

# Old Acc Physics Unit 12 - Magnetism

Content Area: **Science**  
Course(s): **Accelerated Physics**  
Time Period: **Marking Period 4**  
Length: **3 Weeks**  
Status: **Published**

## Course Pacing Guide

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Unit	MP/Trimester	Weeks
Unit 00 - Mathematical Toolkit and Graphing	1	1
Unit 01 - Constant Velocity	1	2
Unit 02 - Constant Acceleration	1	2.5
Unit 03 - 2D Motion	1	3
Unit 04 - Balanced and Unbalanced Forces	2	4
Unit 05 - Circular Motion	2	2
Unit 06 - Work, Power and Energy	2	3.5
Unit 07 - Impulse and Momentum	3	3
Unit 08 - Rotational Inertia	3	3
Unit 09 - Simple Harmonic Motion	3	2
Unit 10 - Waves and Sound	3	3
Unit 11 - Electrostatics	4	4
Unit 12 - Magnetism	4	3

## Unit Overview

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In this unit students will examine concept of magnetism and how magnetic fields can be used to predict the interaction of charged particles within the field.

## Enduring Understandings

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- The internal structure of a system determines many properties of the system.
- Materials have many macroscopic properties that result from the arrangement and interactions of the

atoms and molecules that make up the material.

- A field associates a value of some physical quantity with every point in space. Field models are useful for describing interactions that occur at a distance (long-range forces) as well as a variety of other physical phenomena.
- At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces.
- Certain quantities are conserved, in the sense that the changes of those quantities in a given system are always equal to the transfer of that quantity to or from the system by all possible interactions with other systems.
- Physicists often construct a map of isolines connecting points of equal value for some quantity related to a field and use these maps to help visualize the field.
- The electric and magnetic properties of a system can change in response to the presence of, or changes in, other objects or systems.
- A magnetic field is caused by a magnet or a moving electrically charged object. Magnetic fields observed in nature always seem to be produced either by moving charged objects or by magnetic dipoles or combinations of dipoles and never by single poles.

### **Essential Questions**

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- What is a magnetic field? How is it created?
- What is magnetism?
- How is magnetism related to electricity?
- How do phenomena on the microscopic level affect macroscopic motion?

### **New Jersey Student Learning Standards (No CCS)**

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SCI.HS-PS2-5

Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

### **Amistad Integration**

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N/A

### **Holocaust/Genocide Education**

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N/A

## Interdisciplinary Connections

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MA.F-LE.B.5	Interpret the parameters in a linear or exponential function in terms of a context.
MA.F-TF.B.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.

## Technology Standards

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TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.

## 21st Century Themes/Careers

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List specific standards that are relevant  
No general statements

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

## **Financial Literacy Integration**

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N/A

## **Instructional Strategies & Learning Activities**

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- Use graphing calculator to explore tables.
- Spend time with modeling problems
- Use problems and activities from book involving modeling problems
- Provide access to online book
- Provide access to book pages and problems through Canvas
- Provide access to review keys
- Use Pearson Quizzes to review and reinforce.
- Provide access to Pearson Review.
- Examview Quizzes to assess HW.

## **Differentiated Instruction**

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- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Tiered Learning Targets
- Meaningful Student Voice & Choice
- LMS use
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Goal-Setting & Learning Contracts
- Grouping
- Rubrics
- Learning Through Workstations
- Concept Attainment

- Mentoring
- Assessment Design & Backwards Planning
- Student Interest & Inventory Data

### **Formative Assessments**

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- Homework (Canvas and/or Written Work)
- Warm-Ups
- Exit Tickets

### **Summative Assessment**

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- Quiz
- Unit Test
- Lab(s)

### **Benchmark Assessments**

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- Force Concept Inventory
- Mechanics Baseline Test

### **Alternate Assessments**

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- Modified homework
- Modified quizzes
- Modified tests
- Modified projects

### **Resources & Technology**

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- Google docs, spreadsheets, slides
- TI graphing calculator
- document camera
- chromebooks

- Promethean board
- websites: desmos, geogebra, EdPuzzle
- Canvas

## **BOE Approved Texts**

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Etkina et al., College Physics: Explore and Apply AP Edition, 2nd Edition ©2019 with Mastering Physics with Pearson eText

## **Closure**

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Such as:

- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Have students fill out a checklist with the objectives for the day.
- Have students complete an exit ticket without putting their name on it. Hand back exit tickets the next day in class and have students correct as a warm up.
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"
- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"

## **ELL**

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Such as:

- Alternate Responses

- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaries
- Google Translate

\*Add to or remove any of these as you see fit.

## **Special Education**

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List is not inclusive but may include examples such as:

- Shorten assignments to focus on mastery of key concepts.
- Shorten spelling tests to focus on mastering the most functional words.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Specify and list exactly what the student will need to learn to pass.
- Evaluate the classroom structure against the student's needs (flexible structure, firm limits, etc.).
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom (mobiles, etc.).
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Use a study carrel. (Provide extras so that the student is not singled out.)
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Allow the student to complete an independent project as an alternative test.
- Give progress reports instead of grades.
- Grade spelling separately from content.
- Allow take-home or open-book tests.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Permit a student to rework missed problems for a better grade.

- Average grades out when assignments are reworked, or grade on corrected work.
- Use a pass-fail or an alternative grading system when the student is assessed on his or her own growth.

\*Add to or remove any of these as you see fit.

## 504

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Examples of accommodations in 504 plans include but are not limited to:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

\*Add to or remove any of these as you see fit.

## At Risk

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Examples may include:

- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Use of a study carrel
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule



- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Film or video supplements in place of reading text
- Pass/no pass option
- Cue/model expected behavior
- Use de-escalating strategies
- Use peer supports and mentoring
- Have parent sign homework/behavior chart
- Chart progress and maintain data

\*Add to or remove any of these as you see fit.

## **Gifted and Talented**

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Focus on effort and practice

Offer the Most Difficult First

Offer choice

Speak to Student Interests

Allow G/T students to work together

Encourage risk taking