

Pacing Guide

The *Pacing Guide* below is designed so that you have the option to complete the first eight chapters of *Active Physics* during the school year. The *Plan A Pacing Guide* allows the students to complete all the *Investigates*. If you are a new teacher, or unfamiliar with the program, you may have difficulty adhering to *Pacing Guide A*. *Pacing Guide B* suggests places where either time or equipment may be saved if it becomes necessary to complete the chapter in

the allotted time. To reach this goal, many of the investigations are teacher-led demonstrations rather than student-centered inquiry investigations. This will save time and require less equipment than the optimal inquiry-based instruction that the curriculum is intended to provide.

Note: Each “day” assumes a 45-minute class period, or one half of a 90-minute block.

Day	Plan A (small-group <i>Investigates</i>)	Homework (for Plan A and Plan B)	Day	Plan B (combination of whole-class and small-group <i>Investigates</i>)	Plan B Equipment Reduction
1	Scenario, Chapter Challenge, Chapter Overview, Scoring Rubric Section 1 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Students perform <i>Investigate</i> , Steps 1–3.	Read <i>Physics Talk</i> up to Coulomb’s law and answer the <i>Checking Up</i> Questions 1 and 3.	1	See Plan A.	
2	Review <i>Checking Up</i> questions. Students do <i>Investigate</i> Steps 4–9. Discuss <i>Physics Talk</i> . Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> .	Read the remainder of the <i>Physics Talk</i> and answer <i>Physics to Go</i> Questions 1, 3, 5, 7, 8–10, and 14–16.	2	See Plan A.	
3	Review the previous night’s <i>Physics to Go</i> . Section 2 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Do <i>Investigate</i> Steps 1 and 2.	Read <i>Section 2 Physics Talk</i> and answer <i>Checking Up</i> questions.	3	Review the previous night’s <i>Physics to Go</i> . Section 2 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Do the <i>Investigate</i> as a teacher demonstration. Discuss the <i>Physics Talk</i> . Search the Web for a simulation of the actual Millikan experiment to show the students. Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> .	Requires only one balance and one set of film canisters with pennies
4	Review <i>Checking Up</i> questions. Students do Step 3 of <i>Investigate</i> . Discuss <i>Physics Talk</i> . Search the web for a simulation of the actual Millikan experiment to show the students. Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> .	Answer <i>Physics to Go</i> Questions 1–6, 9, and 11.			
5	Review the previous night’s <i>Physics to Go</i> . Section 3 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Students do <i>Investigate</i> Steps 1–6.	Read <i>Physics Talk</i> and answer the <i>Checking Up</i> questions. For extra credit, do a search on Hans Geiger and report on his discoveries and inventions.	4	See Plan A.	

Day	Plan A (small-group <i>Investigates</i>)	Homework (for Plan A and Plan B)	Day	Plan B (combination of whole-class and small-group <i>Investigates</i>)	Plan B Equipment Reduction
6	Review <i>Investigate</i> Steps 1–6. Students do <i>Investigate</i> Steps 7–9. Review <i>Physics Talk</i> and <i>Checking Up</i> questions. Search the Web for a simulation of the actual Rutherford scattering to show the students.	Answer <i>Physics to Go</i> Questions 3, 4, 6–8, and 11.	5	See Plan A.	
7	Review the previous night's <i>Physics to Go</i> . Do <i>What Do You Think Now?</i> Section 4 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Students do <i>Investigate</i> Steps 1–5.	Read <i>Physics Talk</i> and answer <i>Checking Up</i> questions. For extra credit, search out absorption spectra and describe how scientists use this to identify the elements in stars.	6	Review the previous night's <i>Physics to Go</i> . Do <i>What Do You Think Now?</i> Section 4 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Do <i>Investigate</i> as a teacher demonstration along with calculations. Discuss <i>Physics Talk</i> .	Requires only one spectrum tube power supply and one set of spectrum tubes. A complete set of spectrometers should still be available for the class.
8	Review <i>Investigate</i> Steps 1–5. Students do <i>Investigate</i> Steps 6–8. Discuss <i>Physics Talk</i> and review <i>Checking Up</i> questions.	Answer <i>Physics to Go</i> Questions 1–3, 6–8, and 11.			
9	Review <i>Physics to Go</i> questions. Search the Web for a simulation of "models of the hydrogen atom" to show the students. Review <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> . Students start the <i>Mini-Challenge</i> .	Work on <i>Mini-Challenge</i> .	7	See Plan A.	
10	Students discuss <i>Mini-Challenge</i> products in their groups, and then present their work to the class.	Refine your <i>Mini-Challenge</i> presentations based on class feedback.	8	See Plan A.	
11	Section 5 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Students do <i>Investigate</i> Part A.	Read <i>Physics Talk</i> up to "Developing the Wave Particle Model of Electrons" and answer the <i>Checking Up</i> questions. Answer <i>Physics to Go</i> Questions 1 and 2.	9	Section 5 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Teacher does the <i>Investigate</i> as a demonstration, Discuss <i>Physics Talk</i> . Search for a simulation of the Photoelectric effect to show the students.	Requires only one laser, one single slit set, one diffraction, and one helical spring. A class set of tuning forks is recommended.
12	Students do <i>Investigate</i> Parts B and C. Discuss <i>Physics Talk</i> and review <i>Checking Up</i> questions. Search for a simulation of the Photoelectric effect to show the students.	Answer <i>Physics to Go</i> Questions 3–6, 8, and 11.			

