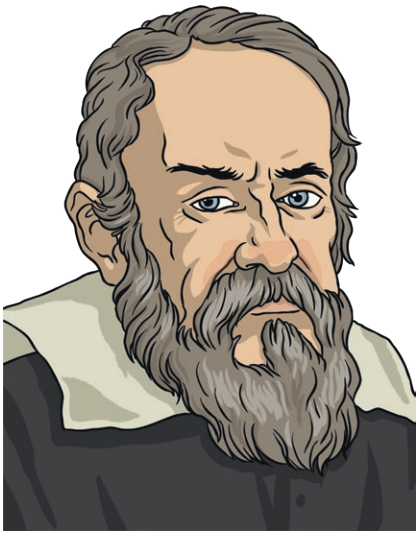
Galileo Galilei



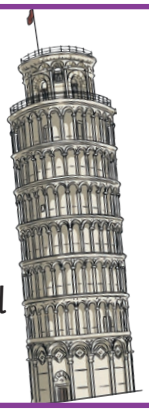
Galileo was a brilliant mathematician and astronomer. His scientific observations and inventions changed the way people thought about the world. His ideas and discoveries are still relevant today.

Galileo Galilei was born in Pisa, Italy on 15th February 1564. His father was a famous musician and music teacher. At around the age of 10, Galileo and his family moved to Florence where Galileo went to school at a monastery. He was a talented musician and a very able student. Learning in a monastery, at first Galileo believed that he would become a priest. However, in 1581, he studied medicine at the University of Pisa. He wanted to become a doctor.

Galileo was always curious about the world around him – in particular, space and the planets. In 1585, he left university and got a job as a teacher. At this time, he started to perform scientific experiments.

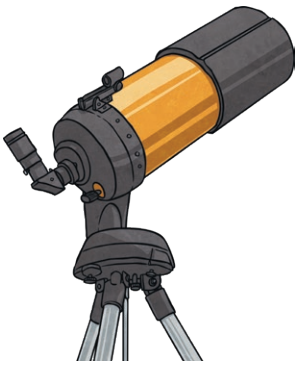
The Tower of Pisa Experiment

One famous experiment was the Tower of Pisa experiment. At that time, it was believed that if two objects were dropped from the same height, the heavier one would land first. To test this, Galileo went to the top of the Leaning Tower of Pisa and dropped two balls of different weights. They both landed at the same time. He had disproved the original theory.



Discovering the Telescope

In 1609, Galileo heard about an invention that could make things that were far away look as if they were much closer. This invention was the telescope. Galileo was fascinated and began to build his own telescope.



His improvements were so good that he was able to use it to view the Sun and other planets in space. This led to his discoveries that Jupiter was orbited by four moons and that the moon was not smooth but was covered in craters.

Nicolaus Copernicus

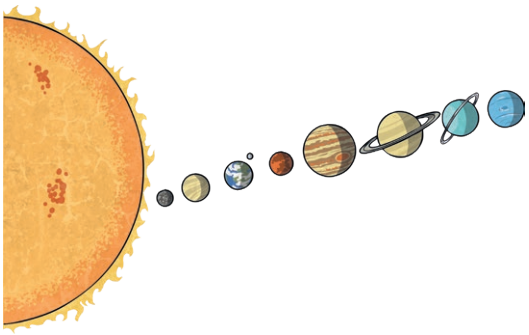
Another belief that Galileo did not just accept was that the Sun travelled around the Earth. In the 1500s, an astronomer called Copernicus came up with the idea that the Sun was at the centre of the universe. Galileo studied Copernicus' work and felt that his scientific observations supported his idea. In 1632, Galileo published his findings in a book called 'Dialogue of the Two Principal Systems of the World'.

Galileo's ideas and findings were not popular at the time as they went against people's traditional beliefs about the world. Galileo was forbidden to write or teach about his work and was sentenced to life in prison. However, his sentence was later changed and he was allowed to live under house arrest. Galileo continued to study and a year before he died, he came up with a pendulum design that could be used for keeping time.

Sadly, Galileo became totally blind in his older years. He died in Florence on 8th January, 1642.

