



## ROBOTICS SMART MACHINES



Robotics is a vast, thrilling, and sometimes overwhelming interdisciplinary field involving physics, engineering, and computer science. This kit gives kids a simple, fun, and customizable introduction to robotics that lets them build eight motorized machines controlled by programs and an ultrasound sensor. Kids code the programs using an easy, visual programming app on a tablet or smartphone, which connects to the robot models via a wireless Bluetooth connection.

The ultrasonic sensor works on the same principle as sonar. It sends out sound waves, which bounce off objects. The sensor interprets the echoes returning to it, and from this detects objects in the path of the sensor. Using the app interface, you can program the robots you build to behave based on the feedback coming from the ultrasound sensor.

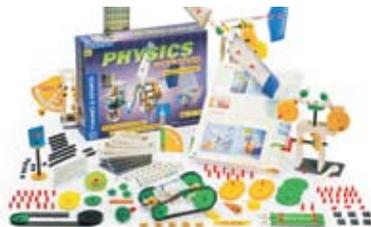
Build a humanoid robot that walks forward on two legs and pivots to avoid obstacles in its path. An awesome stag beetle model moves backwards or forwards in response to an obstacle, and opens and closes its pincers. Construct a funny crocodile model that wags its tail if no object is in sight, but then opens its giant jaws when an object approaches. Using an additional smartphone and tablet, you can even hack together a cute little spy-bot that roams around and streams video back to the tablet screen. A cool dual-rotor drone model rotates its rotor blades 90 degrees. You can also assemble other fun robots including a robo-dog and robo-dino. After you have learned how the technology works, you can build and program your own robots using the kit's 230 building pieces.

A full-color, 64-page step-by-step illustrated manual helps kids assemble all of the models and teaches them about robotics in the real world. The visual programming language allows you to command the robots' motors to move at different times, different power levels, in different directions, and in response to the data from the sensor. Requires a tablet or smartphone running iOS (iPhone 4S or later, iPad 3 or later, iPod 5 or later) or Android (Android 4.3 or later on a device with Bluetooth 4.0 support). Requires 3 - AA alkaline batteries. Ages 8+

**THA620375 Robotics Smart Machines MSRP \$169.95..... \$97.99**

### PHYSICS BY THAMES & KOSMOS

**MANY MORE THAMES & KOSMOS SETS AVAILABLE  
VISIT - WWW.ACSUPPLYCO.COM !**



Physics Workshop



Physics Solar Workshop v2.0



Physics Pro v2.0

The kits in the Thames & Kosmos Physics Series teach various aspects of physics through the process of building models and conducting experiments with the models.

#### PHYSICS WORKSHOP

A more thorough starter kit for children ages 8 and up. By building 36 models and conducting subsequent experiments with the models, children can learn the fundamental laws of mechanical physics, including basic equations involving force, mass, motion, and more.

Almost everyone has heard of a chemistry set. But until this kit was introduced, a physics set was almost unheard of. Physics is an essential science for everyone, and this kit provides a comprehensive explanation of mechanical physics. Through building 36 models and conducting subsequent experiments with the models, you will learn the fundamental laws of mechanical physics. Start by building small models, such as a fixed pulley, to learn about basic forces and simple machines. Then, work your way up to more complex machines, such as a pendulum clock, to learn more advanced concepts like work and centripetal force. This hands-on approach is both fun and effective because the principles of physics are demonstrated right in front of you. This kit includes more than 300 building pieces. The 64-page, full-color manual presents assembly instructions, experiments and explanations in a richly-illustrated, easy-to-follow manner. Ages 8 and up.

- build a windmill, two-speed crane, force scale, sail car, mars robot, hammer machine, centrifuge, pinball game, centrifugal switch, ship's lantern, and dozens of other models
- experiment with simple machines: gears, levers, screws, inclined planes, pulleys, wheels and axles
- learn and understand the most fundamental physics equations
- read about amazing real-world applications for physics

**THA625412 Physics Workshop MSRP \$82.95..... \$49.95**

#### PHYSICS SOLAR WORKSHOP v2.0 Solar Power Technology in Action

In one way or another, almost every form of energy we use originates as energy from the sun. Solar energy directly powers photovoltaic cells and thermal collectors. Indirectly, we get power from plants grown by the sun, oceans heated by the sun, and Earth's weather systems sustained by the sun. Even the energy stored in fossil fuels originated as energy from the sun, captured by plants and animals millions of years ago. Physics Solar Workshop explores the topic of solar energy, focusing on photovoltaic cells.

