

COMPUTER CONTROL



COMPUTER CONTROL

Grades 4 - 6

Using the K'NEX Computer Control set, students will assume the role of teams of designers working for an Engineering Design firm. Over the course of the lessons students take on five major projects. The projects each include construction, design, redesign, programming, linear programming challenges, branched logic and programming challenges as well as determining the individual and combined costs of the projects. This is truly an integrated approach to STEM education in the classroom. This Teacher's Guide outlines a series of 5 comprehensive lessons that introduce students to computer control technology, writing programs to operate models, and rigorous content in science, technology, engineering, and mathematics. The objectives for each lesson highlight what students will learn and the processes they will use to meet those objectives. Science process skills, the engineering design process, the core concepts of technology, science inquiry, and the role of invention and innovation in technology are emphasized throughout the lessons. Build and control K'NEX models using control interface with memory!

Key Concepts

- Exploratory and Discovery Learning • Active engagement to find solutions
- Critical Thinking & Problem Solving • Systems and Organization
- Design and alter machine operations to meet stated needs
- Forces, Energy & Motion • Design Process/Engineering Design Process
- Communicate Mathematical thinking • Sequential thinking and patterns
- Invention and Innovation • Troubleshooting and Optimization
- Testing, evaluating and modifying

Set Details

- Builds 5 fully-functioning replicas of realworld machines, one at a time.
- Supports 2 – 3 students working as a team.
- Includes 699 K'NEX parts along with K'NEX Interface and Computer Control Software, 2 motors, 3 LEDs, 1 Buzzer, 2 Push Button Switches, 2 Reed Switch, 4 Magnets, building instructions and a teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards included including Common Core Mathematics and Next Generation Science Standards.
- Compatible with interactive whiteboards.
- PC Compatible

KNX79018 MSRP \$709.99 **\$399.99**

DNA REPLICATION & TRANSCRIPTION SET

BONUS - Teachers guide on CD now included with every DNA set !



Grades 5 - 12

DNA REPLICATION & TRANSCRIPTION SET

The set is designed to aid in teaching the structure and function of the nucleic acid molecules that make up DNA (deoxyribonucleic acids) and RNA (ribonucleic acids).

The Teacher's Guide provides lessons designed to take students through three instructional modules:

- I. DNA Structure
- II. Replication & Transcription
- III. Coding, Translation, and Mutations

Excellent demonstration tool at the elementary school level. The curriculum is aligned to National Science Education standards for grades 5 – 12.

Key Concepts

- Molecular basis of heredity • Chemistry of DNA • DNA Structure
- The Double Helix • Enzymatic Control of DNA Processes
- Semi conservative Replication of DNA
- Transcription and mRNA Production • Translation of the DNA Code
- Deletion, Substitution, and Insertion Mutations
- Nuclear and Cytoplasmic Processes of DNA

Set Details

- Builds 19 DNA and mRNA models, up to two at a time!
- Supports 2 – 3 students working as a team. 521 pieces
- Building instructions and comprehensive teacher's guide included.
- Aligned to National Standards including Next Generation
- Comes packaged in a strong, plastic storage case with dividers and locking lid

KNX78780 Dna Single Set MSRP \$71.99 **\$46.87**
Each DNA set now includes teacher guide on CD (19.99 value)

MAKERS KITS

MAKER KIT - BASIC



MAKER KIT - LARGE



MAKER KIT - WHEELS



MAKER KIT - SIMPLE MACHINES



Make learning more exciting and fun with the K'NEX Education Makers Kit Simple Machines, the perfect K'NEX solution for your makerspace! Put children on a path towards a fundamental understanding of STEAM/STEM subjects.

MAKER KIT - BASIC

- 400+ assorted parts that click together to build anything your students can imagine! 50 unique building ideas included
 - Enough parts for 2-6 students. Building ideas appropriate for children ages 6 and up
 - Mix and match the pieces to build a T-rex, airplane, snow boarder, off-road rover and so much more
 - Building with K'NEX puts children on a path towards a fundamental understanding of STEAM/STEM subjects.
 - Comes packaged in strong plastic storage case
- KNX78496 MSRP \$49.99 **\$36.47**

MAKER KIT - LARGE

- 863 assorted parts that click together to build anything your students can imagine! 100 unique building ideas included
 - Enough parts for 6-12 students. Building ideas appropriate for children ages 6 and up
 - Mix and match the pieces to build an ambulance, a guitar, a space shuttle, and so much more
 - Comes packaged in strong plastic storage case.
- KNX78497 MSRP \$89.99 **\$69.48**

