

CENTER OF GRA VITY- 01 Group Activity Kit Item

Comments: I removed the price part from the original.

Grades 9 through 12 13 Experiments 20 kits with Manuals are provided in a sturdy plastic box with 5 compartments, where the parts can be saved after

experimentation

* For Class of 32 students, suggested Group Kit Distribution 4 Groups of 8 students perform Experiments 1 through 13
Each Group divided into 4 Teams, Each Team uses 4 Kits and Manuals in Compartments 1 through 4 in the Box
The Teacher utilizes 4 Kits and Manuals in 5" compartment Detailed suggested kit distribution provided in kit

Since 2 students share one kit (pans in bag in each compartment) at any given time during experimentation, and have the freedom to exchange parts, this Kit provides parts for individual experimentation. Also, all the experiments are performed by 16 Two- Student Teams simultaneously; the entire Class of Students can practically perform 13 experiments. Time per student to complete 13 experiments is estimated at approximately 4 hours.

Kit Description

This kit explores the concept of Center of Gravity. (CG) and illustrates how the CG of various thin laminates can be determined. Students are provided with geometric cutouts of various figures like the square, rectangle, rhombus, oval and etc. for the purpose. Each team of 2 students works on the problem using the manual provided. After the above, they are also asked to cut out certain shapes not provided in the kit and then determine the CG of these shapes. Additionally, they are asked to find the CG of certain components in the kit.

The accent in design of this kit has been low-cost with maximum utility.



CENTER OF GRA VITY -02 Group Activity Kit (Boxes A and B) Item

Comments: I removed the price part from the original.

Grades 9 through 12 20 kits with Manuals are provide, 10 in Box A and 10 in Box B (5 compartments per Box where the parts can be saved after

experimentation)

17 Experiments

* For Class of 32 students, suggested Group Kit Distribution 4 Groups of 8 students perform Experiments 1 through 17, sharing the kits in Boxes A and B

Each Group divided into 4 Teams, Each Team uses 4 Kits and Manuals in Compartments I through 4 in Boxes A and B

The Teacher utilizes 4 Kits and Manuals in 5" compartment of Box A and Box B

Detailed suggested kit distribution provided in kit

Since 2 students share 1 kit (compartment parts) at any given time and can exchange parts, this leads to individual experimentation.

All 17 experiments are performed by 16 two-student teams simultaneously, covering the entire class. Time for completion is approximately 4 hours.

Kit Description:

This kit expands on CG-01.

Experiments 1 through 6 relate to States of Equilibrium, Stable, Unstable and Neutral Equilibrium. Each student handles parts like steel washers, balloons, funnels and a cylindrical box to illustrate Equilibrium, states. Experiments 7 through 13 establish the relationship between Center of Gravity and the Base of Support. In Experiments 14 15 and 16, the concept of Stability is further explored with additional parts, and a seemingly unstable assembly is attempted in Experiment 16. Finally, the students' skills are tested in Experiment 17, in the assembly of a Tightrope Walker, utilizing about a dozen parts to create a stable fixed and moving assembly Teams of 2 students work on the experiments using the instruction manual. Manual includes stimulating questions after many of the experiments.

This is a Maximum utility-low cost kit, ideal for classroom science.

DO-IT-YOURSELF BELL & BUZZER KIT
Comments:
Grades 5 through 12
This kit explores the working of the electric bell and the electric buzzer. Students and teachers can build the bell utilizing the solenoid, its core the baseboard, the hammer and the bell gong with other parts of the kit. The electric circuit for the working bell is explained to facilitate easy wiring of the bell. A schematic diagram links the mechanical operation of the bell with the repeated interruption of current flow in the circuit in a regular manner, explaining the "make" and "break" principle, resulting in the hammer striking the gong.
This kit operates on two size D batteries.
 Batteries are not provided with the kit.
ELECTRIKIT Item # Comments:
Grades 6 through 12 This versatile kit consisting of more than 40 components and a fully illustrated instruction manual helps the teacher and students explore the exciting world of electricity, permanent magnetism, electro-magnetism, electrolysis, etc. The latter part of the experimental process involves the building of dynamic working models to illustrate the actual applications of the principles taught in the former part. In effect, this kit is a comprehensive study of the principles of electricity, magnetism and electromagnetism, and shapes the participant in the art of science model assembly. The Electrikit orients the student towards practical science projects in a methodical and graded manner. The kit operates on three size D batteries. Batteries are not provided with the kit.

<image/>	ELECTRONICS KIT Item # Comments: Grades 5 through 12 Students explore the fascinating –world of electronics, utilizing an integrated circuit chip (IC555). This kit is also known as the CHIP-CHAP Kit, and offers more than 100 exciting 'hands-on ' electronic experiments. This kit helps unravel the mysteries of a seemingly complex electronic world of today. To help familiarize circuitry with the actual parts, in a few cases, pictorial diagrams are included. Assemble oscillators, flashers, timers, keyboards, fire alarms, burglar alarm, transmitters, and numerous circuits easily and effectively with the unique spring - loaded 'snap-on' terminals provided in the kit, eliminating the soldering process. Students learn to use the color identification codes for components, laying the foundation for future electronic experimentation. The CHIP-CHAP instruction manual provides easy instructions and wiring circuit diagrams to enable effective assembly of its components. The kit operates on 4 size D batteries. Batteries are not included in the kit.
<image/>	EMR-2 kit - Electromagnetism Item # Comments: Grades 9 through 12 62 Experiments This kit is an extremely versatile and comprehensive treatment of Electromagnetism, with a total of 62 dynamic "hands-on" experiments. EMR-2 offers a multitude of exciting experiments at a very reasonable price and is a cost-effective teaching aid in the field of study of solenoids, electromagnets and galvanometer, apart from the application of electromagnetic principles to working models of relays, lifting electromagnets, and an electric hammer. It introduces the participant to the technological applications of electromagnetism principles. The principles of working of maglev trains, electric doorbells and loudspeakers, etc. are also explained. The manual is very exhaustive and well illustrated in covering all the 62 dynamic experiments. The EMR- is one of the most versatile and inexpensive kits/or both the teacher and student.





HPKE GA2 Electronics Group Activity Kit Item

Comments:

Grades 10 through 12 39 Experiments

Use this kit after the use of HPKE GA1, which is the Primer.

This Cost-effective kit introduces the student to the Integrated Circuit Chip, the 1C 555 Timer

The student wires more complex circuits than in HPKE-GA1. Contains 5 kits in plastic box with 5 compartments where the parts can be saved after experimentation.

For Class of 32 students, suggested Group Kit Distribution: 4 Groups of 8 students perform Ex. I through 39. Each Group using parts in Compartments 1 through 4.

Time per Group to complete 39 experiments approx. 20 - 35 hours, (depends on class / student situation)

The Teacher utilizes parts in 5th compartment with the Instruction manual. Extra manuals and kit parts can be shipped at additional cost if required by Teacher.

Parts: IC555, resistors, capacitors, LEDs, Dual-colored LED, LDR, transistor, diode, breadboard, connector, battery holder, push button switch, potentiometer, etc. Manual details resistor color code, circuit diagrams and information on electronic parts as well as the IC555 Timer circuitry.

20 size 'C9 batteries (not included) required to operate the 5 Group kits in the Box.



HPKE GA3 Electronics Group Activity Kit

Comments:

Grades 10 through 12 20 Experiments

Use this kit after HPKE GA1, which is the Primer. More complex circuits than HPKE GA1 and HPKE-GA2. Contains 5 kits in plastic box with 5 compartments where the parts can be saved after experimentation. For Class of 32 students, suggested Group Kit **Distribution:** 4 Groups of 8 students perform Ex. I through 20, each Group using parts in Compartments 1 through 4. The Teacher utilizes parts in 5th compartment with the Instruction manual. Extra manuals and kit parts can be shipped at additional cost if required by Teacher. Time (Approx.) to complete 20 experiments 20 - 35 hours, (depends on class / student situation Parts: 2 breadboards, IC555 Timer, loudspeaker, several resistors, capacitors, LEDs, LDR (photocell), battery holder, potentiometer. Experiments include Oscillators & Metronomes, Electronic Keyboards and Motorbikes, Flashers, Timing Tests. Continuity checkers, etc. The Speaker provides the audio effect in this exciting kit. 20 size 'C' batteries (not included) required to operate the **5** Group kits in the Box.



HPKE-01 Electronics Kit Item # Comments:

> Grades 9 through 12 43 Experiments

The kit trains the student in **breadboard wiring.**

HPKE-01 utilizes about 40 components, which include an Integrated Circuit chip (IC555 Timer), several resistors, capacitors, LEDs, an LDR (photocell), a transistor, a diode, breadboards, a connector, bulb, bulb holder, batter} holder, push button switch, potentiometer, and screwdriver, etc.

Through the first 25 experiments, the student explores the functions of resistors, capacitors, transistors, diodes, LEDs, LDRs and associated electronic components utilizing the assembly of several exciting circuits. This section provides the requisite background for the advanced -wiring circuits that follow.

The latter 18 experiments use the IC555, which include many exciting circuits including Flasher circuits. Light sensitive alarms. Timing tests. Liquid level indicators, and a Touch-Operated device, among others.

The instruction manual is elaborate, providing circuit diagrams and information on electronic components as well as the IC555 Timer circuitry. **Voltage Drops** are explored, besides calculations of **Effective Resistance** of resistors connected in series and in parallel.

Works on 4 "C" Batteries. Batteries not included.

· · · · · · · · · · · · · · · · · · ·	HPKE-02 Electronics Kit
	Item #
	Comments:
	Commonts.
Hards-On Electronics !	Grades 10 through 12
	46 Experiments
	Approximately 40 components, include the IC555
	Timer, resistors, capacitors, LEDs, (dual colored
and the second s	LED), LDR (photocell), transistors (NPN / PNP), diode, push
INVEATIONAL INCOM	button switches, 2 breadboards, a connector, bulb, bulb holder.
	battery holder, potentiometer, screwdriver, etc.
	The kit trains the student in breadboard wiring .
Hands-On Electronitie a Anne a	0
E - D BAA	The first 25 experiments are identical to HPKE-01, which
	makes this kit independent of HPKE-01. The remaining 21
	experiments utilize the IC555 Timer, different from
	HPKE-01. They explore Strength Testers, Short and Long
	Duration Timers, Touch Operated Timers, Two-Level flashers,
	experiments with LDR and Dual colored LED, and the PNP
	transistor provided in the kit.
	The instruction manual is elaborate, with circuit diagrams, and
	a wealth of information on electronic components and the
	IC555 Timer circuitry.
	Voltage Drops in electronic circuits are explored,
	(also 'short-circuits') besides calculations of
	Effective Resistance of resistors connected in series and in
	parallel.
	Works on 4 "C" Batteries. Batteries not included.



HPKE-03 Electronics Kit Item # Comments:

Grades 10 through 12 45 Experiments

This kit features a **loudspeaker** in addition to the various other components listed below. The speaker provides the audio experience in addition to the visual effects in the experiments. About 40 components, and the IC555 Timer, loudspeaker, resistors, capacitors, LEDs, an LDR (photocell), NPN transistor, diode, switch, breadboards, connector, bulb, bulb holder, battery holder, potentiometer, screwdriver, etc. Instruction manual is well illustrated.

The first 25 experiments are identical to HPKE=01 and HPKE-02. The remaining 20 experiments utilize the IC555 Timer chip, different from HPKE-01 and HPKE-02.

Exciting projects include Oscillators and Metronomes of various types, Electronic Organ assemblies, Electronic Motorbikes, Flashers, Timing tests, Continuity checker.

Voltage Drops and 'short circuits' are explored, besides calculations of **Effective Resistance** when resistors are connected in series and in parallel.

Works on 4 "C" Batteries, not included.

DYNALAB PORTABLE OPTICS LAS	Junior Optics Kit
THERE	Item #
Active and a second sec	Comments:
DEPIESON DI LENT	
- JUNION	
	LITE LAB
LÎTE LAB	Item #
	Comments:
Management and a second se	Explore optics in a comprehensive manner utilizing this
A M Dynam	versatile kit, consisting of about 115 components.
	You have prisms, mirrors, filters, lenses, a light bulb, and a
	host of important components to perform 37 experiments.
	Topics covered include the following, among others:
	Shadows, images, experiments with various lenses and
	combinations; the working of the human eye, eyeglasses,
	astronomical and Galilean telescopes, microscopes; the laws of
	reflection, refraction, diffraction, total internal reflection in the
	prism, dispersion, the spectrum, its separation; interference,
	Students and teachers will find this an invaluable teaching tool
	in optics. The instruction manual is fully illustrated and a
	convenient plastic box is provided to house the components of the kit



MAG-LITE KIT Item # Comments:

Students can perform 20 experiments and learn all about the fundamentals of electric current flow, permanent magnetism and electrolysis. Starting with a single bulb and a very simple electric circuit, they progress step by step into assembly of switches in the circuit, series and parallel circuits, and conductors and insulators. The section on magnetism explores permanent magnets, lines of force, 'like' and 'unlike' poles, attraction, repulsion and the magnetic effect of an electric current. The section on electrolysis explores the conductivity of water, ways of finding the positive and negative terminals utilizing the electrolyte and finally electrolyzing potassium iodide solution.

A fully illustrated instruction manual guides the student through these 20 exciting experiments.

	MOTORKIT
	Item #
Engineering made exciting	Comments:
	In a total of 31 dynamic experiments, the Motorkit explores the assembly and working of many kinds of Direct Current Motors. Fleming's Left Hand Rule, which is the fundamental principle of operation of the motor, is very clearly illustrated in a unique way, and reinforces the concept in an analytic manner. Both teacher and student would be thoroughly motivated by the dynamic rotation of different kinds of rotors provided. With numerous ways of wiring of the stator and rotor circuits to the battery system, the topic of motors is covered substantially. To summarize, the kit includes a machine wound rotor, a wound bipolar rotor and a simple coil rotor all utilized effectively with the permanent magnet or wound stators to navigate the different combinations of circuitry. The experiments range from the Tri-polar motor, the Bi-polar motor, the Simple coil motor, Shunt and Series motors, Speed control of different kinds of motors and Exercises on some of the experiments to stimulate the critical thinking required in the practical solution of problems in the field of circuits and motors.
	The Motorkit is accompanied by an exhaustive, illustrated instruction manual to cover the entire range of 31 experiments.
	The kit operates on 2 size D batteries
	Batteries are not included in the kit
	Batteries are not meruded in the kit.
	SOL-MAG GROUP ACTIVITY SET
	Item #
	Comments:





HPK SOUND -02 Group Activity Kit Item

Comments:

Grades 9 through 12 20 kits with Manuals provided are contained in a sturdy plastic box with 5 compartments where the parts can he saved after experimentation 13 Experiments

* For Class of 32 students, suggested Group Kit Distribution 4 Groups of 8 students perform Experiments I through 14
Each Group divided into 4 Teams, Each Team uses 4 Kits and Manuals in Compartments 1 through 4 in the Box
The Teacher utilizes 4 Kits and Manuals in 5th compartment

Detailed suggested kit distribution provided in kit

Since 2 students share one kit (parts in bag in each compartment) at any given time during experimentation, and have the freedom to exchange parts this kit provides parts for individual experimentation. Also, all the experiments are performed by 16 Two- student Teams simultaneously, the entire Class of Students can practically perform 14 experiments. Time per student to complete 14 experiments is estimated at approximately 4 hours.

Kit Description

This kit initiates students through a series of 14 Hands-on experiments and provides a further understanding of the phenomenon of Sound beyond **HPK SOUND-01**. Experiments include the fabrication of tubular musical instrument, the generation of different frequencies of sound using different tube lengths, the fabrication of a **string instrument**, a **reed instrument**, the variations of sound produced in them, experiments with different kinds of whistles and sounds produced using balloons.

The final experiments are the fabrication of a Spinner and the variety of Sounds capable of being produced using mechanical force impulses of a bead on a plastic strip. In addition to the above, there are **thought-provoking** and **stimulating** questions on the subject for the students after many of the experiments.

The accent in design of this kit has been low-cost with maximum utility.

	Electric Circuits (Wire-it-Yourself kit)
	Item # EC1
	Comments:
	15 experiments
	This H-0-P-E-S Program Kit on Electric Circuits explores the
	fundamental concepts of current flow with switches and bulbs
	 in the circuits. In a series of 15 or more experiments outlined below, the student learns to wire the circuit in several ways, to produce different results. The process of Hands-On experimentation results in a quick grasp of the essentials in building a variety of circuits and drawing schematic diagrams. A special feature of this kit is the Questions and Exercises section highlighted in italics. This feature tests student proficiency and also encourages independent exploration beyond the scope of the 15 experiments. The emphasis is on a Dynamic Hands-On approach to sustain interest and achieve the skill and versatility in wiring circuits. The spring loaded snap-on connection feature enables easy connections between components. Uses two "D" batteries. Note: Batteries are not provided with the kits
	ELECTROMAGNETISM
	Item # EMR
	Comments:
LUMERAL HARAF	5 experiments Explores the practical application of electromagnetic principles to assemblies of a switching relay and lifting of weights after experiments that illustrate solenoid action. In additional experiments, the principles of magnetic repulsion and the heating effect of an electric current using a simple lamp circuit are also investigated. Schematic diagrams included. The total number of experiments is 5.
	Uses two "D" batteries. Note: Batteries are not provided with the kits

