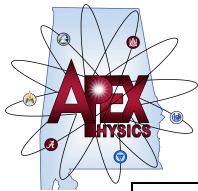


Alliance For Physics Excellence (APEX)
2016 Summer Institute Workshop – Cohort 2, Week 2
Physics Teacher Institute (PTI) Activity Schedule
Alabama A & M University
APEX Schedule for Cohort 3 June 27-July 1, 2016

Monday June 27, 2016

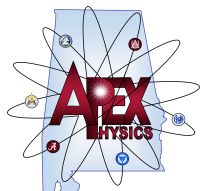
Material person (Jeff) hangs bar magnets outside (or in Atrium) for activities #3, #5 and #6

Activity	Title and comments	Source	Time min	Clock Time
Activity #1	<i>What Kinds of Objects Are Attracted To a Magnet I?</i> Page 9 See Page 63 for note about “furry magnets.” (A metal point concentrates magnetic field) (Do not pass out Magnetism books until after Activity #4)	AAPT/PTRA	20	8:00 – 8:20 AM
Activity #2	<i>What Kinds of Objects Are Attracted To a Magnet II?</i> Page 11	AAPT/PTRA Magnets & Magnetism	20	8:20 – 8:40 AM
Activity #3	<i>How Can the Strength of Magnets Be Compared?</i> Page 14 Do Activities #3 and #4 together	AAPT/PTRA Magnets & Magnetism	45	8:40 – 9:05 AM
Activity #4	<i>Where Is a Magnet Strongest?</i> Page 18 (Pass out Magnetism books after Activity #4)			9:05 – 9:25 AM
Activity #5	<i>Which Way Is North?</i> Page 21 and 23 Do Activities #5 and #6 together outside room. Discuss inside. The whole magnetism Eureka series is on YouTube. https://www.youtube.com/watch?v=bht9AJ1eNYc	AAPT/PTRA Magnets & Magnetism	40	9:25 – 9:45 AM
Activity #6	<i>Do Magnets Affect One Another?</i> Page 23			9:45 – 10:05 AM
Activity #6	<i>Magnetism Song</i> Page 25 Pass out Magnetic Supplement	AAPT/PTRA Magnets & Magnetism	10	10:05 – 10:15 AM
Activity #6 Supplement Activity #2	<i>Where Are the Poles?</i> (Demonstration) Page 26 <i>Dancing Doll Exhibit</i> Page 27 Supplement <i>Refrigerator Magnets</i> Page 19	AAPT/PTRA Magnets & Magnetism and Supplement	30	10:15 – 10:45 AM
Activity #7	<i>What Can a Compass Be Used For?</i> Page 28 Whiteboard presentations after lunch.	AAPT/PTRA Magnets & Magnetism	25	10:45 – 11:10 AM
	<i>How does the battery know?</i>	Jim Minstrell, Facet Innovations	50	11:10 – Noon
	Lunch (On Your Own)		60	Noon – 1:00 PM
Activity #7	Presentation of whiteboards <i>What Can a Compass Be Used For?</i> Page 28	AAPT/PTRA Magnets & Magnetism	15	1:00 – 1:15 PM
Activity #8	<i>Where are the Earth’s Magnetic Poles?</i> Page 32	AAPT/PTRA Magnets & Magnetism	20	1:15 – 1:35 PM



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Activity	Title and comments	Source	Time min	Clock Time
Activity #8	<i>Where Are Earth's Magnetic Poles?</i> (Demonstration) Page 33 & 34 Magnetic Declination, Dip Angle and Magnetic field reversal Horizontal at equator and vertical at magnetic pole	AAPT/PTRA Magnets & Magnetism	20	1:35 – 1:55 PM
Activity #8	<i>Magnetic Bacteria</i> (The Science Teacher, April 1992) Page 36	AAPT/PTRA Magnets & Magnetism	5	1:55 – 2:00 PM
	<i>Teacher Reflection on Using APEX model Activities in Classrooms 2015-16: What Was Learned</i>	Dennis Sunal	60	2:00 – 3:00 PM
	<i>APEX Program Results 2015-16: What Was Learned</i>	Dennis Sunal	60	3:00 – 4:00 PM
	<i>Developing Expertise in Assessing Inquiry III</i>	Dennis Sunal	60	4:00 – 5:00 PM
		Total time =	540	

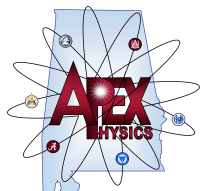


Alliance For Physics Excellence (APEX)
2016 Summer Institute Workshop – Cohort 2, Week 2
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Alabama A & M University

Tuesday June 28, 2016

Material person (Jeff) Heat and cool neodymium magnets for Activity ##13 in Supplement
 Material person (Jeff) Try Magnetic Supplement Activity #13.

