

Magnetic Fields

- Magnet Fields
- Law of Magnetic Poles
- Permanent vs. Temporary Magnets
- Earth's Magnetic Field
- Oersted's Principle
- The Right-Hand Rule
- Magnetism and Electricity
- Solenoids
- Electromagnetism and Electromagnetic Induction
- Faraday's and Lenz's Laws
- Conventional Current and Electron Flow



SAMPLE FILE

Thank you for your interest in my lesson.

The following slides will give you a good idea of how this lesson is structured although, much of the information has been removed.

For instance, when you see, that represent text that has been removed.

Note: This sample was created from the student version of the PowerPoint therefore, you will see _____ which are placeholders for the teacher version text which your students will fill in. Furthermore, the videos have also been removed.

If you have any questions, please send me an email – devon@teachwithfergy.com

Magnetic Fields

With the person beside you, come to a conclusion as to how magnetic fields work.

Applications of Magnetic Fields

Talk to the person beside you and come up with three different applications of magnetic fields (magnets)

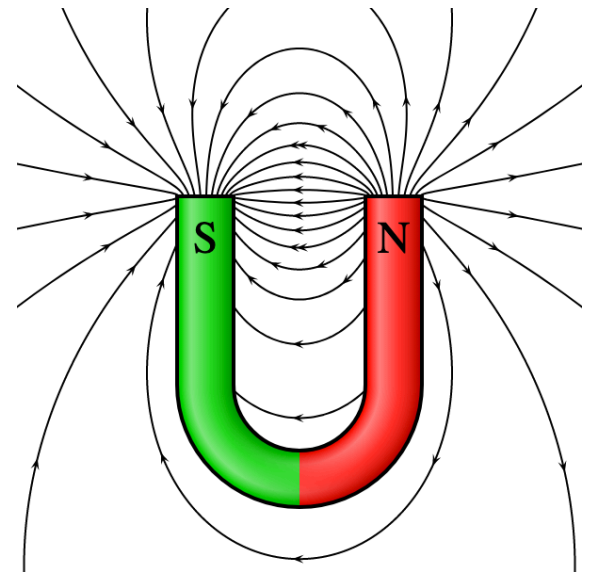
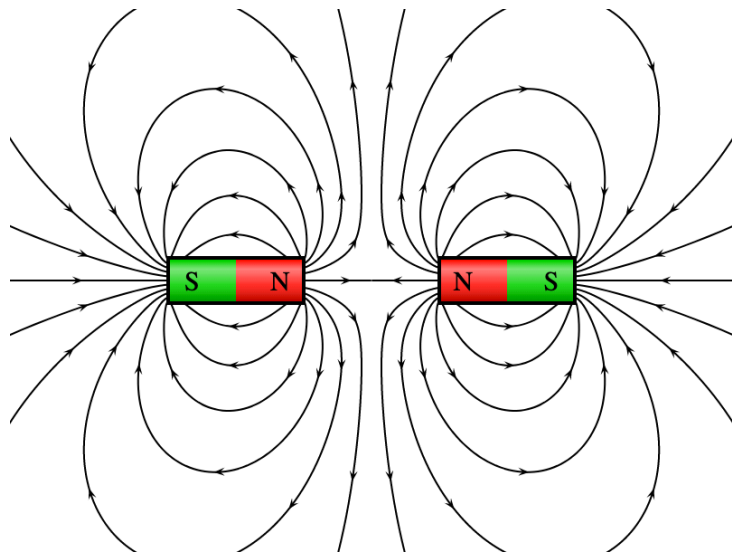
Some Applications of Magnetic Fields

- Maglev trains
- Particle accelerators
- Magnetic resonance imaging (MRI) systems
- Speakers in stereos, earphones, and televisions.
- Store data in computers
- Car horns and motors

