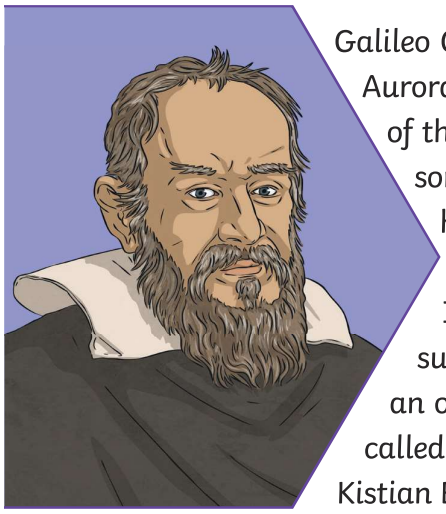
The Northern Lights

The Aurora Borealis, or Northern Lights, have been fascinating generations of people and cultures since ancient times. These colourful waves of light, known as auroras and located above the Arctic Circle in the North Pole, are caused by **solar winds** meeting the Earth's **atmosphere**. Extremely popular, the Aurora Borealis entices millions of tourists to countries such as Norway, Sweden and Iceland every year.

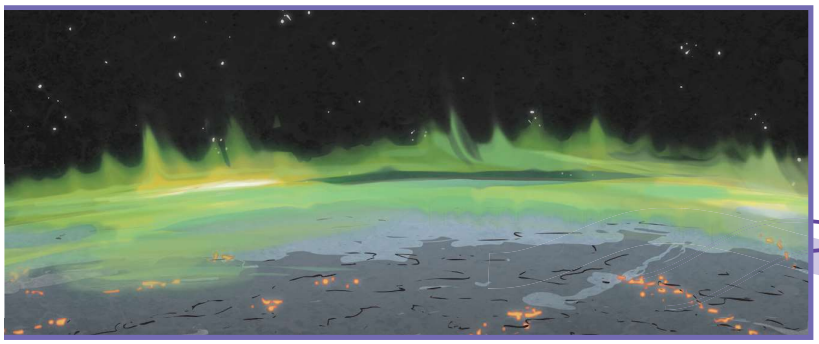
The Northern Lights in History



Galileo Galilei, the famous Italian astronomer, named them in 1619 - after Aurora, the Roman goddess of the morning, and Boreas (the Greek god of the north wind). A story from 2600 BC in China is considered by some to be the oldest recorded sighting of the lights. Throughout history, different cultures have had various ideas about what exactly the Northern Lights were and how they were formed. In Norse mythology, the colourful waves were thought to be sunlight reflecting off of the **Valkyries**' shiny armour. According to an old legend from Finland, it was the trail left by a mythical creature called a firefox as he ran across the night sky. It wasn't until 1903 that Kistian Birkeland, a Norwegian scientist, worked out exactly what caused them.

What Causes the Northern Lights?

Solar winds are launched from the Sun's **corona** and then travel quickly towards the Earth at speeds of up to 45 million mph. Our planet's magnetic field redirects these waves, sending them towards the poles at **altitudes** of 60-155 miles, where they mingle with gases in the atmosphere: mostly nitrogen and oxygen. When mixed with charged particles, nitrogen gases tend to produce radiant blue, purple and pink waves of light. Oxygen, on the other hand, produces bright green and sometimes red, ripples in the night sky.



Did You Know...?

Due to the Earth's tilt away from the Sun in winter, this season is considered to be the best time to see them.