Did You Know...?

In 1979, the Catholic church investigated how Galileo had been treated because of his ideas about the Sun and Earth. They apologised and admitted that his and Copernicus' ideas were actually correct.



Questions

1. When was Galileo born? Tick **one**.

   - ◯ 15th February 1546
   - ◯ 15th January 1564
   - ◯ 15th February 1564
   - ◯ 15th February 1585

2. Where did Galileo receive his education?

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3. What did Galileo study at the University of Pisa? Tick **one**.

   - ◯ mathematics
   - ◯ philosophy
   - ◯ music
   - ◯ medicine

4. Explain what people used to believe would happen when two objects were dropped from a height **before** Gailieo's experiment.

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5. What discoveries did the telescope allow Galileo to make about space?

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6. Who first believed that the sun travelled around the Earth?

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7. **Find** and **copy** a word which means **banned**.

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8. Explain why Galileo spent the later years of his life under house arrest.

Answers

1. When was Galileo born? Tick **one**.

   ◯ 15th February 1546

   ◯ 15th January 1564

   ✓ **15th February 1564**

   ◯ 15th February 1585

2. Where did Galileo receive his education?

At a monastery

3. What did Galileo study at the University of Pisa? Tick **one**.

   ◯ mathematics

   ◯ philosophy

   ◯ music

   ✓ **medicine**

4. Explain what people used to believe would happen when two objects were dropped from a height **before** Gailieo's experiment.

Pupil's own response, such as: When two objects were dropped, people used to believe that the heavier of the two objects would fall faster and therefore hit the ground first.

5. What discoveries did the telescope allow Galileo to make about space?

Pupil's own response, such as: The telescope allowed Galileo to discover that Jupiter had four moons that travelled around it and that the surface of the Moon was covered in craters and was not smooth.

6. Who first believed that the sun travelled around the Earth?

Copernicus

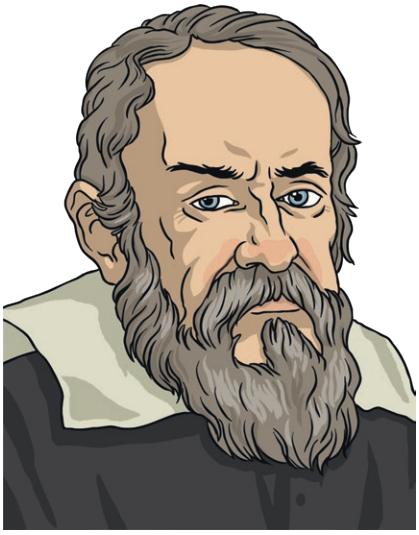
7. **Find** and **copy** a word which means **banned**.

forbidden

8. Explain why Galileo spent the later years of his life under house arrest.

Pupil's own response, such as: Galileo had to spend the later years of his life under house arrest because his ideas and scientific findings went against people's traditional beliefs and he was not allowed to write about them or teach them.

Galileo Galilei



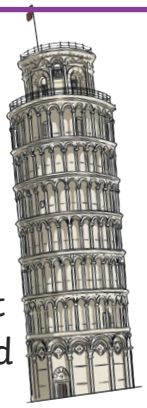
Galileo was a brilliant scientist, mathematician and astronomer. His scientific observations and inventions changed the way people thought about the world and his ideas and discoveries are still hugely relevant today. However, because of his scientific findings, his life was not always an easy one.

Galileo Galilei was born on 15th February 1564 in Pisa, Italy where he grew up with his brothers and sisters. His father, who was not a particularly wealthy man, was a famous musician and music teacher. At around the age of 10, Galileo and his family moved to Florence where Galileo went to school at Camaldolese monastery. He was a talented musician and a very able student. Learning in a monastery, at first Galileo believed that he would become a priest, but his father did not want him to pursue a career in religion and removed him from the school. In 1581, he studied medicine at the University of Pisa, training to become a doctor.

Galileo was always curious about the world around him and he shifted the focus of his university studies to mathematics. In 1585, he left university without earning a degree and got a job as a professor. At this time, he continued to study mathematics on his own and started to perform scientific experiments.

