Copyright Teacher Resource Cabin

WHAT IS SPACE?

Copyright Teacher Resource Cabin

WHAT IS SPACE?

- Outer space is the universe beyond Earth's atmosphere and between celestial bodies, like planets.

- Space (the area between celestial bodies) is a **near-perfect vacuum**, which means it is basically empty.

Copyright Teacher Resource Cabin

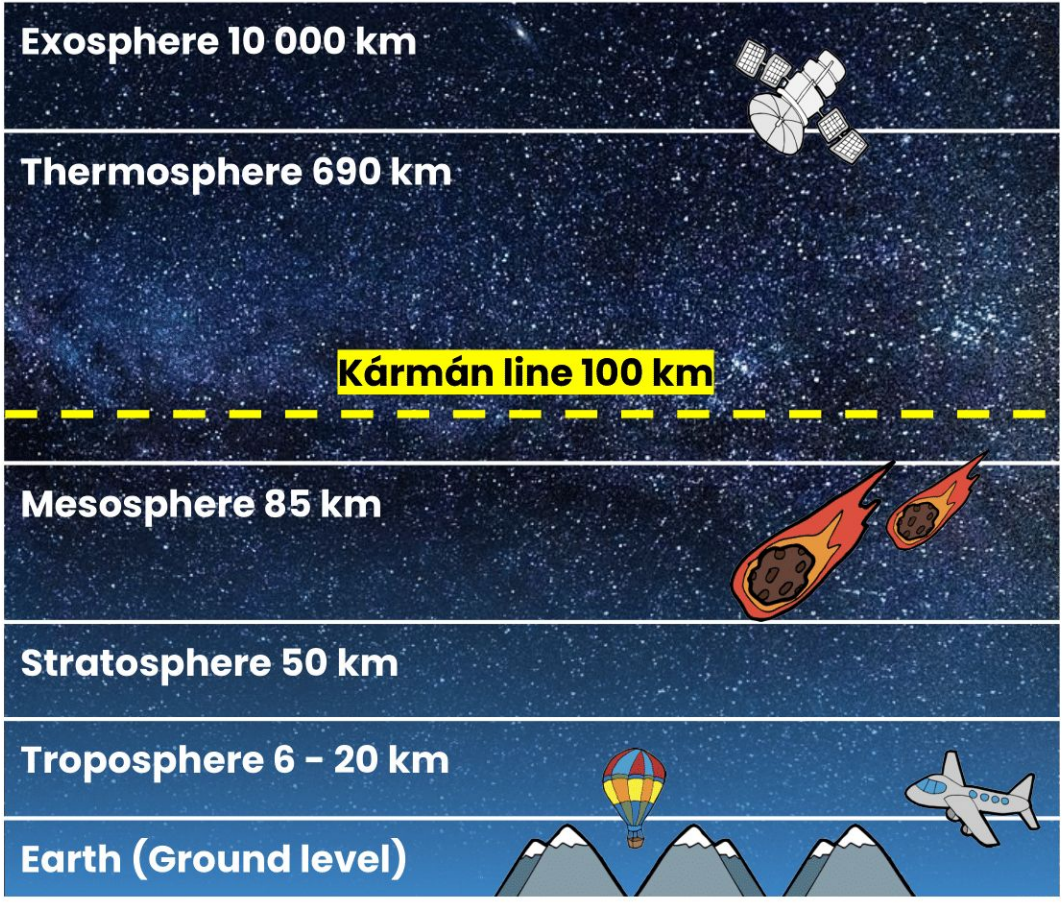
WHAT IS SPACE?

- Outer space has very **low density** and **low pressure**.
- Sounds waves cannot travel in space either, so **there is no noise**.
- Outer space is **nearly empty** because any matter has been pulled by gravity into a planet, moon, asteroid, or star.

Copyright Teacher Resource Cabin

WHAT IS SPACE?

- The Kármán line is the altitude where space begins.