Other Auroras

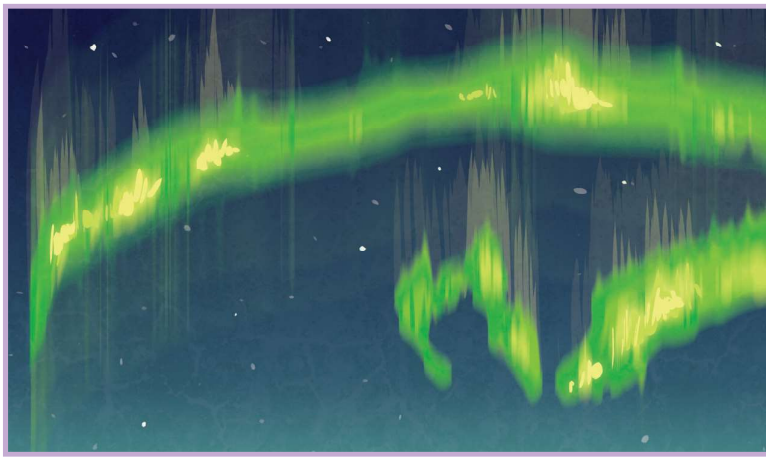
There are other auroras to be seen on Earth. Near the South Pole, the Aurora Australis can be seen between March and September. Nearer to the equator, mauve and green streaks and arcs found in the night skies are known as STEVE (Strong Thermal Emission Velocity Enhancement).

Did You Know...?

Similar lights can be seen on other planets, especially the gas giants: Jupiter, Saturn, Neptune and Uranus.

NASA is hoping to answer some of the many questions about the lights using their Parker Solar Probe, which was launched in 2018. This probe will orbit close to the Sun to examine the corona, helping us to further understand solar winds.

Seeing the Northern Lights is a 'must do' for millions of people around the globe. In the future, scientists will be able to explain more about this stunning phenomena. Until then, we can simply enjoy the incredible display as our ancestors did before us.



Glossary

altitudes: How far above sea level an object is.

atmosphere: The envelope of gases surrounding the Earth.

corona: The outermost layer of the Sun.

solar winds: A stream of particles released from the Sun.

Valkyries: Warrior maidens in Norse mythology who guarded ships and soldiers.

Questions

1. What two mythical figures are the Northern Lights named after? Tick one.
   - ○ Aurora and Boreas
   - ○ Boreas and Valkyrie
   - ○ Aurora and Firefox
   - ○ Aurora and Valkyrie

2. What colour waves does nitrogen produce? Tick one.
   - ○ mauve
   - ○ blue, purple and pink
   - ○ green
   - ○ white

3. Fill in the missing words.
   It wasn't until 1903 that Kristian Birkeland, a _____,
   worked out exactly what caused the Northern Lights.

4. Look at the section called **Other Auroras**.
   Find and copy one word that means 'to go around a planet or sun'.

   _____

5. At what altitudes do the Northern Lights appear?

   _____

6. Explain why winter is the best season to see the Northern Lights.

   _____

   _____

   _____

7. Look at the section called **Other Auroras.**
   Compare the differences and similarities between the Aurora Australis and the Aurora Borealis.

   _____

   _____

   _____

8. Look at the section called **What Causes the Northern Lights**? Explain in 25 words or fewer how auroras are made.

Answers

1. What two mythical figures are the Northern Lights named after? Tick one.
   ✓ **Aurora and Boreas**

2. What colour waves does nitrogen produce? Tick one.
   ✓ **blue, purple and pink**

3. Fill in the missing words.
   It wasn't until 1903 that Kristian Birkeland, a '**Norwegian scientist**', worked out exactly what caused the Northern Lights.

4. Look at the section **Other Auroras**.
   Find and copy one word that means 'to go around a planet or sun'.
   orbit

5. At what altitudes do the Northern Lights appear?
   The Northern Lights appear at altitudes of 60-155 miles.

6. Explain why winter is the best season to see the Northern Lights.
   Pupils' own responses, such as: Winter is the best time to see the lights because the Earth is tilted away from the Sun so there is less daylight and the nights are longer, meaning there is more opportunity to see the lights.

7. Look at the section called **Other Auroras.**
   Compare the differences and similarities between the Aurora Australis and the Aurora Borealis.
   Pupils' own responses, such as: They are both caused by the same thing - solar winds and the Earth's atmosphere mixing. They are different because Aurora Australis happens at the South Pole and Aurora Borealis happens at the North Pole.

8. Look at the section **What Causes the Northern Lights?**
   Explain in 25 words or fewer how auroras are made.
   Pupils' own responses, such as: Solar winds from the Sun hit the Earth's magnetic field. They are sent to the poles where they mix with the atmosphere to make lights.