

Magnetic Fields

5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom

- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



Complete Teacher Instructions

Magnetic Fields 5E Lesson

Grades 10-12	Magnetic Fields	Ongoing Lesson (4-6)
Lesson Objective: Students will learn about: - Magnet Fields - Law of Magnetic Poles - Permanent vs. Temporary Magnets - Earth's Magnetic Field - Oersted's Principal - The Right-Hand Rule - Magnetism and Electricity - Solenoids - Electromagnetism and Electromagnetic Induction - Faraday's and Lenz's Laws - Conventional Current and Electron Flow		
Possible Student Misconceptions: - Electricity and magnetism are unrelated - There's only one kind of magnet and it is unchanging - Conventional current shows the direction of electron movement		
Materials: 1 device (smartphone, <u>Chromebook</u>, laptop, tablet, or computer) per 3 students - A means of projecting a PowerPoint presentation - Internet access - General classroom objects - Stopwatch		
Teacher Notes: - All videos can be accessed directly from the PowerPoint. To retrieve them, click on the icon while in slideshow mode and it will automatically open for you. If it doesn't, right-click on the image and click Edit Hyperlink or something similar. - I've created a video walkthrough if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I don't believe in long lessons. If you feel your students are losing their focus, stop the PowerPoint and give them a 5-minute break. If you'd like to show a video, I recommend my video collection here - http://www.teachwithfergy.com/science are tons of brain-break videos to choose from all grouped by category.		

Magnetic Fields – 5E Lesson

Engagement Phase Your students will complete the introductory questions in the <i>Engagement</i> document. It is assumed that they won't know many of the questions. The point is for them to think and try their best. Each question will be revisited again during the unit and they will be asked to answer the same questions in the <i>Evaluate</i> section to see what they've learned. Teacher Notes: It's very important that your students write down their answers. Even if they don't know the answer, commitment is important.	Duration: 30 minutes Teacher Role – Facilitate learning and guide student understanding Goals - Connect student's experiences - Create interest - Get students thinking - Understand the objectives of the unit
Exploration Phase Exploration – Lab Station Activity - In groups of 2-3, have your students complete <i>Exploration – Lab Station Activity</i>. Once they're done, they will submit their passport to you. Teacher Notes: - The complete instructions for my Lab Station activity can be found in the <i>START HERE – Instructions</i> file.	Duration: 1 hour Teacher Role – Facilitate learning and guide student understanding Goals - Students receive real experience with the topic - Students use and develop creative thinking skills - Students make observations, record results, and make connections
Explanation Phase PowerPoint Lessons - The lesson is found in the folder – <i>Explanation – Lesson</i> - This lesson is designed to be completed over two days - There is plenty of opportunity to engage, interact, and check for your students' understanding throughout the lesson - The lesson covers the following topics: - Magnet Fields - Law of Magnetic Poles - Permanent vs. Temporary Magnets - Earth's Magnetic Field - Oersted's Principal - The Right-Hand Rule - Magnetism and Electricity - Solenoids - Electromagnetism and Electromagnetic Induction - Faraday's and Lenz's Laws - Conventional Current and Electron Flow Teacher Notes: - Videos are embedded directly in the PowerPoint. I've created a video walkthrough to help you access them if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I have also enclosed both the teacher and student versions.	Duration: 2 hour(s) Teacher Role – Explain the concepts by presenting the material found in the presentation. Goals - Students develop understanding of the content - Observations and experiences are discussed and critiqued - Students develop vocabulary - Students are able to connect the content presented to previous experiences

Reading <i>Reading</i> . This activity will be covered directly in the <i>Reading</i> section of their understanding.	Duration: 1 hour Teacher Role – Facilitate learning and keep students focused Goal Students use their newly obtained knowledge to propose solutions and extend their learning to new situations
Magnetic Fields Quiz as the ones in the <i>Quiz</i> to see what the students have learned from their prior and post unit. Students peer evaluate and having them exchange ideas on things they just completed. I've suggested when appropriate.	Duration: 30 – 60 min Teacher Role – Distribute and collect evaluation Goal Students are given the opportunity to demonstrate their understanding and evaluate their own progress

Each phase is clearly described

A Complete Lesson

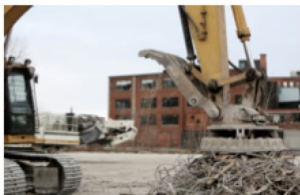
Drop Rides and Lenz's Law

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



Solenoid

- Since we can run current through the coiled wires, we can create a current induced magnet – an electromagnet
- Electromagnets are activated when the current flows and stop working when the current stop



← Make sure your students are on track

Student copies with blanks
Videos embedded right into
your slideshow

Solenoid

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



Interactive and Engaging Activities

Magnetic Fields Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Magnets and Electromagnets - Scientific Reading Comprehension Article



Improve your students **Scientific Literacy** and **Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration