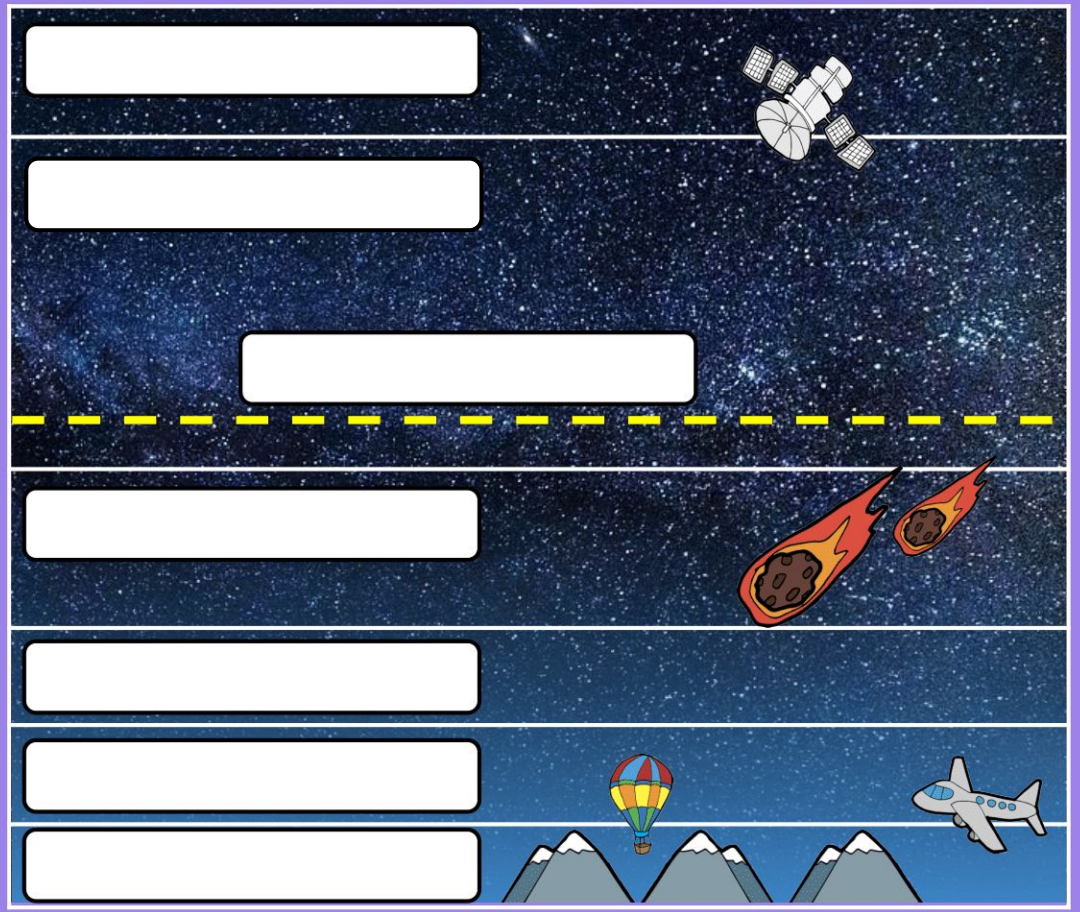


Copyright Teacher Resource Cabin

Think about it!

Drag and drop to label each component of Earth's atmosphere.

- Stratosphere
- Kármán line
- Ground level
- Exosphere
- Thermosphere
- Mesosphere



Copyright Teacher Resource Cabin

? ? ?

What recent innovations in space technology do you know of?

Copyright Teacher Resource Cabin

? ? ?

What social, environmental, economic, and political factors affect space exploration?

Copyright Teacher Resource Cabin

Copyright Teacher Resource Cabin

THE HISTORY OF SPACE

- In 1610, Galileo Galilei was the first to use a telescope to look at stars and celestial bodies.

- In 1957, Russian space dog Laika became the first animal to orbit Earth.

Copyright Teacher Resource Cabin

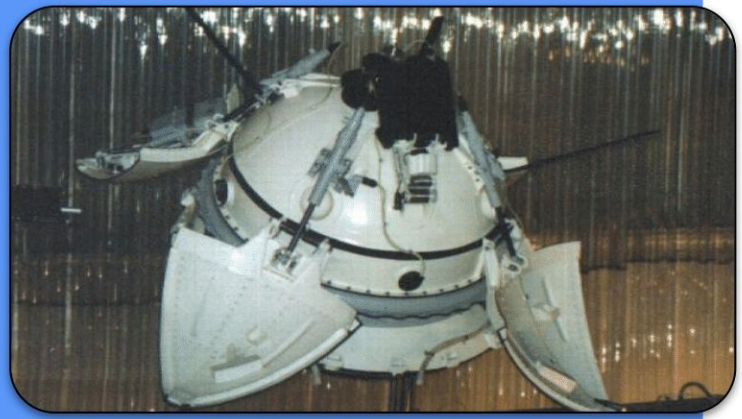
THE HISTORY OF SPACE

- In 1966, the first human-made object to safely land on another celestial body was Luna 9, which landed on the moon.

- In 1969, Neil Armstrong and Buzz Aldrin were the first men to step foot on the moon in the Apollo 11 spacecraft.