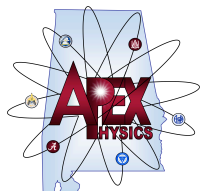
Activity	Title and comments	Source	Time min	Clock Time
Activity #9	<i>What Happens When Magnets Are Broken Or Cut?</i> Page 42	AAPT/PTRA Magnets & Magnetism	30	8:00 – 8:30 AM
Activity #9	<i>What's Wrong With these Pieces of a Magnet?</i> (Demonstration) Page 46	AAPT/PTRA Magnets & Magnetism	10	8:30 – 8:40 AM
Activity #10	<i>Can You Make a Model of a Magnet?</i> Page 47	AAPT/PTRA Magnets & Magnetism	30	8:40 – 9:10 AM
Activity #10	<i>Magnetic and Non-Magnetic Materials</i> (Demonstration) Page 51	AAPT/PTRA Magnets & Magnetism	10	9:10 – 9:20 AM
Activity #11	<i>How Can You Make a Magnet?</i> Page 52 Discuss Similar to Activity #10	AAPT/PTRA Magnets & Magnetism	10	9:20 – 9:30 AM
Activity #12 Supplement Activity #13	<i>How Can You 'Unmake' a Magnet?</i> Page 56, Discuss but do Activity #13 in Supplement. Temperature and Magnetic Strength. Supplement Page 57	AAPT/PTRA Magnets & Magnetism and Supplement	60	9:30 – 10:30 AM
Activity #12	<i>Which Nail Is the Magnet?</i> (Problem) Page 59	AAPT/PTRA Magnets & Magnetism	15	10:30 – 10:45 AM
Activity #13	<i>How Can You Study a Magnetic Field?</i> Page 65 Show 3-D magnet in a bottle	AAPT/PTRA Magnets & Magnetism	45	10:45 – 11:30 AM
TPACK	Content Management Systems	Marius Schamschula	30	11:30 AM to Noon
	Lunch (On Your Own)		60	Noon – 1:00 PM
Activity #13	Presentation of Whiteboard for Activity #13	AAPT/PTRA Magnets & Magnetism	15	1:00 – 1:15 PM
Activity #14	<i>What Is the Extent of a Magnet's Force?</i> Page 69	AAPT/PTRA Magnets & Magnetism	45	1:15 – 2:00 PM
Activity #15 Supplement Activity #1	<i>Exploring Strength of a Magnetic Field At Different Points</i> Page 71 Whiteboard Items #5 & #6 Supplement Activity #1 <i>Measuring Force Between Magnets</i> Discuss Only	AAPT/PTRA Magnets & Magnetism and Supplement	60	2:00 – 3:00 PM
Activity #16	<i>Can You Plot a Magnetic Field?</i> Page 74 (Magnetic Field 3-D Picture) Magnetic 3-D Field.jpg Two magnets & Compass per Group	AAPT/PTRA Magnets & Magnetism	60	3:00 – 4:00 PM
Activity #17	<i>What is The Magnetic Field About Two Magnets?</i> Page 79 Note: Discussion of Weber and Tesla in reading section on Page 83	AAPT/PTRA Magnets & Magnetism	60	4:00 – 5:00 PM
		Total time =	540	



Alliance For Physics Excellence (APEX)
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Alabama A & M University