Pacing Guide *(continued)*

Day	Plan A (small-group <i>Investigates</i>)	Homework (for Plan A and Plan B)	Day	Plan B (combination of whole-class and small-group <i>Investigates</i>)	Plan B Equipment Reduction
13	Review previous night's <i>Physics to Go</i> . Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> . Section 6 Do <i>What Do you See?</i> and <i>What Do You Think?</i> Students do <i>Investigate</i> Steps 1–6.	Read the <i>Physics Talk</i> and answer <i>Physics to Go</i> Questions 1–3.	10	See Plan A.	
14	Students do <i>Investigate</i> Steps 7–9 and the teacher discusses Steps 10–12. Discuss the <i>Physics Talk</i> , and do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> .	Answer <i>Physics to Go</i> Questions 4–11.	11	See Plan A.	
15	Review previous night's <i>Physics to Go</i> . Section 7 Students do <i>Investigate</i> Steps 1–7. Search the Web for a simulation on Alpha decay to show the students.	Read <i>Physics Talk</i> and answer <i>Checking Up</i> questions. Answer <i>Physics to Go</i> Question 1. For extra credit, do a Web or magazine search for a medical use of one particular radioactive isotope, and report on its use.	12	See Plan A.	
16	Students do <i>Investigate</i> Steps 8–14. Discuss <i>Physics Talk</i> and review <i>Checking Up</i> questions. Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> .	Answer <i>Physics to Go</i> Questions 2–5, and 9.	13	See Plan A.	
17	Review <i>Physics to Go</i> homework. Section 8 Do <i>What Do You See?</i> and <i>What Do You Think?</i> Students do <i>Investigate</i> .	Read <i>Physics to Go</i> , and answer <i>Checking Up</i> questions. Answer <i>Physics to Go</i> Questions 1 and 2.	14	See Plan A.	
18	Review <i>Physics Talk</i> and <i>Checking Up</i> questions. Review <i>Physics to Go</i> questions. Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> . Section 9 Do <i>What Do You See?</i> and <i>What Do You Think?</i>	Answer <i>Physics to Go</i> Questions 4, and 6–11.	15	See Plan A.	

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19	Review <i>Physics to Go</i> questions. Students do <i>Investigate</i> . Search the Web for a simulation of Nuclear Fission to show the students.	Read <i>Physics Talk</i> and answer <i>Physics to Go</i> Questions 2, 5, 7, and 9–12.	16	See Plan A.	
20	Review <i>Physics to Go</i> homework. Do <i>What Do You Think Now?</i> and <i>Reflecting on the Section and the Challenge</i> . The students start work on the <i>Chapter Challenge</i> .	Work on your <i>Chapter Challenge</i> .	17	See Plan A.	
21	Students work in groups on <i>Chapter Challenge</i> .	Finish work on your <i>Chapter Challenge</i> .	18	See Plan A.	
22	Students give presentations. Review for <i>Physics Practice Test</i> .	Study for <i>Physics Practice Test</i> .	19	See Plan A.	
23	<i>Physics Practice Test</i>		20	See Plan A.	

Implementation Chart

Hopefully, as you become more experienced and comfortable with the curriculum, you will shift to small-group *Investigates*. Accordingly, below is an *Implementation Chart* that suggests a three-year timetable to expand students' role in the chapter by having them do more of the *Investigates*. Although

this will require a slightly greater expenditure of time and more equipment, the benefits to the student will be manifest. Your goal should be to have the students complete almost all of the investigations rather than you having to provide the maximum opportunity for inquiry.

	Section 1 Investigate	Section 2 Investigate	Section 3 Investigate	Section 4 Investigate	Section 5 Investigate	Section 6 Investigate	Section 7 Investigate	Section 8 Investigate	Section 9 Investigate
Year 1	Small group	Whole class	Small group	Whole class	Whole class	Whole class	Small group	Whole class	Whole class
Year 2	Small group	Small group	Small group	Small group	Whole class	Small group	Small group	Whole class	Whole class
Year 3	Small group	Small group	Small group	Small group	Small group	Small group	Small group	Small group	Small group