Copyright Teacher Resource Cabin

THE HISTORY OF SPACE

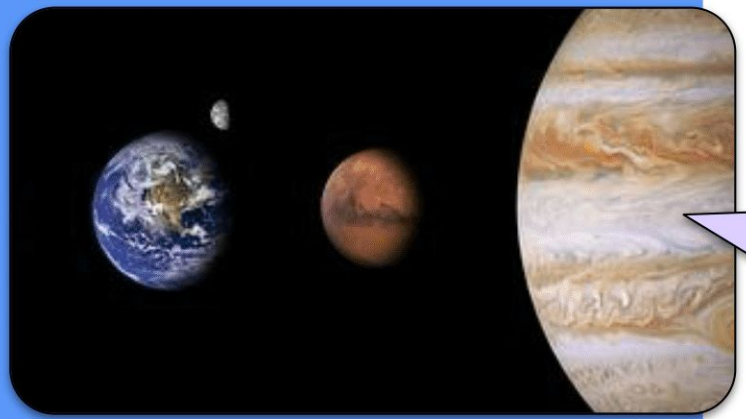


- In 1971, Russian space probe Mars 2 explored Mars. It was the first successful landing of a spacecraft on another planet.

- In 1986, the space shuttle Challenger exploded 73 seconds into its flight, killing all seven crew members.

Copyright Teacher Resource Cabin

THE HISTORY OF SPACE



- In 2000, the International Space Station (ISS) was launched into a low orbit of Earth.
- NASA plans to send humans to Mars by as early as 2028.

Would you visit outer space if you had the opportunity? Explain.

Copyright Teacher Resource Cabin

Think about it!

What historical event do you think was most impactful in space exploration? Justify your answer.

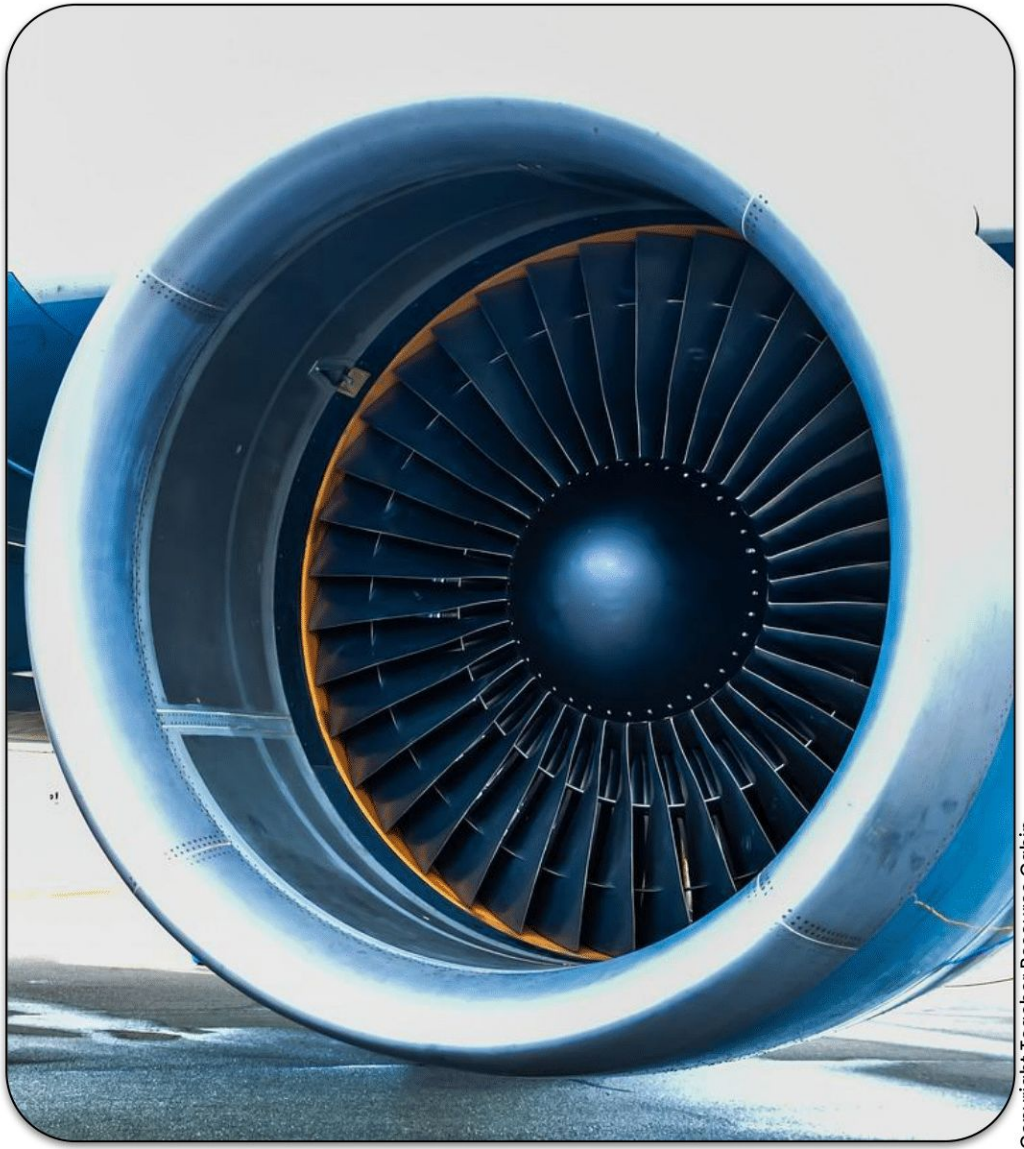
Event:

Justification:

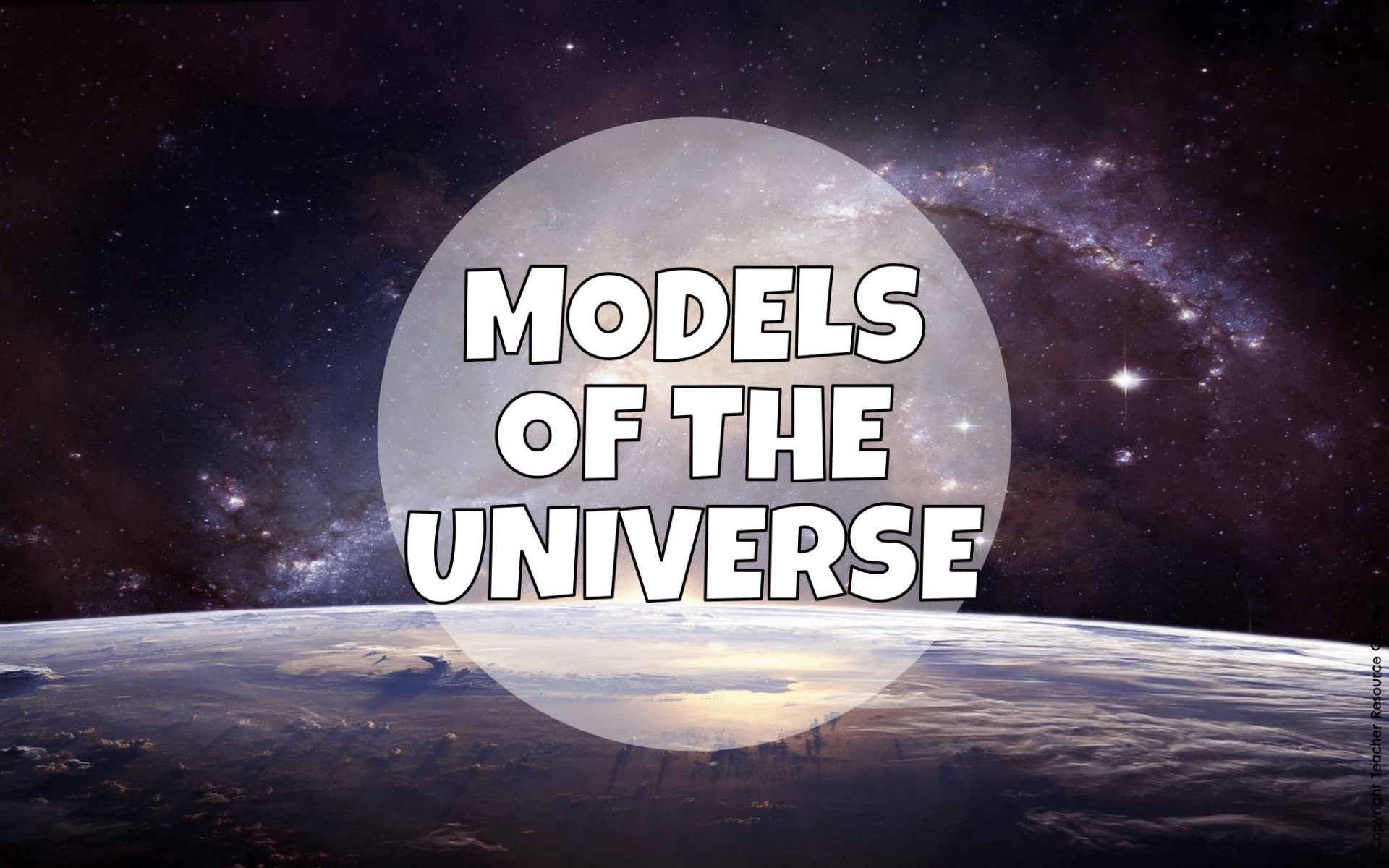
Copyright Teacher Resource Cabin

? ? ?