By building five awesome models and conducting experiments with them, you will learn how solar cells transform light into electrical energy, and how motors and mechanical devices can optimize the work done by this energy. Start with a simple helicopter model that converts sunlight into a rotating motion and demonstrates the basics of solar technology. Continue your experiments by constructing increasingly complex models: a solar-bot, a moon rover, and a stag beetle. Finally, build a cool praying mantis model that moves like an insect and is powered by a solar cell. The models can also be powered by a battery, allowing operation in all lighting conditions.

There are 138 parts, which are compatible with other Thames & Kosmos physics and engineering kits. The 48-page book offers illustrated step-by-step instructions for the projects.

**THA628918 Physics Solar Workshop (v2.0) replaces 623715 MSRP \$96.59..... \$57.95**

#### PHYSICS PRO Advanced Physics Kit

Physics Pro is our biggest, most advanced physics kit. With this kit, you can continue your study of statics and dynamics from previous lessons and begin your study of more advanced topics in physics, including fluid dynamics, energy, oscillation, hydraulics, and pneumatics.

By adding advanced topics like fluid dynamics to your physics repertoire, you can now build some really spectacular models and devices, such as a wind tunnel, pneumatic shocks, and a hydraulic lift. You will see how physics extends far beyond the classroom, giving us an amazing set of tools that can be applied in the real world to engineer marvelous things.

The main focus of the kit is the behavior of the two most important fluids in our world — water and air — and objects immersed in them. You will investigate how air and water rest and flow, what they can carry and how they move. With experiments and models, you will find out what forces work on them and what kinds of energy they possess. You will learn how ships float and airplanes fly, why a streamlined shape lets a car drive faster and how power plants convert a current of water into electrical current.

The 96-page, full-color experiment manual has two major sections. In the first part, you will enter the physics lab, where you will get to know the properties of air and water and become familiar with currents and energy. There is a series of 17 experiments in which you will start building smaller models. In the second part, you will move on to the workshop, where you will build 14 larger models of complex real-world devices. More than 212 parts are included in this kit, which are compatible with our other Physics kits.

**THA625314 Physics Pro (v2.0) MSRP \$129.95..... \$79.95**

## REMOTE CONTROL MACHINES



Build your own motorized vehicles and machines and control them with a wireless remote control unit. A unique six-button infrared remote allows you to control three different motors simultaneously, moving each of them forward or in reverse, with easy-to-activate touch sensors. The three motors can be combined to make complex vehicles and machines in numerous configurations limited only by your imagination. Assemble ten models demonstrating different ways in which the motors can be used including a bulldozer, car, three-wheeler, crane, antique car, plow, folding car, formula one racer, three-blade dozer, and robotic arm. After you have built the models in the instructions, you can design your own remote control creations! The kit comes with three motors, remote control unit, battery holder, and 182 building pieces. 48-page color instruction book. Requires 2 - AA alkaline batteries. Ages 8+

**THA555004 Remote Control Machines MSRP \$139.95 .....\$69.99**

## REMOTE CONTROL MACHINES DLX



Deluxe 20-Model Version. Build your own motorized vehicles and machines and control them with a wireless remote control unit. A unique six-button infrared remote allows you to control three different motors simultaneously, moving each of them forward or in reverse, with easy-to-activate touch sensors. The three motors can be combined to make complex vehicles and machines in numerous configurations limited only by your imagination. Assemble 20 models demonstrating different ways in which the motors can be used including a three-wheeled car, bat-bot, stag beetle, robot, battle car, ball collector car, forklift, tunneling vehicle, truck, drilling machine, crane, robotic arm and more. After you have built the models in the instructions, you can design your own remote control creations! The kit comes with three motors, remote control unit, battery holder, and 155 building pieces. 128-page, full-color instruction book. Requires 5 - AA alkaline batteries. Ages 8+

**THA620370 Remote Control Machines DLX MSRP \$169.95 .....\$97.99**

## REMOTE CONTROL MACHINES - SPACE EXPLORERS



Ready your courageous robots for a mission to the moon, Mars, or beyond! With this engineering kit, you can build a remote-controlled model of a robotic rover resembling the ones used to explore Mars. Deploy your Mars rover in the backyard or sandbox and use the remote control unit to survey the uncharted terrain! The remote can control up to three motors, which move the rover back and forth, turn the wheels to steer the rover, and control the robotic arm to pick up extraterrestrial specimens like small rocks.

