Grade High School
Distance Learning Module 3 - Week of: April 13th – April 17th

Honors Physics - Modified from Unit 9 - Magnetism 2

Targeted Goals from Stage 1: Understand Induced EMF and the basics of electric motor operations. Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields.

Content Knowledge: Right Hand Rule (qvB and IlB); Circular motion of a moving charge captured in a magnetic field. Force between two parallel wires. Magnetic fields and their origin. Forces on moving charges. Forces on Current carrying wires. Similarities and differences between Electrostatic fields and magnetic fields. Electromagnets.

- Students will understand what is needed to produce a magnetic field. They will be able to describe what produces magnetic fields in permanent magnets and electromagnets.
- Students will understand that the earth is magnetic. They will be able to describe what produces earth's magnetic field. Students will be able to differentiate between earth's geographic poles and its magnetic poles.
- Students will understand that all permanent magnets have two poles – north and south. If a permanent magnet is divided, the resulting smaller magnets still have two poles.
- Students will understand how a compass works and how it can be used to determine the magnetic field around any magnet.
- Students will understand that when two magnets interact magnetic forces are created. They will understand that this force is directly related to the strength of the magnetic fields.
- Students will understand that moving charges (currents) create magnetic fields;
- Students will understand changing magnetic fields can create moving charges

Vocabulary*:* Vector cross product. Magnetic field; Magnetic Force; Tesla, Amps, Current, voltage, coulomb, Electro-motive Force, Electromagnet, Solenoid, Coil.

Skills: Apply Theory and equations to mass spectrometer problems. Determine the capture radius for a moving charge in a magnetic field. Understand the Aurora Borealis

- Students will be able to draw magnetic field lines around permanent magnets and electromagnets.
- Students will be able to use a right-hand-rule to determine the magnetic field around a wire, a loop of wire or many loops (solenoid) of wire.

- Students will be able to determine the direction of the magnetic force on a current carrying wire in an existing magnetic field OR a moving charge in an existing magnetic field. Students will be able to explain what conditions are necessary in order for this force to be a maximum and what conditions are necessary for this force to be non-existent.
- Students will be able to determine the magnitude of the magnetic force on a wire or a moving charge in an existing magnetic field.
- Students will be able to determine the radius of the circular path taken by a charge moving perpendicular to an existing magnetic field. They should be able to work with magnetic force acting as a centripetal force.
- Students will be able to determine the magnitude and direction of magnetic force on different segments of a wire in a magnetic field. They will be able to calculate the acceleration of the wire and be able to include F_M in F_{net} calculations.
- Students will be able to calculate the voltage and current in step-up or step-down transformers

Expectation: Demonstrate mastery by completing assigned UTexas assessments

Description of Task (s):	***Resources and Materials:***	***Daily Checks (Return to Google Classroom or snapshots from a cell phone)***
Monday: *Students are encouraged to attend Zoom meetings, and to review notes.* *They are also to work on UTexas Assignment.*	*Crash Course Physics Videos:* *PBS* ***Magnetism*** ***Ampere's Law*** ***→ has integral walkthrough, but if they don't know integrals…*** ***Induction*** *Flipping Physics Videos* *Khan Academy Physics Videos* ***Magnetism Unit*** *University of Colorado Physics simulations/on-line experiments*	*Greater than 75 % earned on University of Texas on-line Homework and Assessment (accounts required)* *Participation in Zoom classroom learning as available and needed*

Description of Task (s):	***Resources and Materials:***	***Daily Checks (Return to Google Classroom or snapshots from a cell phone)***
	The Physics Classroom tutorials	
Tuesday: *Students are encouraged to attend Zoom meetings, and to review notes* *Finish UTexas*	*As above*	*Participation in Zoom classroom learning as available and needed*
Wednesday: *Students are encouraged to attend Zoom meetings, and to review notes*	*As above*	*Participation in Zoom classroom learning as available and needed*
Thursday: *Students are encouraged to attend Zoom meetings, and to review notes*	*As above*	*Participation in Zoom classroom learning as available and needed*
Friday: *Students are encouraged to attend Zoom meetings, and to review notes*	*As above*	*Participation in Zoom classroom learning as available and needed*

Week criteria for success *(attach student checklists or rubrics): Greater than 75 % on Assigned UTexas Assessments*

Supportive resources and tutorials for the week *(plans for re-teaching): Textbook; Finalsite resources (Powerpoints, worksheets with answer keys, pdf notes); Khan Academy; Crash Physics videos; PHeT simulators from University of Colorado; Flipping Physics videos; Interactions with teacher using Zoom.*