Catalog of CONDUIT Reviewed and Tested Materials For Personal Computers: TRS-80, Apple, and PET

The continuing activity of CONDUIT is to search for and distribute computer-based learning materials for undergraduate instruction. Our materials are reviewed by content experts and, when possible, by instructors who have used the materials in the classroom. This review process identifies materials meriting the investment of the resources needed to package the materials for distribution.

CONDUIT *packages* provide instructors with the complete information and materials they will need to effectively use the unit: manuals for students, recommendations for using the materials in the classroom, and the software. CONDUIT staff thoroughly test the programs to verify substantive and technical performance and modify the programs to improve clarity of input and output and ease of use.

CONDUIT's packages for microcomputers are written specifically for these machines and require no modifications:

Apple II, Applesoft in ROM, DOS 3.2.1, 48K, diskette
Radio Shack TRS-80, Model 1, Level II BASIC, DOS, 32K, diskette
Commodore PET 2001, 8K OLD ROM and 16K NEW ROM, diskette or cassette

If additional information about a particular package is needed in making a decision to adopt, complete abstracts are available from CONDUIT. Buying a copy of the instructor and student manuals in advance of the software will also be helpful in making a decision. CONDUIT is unable to offer complimentary desk copies of our manuals. However, if you order a manual and later decide not to adopt the package, you may return the manual (within 30 days and in resaleable condition) and we will fully refund your money.

Sifting through CONDUIT's packages to locate the appropriate software for your machine can be confusing. To help you in this process we have divided the packages into two catalogs: (1) standard BASIC and FORTRAN packages (non-machine specific), and (2) microcomputer packages (for the TRS-80, Apple II, and PET 2001). The Standard Packages catalog begins on page 17.

The Fine Print:

Common Questions and Their Answers about Using CONDUIT's Materials for Microcomputers

How are CONDUIT's programs protected?

All CONDUIT materials are copyrighted which prohibits the purchaser from reproducing or redistributing the materials in part or in full without prior written permission from CONDUIT. Neither the printed materials nor the programs may be copied, with these exceptions: (1) the diskette or cassette may be copied only for backup, and (2) certain student handouts in instructors' manuals may be copied, where explicitly stated in the manuals.

How do I make copies for my students?

If additional copies of the programs are needed, you may buy extra copies of the software from CONDUIT for a nominal fee.

Are the programs purchased or leased from CONDUIT?

The customer purchases the programs for use on the computer designated on the order form. CONDUIT assures that the programs will operate as described and is available for consultation by phone concerning the materials up to six months from date shipped. (Please see the order form at the end of this catalog for a complete description of CONDUIT's software purchase agreement.)

Can we reproduce the materials for our school district?

Educational organizations that would like to reproduce CONDUIT materials for their constituency should contact CONDUIT for further information on possible redistribution arrangements.

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As a nonprofit organization we are unable to offer complimentary materials for review. However, we do have a demonstration kit for the Apple II that an educational organization may use or purchase. Please contact CONDUIT for details.

May we revise or extend the software to meet the needs of our school?

Yes, we strongly encourage you to adapt the software to your computer and curriculum.

Can we edit the programs so that they will operate on a different computer?

If CONDUIT does not presently offer a version for your microcomputer, you may request permission to rewrite the software. Permission will likely be granted and, in fact, we would be interested in reviewing the new version for possible distribution.

A Note to Apple II Users

We have had several complaints from people trying to use CONDUIT Apple diskettes on their newly purchased Apple microcomputers: the diskettes from CONDUIT won't "boot" on their computers. The cause of the problem is Apple's new Disk Operating System, DOS 3.3. As those who have converted their machines to the new operating system know, the old DOS 3.2.1 has a different diskette format. The principal difference between the diskette format for the old and new DOS is the number of sectors per track: 13 sectors for DOS 3.2.1 and 16 sectors for DOS 3.3. (More data is squeezed onto the same amount of diskette surface in the new 16-sector format.) If your Apple uses DOS 3.3, you must convert DOS 3.2.1 diskettes to run under DOS 3.3.

CONDUIT diskettes are written with DOS 3.2.1. To produce a working version of a CONDUIT diskette for DOS 3.3., follow this procedure:

Start up your Apple with the DOS 3.3 master diskette.
Put a blank diskette in your disk drive.
Type 'NEW'.
Type 'INIT regno',

where 'regno' is the registry number of the CONDUIT package. This will generate a disk with DOS 3.3 and a hello program named REGNO.

Re-insert the DOS 3.3 master diskette in the disk drive.
Run the MUFFIN program.*
Convert the CONDUIT diskette using the file name '='.

Be sure and replace the REGNO program when the MUFFIN program prompts you.

Keep the original (3.2.1) diskette as a backup.

Advance Warning to Owners of DOS 3.2.1

We expect to switch from DOS 3.2.1 to DOS 3.3 sometime this year, either in late Summer or early Fall. Because of the cost of producing diskettes, we will only be able to support one version of DOS for CONDUIT Apple diskettes. We will discontinue distributing 13-sector, DOS 3.2.1 diskettes. We are currently investigating the exact timing of the change, and welcome any comments or questions you may have.

*For a complete description of the MUFFIN program, consult *The DOS Manual* for DOS 3.3 published by Apple Computer Inc., page 191, "Using the MUFFIN Program."

Sample CONDUIT Abstract

Title ➤ SAMPLE CONDUIT ABSTRACT

Catalog number ➤ **Catalog #:** SAM235A
Topic: instructions

Courses where applicable ➤ **Suggested course:** Learning to Use the CONDUIT Catalog

Author, publishers, & date of publication ➤ **Author:** Molly Hepler, CONDUIT, 1980.

