

# The Mechanical Universe

## MAGNETIC FIELDS

17min



This video sequence presents many related and unrelated facts about magnets and magnetic fields. In the process, the following scientists are referred to.

Dr. William Gilbert: 16th century British magnetism experimenter; first to record many qualitative findings.

Hans Christian Ørsted: 19th century Danish lecturer who demonstrated link between current and magnetism.

Michael Faraday: 19th century British experimentalist in electricity and magnetism.

André Ampère: 19th century French theoretical physicist, originator of *electrodynamics theory* relating electricity and magnetism.

James Clerk \_\_\_\_\_: 19th century Scottish physicist who united the work of Faraday and Ampère.

Read the following questions before the video begins. Answer the questions while the video is in progress. This is an **INDIVIDUAL** effort, so complete it by yourself.

**DON'T ASK OTHERS FOR ANSWERS** since doing so would be cheating.

Most of the important information (and answers to the questions on this sheet) is in the text spoken during the presentation. So don't become entranced by the visual imagery; concentrate and stay focused on the words!

1. The aurora borealis involves \_\_\_\_\_ particles from the sun directed by the Earth's \_\_\_\_\_ field.

2. The equation for the magnetic force between two magnetic poles follows the form of  
A. the equation for the electric force between two charges  
B. the equation for the gravitational force between two masses  
C. both A and B                      D. none of these

3. Theoretically, magnetic \_\_\_\_\_ may exist. So far, none have been found.

4. The magnetic field of a bar magnet resembles the electric field around...

5. (True/False) The Earth's magnetic field is confined by the solar wind.

6. The Earth's magnetic field is (RELATED TO/INDEPENDENT OF) the earth's rotation.

7. Earth's magnetic field protects the surface from \_\_\_\_\_ originating in the sun and outer space.

8. The magnetic force on a moving charged particle **MAY**  
A. speed the particle up    B. slow the particle down                      c. both                      D. neither

9. Magnetic forces arising from electric currents make magnets point \_\_\_\_\_ to the direction of current.

10. If a solenoid is bent into a circle, the doughnut it forms is called a \_\_\_\_\_.

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1. Much of the universe is like an \_\_\_\_\_ of magnets.
2. The equation for the magnetic force between two magnetic poles follows the form of  
A. the equation for the electric force between two charges  
B. the equation for the gravitational force between two masses  
C. both A and B                      D. none of these
3. Theoretically, magnetic \_\_\_\_\_ may exist. So far, none have been found.
4. The magnetic field of a bar magnet resembles the electric field around...
5. (True/False) The Earth's magnetic field extends infinitely into space.
6. The Earth's magnetic field arises from large scale \_\_\_\_\_ deep inside the Earth.
7. Earth's magnetic field protects the surface from \_\_\_\_\_ originating in the sun and outer space.
8. Magnetic forces arising from electric currents make magnets point \_\_\_\_\_ to the direction of current.
9. If a solenoid is bent into a circle, the doughnut it forms is called a \_\_\_\_\_.
10. James Clerk \_\_\_\_\_ united the work of Faraday and Ampère ("om PAIR").