discoveries and his belief in a heliocentric, or Sun-centered, Universe, he was called to Rome to answer charges brought against him by the Inquisition (the legal body of the Catholic Church). Early in 1616, Galileo was accused of being a heretic, a person who opposed Church teachings. Heresy was a crime for which people were sometimes sentenced to death. Galileo was cleared of charges of heresy, but was told that he should no longer publicly state his belief that Earth moved around the Sun. Galileo continued his study of astronomy and became more and more convinced that all planets revolved around the Sun. In 1632, he published a book that stated, among other things, that the heliocentric theory of Copernicus was correct. Galileo was once again called before the Inquisition and this time was found guilty of heresy. Galileo was sentenced to life imprisonment in 1633. Because of his age and poor health, he was allowed to serve his imprisonment under house arrest. Galileo died on January 8, 1642.

CONTRIBUTIONS:

Few individuals have had as profound an impact on science as Italian physicist and astronomer Galileo Galilei, whose groundbreaking inventions and discoveries earned him the title "father of modern science." Galileo's innovative, experiment-driven approach to science made him a key figure of the Scientific Revolution of the 16th and 17th centuries, during which he all but disproved the Aristotelian physics and cosmology that had previously dominated the field in Europe.

Among Galileo's contributions to physics is the law of falling bodies, which states that objects fall at the same speed regardless of weight or shape. Through experiments, Galileo countered the pervasive Aristotelian view, which held that heavier objects fall faster. The distance travelled, he calculated, is proportional to the square of the time it took the object to reach the ground. Galileo also first developed the concept of inertia -- the idea that an object remains in rest or in motion until acted on by another force -- which became the basis for one of Isaac Newton's laws of motion.

There is a legendary story that Galileo dropped simultaneously two objects of different masses from the leaning tower of Pisa and he observed that both the objects hit the ground at approximately the same time. He explained that if at all there is a difference in the rate of fall or acceleration produced in it, then it is due to the resistance offered by air.



Geometric and Military Compass

In 1598, Galileo began selling a geometric and military compass of his own design, though the profits were minimal. Consisting of two rulers attached at right angles with a third, curved ruler between them, Galileo's compass, known as a sector, was multifunctional. Soldiers in the military used it to measure the elevation of a cannon's barrel, while merchants employed it to calculate currency exchange rates.

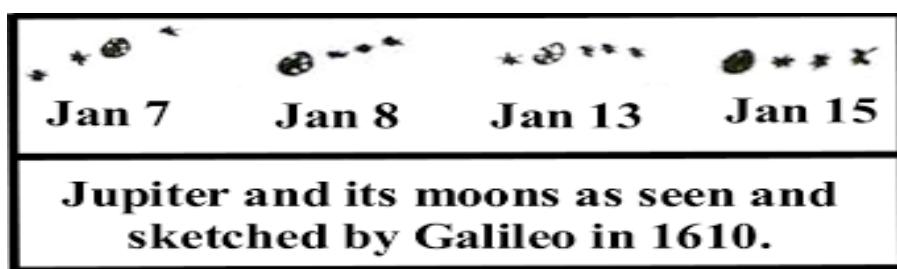


An Improved Telescope

While he did not invent the telescope, the enhancements Galileo made to original Dutch versions of the instrument enabled his empirical discoveries. Early telescopes magnified objects by three times; Galileo learned to grind lenses and eventually created a telescope with a magnifying factor of 30x. With his unprecedentedly powerful telescopes, Galileo was the first to observe the uneven, cratered surface of the moon; Jupiter's four largest satellites, dubbed the Galilean moons; dark spots on the surface of the sun, known as sunspots; and the phases of Venus. The telescope also revealed that the universe contained many more stars not visible to the naked eye.