WINDMILL ATTRACTION MOTOR
Item # WAM
Comments:
Explores the assembly of an attraction type electric motor, using a simple wire-wound commutator to 'make' (switch ON) and 'break' (switch OFF) the electromagnet in the circuit, attracting the blades of the steel 'windmill' rotor and causing rotation, (this is different from #TPM, the Tri-Polar Motor) The experiment involves the assembly of the commutator, the rotor, the brush system and the electromagnet on the base plate, besides the electrical connections and the mechanical adjustments to make the motor work. Schematics included. Uses two "D" batteries. Note: Batteries are not provided with the kits
1
Force & Motion / Air Pressure Item # FMAP Comments:
Topics covered Force & Motion12 Concept of Force and Motion, Straight line Motion, Action and Reaction, Principles of Jet Propulsion, Newton's Third Law of Motion - Assembly/Working of Air-powered Car3. Concept of Force and Motion, Circular Motion, Centripetal Force, Action and Reaction - Newton's Third Law of Motion4. Concept of Force and Motion, Circular Motion, Centripetal Force, Gravitational Force, Planetary Motion, Satellite Motion around the Earth 5. Concept of Force and Motion, Energy, Distance, Time and Speed, Car Assembly and working to illustrate the above concepts, Calculation of speed
1-5 Concept of Air Speed / Air pressure Principle, Airplane Lift Each kit is also provided with illustrated instructions.



MOTOR ACTION DEMONSTRATOR Item # MOD Comments:

10 experiments

The Motor Action Demonstrator is, as the name suggests, a demonstration kit that illustrates very clearly how a nonmagnetic conductor moves in a magnetic field when an electric current flows through it, in accordance with Fleming's Left Hand Rule in Electromagnetism. The 10 experiments are supplemented with Questions and Exercises to ensure a thorough study of Fleming's Rule. The method of working of an electric motor is conveyed dramatically, by including a readily assembled tri-polar rotor which the teacher or student assembles into the magnet system. This provides an instant recognition of the similarities between the basic experiments (Experiments 1 through 5) and Experiments 6 through 10 using the tri-polar rotor, enabling the concept of Fleming's Rule to be translated into actual application. To our knowledge, our kit design is unique in design and experimental process, enabling effective visualization of the three axes of current, field and motion "AS IS". Our model does not involve angular motion of the conductor that generally makes it more difficult to understand the direction of motion with respect to the field and current directions. The High School or Junior High School teacher and student would certainly find this kit exciting and useful in the laboratory and class.

Uses two "D" batteries. Note: Batteries are not provided with the kits

	MOTOD_CENEDATOD SET
	WOIOR-GENERAIOR SEI
	Comments:
	4 experiments
	Explores the practical applications of:
	* Electric motors through assemblies of a flexible coupling,
	friction drive, and a friction-drive car.
	* Electrical generators through the assembly of a motor-
	generator coupled set
	The motor is fed with bettery current and the generator lights
	up the bulb. Two motors are used to perform a total of A
	avagiments. The functions and applications of both motors
	experiments. The functions and applications of both motors
	and generators are explained in the summaries.
	Uses two "D" batteries.
	Note: Batteries are not provided with the kits
	TRI-POLAR ELECTRIC MOTOR
	Item # TPM
	Comments:
THE FOLLAN LILLETHIC MOTOR UNIT 199	
	4 experiments
	Explores the working of an electric motor using two
	permanent magnets to create a bi-polar stator and a ready-
	wound tri-polar rotor.
	The brush system is simplified to a two-wire brush system that
	leads current into the commutator.
	Uses one "D" batteries.
	Note: Batteries are not provided with the kits
	ELECTRICITY & MAGNETISM
COLUMN TO A COLUMNTA A COLUMN TO A COLUMN TO A COLUMNTA A COLUMN TO A COLUMNTA A COLUMN TO A COLUMNTA A	Item # TPM
	Comments:
HERE LARGE AND ADDRESS	Total 15 experiments
A second se	Topics covered
	I 1-5 (5 experiments)
	Magnetism, Permanent Magnets, Earth's Magnetism,
	Magnetic Compass, Magnetic Attraction and Repulsion.
	Magnetic Poles, Exercises on Identification of North. South
	East and West Directions, utilizing the Compass
	I 6-11 (6 experiments)
	Magnetism Permanent Magnets Properties of Rar and Ring
	Magnets Direction Finders Magnetic Attraction and
	Population Magnetic Polog Exercises on Magnetic Statistics
	Repuision, Magnetic Poles, Exercises on Identification of

Magnetic Polarities of Bar and Ring Magnets.
I 12-15 (4 experiments)
Current Electricity, The Battery as a Source of Electrical
Power, Basic Electric Circuit, Current Flow, Identification
of Conductors, Insulators, Heating / Lighting Effects of the
Electric Current, Circuit Diagram and Switching concepts.
Extensive wiring of Electric Quiz and Additional Project.
Item # E & M consists of 3 kits. Each of the 3 kits
corresponds to I 1-5, I 6-77, I 12-75, and is packaged
separately within the main box. Each kit is also provided with
illustrated instructions.