What space technology innovations do you predict in the next 200 years?



Copyright Teacher Resource Cabin



Copyright Teacher Resource

Models of the Universe

- People have studied stars and patterns in space since the beginning of humankind.

- Originally believed that stars, including the Sun, revolve around Earth.
    - As people studied the stars, they started recognizing patterns.

Copyright Teacher Resource Cabin

Models of the Universe

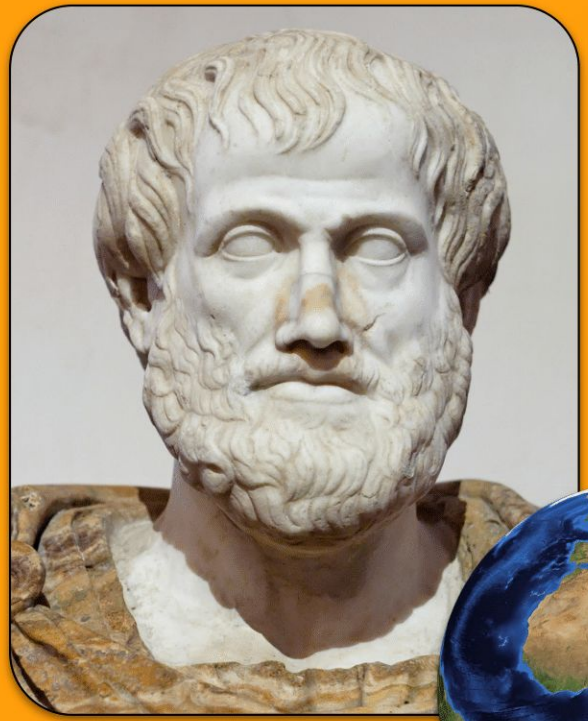
- A constellation is a group of stars forming a recognizable pattern.

- After studying constellations, scientists observed that any given star rises and sets four minutes earlier than the day before.

What does this observation suggest?

Copyright Teacher Resource Cabin

MODELS OF THE UNIVERSE



Marble bust of **Aristotle** by Lysippos, c. 330 BC

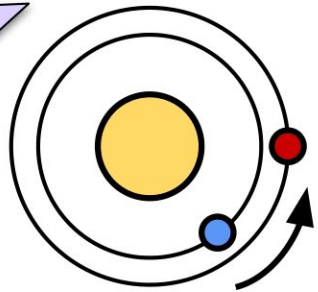
- In the past, people had a geocentric view of the universe.
- The geocentric view places Earth at the centre of the solar system.
  - This view is based on information from a well-known philosopher, Aristotle.

Copyright Teacher Resource Cabin

MODELS OF THE UNIVERSE

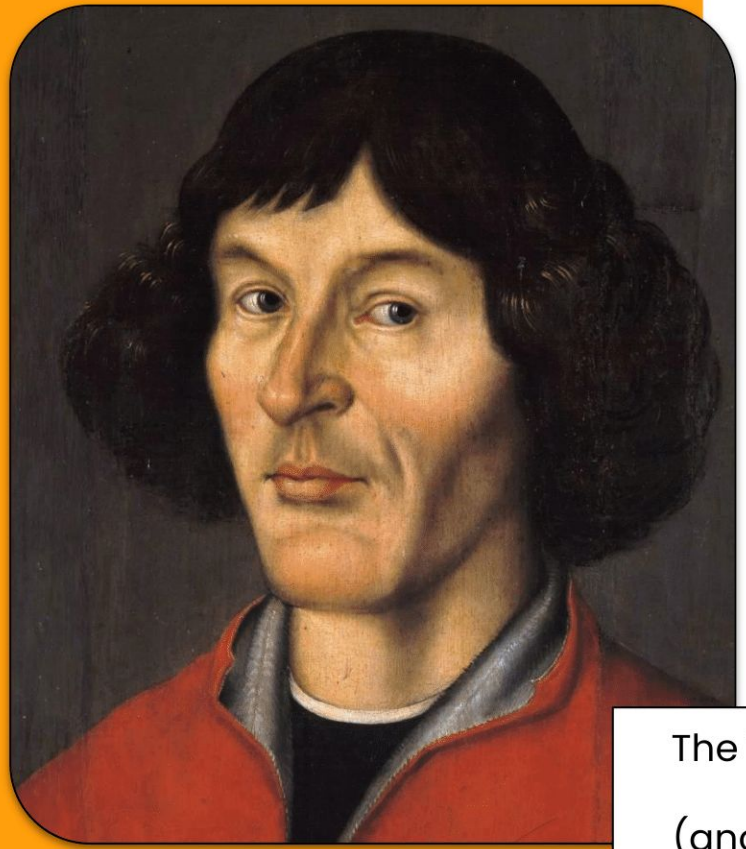
- One flaw discredited the geocentric view:
  - Mars, Jupiter, and Saturn were occasionally observed to travel in opposite directions without explanation.