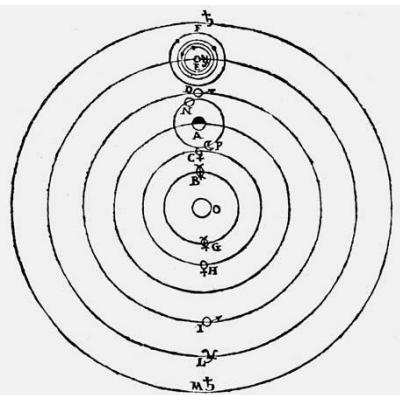


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The Case for Heliocentrism

In the 16th century, Polish astronomer Nicolaus Copernicus became the first scientist to promote a model of the solar system in which the earth orbited the sun rather than the other way around. Galileo's observations discredited the Aristotelian theory of an earth-centered solar system in favor of the Copernican heliocentric model. The presence of moons in orbit around Jupiter suggested that the earth was not the sole center of motion in the cosmos, as Aristotle had proposed. Furthermore, the realization that the surface of the moon is rough proved untrue the Aristotelian view of a perfect, immutable celestial realm. Galileo's discoveries -- including the theory of solar rotation, as suggested by shifts in sunspots -- incurred the wrath of the catholic Church, which espoused the Aristotelian system. Upon finding him guilty of heresy in 1633, the Roman Inquisition forced Galileo to rescind his support of heliocentrism and sentenced him to house imprisonment. Galileo was still under house arrest when he died in 1642.



Thermometer

Galileo did invent a thermometer, called Galileo's air thermometer (more accurately termed a thermoscope), in or before 1603.

Pendulum clock

Galileo discovered the key property that makes pendulums useful timekeepers: isochronism, which means that the period of swing of a pendulum is approximately the same for different sized swings.[3][4] Galileo had the idea for a pendulum clock in 1637, which was partly constructed by his son in 1649, but neither lived to finish it.

Interpretation of the student: We collect the information of the life history and contributions of Galileo Galilei from internet. We collect pictures of his contributions in various science books. we know that he invented the pendulum clock, compass, thermometer and wrote two books. when he was 72, he became blind, he most likely lost his sight from cataracts or glaucoma. But there were theories he got blinded by telescope research.

Conclusion: After completion of this project we know that his research, works and books taught about astronomy. His inventions inspired people to make innovations. Without him, we would still think that the sun and all the planets revolve around the earth and it would affect how we view space and time. Some of his theories had mistakes but he used his research to improve them and that set examples for other scientists.

References:

- Wikipedia article.
- Science magazines.
- 9th class text book.
- <http://www.localhistories.org/>

PROJECT REPORT

Title of the Project	: Life History and contributions of Galileo Galilei.
Class	: 9 th
Subject	: Physics
School	: Z.P.High School, Lolugu, Ponduru Mandal, Srikakulam district
Time frame	: 5 days

Material/Sources used tools: Internet, News paper clippings, Science books, laboratory equipment.

Details of procedure followed:

We collect information of life history of a famous scientist Galileo Galilei from internet and science magazines. We also collected the contributions of him in various science books. We collected some pictures in Internet.

Finding Observations: We collect the information of the life history and contributions of Galileo Galilei from internet. We collect pictures of his contributions in various science books. We know that he invented the pendulum clock, compass, thermometer and wrote two books. When he was 72, he became blind, he most likely lost his sight from cataracts or glaucoma. But there were theories he got blinded by telescope research.

Experiences faced: When we collect information about Newton's law from internet we know the process to search the results from internet. By the experiments done by Galileo we have done the experiments on inclined planes. We know about the telescope in our laboratory by our teachers.

Project outcome : After completion of this project we know that his research, works and books taught about astronomy. His inventions inspired people to make innovations. Without him, we would still think that the sun and all the planets revolve around the earth and it would affect how we view space and time. Some of his theories had mistakes but he used his research to improve them and that set examples for other scientists.

Name of the group members and work allotment:

Sl.No	Name of the team member	Work allotment
1		
2		
3		
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Date of Submission :

Signatures