Statement of purpose and content of the materials. ➤ **Description:** The purpose of this unit is to help students understand. . .

What you get when you order the package. Always includes at least one copy of each manual and the software. ➤ **Package:** Five copies of Student Guide (30 pages), one copy of Instructor's Guide (50 pages), and software on diskette

The package price includes at least one copy of each manual. Additional copies are for students, the library, etc. Extra copies of the software are available only if you order the full package. ➤ **Price:** Package, $40.00; Add'l Instructor, $3.00; Add'l Student, $2.50; Add'l copy of software, $10.00

Apple II

Applesoft in ROM, DOS 3.2.1, 48K, diskette

Biology

COEXIST—Population Dynamics

Catalog #: BIO118A

Topic: population dynamics

Suggested course: Introductory Biology

Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit simulates two biological situations. In the first, up to three populations are modeled to grow independently on identical, limited food resources. The student can then investigate organisms competing only with members of their own species. The second simulates two populations in competition with each other for the same limited resources. In each situation the student controls a number of parameters such as initial population, number of offspring, generation times, initial and saturation points, and inhibiting factors which influence the outcome of species competition.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

COMPETE—Plant Competition

Catalog #: BIO182A

Topic: plant competition

Suggested course: Introductory Biology

Author: M.E. Leveridge, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This simulation enables students to plan and carry out investigations of interactions between flowering plants without the long delay usually associated with growth experiments. The unit includes investigations with both real and simulated plants, and other relevant data in the form of graphs, tables and descriptions. The seven investigations deal with effects of crowding on plant growth, measurement growth, simulated growth in a monoculture, interaction between clover varieties, simulated growth in a mixture, interaction below the ground, and direct plant interaction.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Computers in the Biology Curriculum

Catalog #: BIO205A

Topics: inheritance, predatory-prey relationships, pond ecology, transpiration, counter-current systems, human energy expenditure, statistics for biologists

Suggested course: General Biology

Authors: J. Denham, M.E. Leveridge, J.A. Trantor, and J. Pluck, Schools Council Project, Chelsea College, London, 1978

Description: These programs provide the facility for simulation gaming and model building, and computation and data retrieval. The documentation is provided in loose-leaf form so that the instructor may select and distribute specific desired pieces to students, thus giving total flexibility to the package. *Inheritance* simulates inheritance of characteristics for three species of animals (fruit flies, mice, humans) and one species of plant (tomatoes). Multifactorial inheritance can be simulated in the more complex version of the program. *Predator-Prey Relationships* is a simple model to support the students' study of interspecies relationships in ecosystems. *Pond Ecology* simulates a freshwater community consisting of five trophic levels: phytoplankton, herbivores, and fish. *Transpiration* simulates water loss by leaves. *Countercurrent Systems* simulates two types of systems found in the bodies of animals — exchangers and multipliers. *Human Energy Expenditure* contains data for men and women undertaking 72 different activities and allows students to explore human energy requirements in relation to activity, sex, and body mass. *Statistics for Biology* computes simple statistics for introductory level biology students: mean, standard deviation, and chi-square.

Package: Student and Instructor documentation combined (162 pages) and software on diskette

Price: Package, $95.00; Add'l Student/Instructor, $41.00; Add'l copy of software, $10.00

Ecological Modeling

Catalog #: BIO083A

Topics: ecology, ecosystem, population growth

Suggested courses: Introductory Ecology, General Biology

Authors: Wm. Reiners, Wm. Glanz, and S. Cornish (Project COMPUTe), CONDUIT, 1973

Description: This package introduces students to techniques for modeling ecological systems and processes on the computer. By controlling certain parameters, such as initial population size, growth rate, time length of the simulation, and others, students test hypotheses and predict results about ecosystems. Population growth is first considered as unlimited growth of a single species, using an analytical solution for the differential equations and then is considered using difference equations for incrementing growth. Additional factors introduced are environmental carrying capacity, random environmental factors, and competitive interaction between species. Each of these concepts builds toward the last program, a simulation of the growth and interactions of trophic levels within an arctic tundra ecosystem.

Package: Three copies of *User's Manual* (76 pages) and software on diskette

Price: Package, $65.00; Add'l User's, $4.00; Add'l copy of software, $10.00

ENZKIN—Enzyme Kinetics

Catalog #: BIO181A

Topic: enzyme kinetics

Suggested course: Biochemistry

Author: M.T. Heydemann, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit permits students to obtain realistic results using a computer program to simulate enzyme-catalyzed reactions. The introduction to the *Students' Notes* describes some of the features of enzyme-catalyzed reactions. In later sections, students are asked to plot progress curves and calculate initial velocities of reactions. Six enzymes with different properties are simulated.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

EVOLUT—Evolution and Natural Selection

Catalog #: BIO082A

Topics: natural selection, genetics

Suggested course: General Biology

Author: S. McCormick, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This introductory unit in evolution and population genetics is intended to teach (1) mechanisms generating variation and the selective process leading to adaptations, (2) adaptation to environmental conditions in relation to survival value, (3) manipulation of models of selection acting on populations, and (4) investigation of the power of selection in producing certain frequencies of alleles in a given environment and relation of adaptation to survival. Students select various parameters, such as zygote type, percent of green alleles, and number of generations, and observe the simulated process of natural selection and evolution.