Discuss with a partner:
Mars and Earth orbit the Sun at different speeds. When might it appear from Earth that Mars is travelling a different direction?



Copyright Teacher Resource Cabin

MODELS OF THE UNIVERSE



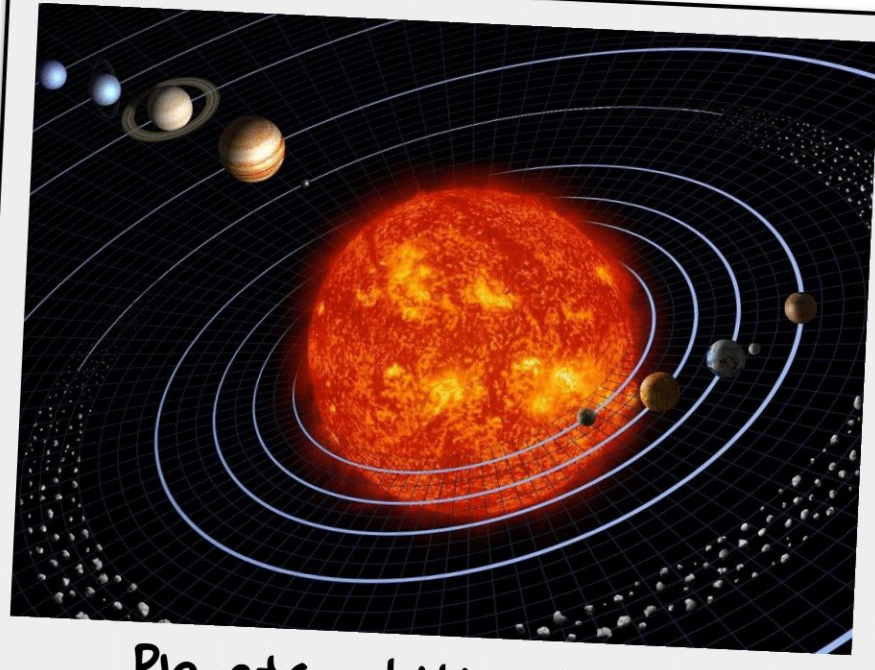
The "Toruń portrait" of Copernicus (anonymous, c. 1580)

- In the 1500s, an astronomer named Nicholas Copernicus developed a different model for the universe.
  - This model is known as the heliocentric model of the universe.

Copyright Teacher Resource Cabin

MODELS OF THE UNIVERSE

- The heliocentric model proposed that the Earth and planets revolve around the Sun at the centre of the universe.
    - This model is accepted today and supported by the scientific community.



Planets orbiting the Sun

Copyright Teacher Resource Cabin

Think about it!

Define the geocentric and heliocentric model.
Write the name of who founded each model.

Geocentric Model

Heliocentric Model

What discovery discredited the geocentric model?