This 237-piece construction set includes instructions to build not only the robot rover, but nine additional space-themed models as well, including: a lunar rover, rocket launcher car, space shuttle with opening and closing cargo bay doors, robotic space shuttle payload arm, moon lander, wacky astronaut, satellite, mars station, and cross-wing flyer. Kids will be inspired to learn various STEM skills through these fun, hands-on construction projects that bridge two captivating interest areas: robots and outer space.

A full-color, 64-page step-by-step illustrated manual helps kids assemble all of the models and teaches them about real-world examples of the outer space robots, vehicles and devices they are creating. Read about the various technical features of the Mars Curiosity rover. Learn about the history of Mars exploration, robotics in satellites, deep-space exploration, and the robots in popular space-related science fiction. This kit is perfect for every kid who is fascinated by the prospects of being an astronaut, colonizing the moon, or being the first human to land on Mars.

Requires 6 - AAA alkaline batteries. Ages 8+  
**THA620374 Remote Control Machines - Space Explorers MSRP \$139.95 .....\$79.99**

## REMOTE CONTROL MACHINES - ANIMALS



Two button, multi-channel remote unit

Construct a whole zoo's worth of remote-controlled animals with mechanical insides covered by colorful plastic "skins." The animals all move using different mechanisms, each one mimicking the movement of the real animal it represents. A two-button remote control unit moves the small, lightweight motor forward and in reverse, allowing the models to move forward or backward.

Build an elephant that walks, a scorpion that crawls along, and a cute little penguin that waddles. Construct a rabbit that bounds forward, a crab that scurries sideways, and an orangutan that climbs hand over hand along a string. You can even build a couple of dinosaurs: a Tyrannosaurus rex that walks on two legs and a Pteranodon that "flies" along a cord. Learn about animal locomotion and biomechanics as you build each model. When you are done, use the same 100 building pieces to dream up your own mechanical animal creations! You can even mix up the animal skins in funny ways to make outrageous hybrid animals.

A full-color, 36-page step-by-step illustrated manual helps kids assemble all of the models, and teaches them about the animals they are modeling and the ways different animals move.

Requires 6 - AAA alkaline batteries. Ages 8+  
**THA620373 Remote Control Machines - Animals MSRP \$69.95 .....\$39.99**



## FUEL CELL CARS

Experiment with one of the most promising energy sources of the 21<sup>st</sup> Century! Find out how environmentally friendly fuel cells work! Learn how this unique reversible fuel cell works to both perform electrolysis and serve as the energy source for your car!  
 Separate water into hydrogen and oxygen to create energy!  
 Store energy for future use! Conduct more than 30 experiments and demonstrations! (Std fuel cell car only).

### FUEL CELL 10

**CONCEPT** • Build & Experiment with a Car that Runs on Water!

This new Thames & Kosmos Fuel Cell Car & Experiment Kit provides a playful introduction to one of the most significant technologies of the 21<sup>st</sup> Century. With this kit you can build a model car that actually runs on water!

Pour in water and watch it separate into hydrogen and oxygen, forming a gas to power your vehicle across the floor. Now that we have your attention, roll up your sleeves and find out more through experiments and demonstrations you can do on your own, in a classroom or with friends.

Fuel cells are one of the most promising means of producing energy in the future. Some fuel cells, such as this one, do not consume fossil fuels and therefore are considered environmentally friendly. Automobile manufacturers are already experimenting successfully with this technology and it is widely believed that fuel cells will power automobiles and many electronic devices including laptops and cell phones, in the near future.

With this unique kit, you can build your own experimental reversible fuel cell car to learn more about this energy source. With more than 30 experiments and demonstrations, provided either in the kit or on the Thames and Kosmos web site, users will learn how a reversible fuel cell works to perform electrolysis as well as to create energy. The electricity required to activate electrolysis is created with a large solar cell included in the kit. During electrolysis, water is separated into hydrogen and oxygen and the resulting energy is stored as a gas. When needed, the gas is fed into the fuel cell, which then serves as the power source.

**EXPERIMENTS**

30 Experiments included: How to build a solar powered car. Effects of direct and indirect radiation. Characteristics of a solar module. Oxy-Hydrogen test. How to construct and load a reversible fuel cell. Decomposition of water in the fuel cell. Qualitative and quantitative analysis of gas in a fuel cell. How efficient is electrolysis? How light influences electrolysis. Fuel cell-powered car. Add your own experiments!