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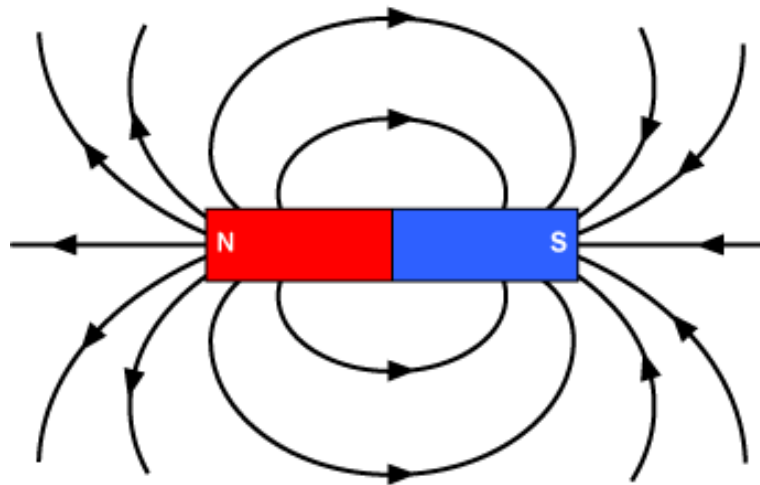
The Properties of Magnetic Fields in Magnets

- _____
- Where the field is strongest (near the poles) the field lines are closer together



Magnet Fields

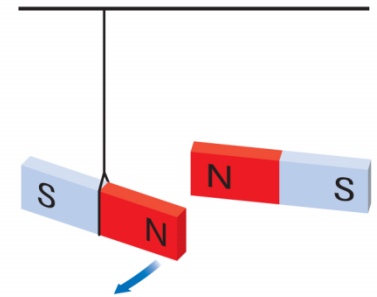
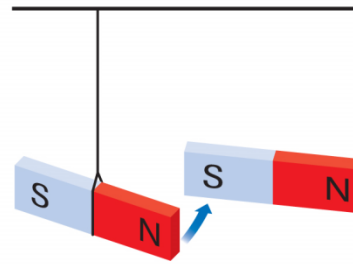
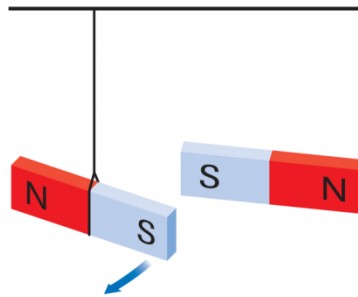
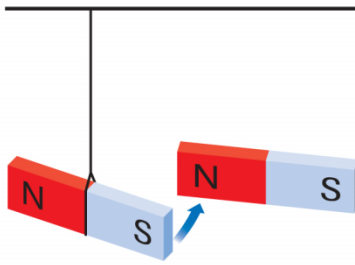
Since substances like iron experience a force when placed near a permanent magnet,



Law of Magnetic Poles

- _____

- _____



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Permanent vs. Temporary Magnets

- _____
- _____



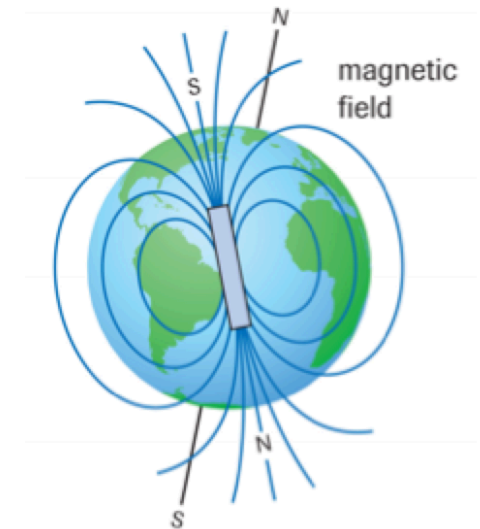
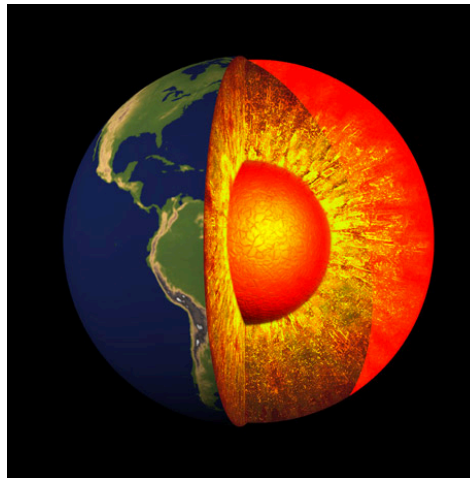
- They can become magnetized and produce a magnetic field when they're within a strong magnetic field
- When the field disappears, temporary magnets lose their magnetism
- Examples include:

Try it with the person next to you. Magnetize a magnet and see if it will attract other ferromagnetic objects



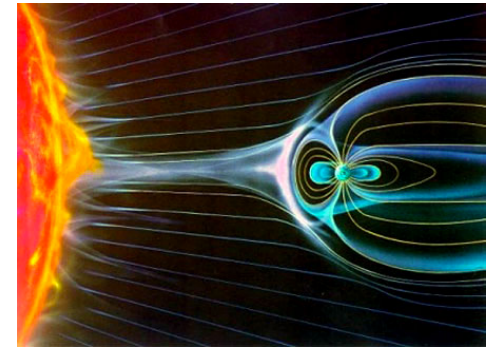
Ferromagnetic Materials

- Some objects like Iron, Nickel and Cobalt can become magnetized and produce a magnetic field (called ferromagnetic materials) when brought near a permanent magnet
- _____



Earth's Magnetic Field (The Magnetosphere)

- Solar radiation is the result of electrons and



- These particles would be devastating if they reached us → increased cancer rates, electricity grid issues
- _____

Earth's Magnetic Field

- These solar winds get closest to the surface at the poles and interact with our atmosphere
- _____

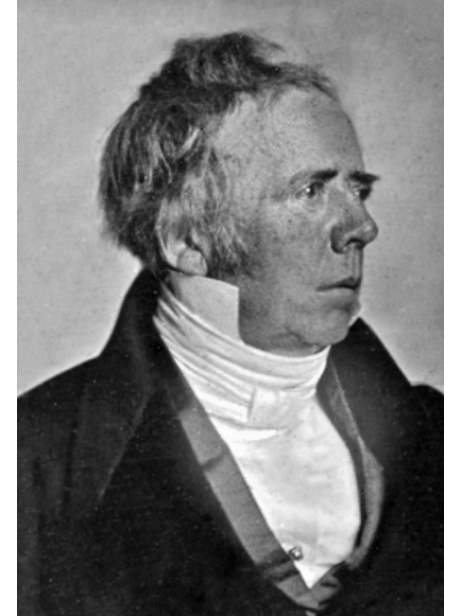


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Oersted's Principle

Hans Christian Oersted (1777 –1851) was a Danish physicist and chemist who discovered that electric currents create magnetic fields

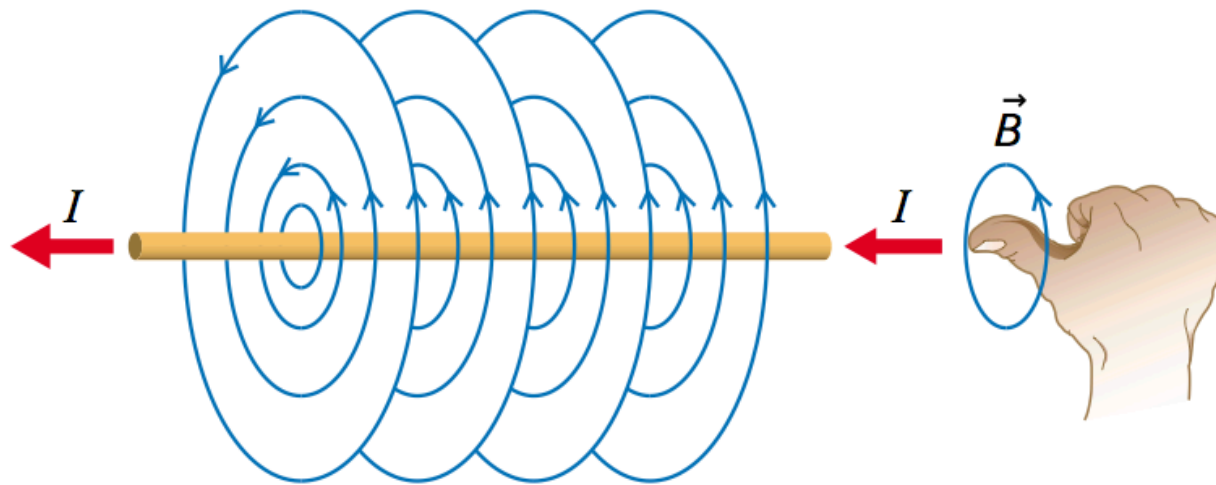
This was the first connection found between electricity and magnetism



Magnetic Field of a Straight Conductor

– The Right-Hand Rule

If a conductor (like a piece metal or a wire) is grasped in the right hand, with the thumb pointing in the direction of the current, ...