Wednesday June 29, 2016

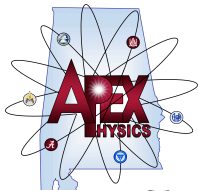
Activity	Title and comments	Source	Time min	Clock Time
Activity #17	<i>Review Worksheet – Strength of a Magnetic Field</i> Page 86 NOTE: In a MRI, $B = 0.5$ to 3.0 T	AAPT/PTRA Magnets & Magnetism	50	8:00 – 8:50 AM
Activity #18	<i>Are Magnetism and Electricity Related?</i> Page 88. There is a ppt on static charges and magnetism.	AAPT/PTRA Magnets & Magnetism	35	8:50 – 9:25 AM
Activity #19	<i>Does a Current Carrying Wire Affect a Magnet in its Vicinity? I</i> Page 90 (Mention that it exists, do not do it. Similar to activity 1.2 in CASTLE	AAPT/PTRA Magnets & Magnetism	15	9:25 – 9:40 AM
Activity #20 Supplement #11	<i>Does a Current Carrying Wire Affect a Magnet in its Vicinity? II</i> Page 96 Magnetic Supplement #11 <i>Magnet Song Wire</i>	AAPT/PTRA Magnets & Magnetism and Supplement	60	9:40 – 10:40 AM
Activity #20	<i>Use of Electrical Meters</i> Page 100 Discussion	AAPT/PTRA Magnets & Magnetism	20	10:40 – 11:00 AM
Activity #21 Supplement #9 & #10	<i>Does a Current Carrying Wire In the Shape of a Solenoid Affect a Magnet in its Vicinity?</i> Page 103 <i>Where to buy Air Core Solenoid</i> Supplement 9 <i>Drawing Solenoid</i> Supplement 10 <i>Magnet Song Coil</i>	AAPT/PTRA Magnets & Magnetism and Supplement	60	11:00 AM – Noon
	Lunch (On Your Own)		60	Noon – 1:00 PM
Activity #22	<i>The Magnetic Field Around a Current Bearing Wire.</i> Page 107 (Magnetic Flux and Induced <i>EMF</i> first half. $B = \Phi/A$) Reminder if angle is 45 degrees $B_{\text{earth}} = B_{\text{wire}}$	AAPT/PTRA Magnets & Magnetism	120	1:00 – 3:00 PM
Activity #23	<i>What is the Magnetic Field at the Center of a Square Loop?</i> Page 122	AAPT/PTRA Magnets & Magnetism	120	3:00 – 5:00 PM
Total time =			540	



Alliance For Physics Excellence (APEX)
2016 Summer Institute Workshop – Cohort 2, Week 2
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Thursday June 30, 2016

Activity	Title and comments	Source	Time	Clock Time
Activity #26 Supplement Activities #3, #5 #12, and #15	<i>Magnetic Forces on Current Carrying Wire</i> Page 139. Additional materials needed, not listed in book, are swing kit, Genecon, two kinds of motor models. Activity #3 <i>Cathode Ray Tube Demo</i> Page 23 Supplement Activity #5 Magnet Force Practice Diagrams Page 29 Supplement Activity #12 Motor Song Page 55 Supplement Activity #15 Cathode Ray Equations Page 69 Helmholtz Coil Demonstration If time	AAPT/PTRA Magnets & Magnetism Supplement	150	9:00 – 10:30 AM
Activity #25 Supplement #10	<i>Worksheet II - Magnetic Fields and Electrical Current</i> Page 133 Do this first, it is easier than Worksheet I Supplement Field Song #10 The velocity changes but the speed and KE do not change.	AAPT/PTRA Magnets & Magnetism Supplement	60	10:30 – 11:30 AM
TPACK	Presentation Techniques	Marius Schamschula	30	11:30 AM to Noon
	Lunch (On Your Own)		0	Noon – 1:00 PM
Activity #24	<i>Worksheet I - Electrically Induced Magnetic Fields</i> Page 129	AAPT/PTRA Magnets & Magnetism	60	1:00 – 2:00 PM
Activity #27	Electromagnetic Induction I Page 139 Use 2 V and one bar.	AAPT/PTRA Magnets & Magnetism	60	2:00 – 3:00 PM
Activity #27 Supplement #6 & #7	Electromagnetic Induction I Page 148 Supplement Activity #6 Magnetic Flux and Supplement Activity #7 Induced EMF	AAPT/PTRA Magnets & Magnetism and Supplement	60	3:00 – 4:00 PM
Activity #28	Start: Electromagnetic Induction II Page 156 Use 1 -2 V and one bar.	AAPT/PTRA Magnets & Magnetism	60	4:00 – 5:00 PM
		Total time =	480	



**Alliance For Physics Excellence (APEX)
2016 Summer Institute Workshop – Cohort 2, Week 2
Physics Teacher Institute (PTI) Activity Schedule
Alabama A & M University**

Friday July 1, 2016

Activity	Title and comments	Source	Time min	Clock Time
Activity #28	Finish: Electromagnetic Induction II Page 156	AAPT/PTRA Magnets & Magnetism	60	8:00 – 9:00 AM
Activity #29 Supplement #8	Worksheet on Magnetically Induced Electrical Currents Page 166 Supplement Activity #8 Transformers Magnetically Induced Electric Current Page 45	AAPT/PTRA Magnets & Magnetism and Supplement	120	9:00 – 11:00 AM
	Magnetism Equations Review		30	11:00 – 11:30 AM
Supplement #16	Electrical Distribution System	Magnetic Supplement #16	30	11:30 AM - Noon
Lunch Break	Lunch Provided.		60	
	Post Institute Survey		0	
	AAPT/PTRA Magnets & Magnetism Post Assessment	Eric Banilower & Kieth Esch Horizon Research, Inc.	60	1:00 – 2:00 PM
		Total time =	360	