MAKER KIT - WHEELS

- 442 assorted parts that click together to build anything your students can imagine! Build up to 11 different types of wheeled wonders
 - Enough parts for 8-12 students. Building ideas appropriate for children ages 8 and up
 - Include plenty of wheels plus 3 types of motors to power their creations - a battery-powered motor, spring motor, and fly-wheel motor
 - Comes packaged in strong plastic storage case
- KNX78498 MSRP \$109.99 **\$89.97**

MAKER KIT - SIMPLE MACHINES

- 597 assorted parts that click together to build anything your students can imagine! Building ideas for 22 simple machine models included
 - Enough parts for 6-12 students. Building ideas appropriate for children ages 8 and up • Suspension Technology • Keystone • Abutments and Anchorages
 - Special parts include differently sized gears, pulley wheels, and flexible rods to build a paddle boat, crank fan, wheelbarrow, and more
 - Comes packaged in strong plastic storage case
- KNX78499 MSRP \$109.99 **\$89.97**

ENERGY, MOTION & AERONAUTICS

ENERGY, MOTION & AERONAUTICS

The K'NEX Education Energy, Motion & Aeronautics allows students to investigate a variety of concepts related to Newton's Laws and aeronautics. These concepts include aeronautics as it applies to force and motion as well as the effects on individuals who work and live in space. The teacher's guide follows a modified version of the 5E instructional model – Engage, Explore, Explain, Elaborate, and Evaluate. Students will use the Scientific Inquiry and the Engineering Design Processes extensively throughout the lessons as they explore, create, invent, and innovate. Lessons include worksheets, key terms, design briefs, design challenges, research and design logs, and rubrics.

Key Concepts:

- Problem Solving and Experimentation
- Data collection, graphing and analysis Forces, Energy and Motion
- Newton's Laws Ratios and Proportions
- The Design Process/Engineering Design Measurement
- Systems and Organization Models and Prototypes
- Testing, Evaluating and Modifying

Set Details

- Builds 9 K'NEX Models, up to three at a time!
 - Supports 6 – 9 students working in teams.
 - Building instructions and comprehensive teacher's guide included.
 - Aligned to Science, Technology,
- KNX79621 Energy, Motion and Aeronautics MSRP \$249.99 **\$149.99**



Grades 5 - 9

INTRO TO SIMPLE MACHINES

LEVERS AND PULLEYS



GEARS



WHEELS, AXLES, ETC



BRIDGES



Set Details pertain to all Intro Sets: Supports 2 – 3 students working as a team. • Building instructions and comprehensive teacher's guide included.
• Aligned to Science, Technology, Engineering and Math Standards included. Including Common Core Mathematics and Next Generation Science Standards.

INTRO TO LEVERS AND PULLEYS **Grades 3 - 5**

- Builds 8 fully-functioning replicas of real-world machines, one at a time.
 - Key Concepts:** • Making work easier • $W = Fd$ (Work equals force x distance)
 - Effort Arm • Resistance (Load) Arm • Fulcrum • Classes of levers
 - Ideal Mechanical Advantage • Actual Mechanical Advantage • Fixed Pulley
 - Movable Pulley • Block and Tackle • Mechanical Systems • 178 pieces
 - Comes packaged in strong plastic storage case with dividers
- KNX78610 MSRP \$53.99 **\$33.99**

INTRO TO WHEELS, AXLES AND INCLINED PLANES **Grades 3 - 5**

- Builds 7 fully-functioning replicas of real-world machines, one at a time.
 - Key Concepts** • Making work easier • $W = Fd$ (Work equals force x distance)
 - Effort Arm • Resistance (Load) Arm • Fulcrum • Ideal Mechanical Advantage
 - Actual Mechanical Advantage • Mechanical Systems • Energy Transfer
 - Measurement, data organization and analysis • 221 pieces
- KNX78620 MSRP \$53.99 **\$33.99**

INTRO TO GEARS **Grades 3 - 5**

- Builds 7 fully-functioning replicas of real-world machines, one at a time.
 - Key Concepts** • Making work easier • $W = Fd$ (Work equals force x distance)
 - Ideal Mechanical Advantage • Actual Mechanical Advantage • Gear Ratios
 - Spur Gears • Crown Gears • Mechanical Systems • Energy Transfer
 - Chain Driven Systems • 198 pieces
 - Comes packaged in strong plastic storage case with dividers
- KNX78630 MSRP \$53.99 **\$33.99**

INTRO TO STRUCTURES BRIDGES **Grades 3 - 6**

- Builds 13 fully-functioning replicas of real-world structures, one at a time.
 - Key Concepts** • Design Process • Compression • Tension
 - Load (Dead and Live) • Force • Stress • Cantilever Construction
 - Suspension Technology • Keystone • Abutments and Anchorages
 - 207 pieces • Comes packaged in a strong plastic storage case with dividers.
- KNX78640 MSRP \$53.99 **\$33.99**

INTRO TO SIMPLE MACHINES - CLASS PACK

Set Details: 2 Units each of Intro to Simple Machines: Levers and Pulleys, - Wheels, Axles, & Inclined Planes - Gears Supports 12 - 18 students working as a team. • Building instructions and comprehensive standards-aligned teacher's guide included.