Package: Six copies of *Students' Notes* (19 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

LINKOVER—Genetic Mapping
Catalog #: BIO122A
Topic: genetic mapping
Suggested courses: General Biology, Genetics
Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: Students plan and execute genetic mapping experiments to reinforce the concepts of linkage and crossing-over. Students specify a series of genetic crosses and from the resulting data build up a linkage map for ten genes of a hypothetical diploid species using the three-point testcross technique.
Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

TRIBBLES
Catalog #: BIO248A
Topic: scientific method
Suggested course: Introductory Biology
Authors: R. Von Blum and T.M. Hursh, Project SABLE, Lawrence Hall of Science, University of California, Berkeley, 1976
Description: This introductory unit on the scientific method consists of a written tutorial and a computer simulation. The tutorial presents students with a problem and guides them to its solution. The computer simulation provides the data for making observations and for forming tentative explanations and testing predictions. To eliminate the variable of background knowledge, the problem takes place on an alien planet inhabited by tribbles.
Package: Five copies of *Student Tutorial* (30 pages) and software on diskette
Price: Package, $35.00; Add'l Student, $3.00; Add'l copy of software, $10.00

Chemistry

HABER—Ammonia Synthesis
Catalog #: CHM199A
Topics: ammonia synthesis, Haber process
Suggested course: Introductory Chemistry
Authors: R. Edens and K. Shaw, Chelsea Science Simulation Project, Chelsea College, London, 1978
Description: This simulation allows students to study the Haber process and how the various conditions (temperature, pressure, catalyst and reactant concentration ratios) influence the course of the reaction (the time required to reach equilibrium and the equilibrium yield of ammonia).
Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

RKINET—Reaction Kinetics
Catalog #: CHM160A
Topic: chemical reaction kinetics, first and second order reactions, rate constants, concentrations
Suggested course: Introductory Chemistry
Author: A. W. B. Aylmer-Kelly, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: This simulation is intended to extend students' laboratory experience and understanding of reaction kinetics by enabling them to carry out a wider range of investigations. It will also help students understand the relationship between a mathematical model and reality. The model, based on data from real experiments, will broaden students' knowledge of first- and second-order reactions, rate constants, concentrations, and the effect of variation of temperature on reaction rate.
Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (10 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Humanities

Practicando Español con La Manzana II
Catalog #: HUM278A
Topics: Spanish verbs and vocabulary
Suggested courses: Introductory Spanish, Intermediate Spanish (for review)
Author: Robert Phillips (Miami of Ohio University), CONDUIT, 1980
Description: These computer-assisted instruction materials in Spanish provide (1) verb drills covering virtually all tenses of Spanish verbs (excluding the perfect subjunctive and the future and conditional perfects), and (2) vocabulary drills which can be keyed to any textbook of the instructor's choice. The drills are appropriate at all levels of Spanish language courses from the seventh grade through second-year college whenever students need drill in vocabulary (English to Spanish) or in verb forms. Students can use the drills as soon as they learn to read and write vocabulary items and verb tenses.
Package: *Instructor's Guide* (30 pages) and software on two diskettes
Price: Package, $100.00; Add'l Instructor, $3.00; Add'l copy of software, $20.00

Mathematics

Algebra Drill & Practice I
Catalog #: MTH229A
Topics: algebraic signs, operations with numeric and algebraic fractions, percents, equations of lines, simplification of algebraic expressions, word problems
Suggested courses: Elementary Algebra, Intermediate Algebra, College Algebra, Remedial Algebra
Authors: R.C. Detmer (Western Kentucky University) and C.W. Smullen (University of Tennessee at Chattanooga), CONDUIT, 1979
Description: This package will enable instructors to provide drill, practice, and help for students of algebra with little direct instructor involvement. Once the student knows how to manage the technical details of using the computer, the programs provide all the guidance necessary. The programs provide virtually unlimited example problems and their detailed, step-by-step solutions. Nine drills covering the topics listed above are included.
Package: *Instructor's Manual* (90 pages) and software on diskette
Price: Package, $125.00; Add'l Instructor, $4.00; Add'l copy of software, $10.00

Elementary Numerical Techniques for Ordinary Differential Equations
Catalog #: MTH227A
Topic: numerical solutions for ordinary differential equations
Suggested courses: Differential Equations (Introductory, Elementary, Computational, Applied)
Author: John L. Van Iwaarden (Hope College), COMPress, Wentworth, New Hampshire, 1980
Description: This package is intended to supplement standard one-semester courses in ordinary differential equations at the sophomore or junior level. This supplement makes it possible to insert numerical methods and exercises in the standard course as the analytic tools become available. The objective is to develop analytic and numerical methods hand-in-hand, so that each reinforces the other, and so that students can solve more realistic problems and develop a broader repertoire. Topics covered are Euler's and improved Euler's methods, Runge-Kutta and predictor-corrector methods, series solutions, systems of equations, and the methods of Milne and Hamming. Programs are provided for getting started on each topic; some exercises call for students' modifications of the programs. The *Student Manual* includes an excellent selection of both routine and realistic problems.
Package: *Student Manual* (207 pages), *Instructor's Manual* (35 pages) and software on diskette
Price: Package, $75.00; Add'l Student, $7.95; Add'l Instructor, $1.00; Add'l copy of software, $10.00

Physics

Group Velocity
Catalog #: PHY280A
Topics: group velocity, superposition, wave motion
Suggested courses: Quantum Mechanics, Introductory Physics
Author: Eric T. Lane (University of Tennessee at Chattanooga), CONDUIT, 1980
Description: In this program for the Apple II, students use game paddles to control wave velocity and wave length to demonstrate a traveling sine wave and two

types of wave groups by controlling wave velocity and group velocity. Students select values for frequency, time and wave number to display velocity, oscillation, cosine waves, moving waves, and group waves.