Connecting Magnetism and Electricity

- Since the movement of electric charges creates magnetic fields we know that electrons feel the force exerted by a magnetic field
- Therefore, _____
- Conclusion: Magnetic fields create moving electrons (electricity) and moving electrons create magnetic fields. They are essentially the same force which we call electromagnetism

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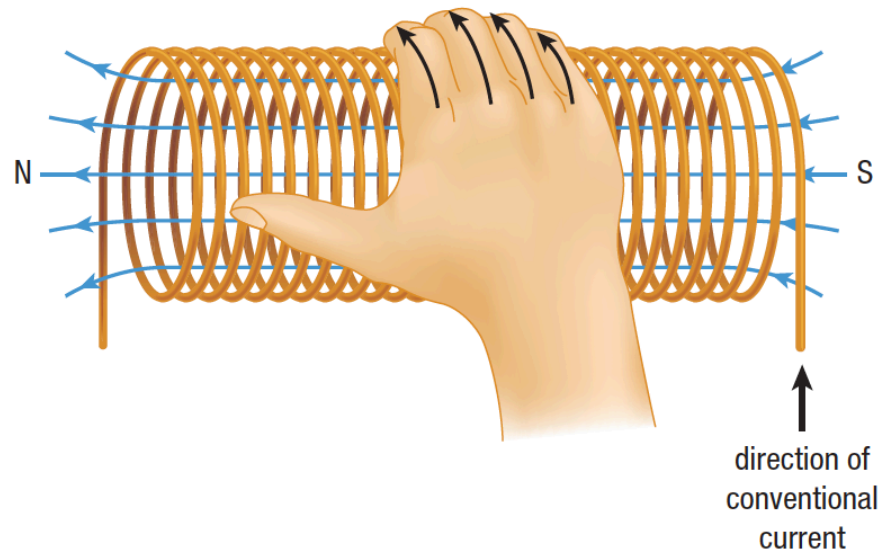
Solenoid

- Since we can run current through the coiled wires, we can create a current induced magnet – an electromagnet
- _____



Right-Hand Rule - Solenoids

If a solenoid is grasped in the right hand, with the fingers curled in the _____



Electromagnetism

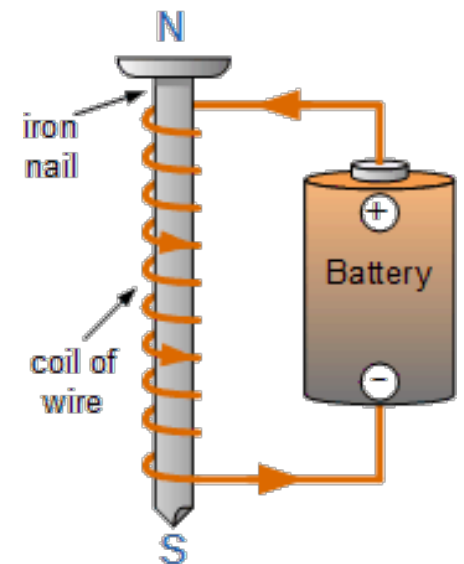
- Electromagnets create a magnetic field by _____
- The conductor is typically a version of a solenoid



Increase The Magnetic Strength

Regarding a solenoid, strength increases as:

- _____
- adding a substance that can be magnetized (a ferromagnetic substance) into the core of the solenoid
 - The core concentrates the field
 - Increases the strength 1000's of times
- _____