KNX78606 Intro to Simple Machines class pack MSRP \$289.99 **\$199.99**

BRIDGE BUILDING



REAL BRIDGE BUILDING Grades 5 - 9

The Real Bridge Building set is designed to assist students in their study of the history, function, structural design, geometry and strength of bridges. They will also investigate concepts related to the physical properties of materials and their application in the placement, design, and construction of bridges. The Teacher's Guide offers a wide choice of activities and extensive background information provided to assist the teacher as they present the materials and answer student questions. Each lesson includes background information, Student Objectives, Student Inquiry Sheets, Glossary of Key Terms, Journaling Opportunities, and Skill Builder Activities.

Key Concepts

- Design Process
- Compression – Tension – Stress – Strain – Elastic Limit
- Load (Dead and Live)
- Force
- Stress/Strain Curves
- Young's Modulus
- Cantilever Construction
- Suspension Technology
- Materials Applications
- Materials Limitations

Set Details

- Builds 7, five to six foot long K'NEX® Bridge models, two at a time.
- Support 6 – 8 students working in teams.
- Building instructions and comprehensive teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards including Common Core Mathematics and Next Generation Science Standards.

KNX78680 Real Bridge Building MSRP \$299.99 **\$179.99**

ELEMENTARY MATH & GEOMETRY



NCTM Curriculum Standards for grades K-4

- Geometry and Spatial Sense
- Number Sense and Numeration
- Mathematics as problem solving
- Measurement
- Mathematics as Reasoning

ELEMENTARY MATH & GEOMETRY Grades 1 - 3

- 131 K'NEX parts and instructions to build 144 models
- Students can construct squares, rectangles, trapezoids, rhombi, prisms, quadrilaterals, plus symmetry and fraction models
- 12 challenges included to fine tune understanding of shape characteristics and attributes
- Set supports 34 students working as a team
- Comes packaged in a strong, plastic storage case with dividers and locking lid

KNX78720 Elementary Math & Geometry MSRP \$48.99 **\$33.99**

RENEWABLE ENERGY



Grades 5 - 9

RENEWABLE ENERGY

Go green and bring STEM concepts to life with the K'NEX® Education Renewable Energy Set! Designed to address critical science, technology and engineering concepts in the middle school classroom and provide instructional models that will enhance students' understanding of renewable energy sources.

Using K'NEX® and the lessons provided in the teacher guide enables you to offer students a program of study that uses hands-on exploration in conjunction with an engaging inquiry based approach to learning. As students work cooperatively they are encouraged to work together as they build, investigate, discuss and evaluate concepts, ideas and designs.

Key Concepts

- Renewable Energy • Reducing Greenhouse Gas Emission
- Solar, Wind and Hydro Power • Energy; Radiant, Mechanical, Electrical
- Energy Storage • Reducing Dependence on Foreign Energy
- Electrical Energy Generation • Conservation of Energy
- Hydroelectric Energy Generation • Kinetic and Potential Energy
- Energy Efficient Technologies • Innovation and Invention
- Green Energy/Clean Energy • Mechanical and Electrical Systems
- Force, Motion, Work and Power • Newton's Laws

Set Details

- Builds 9 renewable energy models, three at a time.
- Supports 6 – 12 students working in teams.
- Building instructions and comprehensive teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards including Common Core Mathematics and Next Generation Science Standards.

KNX78976 MSRP \$249.99 **\$139.99**

INVESTIGATING SOLAR ENERGY Grades 5 - 9

This small group version of the Renewable Energy set allows students to harness the energy of the sun and convert it into electricity to power K'NEX models.