Package: *Student Guide* (10 pages) and software on diskette

Price: Package, $45.00; Add'l Student, $2.50; Add'l copy of software, $10.00

INTERP—Wave Superposition

Catalog #: PHY183A

Topics: wave superposition, diffraction patterns

Suggested course: Introductory Physics

Author: John Harris, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit on wave superposition is designed to improve students' understanding of the use of models in physics using the wave theory of light. The *Students' Notes* provide information to guide students through three investigations of interference and diffraction phenomena using the computer program. The simple model of the program calculates the intensity due to the superposition of radiation from two sources, or two slits, each having two secondary sources. The complex model allows students to investigate the effects of the number of secondary sources in each slit.

Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Introductory Mechanics for the Apple II

Catalog #: PHY354A

Topics: Newton's Second Law, harmonic oscillator, motion of particles in two dimensions

Suggested course: Introductory Physics

Authors: Alfred Bork, Arthur Leuhrmann, J. Robson, Wayne Lang, John Merrill, Herbert Peckham, and Harold Peters, CONDUIT, 1981

Description: This package epitomizes the simplicity and power of applying the computer to solving problems in physics. The materials focus on the application of the Second Law to the simple harmonic oscillator and to the motion of particles in two dimensions, under the influence of uniform fields or one or more force centers. The materials emphasize problem solving: students start with some example programs and make modifications to meet their specific needs. The exercises and examples use graphics throughout.

Package: *Student Guide* (30 pages) and *Instructor Guide* (35 pages) and software on diskette

Price: Package, $45.00; Add'l Student, $3.00; Add'l Instructor, $3.00; Add'l copy of software, $10.00

NEWTON—Satellite Orbits

Catalog #: PHY130A

Topics: Newton's Laws, gravitation, velocity

Suggested course: Introductory Physics

Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit is designed to help students achieve an appreciation of how the application of Newton's Second Law and Law of Gravitation lead to the prediction of satellite orbits. The computer program on which the unit is based uses an iterative method to calculate the path of a projectile launched horizontally. The student is instructed to find the initial velocity needed for the minimum (circular) orbit.

Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

SCATTER—Nuclear Scattering

Catalog #: PHY129A

Topic: nuclear scattering

Suggested course: Introductory Physics

Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: Because of the experimental difficulties in performing certain nuclear scattering investigations, models of three experimental situations have been programmed for computer simulation. The programs give students experience in deducing the size, shape and force law of a single scattering center, and the scattering of alpha particles by a metal foil.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (17 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Psychology

Laboratory in Cognition and Perception

Catalog #: PSY224A

Topics: cognition and perception, experimental research and design, human information processing

Suggested courses: Experimental or Cognitive Psychology, Experimental Design and Statistics, General Psychology, Introduction to Mental Processes, Human Memory, Learning and Conceptual Processes, Psychology of Thinking, Laboratory in Cognition and Perception

Authors: Michael Levy, et al. (University of Florida), CONDUIT, 1979

Description: This package exposes students to a variety of phenomena, theoretical points of view, techniques and experimental designs. The package may be used as a vehicle to demonstrate the use of between-subject, within-subject, and mixed designs; explore the methodological decisions of a researcher; and extend students' knowledge of the processes and phenomena in contemporary human experimental psychology. The experiments included in the package are (1) Method of Constant Stimuli (Müller-Lyer), (2) Signal Detection (Green-Swets), (3) Span of Apprehension (Sperling), (4) Iconic Memory (Sperling), (5) Feature Detection (Neisser), (6) Pattern Interpretation (Posner), (7) Retrieval from STM (Sternberg), (8) Short-Term Forgetting (Brown-Peterson), (9) Comparing Visual and Semantic Information (Chase-Clark), (10) Concept Learning (Levine), and (11) Reasoning from Prose (Frase-Griggs).

Package: Five copies of *Student Guide* (100 pages), one copy of *Instructor Guide* (100 pages) and software on diskette

Price: Package, $125.00; Add'l Student, $5.50; Add'l Instructor, $8.00; Add'l copy of software, $10.00

Sociology

Demo-Graphics

Catalog #: SOC164A

Topics: demography, population growth and change

Suggested courses: Demography, Population Studies, Introduction to Sociology, World History, Public Administration

Author: Population Dynamics Group, University of Illinois, Urbana, 1978

Description: These programs can be used to present current and historical demographic data for many nations; project multi-national populations given current trends; and facilitate understanding of demographic dynamics and the impact of both real and simulated factors affecting the growth of world populations. The programs include 1980 data on population, fertility, and mortality for 24 countries. The materials are suitable for students just beginning to learn the outlines of the population/resource relationship as well as for graduate students who are ready to attempt computer simulations to test hypotheses about the effects of various demographic variables.

Package: *User's Manual* (120 pages), *Instructor's Notes* (13 pages), and software on diskette

Price: Package, $85.00; Add'l User's Manual, $3.50; Add'l copy of software, $10.00

SAMP—Survey Sampling

Catalog #: SOC221A

Topics: survey sampling, public opinion, social science research, statistics

Suggested courses: Research methods or statistics in any social science discipline, especially sociology and political science; public opinion and social survey courses

Author: G. Nigel Gilbert (University of Surrey, England), CONDUIT, 1981

Description: Using this simulation students can put into practice the theory and procedures for sampling and compare and discuss the merits of four different sampling designs: simple random, stratified, cluster, and quota-sampling. Students select the design and the number of respondents; the program "samples" the population and reports back the results of administering the survey. Students can conduct as many surveys as they choose, varying the sample size and design and exploring the effects of these factors on the precision of the results. The program also reports information on

the costs of administering the surveys so that students can see the financial implications of their choices.