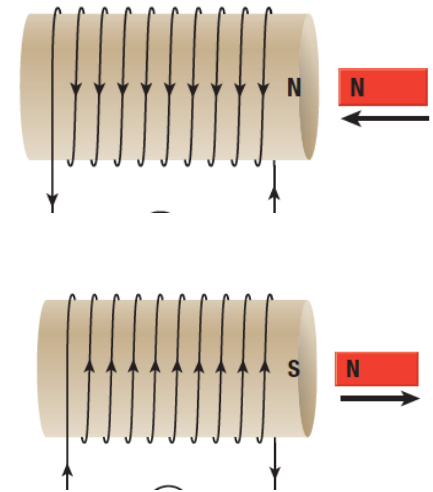


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Lenz's Law

- When a permanent magnet is pushed into a coiled conductor, the electrons in the coil respond to the magnetic field by starting to move in a particular direction and forming an electric current.
- _____
- This is consistent with the conservation of energy. You create



Drop Rides and Lenz's Law



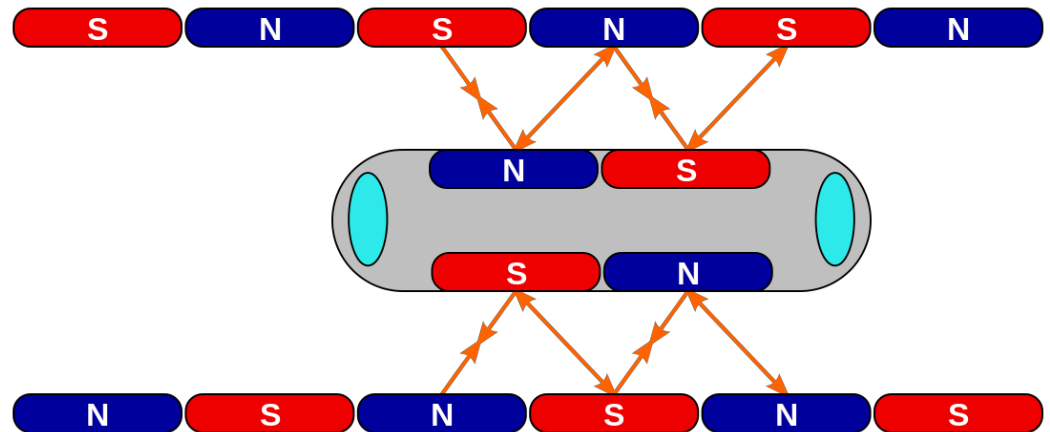
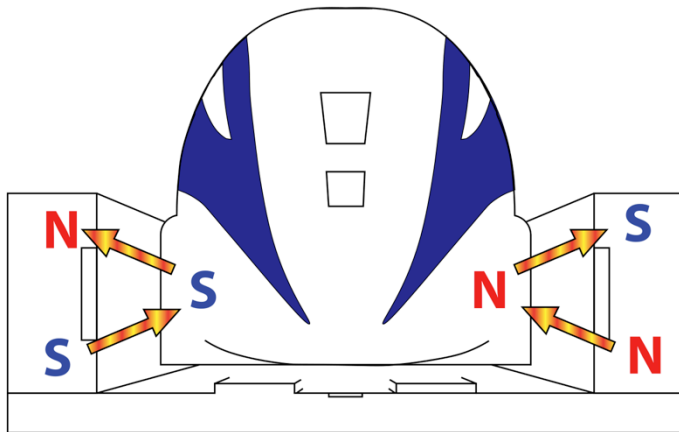
Drop Rides and Lenz's Law

With the person beside you, discuss how drop rides such as the one you just watched, utilize Lenz's Law.



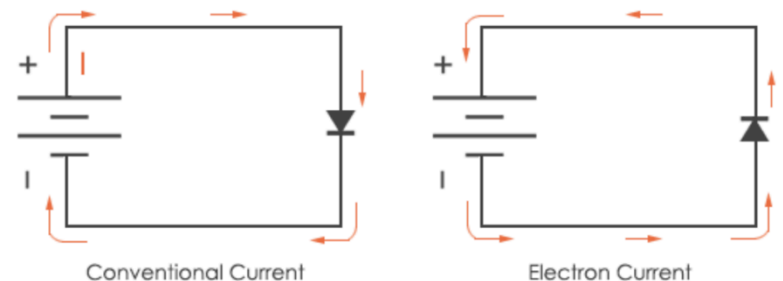
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Maglev Trains



Conventional Current and Electron Flow

- Conventional current models (what the scientific community uses) the flow of charges from the positive to negative terminal
- _____
- _____
- To model this you need to



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