Lights in the Sky

Level 5

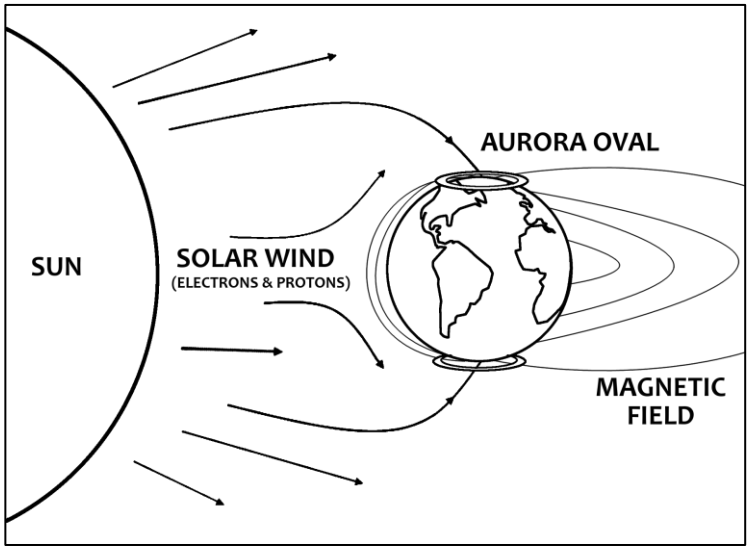
Every year, many people travel to see a spectacular light show in the sky. The night sky is illuminated with flickering shades of purple, green, blue and red. This natural phenomenon is known as an aurora. An aurora can be seen from either the North Pole or the South Pole.

The light show is given a different name depending on where it occurs. When it occurs around the northern magnetic pole, it is called ‘aurora borealis’. When the event occurs around the southern magnetic pole, it is called ‘aurora australis’. While an aurora can occur at any time during the day, it is visible under dark skies.

What Causes an Aurora?

An aurora begins with a large disturbance on the Sun. The Sun doesn’t just emit light and heat; it also sends out small, charged particles. Electrons and protons are carried from the sun in all directions. This stream of particles is known as the solar wind. Most of these particles are not able to pass through into our atmosphere because of our magnetosphere. Our magnetosphere is the region surrounding Earth in which Earth’s magnetic field is dominant.

However, the disturbances on the Sun can be so strong at times that they cause the magnetic field around Earth to be pulled like a rubber band. The magnetic field ‘snaps’ back into place. This sends special electromagnetic waves, called Alfvén waves, travelling towards Earth. Alfvén waves help carry some of the electrons from the solar wind towards Earth at extremely high speeds.



This causes some of these electrons to pass through the magnetosphere. Once inside, these particles are directed along the magnetic field lines towards the poles. The electrons then collide with atoms in our atmosphere. The electrons transfer energy to the atoms, which causes light energy, known as photons, to be released.

The colours of an aurora vary depending on the altitude of the atoms. A red glow occurs if the atom is high in the atmosphere, whereas a green or yellow glow will be produced if the atom is low in the atmosphere. The colours of the lights also depend on what type of atoms the electron collides with. For example, nitrogen causes blue or red colours. Oxygen gives off a green colour.

Questions

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1. What is the difference between aurora borealis and aurora australis?

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2. During which time of the day can an aurora occur?

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3. What does the word ‘emit’ mean? _____

4. Why did the author choose the word ‘snap’ in the fourth paragraph?

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5. What two factors affects the colour of the aurora?

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6. Why do auroras only occur near the two poles?

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7. Explain how the diagram helps a reader better understand this text.

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Answers

1. What is the difference between aurora borealis and aurora australis?

   Aurora borealis is the name for the light show that occurs near the north pole. It is name aurora australis when it occurs near the south pole.

2. During which time of the day can an aurora occur?

   An aurora can occur at any time of the day (but it can only be seen at night).

3. What does the word 'emit' mean? Emit means to produce.

4. Why did the author choose the word 'snap' in the fourth paragraph?

   The word 'snap' was used because the author said the magnetic field was pulled back like a rubber band. The word 'snap' helps the reader understand what happens to it when it is released.

5. What two factors affects the colour of the aurora?

   The colour of the aurora is affected by the altitude of the atoms and what type of atom the electrons collide with.

6. Why do auroras only occur near the two poles?

   The electrons inside the magnetosphere are led along the magnetic field lines. The magnetic field lines run between the north pole and the south pole. This means when they enter the atmosphere, it is at one of the two

7. Explain how the diagram helps a reader better understand this text.

   Answers may vary. The diagram helps the reader see effect of the magnetic field. It shows the how the solar wind travels to the Earth and shows that some electrons get through our atmosphere at the north and south poles.