Package: *Instructor's Guide* and software on diskette

Price: Package, $65.00; Add'l Instructor, $3.00; Add'l copy of software, $10.00

Statistics

Exploratory Data Analysis

Catalog #: STA324A

Topics: data analysis, exploratory data analysis

Suggested courses: Data Analysis, Applied Statistics, Research Methods

Authors: Paul Velleman (Cornell University) and David Hoaglin (Abt Associates), Duxbury Press, Boston, 1981

Description: These programs accompany the authors' book *Applications, Basics, and Computing of Exploratory Data Analysis*. The programs analyze data according to EDA techniques and would be useful in any course in which EDA is taught. Methods included in the package are stem and leaf displays, letter-value displays, boxplots, x-y plots, resistant lines, data smoothing, coded table displays, median polish, and two-way tables. The book presents selected basic techniques of exploratory data analysis, illustrates their application to real data, and explains the accompanying program from this software package.

Package: One copy of book, *Applications, Basics, and Computing of Exploratory Data Analysis* and software on diskette

Price: Package, $150.00; Add'l Student, $15.00. (Multiple copies of this text for class use should be purchased directly from the publishers to obtain bookstore discounts.); Add'l copy of software, $10.00

Descriptive Statistics

Catalog #: STA114A

Topics: tabular analysis, graphic analysis, measures of central tendency, measures of dispersion

Suggested courses: Descriptive Statistics, Introductory Statistics

Author: Harrison D. Weed, Jr. (Project COMPUTe), COMPress, Wentworth, New Hampshire, 1978.

Description: This package provides supplementary materials to standard textbooks for precalculus statistics and probability courses. The student manual discusses several methods of describing and summarizing raw data. Students use the programs and data sets to practice applying these methods. Concepts discussed in the manual include data types, frequency distributions and their graphical representations, measures of location, and measures of dispersion.

Package: *User's Guide* (56 pages) and software on diskette

Price: Package, $75.00; Add'l Student, $5.95; Add'l copy of software, $10.00

TRS-80

Model I, 32K Level II BASIC, diskette

Biology

COEXIST—Population Dynamics

Catalog #: BIO118T

Topic: population dynamics

Suggested course: Introductory Biology

Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit simulates two biological situations. In the first, up to three populations are modeled to grow independently on identical, limited food resources. The student can then investigate organisms competing only with members of their own species. The second simulates two populations in competition with each other for the same limited resources. In each situation the student controls a number of parameters such as initial population, number of offspring, generation times, initial and saturation points, and inhibiting factors which influence the outcome of species competition.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

COMPETE—Plant Competition

Catalog #: BIO182T

Topic: plant competition

Suggested course: Introductory Biology

Author: M.E. Leveridge, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This simulation enables students to plan and carry out investigations of interactions between flowering plants without the long delay usually associated with growth experiments. The unit includes investigations with both real and simulated plants, and other relevant data in the form of graphs, tables and descriptions. The seven investigations deal with effects of crowding on plant growth, measurement growth, simulated growth in a monoculture, interaction between clover varieties, simulated growth in a mixture, interaction below the ground, and direct plant interaction.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Ecological Modeling

Catalog #: BIO083T

Topics: ecology, ecosystem, population growth

Suggested courses: Introductory Ecology, General Biology

Authors: Wm. Reiners, Wm. Glanz, and S. Cornish (Project COMPUTe), CONDUIT, 1973

Description: This package introduces students to techniques for modeling ecological systems and processes on the computer. By controlling certain parameters, such as initial population size, growth rate, time length of the simulation, and others, students test hypotheses and predict results about ecosystems. Population growth is first considered as unlimited growth of a single species, using an analytical solution for the differential equations and then difference equations for incrementing growth. Additional factors introduced are environmental carrying capacity, random environmental factors, and competitive interaction between species. Each of these concepts builds toward the last program, a simulation of the growth and interactions of trophic levels within an arctic tundra ecosystem.

Package: Three copies of *User's Manual* (76 pages) and software on diskette

Price: Package, $65.00; Add'l User's, $4.00; Add'l copy of software, $10.00

ENZKIN—Enzyme Kinetics

Catalog #: BIO181T

Topic: enzyme kinetics

Suggested course: Biochemistry

Author: M.T. Heydemann, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit permits students to obtain realistic results using a computer program to simulate enzyme-catalyzed reactions. The introduction to the *Students' Notes* describes some of the features of enzyme-catalyzed reactions. In later sections, students are asked to plot progress curves and calculate initial velocities of reactions. Six enzymes with different properties are simulated.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

EVOLUT—Evolution and Natural Selection
Catalog #: BIO082T
Topics: natural selection, genetics
Suggested course: General Biology
Author: S. McCormick, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: This introductory unit in evolution and population genetics is intended to teach (1) mechanisms generating variation and the selective process leading to adaptations, (2) adaptation to environmental conditions in relation to survival value, (3) manipulation of models of selection acting on populations, and (4) investigation of the power of selection in producing certain frequencies of alleles in a given environment and relation of adaptation to survival. Students select various parameters, such as zygote type, percent of green alleles, and number of generations, and observe the simulated process of natural selection and evolution.
Package: Six copies of *Students' Notes* (19 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