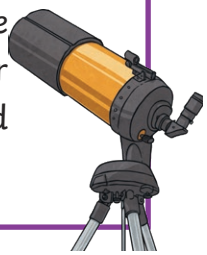
The Tower of Pisa

One famous experiment was the Tower of Pisa experiment. At that time, a commonly held belief was that if two objects were dropped from the same height, the heavier one would land first. To test this theory, Galileo went to the top of the Leaning Tower of Pisa and dropped two balls of different weights. They both landed at the same time and Galileo had thereby invalidated the original theory.



Telescope

In 1609, Galileo heard about an invention by Hans Lippershey that could make things that were far away appear much closer. This invention was the telescope. Galileo was fascinated and began to build his own version of the optical instrument. His improvements were so good that he was able to use it to view the Sun and other planets in space. This led to major discoveries, including that Jupiter was orbited by four moons and that the moon was covered in craters as opposed to being smooth.



Controversial Ideas

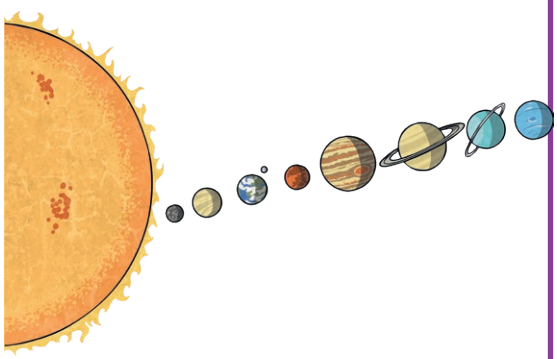
Another belief that Galileo did not just accept was that the Sun orbited the Earth. In the 1500s, an astronomer called Copernicus came up with the idea that the Sun was at the centre of the universe, not the Earth as people had previously believed. Galileo studied Copernicus' work and felt that his scientific observations supported his idea. In 1632, Galileo published his findings in a book called 'Dialogue of the Two Principal Systems of the World'.

Galileo's ideas and findings were not popular at the time as they went against people's traditional beliefs about the world. Galileo was forbidden by the Catholic church to write or teach about his work and was sentenced to life in prison for heresy (challenging religious beliefs). However, his sentence was later changed, and he was permitted to live under house arrest. Galileo continued to study and a year before he died, he came up with a pendulum design that could be used for keeping time.

Galileo became blind in his older years. He died in Florence on 8th January, 1642.

Did You Know...?

In 1979, the Catholic church and Pope John Paul II investigated how Galileo had been treated. 13 years later, the Pope made a formal apology and finally admitted that his, and the ideas of Copernicus, were actually correct.



Questions

1. Wherewas Galileo born? Tick **one**.

   - ◯ Florence
   - ◯ Paris
   - ◯ Pisa
   - ◯ Rome

2. What did Galileo do at Camaldolese monastery?

3. Explain why Galileo's father removed him from Camaldolese monastery.

4. Where did Galileo train to become a doctor? Tick **one.**

   - ◯ University of Florence
   - ◯ Camaldolese monastery
   - ◯ University of Rome
   - ◯ University of Pisa

5. **Find** and **copy** a word which means **disproved.**

6. Explain why Galileo was so fascinated by Hans Lippershey's invention.

7. Which planet did Galileo discover four moons orbiting?

8. Explain in your own words what heresy means.

9. Do you think that Galileo was treated fairly? Explain your answer.

Answers

1. Where was Galileo born? Tick **one**.

   ◯ Florence
   ◯ Paris
   ✓ **Pisa**
   ◯ Rome

2. What did Galileo do at Camaldolese monastery?

Galileo studied at the monastery, thinking he would become a priest.

3. Explain why Galileo's father removed him from Camaldolese monastery.

Pupil's own response, such as: Galileo's father removed him from Camaldolese monastery because Galileo believed that he might become a priest and his father did not want him to have a career in religion.