Key Concepts

- Solar Power
- Energy Storage,
- Innovation and Invention, Energy Efficient Technologies

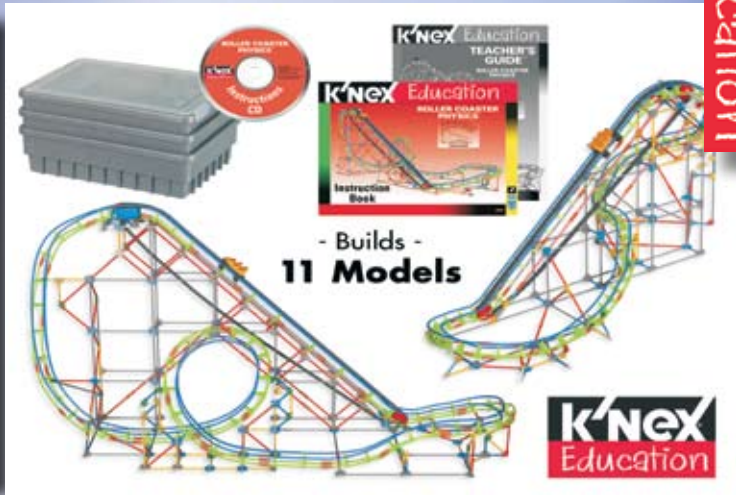
Set Details

- Builds 3 Solar powered models, one model at a time.
- 128 pieces - Supports 2 – 3 students working as a team.
- Solar panel, motor and cord included.
- Building instructions and comprehensive teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards including Common Core Mathematics and Next Generation Science Standards.

KNX77075 MSRP \$99.99 **\$64.93**

AMUSEMENT PARK EXPERIENCE

ROLLER COASTER



AMUSEMENT PARK EXPERIENCE Grades 5 - 9

The K'NEX® Education Amusement Park Experience Set provides an opportunity to combine real-world applications with STEM concepts in a middle school classroom environment. Students will be engaged and energized as they experience the interrelationships and further their knowledge and understanding of the science, technology, engineering and math concepts associated with amusement park rides. The Teacher's Guide offers a teaching approach that challenges students to take an active role in constructing their own knowledge by engaging in hands-on, inquiry-based learning, and by interacting and collaborating with other students while discussing ideas and concepts, informs the activities associated with the Amusement Park set.

Key Concepts

- Relationship between Speed, Distance, and Time
- Applied Mathematics
- Relationship between Mass and Speed
- Variables in an experiment
- Mass, Motion, and Energy Loss
- Transfer of energy
- Slope as a rate of change

Set Details

- Builds 13 Amusement Park Rides, including 2 Roller Coasters! Builds up to 2 models at a time.
- 2264 pieces
- Support 6 – 8 students working as teams.
- Building instructions and comprehensive teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards included including Common Core Mathematics and Next Generation Science Standards..

KNX78890 MSRP \$384.99 **\$219.99**

ROLLER COASTER PHYSICS Grades 10-12

This set is designed to help students as they design and conduct scientific investigations, identify variables of the problem and select appropriate independent and dependent variables for investigations. They will determine the steps necessary to control a variable, observe and record the response, and interpret the results. They will measure, record, and analyze the data for patterns, construct scatter plots or histograms as a graphic representation of the data, and mathematically interpret those graphs. The Teacher's Guide offers nine lab exercises that outline ways to use the models to study physics, and in particular mechanics. The studies adopt a hands-on, student-inquiry based approach.

Key Concepts

- Measurement in 3-D (Trigonometry)
- Time-of Flight
- Uniform Acceleration
- Designing Experiments
- Elastic Collisions in 2-Dimensions
- Projectile Motion
- Centripetal Force and Acceleration
- Centripetal Force in a Vertical Direction
- Weightiness and Weightlessness
- The Physics of the Clothoid Loop
- Collecting, Charting, and reporting experimental results

Set Details

- Builds 11 roller coasters, inclined planes, and loop systems. Builds up to two lab stations at a time.
- 2039 pieces - Supports 6 – 8 students working in teams.
- Building instructions and comprehensive teacher's guide included.
- Aligned to Science, Technology, Engineering and Math Standards included including Common Core Mathematics and Next Generation Science Standards.

KNX78880 MSRP \$384.99 **\$219.99**

ACCESSORIES



EDUCATION MOTOR PACK

- Motorize your K'NEX models to make them more realistic with these 2 battery powered motors. Each motor requires 2 AA batteries (not included)
- Turn Concept models into "Technology at Work"
- Build, Investigate, and experiment with motorized models that have constant speeds and continuous operation.
- Build two models of the same device with different gearing systems and operate them side by side to observe the effects of the earing variations, increased speed and increased force!

KNX78910 DC Motor Twin pk \$33.99 **\$20.99**

DURAA4 Duracell AA Alkaline batteries MSRP \$5.89 **\$3.49**