LINKOVER—Genetic Mapping
Catalog #: BIO122T
Topic: genetic mapping
Suggested courses: General Biology, Genetics
Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: Students plan and execute genetic mapping experiments to reinforce the concepts of linkage and crossing-over. Students specify a series of genetic crosses and from the resulting data build up a linkage map for ten genes of a hypothetical diploid species using the three-point test-cross technique.
Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Chemistry

HABER—Ammonia Synthesis
Catalog #: CHM199T
Topics: ammonia synthesis, Haber process
Suggested course: Introductory Chemistry
Authors: R. Edens and K. Shaw, Chelsea Science Simulation Project, Chelsea College, London, 1978
Description: This simulation allows students to study the Haber process and how the various conditions (temperature, pressure, catalyst and reactant concentration ratios) influence the course of the reaction (the time required to reach equilibrium and the equilibrium yield of ammonia).
Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

RKINET—Reaction Kinetics
Catalog #: CHM160T
Topic: chemical reaction kinetics, first and second order reactions, rate constants, concentrations
Suggested course: Introductory Chemistry
Author: A. W. B. Aylmer-Kelly, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: This simulation is intended to extend students' laboratory experience and understanding of reaction kinetics by enabling them to carry out a wider range of investigations. It will also help students understand the relationship between a mathematical model and reality. The model, based on data from real experiments, will broaden students' knowledge of first- and second-order reactions, rate constants, concentrations, and the effect of variation of temperature on reaction rate.
Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (10 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Mathematics

Syllogistic Logic
Catalog #: MTH268T
Topics: syllogistic logic, categorical propositions, Venn diagrams
Suggested courses: Introductory Logic, Augmentation and Debate
Authors: O. Kem Luther and Cliff Coon (Eastern Mennonite College), CONDUIT, 1980
Description: These three drill and practice programs for the TRS-80 will help students gain a working knowledge of syllogistic logic. Once the concepts in the *Student Manual* have been mastered, students can use the programs to practice identifying the four types of categorical propositions, Venn diagramming, and constructing categorical syllogisms.
Package: *Student Manual* (10 pages), *Instructor Guide* (8 pages), and software on diskette
Price: Package, $50.00; Add'l Student, $2.00; Add'l Instructor, $2.00; Add'l copy of software, $10.00

Physics

INTERP—Wave Superposition
Catalog #: PHY183T
Topics: Wave superposition, diffraction patterns
Suggested course: Introductory Physics
Author: John Harris, Chelsea Science Simulation Project, Chelsea College, London, 1976
Description: This unit on wave superposition is designed to improve students' understanding of the use of models in physics using the wave theory of light. The *Students' Notes* provide information to guide students through three investigations of interference and diffraction phenomena using the computer program. The simple model of the program calculates the intensity due to the superposition of radiation from two sources, or two slits, each having two secondary sources. The complex model allows students to investigate the effects of the number of secondary sources in each slit.
Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

NEWTON—Satellite Orbits
Catalog #: PHY130T
Topics: Newton's Laws, gravitation, velocity
Suggested course: Introductory Physics
Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: This unit is designed to help students achieve an appreciation of how the application of Newton's Second Law and Law of Gravitation leads to the prediction of satellite orbits. The program uses an iterative method to calculate the path of a projectile launched horizontally. The student is instructed to find the initial velocity needed for the minimum (circular) orbit.
Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (11 pages), and software on diskette
Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

SCATTER—Nuclear Scattering
Catalog #: PHY129T
Topic: nuclear scattering
Suggested course: Introductory Physics
Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975
Description: Because of the experimental difficulties in performing certain nuclear scattering investigations, models of three experimental situations have been programmed for computer simulation. The programs give students experience in deducing

the size, shape and force law of a single scattering center, and the scattering of alpha particles by a metal foil.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (17 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Political Science

United States Energy, Environment and Economic Problems

Catalog #: POL126T

Topics: public policy process, environmental policy

Suggested course: American Government

Author: Barry Hughes, American Political Science Association, Washington, D.C., 1975

Description: Using this simulation students can study the formation of public policy through the interaction of the U.S. economy, energy supply and demand, and the physical environment. The model of public policy used in the simulation is composed of (1) societal group and individual values and goals; (2) government structures and processes; and (3) the nonpolitical environment (economy, physical environment, and energy system). The program contains data modeling the third element, thus allowing students to examine various models representing the first and second elements and their implications in the area of environmental issues.

Package: Five copies of *Student Manual* (52 pages), one copy of *Instructor's Notes*, and software on diskette

Price: Package, $50.00; Add'l Student, $5.00; Add'l Instructor, $2.00; Add'l copy of software, $10.00

Psychology

Laboratory in Cognition and Perception

Catalog #: PSY224T

Topics: cognition and perception, experimental research and design, human information processing

Suggested courses: Experimental or Cognitive Psychology, Experimental Design and Statistics, General Psychology, Introduction to Mental Processes, Human Memory, Learning and Conceptual Processes, Psychology of Thinking, Laboratory in Cognition and Perception

Authors: Michael Levy, et al. (University of Florida), CONDUIT, 1979

Description: This package exposes students to a variety of phenomena, theoretical points of view, techniques and experimental designs. The package may be used as a vehicle to demonstrate the use of between-subject, within-subject, and mixed designs; explore the methodological decisions of a researcher; and extend students' knowledge of the processes and phenomena in contemporary human experimental psychology. The experiments included in the package are (1) Method of Constant Stimuli (Müller-Lyer), (2) Signal Detection (Green-Swets), (3) Span of Apprehension (Sperling), (4) Iconic Memory (Sperling), (5) Feature Detection (Neisser), (6) Pattern Interpretation (Posner), (7) Retrieval from STM (Sternberg), (8) Short-Term Forgetting (Brown-Peterson), (9) Comparing Visual and Semantic Information (Chase-Clark), (10) Concept Learning (Levine), and (11) Reasoning from Prose (Frase-Griggs).