4. Where did Galileo train to become a doctor? Tick **one.**

   ◯ University of Florence
   ◯ Camaldolese monastery
   ◯ University of Rome
   ✓ **University of Pisa**

5. **Find** and **copy** a word which means **disproved.**

invalidated

6. Explain why Galileo was so fascinated by Hans Lippershey's invention.

Pupil's own response, such as: Galileo was so fascinated by Hans Lippershey's invention because it was a telescope which allowed him to see the Sun and other planets up close which Galileo was very curious about and interested in.

7. Which planet did Galileo discover four moons orbiting?

Jupiter

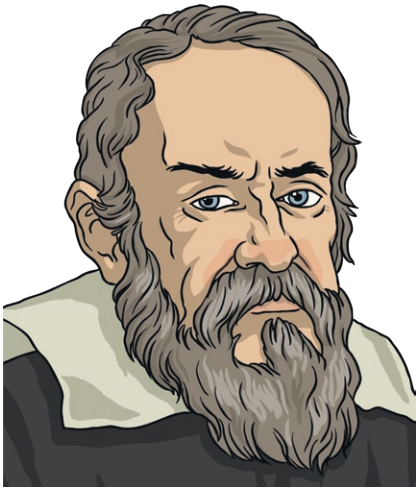
8. Explain in your own words what heresy means.

Pupil's own response, such as: Heresy means to come up with ideas and beliefs which go against religious beliefs.

9. Do you think that Galileo was treated fairly? Explain your answer.

Pupil's own response, such as: No I don't think Galileo was treated fairly because all he did was carry out scientific experiments to prove that certain things were true or false. Because this challenged religious beliefs and what people had previously believed, Galileo had to spend the rest of his life in his house like a prisoner.

Galileo Galilei



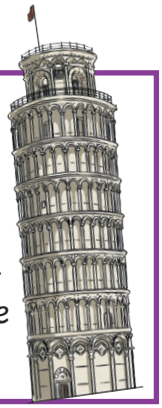
Galileo was a brilliant physicist, mathematician and astronomer. His scientific observations and inventions changed the way people thought about the world and his ideas and discoveries are still hugely relevant today. However, because of his scientific findings, Galileo led a life full of opposition and constraints.

Galileo Galilei was born on 15th February 1564 in Pisa, Italy where he grew up with his brothers and sisters during the Italian Renaissance (the rebirth and development of education, science, art, music and literature). His father, who was not a particularly wealthy man, was a famous musician and music teacher. Around the age of 10, Galileo and his family moved to Florence where Galileo attended Camaldolese monastery to receive his education. He was a talented musician and a very able student. Learning in a monastery, at first Galileo believed that he would become a priest, but his father did not want him to pursue a religious life and eventually removed him from the school. In 1581, urged on by his father, he began studying medicine at the University of Pisa, training to become a doctor.

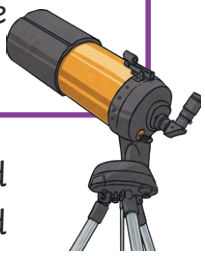
Galileo was always curious about the world around him and he shifted the focus of his university studies to mathematics. In 1585, he left university without earning a degree and began working as a professor. At this time, he continued to study mathematics on his own and started to perform scientific experiments.

In the 1500s, 'scientists' did not really exist. People did not run experiments or test out ideas like they do today. Instead, they studied the works of classical philosophers such as Aristotle and simply believed them to be true. Galileo on the other hand began using scientific methods to test out principles and ideas in order to prove if they were correct or not.

One famous experiment that he conducted was from the Tower of Pisa. At that time, a commonly held belief was that if two objects were dropped from the same height, the heavier one would land first. To test this theory, Galileo went to the top of the tower and dropped two balls of different weights. They both landed at the same time and Galileo had thereby refuted the original theory.



In 1609, Galileo heard about an invention by the Dutch inventor Hans Lippershey that could make things far away appear to be much closer. This optical instrument was the telescope. Galileo was fascinated and began to build his own telescope. His improvements were so significant that he was able to use it to study the Sun and other planets in space. This led to three major discoveries; that Jupiter was orbited by four moons and not stars as had previously been believed; that the moon was covered in craters as opposed to being smooth; and that Venus went through a complete set of phases indicating that it orbited the Sun and not vice versa.



