

Magnetism and Electromagnetism Reading Comprehension

Magnetism is defined as the force of repulsion or attraction that acts at a distance (no contact) and is caused by a magnetic field that in turn is created by moving, electrically charged particles (Balanis, 2012). Moreover, the action is inherent in some magnetic objects such as permanent magnets. A permanent magnet is an object that shows or exhibits a magnetic field that is electronically stable and, in most cases, attracts materials such as iron towards it. Consequently, electromagnetism is the process or the action of creating a magnetic field from the movement of electrical charges. In fact, the process of using an electric current to create an electromagnet is known as electrodynamics (Rare-earth-magnets.com). This paper analyzes magnetism, earth's protective field, its history, current application, how it works, the controversy, its environmental impact as well as the future development.

A brief history

The history of magnetism began back in 600 B.C. but it was not until the 20th century when scientists started to understand it and produce technologies based on its understanding. Magnetism was first observed in the form of the mineral magnetite that was known as lodestones. The lodestone contained iron oxide, which is a chemical compound of oxygen and iron (Cheng, 1989). The ancient Greeks were the first people to utilize this mineral and referred to it as a magnet due to its ability to attract other pieces of lodestone and iron to itself. An Englishman by the name William Gilbert, was the first person to investigate the magnetism phenomena by use of the scientific method (Rare-earth-magnets.com). Later on, Hans Christian a Danish physicist, suggested the relationship between electricity and magnetism. Later on, James Clerk Maxwell (1831-1879) was the first person to provide a theoretical foundation regarding the theory of electromagnetism in the 19th century. He showed that both magnetism and electricity

represent different aspects of the same fundamental force. In 1820, Hans Christian Oersted performed a home science demonstration for some students and friends and realized that a compass needle moved every time an electric current was switched on nearby (Jensen & Mackintosh, 1991). Later on, Andre Marie Ampere described the events and indicated that the effect was due to electromagnetism. More recently, applications include its use in computer hardware such as floppy drives, computer storage disks and televisions.



How it works

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Current applications

Both magnetism and electromagnetism are widely used in different settings including electric motors, electric generators, and the electrical bell. Moreover, there are other gadgets that apply the principles of



electromagnetism including the electric fan as well as microwave ovens. Transformers and MRI scanners in hospitals also use the electromagnetism induction principle (Reitz et al., 2008). Lastly, many waste disposal areas and junkyards utilize electromagnets, which can be turned on (start the current and produce the magnetism) and then turned off (switch off the current to stop the magnetism) to separate and move around heavy piles of metal.

Earth's magnetic shield

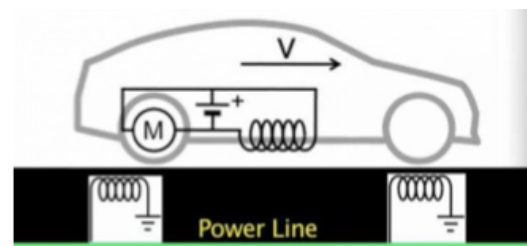
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The future

Engineers and designers are dreaming of manufacturing other devices that utilize the electromagnetism principle. Currently, Trains in Asia and Europe use electromagnets to levitate the cars. This helps them to move at phenomenal speeds. Many other countries will soon be on board and maybe, one day we will see levitating cars (Balanis, 2012). Currently, electric cars have a limited range before they need to be recharged. Through technological innovation, one day, electromagnets buried in the roads may be able to charge your car as you drive.



Reading Comprehension Questions:

1. What is magnetism?
2. What is
3. What object did early scientists first notice were magnetic?
4. What did
5. How is an electromagnet created?
6. How
7. Why is the magnetic shield around Earth so important?
8. Why
9. What
10. What is a current drawback of electric cars?
11. Based on what you have learned, explain how electric cars could potentially be charged as they drive?

Extension Question

12. Create a paragraph that compares magnets and electromagnets. It must be written in a way that it could be understood by someone in grade 4 (9 years old).

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