Package: Five copies of *Student Guide* (100 pages), one copy of *Instructor Guide* (100 pages) and software on diskette

Price: Package, $125.00; Add'l Student, $5.50; Add'l Instructor, $8.00; Add'l copy of software, $10.00

Sociology

Change Agent

Catalog #: SOC097T

Topics: change agent, diffusion of innovation

Suggested courses: Social Psychology, Mass Communications, Social Change

Author: Charles Weinberg (Stanford University), CONDUIT, 1976

Description: This simulation/game helps students understand the role of a change agent and the strategies used to accomplish diffusion of innovation. Students develop and implement (via the computer program) a strategy for influencing change in a hypothetical farm community. Seven diffusion strategies, such as using newspapers or the radio to create knowledge of the innovation, are available.

Package: *Student Manual* (14 pages), *Instructor's Guide* (30 pages), and software on diskette

Price: Package, $35.00; Add'l Student, $2.00; Add'l Instructor, $3.00; Add'l copy of software, $10.00

PROFIS: Programs for Introductory Sociology

Catalog #: SOC156T

Topics: methodology, contingency tables, correlation measures, Yule's Q, linear multiple regression, growth curves, curve models

Suggested courses: Introductory Sociology, Social Problems, Introductory Methods/Statistics

Author: George Conklin (North Carolina Central University), CONDUIT, 1978

Description: These brief tutorials combine relevant content areas and introductory methodology in simple, easy-to-use homework assignments. *Profis I* uses the world population problem to explore the relationship between birth rate and indicators such as per capita income by summarization in contingency tables and correlation measures. *Profis II* uses the concept of correlation between crime and social indicators such as poverty, city finances, and population density, to predict crime through linear multiple regression. *Profis III* illustrates the use of growth curves in the context of urbanization.

Package: *Instructor's Notes* (17 pages) and software on diskette

Price: Package, $40.00; Add'l Instructor, $3.00; Add'l copy of software, $10.00

PET 2001

8K, OLD and NEW ROM, diskette or cassette

Biology

COEXIST—Population Dynamics

Catalog #: BIO118P

Topic: population dynamics

Suggested course: Introductory Biology

Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit simulates two biological situations. In the first, up to three populations are modeled to grow independently on identical, limited food resources. The student can then investigate organisms competing only with members of their own species. The second simulates two populations in competition with each other for the same limited resources. In each situation the student controls a number of parameters such as initial population, number of offspring, generation times, initial and saturation points, and inhibiting factors which influence the outcome of species competition.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

COMPETE—Plant Competition
Catalog #: BIO182P
Topic: plant competition
Suggested course: Introductory Biology
Author: M.E. Leveridge, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This simulation enables students to plan and carry out investigations of interactions between flowering plants without the long delay usually associated with growth experiments. The unit includes investigations with both real and simulated plants, and other relevant data in the form of graphs, tables and descriptions. The seven investigations presented deal with effects of crowding on plant growth, measurement growth, simulated growth in a monoculture, interaction between clover varieties, simulated growth in a mixture, interaction below the ground, and direct plant interaction.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (11 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Ecological Modeling
Catalog #: BIO083P
Topics: ecology, ecosystem, population growth
Suggested courses: Introductory Ecology, General Biology
Authors: Wm. Reiners, Wm. Glanz, and S. Cornish (Project COMPUTe), CONDUIT, 1973

Description: This package introduces students to techniques for modeling ecological systems and processes on the computer. By controlling certain parameters, such as initial population size, growth rate, time length of the simulation, and others, students test hypotheses and predict results about ecosystems. Population growth is first considered as unlimited growth of a single species, using an analytical solution for the differential equations and then difference equations for incrementing growth. Additional factors introduced are environmental carrying capacity, random environmental factors, and competitive interaction between species. Each of these concepts builds toward the last program, a simulation of the growth and interactions of trophic levels within an arctic tundra ecosystem.

Package: Three copies of *User's Manual* (76 pages) and software (specify diskette or cassette)

Price: Package, $65.00; Add'l User's, $4.00; Add'l copy of software, $10.00

ENZKIN—Enzyme Kinetics
Catalog #: BIO181P
Topic: enzyme kinetics
Suggested course: Biochemistry
Author: M.T. Heydemann, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit permits students to obtain realistic results using a computer program to simulate enzyme-catalyzed reactions. The introduction to the *Students' Notes* describes some of the features of enzyme-catalyzed reactions. In later sections, students are asked to plot progress curves and calculate initial velocities of reactions. Six enzymes with different properties are simulated in the computer program.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (15 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

EVOLUT—Evolution and Natural Selection
Catalog #: BIO082P
Topics: natural selection, genetics
Suggested course: General Biology
Author: S. McCormick, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This introductory unit in evolution and population genetics is intended to teach (1) mechanisms generating variation and the selective process leading to adaptations, (2) adaptation to environmental conditions in relation to survival value, (3) manipulation of models of selection acting on populations, and (4) investigation of the power of selection in producing certain frequencies of alleles in a given environment and relation of adaptation to survival. Students select various parameters, such as zygote type, percent of green alleles, and number of generations, and observe the simulated process of natural selection and evolution.