Another belief that Galileo did not just accept was that the Sun orbited the Earth. In the 1500s, a Polish mathematician and astronomer called Nicolaus Copernicus pioneered the idea that the Sun was actually at the centre of the universe, rather than the Earth as people had previously believed. Galileo studied Copernicus' work and felt that his own scientific observations supported this idea. In 1632, Galileo published his findings in a book called 'Dialogue of the Two Principal Systems of the World' in which he clearly supports and advocates the Copernican model of the universe rather than previously held beliefs about the Sun and Earth.

Galileo's ideas and findings were not popular at the time as they opposed and challenged people's traditional beliefs about the world. Galileo was forbidden by the Catholic church to write or teach about his work and was sentenced to life in prison for his heretic ideas. However, his sentence was later changed, and he was permitted to live under house arrest. Galileo continued to study and a year before he died he came up with a pendulum design that could be used for keeping time.

Galileo became totally blind in his later years and he died in Florence on 8th January, 1642 aged 77.

Did You Know...?
In 1979, Pope John Paul II led an investigation into how Galileo had been condemned by the Catholic Church. 13 years later, in 1992, the Pope closed the investigation, made a formal apology and finally admitted that the Copernicus heliocentric theory was true.

Questions

1. Which of the following was Galileo **not**? Tick **one**.

   - ○ an astronomer
   - ○ a mathematician
   - ○ a philosopher
   - ○ a physicist

2. Explain in your own words what a **renaissance** is.

3. What career did Galileo's father want him to persue?

4. Explain why Galileo is considered one of the fathers of the scientific method.

5. What does the word **refuted** mean?

6. Explain how Galileo's discovery that venus orbited the Sun led to further discoveries.

7. What nationality was Copernicus?

8. Explain what Galileo's book, 'Dialogue of the Two Principal Systems of the World', was about.

9. What do you think was Galileo's greatest discovery or achievement? Explain your answer fully.

10. When did the Catholic Church apologise for the way that Galileo was treated? Tick **one**.

- ○ 1642
- ○ 1992
- ○ 1979
- ○ 1790

Answers

1. Which of the following was Galileo **not**? Tick **one**.

   ◯ an astronomer
   ◯ a mathematician
   ✓ **a philosopher**
   ◯ a physicist

2. Explain in your own words what a **renaissance** is.

Pupil's own response, such as: A renaissance is a time when education, science, art, music and literature is reborn and developed.

3. What career did Galileo's father want him to persue?

doctor

4. Explain why Galileo is considered one of the fathers of the scientific method.

Pupil's own response, such as: Galileo is considered one of the fathers of the scientific method because at this time, people did not conduct experiments or test theories. They would read about the work of famous philosophers like Aristotle and believe what they said. Galileo didn't just accept theories but performed experiments to prove or disprove them.

5. What does the word **refuted** mean?

Accept answers showing that it means to disprove/prove something false or inaccurate.

6. Explain how Galileo's discovery that venus orbited the Sun led to further discoveries.

Pupil's own response, such as: Galileo's discovery that Venus orbited the Sun led to his thoughts about how the Earth orbited the Sun and not the other way around. If it was true for one planet then it would have made Galileo look into Copernicus' idea that the Sun was at the centre of the universe.

7. What nationality was Copernicus?

Polish

8. Explain what Galileo's book, 'Dialogue of the Two Principal Systems of the World', was about.

Pupil's own response, such as: Galileo's book, 'Dialogue of the Two Principle Systems of the World' was about the two different beliefs about the Sun and the Earth. The original belief was that the Sun used to orbit the Earth and Copernicus' belief was that the Earth orbited the Sun. Galileo's book supported the second belief.

9. What do you think was Galileo's greatest discovery of achievement? Explain your answer fully.

Pupil's own response, such as: I think that Galileo's greatest achievement was improving the telescope because this allowed him to study space and the planets. Without this, he would not have made other discoveries such as the fact that Jupiter has four moons or that the Moon is covered in craters and not smooth.

10. When did the Catholic Church apologise for the way that Galileo was treated? Tick **one.**

- ○ 1642
- ✓ **1992**
- ○ 1979
- ○ 1790