

**Teacher's Guide to the
PSSC FILMS**

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FOREWORD

The Teacher's Guide for each film gives a summary of the film, a description of the experiments, and a reproduction of the pertinent data. Suggested topics for discussion are included, as well as clarification and amplification of some of the more subtle points. In many cases, the film arguments are extended. It is for the teacher to decide whether these points should be brought to the attention of the student. Because the films are part of the PSSC program, their scheduling is important. The Guide points out where each film best fits into the PSSC course.

The films do not glitter. There is no background music, and there are no elaborate stage settings. They present a number of real scientists, speaking in their individual ways to students, directing their attention to key points. The films are planned with attention to the general aims of the course and to the development of related ideas. They usually treat the course topics in more depth and discuss the topics from a different experimental approach. Generally, the films present experiments that most schools are not equipped to do. It has been demonstrated that when properly used they make it possible for the teacher to increase his effectiveness and efficiency in teaching the PSSC physics program. Indeed, the non-PSSC teacher will also find many of these films useful to his program.

There are 53 course films available. Each of them can serve different teachers in different ways - as an introduction, to teach a whole section, or as a review film. Most films are general in purpose and may use several experiments or models to develop a set of related ideas. Your selection from them depends on the text areas covered and the ability of your students, your own experience and background, and the facilities available at your particular school. Thus, in most cases it is impossible to designate one film as being more important than another.

Specific comments on some types of films and their use follow: Straight Line Kinematics can be used as an introductory film or a review film; experience has shown that students benefit immensely from the particular type of graphical analysis demonstrated. The traditional problems that arise in teaching the kinematics of circular motion are clarified to a great extent by the visual techniques employed in Vector Kinematics.

Parts II and III have introductory films, Introduction to Optics and Forces, each of which presents an array of phenomena needing explanation and suggests some of the central questions that are to be answered in that part of the course. Frames of Reference has excellent demonstrations which can be presented only on film. If you spend any time on this topic, your treatment will not be complete without the use of this film.

Pressure of Light and The Millikan Experiment both present an experiment crucial to the course and generally not available in student laboratories. This latter film is also the first of a series of six films ending with Electric Potential Energy and Potential Difference, which forms a carefully prepared and clearly presented discussion of the fundamental unit of charge and its role in the transformation of energy in electrical systems. The series of four films, Photons, Interference of Photons, Photoelectric Effect and Matter Waves, contributes a great deal to the presentation of

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the wave-particle description of nature. Many teachers have relied heavily on the films to carry the message of Part IV, because they do not have the apparatus that some of these electrical experiments demand, and they find Part IV difficult to schedule.

Even though you do not use a particular film, the Guide can serve as a valuable resource of topics for discussion in your class. It can also help in selecting films with which you are unfamiliar.

The main function of this Guide is to help the teacher achieve maximum benefit from the films and it has been written with this purpose in mind.

Acknowledgments

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James Strickland

PSSC FILMS

Film No.	FILM (running time in min.)	PRINCIPAL COVERAGE IN THE PSSC TEXT
0101	Time and Clocks (28)	Ch. 2
0102	Long Time Intervals (25)	Sec. 2-4
0119	Short Time Intervals (21)	Sec. 2-3, 4, 5
0103	Measuring Large Distances (29)	Sec. 3-1, 2
0104	Measuring Short Distances (20)	Sec. 3-3; 7-11
0106	Change of Scale (23)	Sec. 4-4
0107	Straight Line Kinematics (34)	Ch. 5
0108	Vectors (27)	Sec. 6-1, 2, 3, 4
0109	Vector Kinematics (16)	Sec. 6-5, 6; 21-5
0111	Elements, Compounds, and Mixtures (33)	Ch. 7B, 1st half of Ch. 8
0110	Definite and Multiple Proportions (30)	Sec. 8-1, 2, 3, 4
0113	Crystals (25)	Sec. 8-14, 15, 16
0115	Behavior of Gases (15)	Ch. 9
0116	Random Events (31)	Ch. 7C, 8 (General)
0105	Measurement (21)	Ch. 7, 8, 9 (General)
0201	Introduction to Optics (23)	Ch. 11, Intro. to Part II
0202	Pressure of Light (23)	Sec. 15-4
0203	Speed of Light (21)	Sec. 15-7
0204	Simple Waves (27)	Ch. 16 (Summary)
0207	Sound Waves in Air (35)	Ch. 18 (Summary of Waves)
0301	Forces (23)	Ch. 20, Intro. to Part III
0302	Inertia (26)	Sec. 20-1, 2, 3, 4
0303	Inertial Mass (19)	Sec. 20-5, 6
0304	Free Fall and Projectile Motion (27)	Sec. 21-1, 2, 3, 4
0305	Deflecting Forces (30)	Sec. 21-5
0306	Periodic Motion (33)	Sec. 21-8
0307	Frames of Reference (28)	Sec. 21-9, 10, 11
0310	Elliptic Orbits (19)	Sec. 22-5, 7, 8
0309	Universal Gravitation (31)	Sec. 22-7, 8, 9
0319	Collisions of Hard Spheres (19)	Lab. III-10
0318	Elastic Collisions and Stored Energy (27)	Sec. 24-5, 6, 7, 8; into Ch. 25
0311	Energy and Work (28)	Ch. 24, into Ch. 25
0312	Mechanical Energy and Thermal Energy (22)	Ch. 26
0313	Conservation of Energy (27)	Ch. 26
0403	Coulomb's Law (30)	Sec. 28-1, 3
0406	Electric Fields (25)	Sec. 28-1, 2, 3
0407	Electric Lines of Force (7)	Sec. 28-3
0404	Millikan Experiment (30)	Sec. 28-4, 5
0405	Coulomb Force Constant (34)	Sec. 28-6, 7
0408	Counting Electrical Charges in Motion (22)	Sec. 29-3, 4
0409	Elementary Charges and Transfer of Kinetic Energy (34)	Sec. 29-5
0430	EMF (20)	Ch. 29
0431-2	Electric Potential Energy and Potential Difference (Parts I & II) (54)	Ch. 29
0411	A Magnet Laboratory (21)	Sec. 30-1 through 30-7
0413	Mass of the Electron (18)	Sec. 30-8, 9
0412	Electrons in a Uniform Magnetic Field (11)	Sec. 30-8, 9
0415	Electromagnetic Waves (33)	Sec. 31-12
0416	The Rutherford Atom (40)	Sec. 32
0418	Photons (19)	Sec. 33-1
0419	Interference of Photons (13)	Sec. 33-3
0417	Photoelectric Effect (28)	Sec. 33-4, 5
0423	Matter Waves (28)	Sec. 33-8
0421	Franck-Hertz Experiment (30) with an epilogue by James Franck	Sec. 34-1, 2