Package: Six copies of *Students' Notes* (19 pages), one copy of *Teachers' Guide* (11 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

LINKOVER—Genetic Mapping
Catalog #: BIO122P
Topic: genetic mapping
Suggested courses: General Biology, Genetics
Author: P.J. Murphy, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: Students plan and execute genetic mapping experiments to reinforce the concepts of linkage and crossing-over. Students specify a series of genetic crosses and from the resulting data build up a linkage map for ten genes of a hypothetical diploid species using the three-point testcross technique.

Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Chemistry

Chemistry Laboratory Simulations
Catalog #: CHM254P
Topic: kinetics, Bohr atom, oxidation-reduction, titration
Suggested course: Introductory Chemistry
Authors: William Butler and Henry Griffin (University of Michigan), CONDUIT, 1979

Description: This package of four programs provides valuable supplementary treatment of topics that often cause difficulty for introductory chemistry students. Students use *Titration* to investigate some of the general problems encountered in a typical strong-acid/strong-base titration. *Kinetics* allows students to calibrate a typical analytical instrument for the monitoring of a chemical reaction and then to study the factors that affect the rate of the reaction. *Redox*, a simulation of oxidation-reduction reactions, acquaints students with the type of experimental evidence and analysis needed to rank a group of reagents (metals) in order of their power as reducing agents. *Bohr Atom* simulates the Bohr model of one-electron hydrogen-like atoms and gives students a better understanding of the nature of electrostatic attraction forces in an atom by investigating the behavior of an electron about a positively charged nucleus.

Package: *User's Manual* (60 pages) and software (specify diskette or cassette)

Price: Package, $40.00; Add'l User's, $2.75; Add'l copy of software, $20.00

HABER—Ammonia Synthesis
Catalog #: CHM199P
Topics: ammonia synthesis, Haber process
Suggested course: Introductory Chemistry
Authors: R. Edens and K. Shaw, Chelsea Science Simulation Project, Chelsea College, London, 1978

Description: This simulation allows students to study the Haber process and how the various conditions (temperature, pressure, catalyst and reactant concentration ratios) influence the course of the reaction (the time required to reach equilibrium and the equilibrium yield of ammonia).

Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages) and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

RKINET—Reaction Kinetics

Catalog #: CHM160P

Topic: chemical reaction kinetics, first and second order reactions, rate constants, concentrations

Suggested course: Introductory Chemistry

Author: A. W. B. Aylmer-Kelly, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This simulation is intended to extend students' laboratory experience and understanding of reaction kinetics by enabling them to carry out a wider range of investigations. It will also help students understand the relationship between a mathematical model and reality. The model, based on data from real experiments, will broaden students' knowledge of first- and second-order reactions, rate constants, concentrations, and the effect of variation of temperature on reaction rate.

Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (10 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

Mathematics

Matrix Algebra

Catalog #: MTH267P

Topics: elementary matrix operations (addition, subtraction, scalar and matrix multiplication, inversion), solution of systems of equations

Suggested courses: Matrix Algebra, Linear Algebra, Finite Mathematics, Business Mathematics

Author: A. P. Steward (Sunderland Polytechnic, England), CONDUIT, 1980

Description: This package consists of a sequence of CAI units designed for the Commodore PET. The units are essentially self-contained and take the student step-by-step from the definition of a matrix through all the elementary operations. For each operation, the definition and several examples are given, then a drill-and-practice dialogue follows, using randomly generated problems. The package could be used as a supplement in any course using matrices or as self-study.

Package: Instructor's Manual (30 pages) and software (specify cassette or diskette) Note: cassette copy requires two cassettes.

Price: Package, $50.00; Add'l Instructor, $3.00; Add'l copy of software, $20.00

Physics

NEWTON—Satellite Orbits

Catalog #: PHY130P

Topics: Newton's Laws, gravitation, velocity

Suggested course: Introductory Physics

Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: This unit is designed to help students achieve an appreciation of how the application of Newton's Second Law and Law of Gravitation leads to the prediction of satellite orbits. The computer program on which the unit is based uses an iterative method to calculate the path of a projectile launched horizontally. The student is instructed to find the initial velocity needed for the minimum (circular) orbit.

Package: Six copies of *Students' Notes* (10 pages), one copy of *Teachers' Guide* (11 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

SCATTER—Nuclear Scattering

Catalog #: PHY129P

Topic: nuclear scattering

Suggested course: Introductory Physics

Author: J. Harris, Chelsea Science Simulation Project, Chelsea College, London, 1975

Description: Because of the experimental difficulties in performing certain nuclear scattering investigations, models of three experimental situations have been programmed for computer simulation. The programs give students experience in deducing the size, shape and force law of a single scattering center, and the scattering of alpha particles by a metal foil.

Package: Six copies of *Students' Notes* (15 pages), one copy of *Teachers' Guide* (17 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00

INTERP—Wave Superposition

Catalog #: PHY183P

Topics: wave superposition, diffraction patterns

Suggested course: Introductory Physics

Author: John Harris, Chelsea Science Simulation Project, Chelsea College, London, 1976

Description: This unit on wave superposition is designed to improve student's understanding of the use of models in physics using the wave theory of light. The *Students' Notes* provide information to guide students through three investigations of interference and diffraction phenomena using the computer program. The simple model of the program calculates the intensity due to the superposition of radiation from two sources, or two slits, each having two secondary sources. The complex model allows students to investigate the effects of the number of secondary sources in each slit.

Package: Six copies of *Students' Notes* (11 pages), one copy of *Teachers' Guide* (15 pages), and software (specify diskette or cassette)

Price: Package, $35.00; Add'l Student, $1.50; Add'l Teacher, $1.50; Add'l copy of software, $10.00