Copyright Teacher Resource Cabin

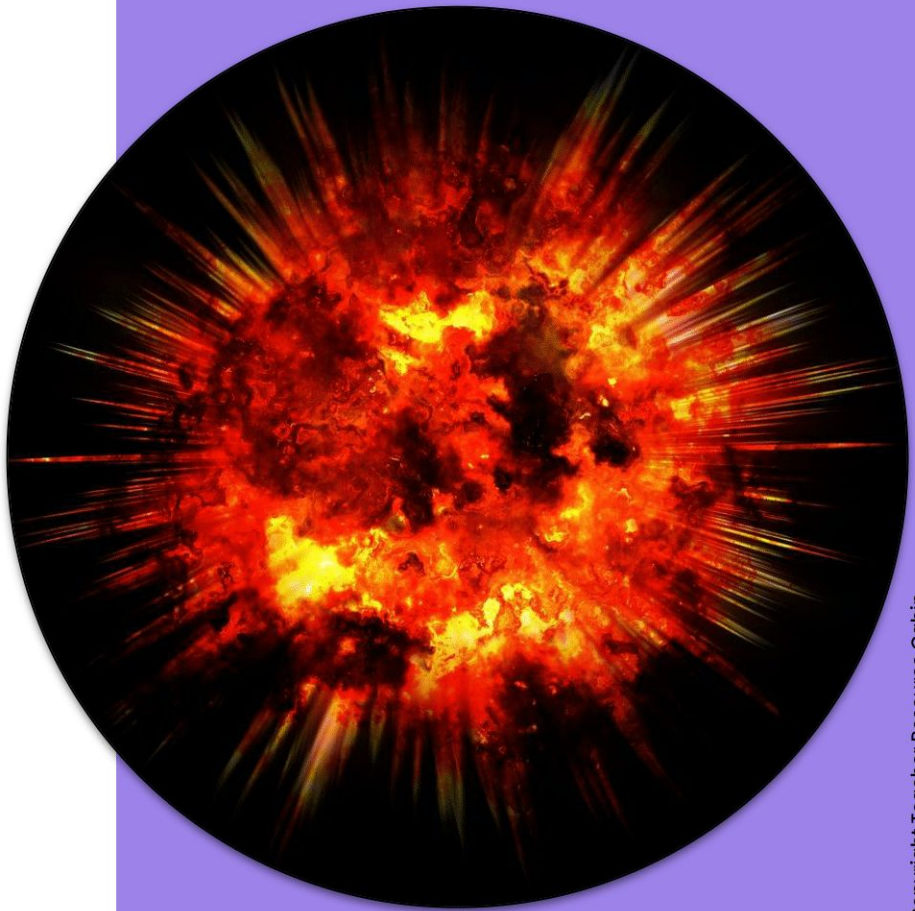
Why do you think the geocentric model preceded the heliocentric model?

Copyright Teacher Resource Cabin

Copyright Teacher Resource Cabin

ORIGIN THEORIES

- The Big Bang Theory states that approximately **14 billion years ago**, the universe was a single point, microscopic in size, that was extremely hot.
    - This point rapidly expanded into the size of a galaxy, and it continues to expand even today.



Copyright Teacher Resource Cabin

ORIGIN THEORIES

- The Big Bang Theory is supported due to the scientific observation that the universe is **continually expanding**.
- It is also supported by cosmic microwave background radiation (CMB).
  - This is the first light that could ever travel freely in the universe.
  - It is believed that this light was caused by the Big Bang.

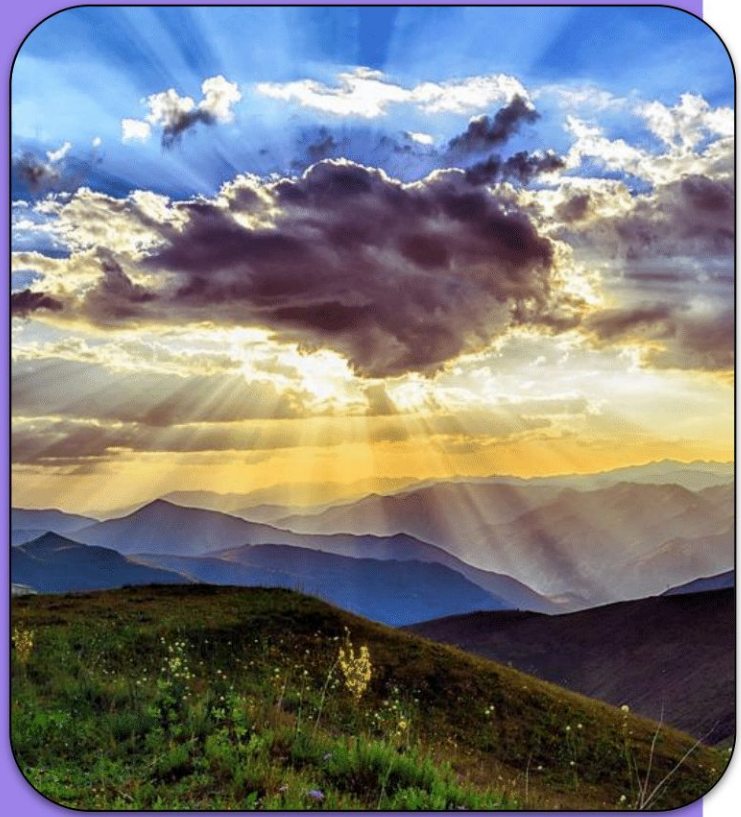
Copyright Teacher Resource Cabin

ORIGIN THEORIES

- Many religious people and scientists accept a creationist view of the universe.
    - Supports the belief that a divine being, or a god, influenced the creation of the universe and life on Earth.

Copyright Teacher Resource Cabin

ORIGIN THEORIES

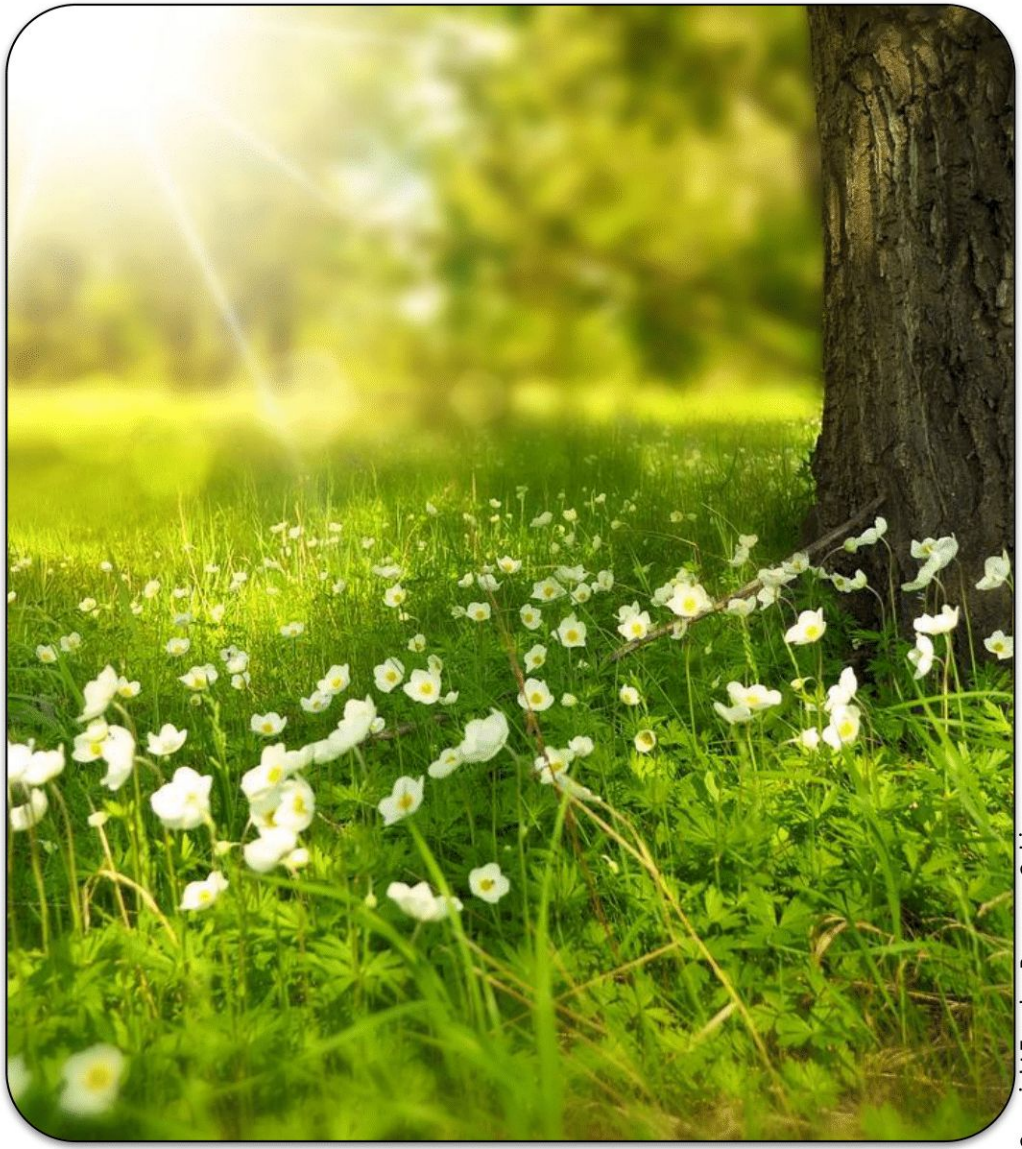


- Divine beings are transcendent–or beyond human comprehension and understanding.
- Creationists can have varying perspectives and opinions of how the universe came into existence.
- Creationist perspectives are often not exclusive from, or in denial of the Big Bang Theory or other scientific-supported theories

Copyright Teacher Resource Cabin

? ? ?

What origin theories of the universe are you familiar with?



Copyright Teacher Resource Cabin

Think about it!

Research a creation theory. Describe the theory in detail below. Insert an image that supports your explanation.

Insert image here!

Theory:

Explanation:

Copyright Teacher Resource Cabin