**CONTENTS**

Kit includes: Complete reversible fuel cell (hydrocycle system) • Wire • Motor • Chassis • Axle • Gas collector • 4 wheels • Solar panel with support • Syringe • Tube • Digital multimeter • Test tube • Protective goggles • Labels • Bag of small parts for fuel cell • Bag of small electronic parts • Comprehensive lab manual with 30 experiments and demonstrations • (Additionally required: 1 quart of distilled water)

**THA620318 Thames & Kosmos Fuel Cell 10 Car & Experiment kit MSRP \$229.99 ..... \$149.95**



### FUEL CELL X7

In this version, they have altered the kit to make it accessible to more users, both in terms of content and price. They have created a new manual, focused more on building and designing a fuel cell car, rather than the comprehensive lesson on the science of fuel cells and solar cells found in the first version. They have lowered the minimum age and geared the instructions to a younger audience. The kit has been optimized for simplicity and ease of use over thorough experimentation. With its new focus, some parts have become unnecessary and thusly have been removed to reduce the cost. The kit that is right for you or your child will depend on your needs, interest level, and age group.

The full-color, 16-page manual contains easy, step-by-step instructions for assembling and using the car, as well as scientific explanations. Ages 10 and up.

- assemble a working fuel cell car
- discover how fuel cells work
- use a unique reversible fuel cell
- learn about the potential alternative energies for automobiles
- design your own fuel cell car

**THA628777 MSRP \$179.95 ..... \$109.95**



- Build an Alternative Energy Model House
- Harness the Power of the Sun and Wind
- Conduct 100 Experiments in Physics, Electricity, Magnetism, and Energy Conservation
- Grow, Cook, and Preserve Food and Desalinate Water



### POWER HOUSE

**CONCEPT** • Sustainable Living in the 21st Century

Human civilization's energy consumption is growing. At the same time, the harmful environmental impact of our energy usage is becoming apparent. A massive global effort to adopt renewable energy and use our resources more sustainably has begun.

To live sustainably, we must use Earth's resources at a rate at which they can be replenished, and thus provide for future generations to live as we have.

With this kit, you can learn about alternative energy and sustainable living by conducting 100 experiments and building energy-related models. Build the Power House and then conduct experiments in and around the house. Learn about energy-efficient construction materials and passive house design. Experiment with heating, cooling, conduction, convection, and insulation. Investigate Earth's climate, the water cycle, and that inexhaustible power plant in the sky: the sun. Test passive solar collection methods with a solar collector. Hook up a photovoltaic solar panel to generate electricity from sunlight. Build wind turbines to extract energy from the wind. Construct a greenhouse and learn about the energy conservation tricks used by plants.

Power House provides a comprehensive overview of the many forms of alternative energy, and makes environmental protection and energy conservation issues tangible with hands-on models. The 64-page, full-color experiment manual provides instructions, scientific explanations, and energy-saving tips. Ages 10 and up.

Experiments • 100 experiments and numerous building projects

The Heat Trap: Construct and experiment with a greenhouse. • The Sun Furnace: Collect the sun's rays to heat water. • The Sun Burners: Make a solar cooker while learning about the principles of light before you cook rice and bake bread. • The Water Vampire: Desalinate water, plant watercress, produce sauerkraut and make chewing gum. • The Heat Absorbers: Learn how heat of evaporation provides cooling, conduct experiments about air humidity, build a hygrometer and test a refrigerator. • Power and Plants: Grow beans, make a potted plant feed a candle, harvest sunflower energy, build an oil press, and assemble an oil lamp. • The Energy Converters: Extract electric current from sunlight and metals in acid, build a light telephone, galvanize a nail and split water into hydrogen and oxygen. • The Forces of Magnetism: Generate electric current with magnetic fields. Build a current indicator, electric and solar motors, a transfer switch, and a crane. Lift pencils with the sun and learn about levers. Build an electric car. • Wings in the Wind: Build a sail car and learn how wings and sails transform energy. Learn to sail with the wind, by the wind, and against the wind and examine a mixed energy vehicle.

**THA625825 Thames & Kosmos Power House v2.0 MSRP \$149.99 ..... \$89.99**

**MIDWEST PRODUCTS**



**MOUSETRAP RACER KIT**

Each kit comes complete with precut parts and detailed instructions. Now lower grade level students (recommended for 4th grade and up) can participate in mousetrap racing. Teachers across the country have asked for this since we came out with the original mousetrap racer designer assortment. Grades 4 and up.

MID543 12 pack MSRP \$133.99 ..... **\$79.99**

**MOUSETRAP RACER DESIGNER ASST (NOT PICTURED)**

Midwest's Products original mousetrap racer designer assortment is available to those who prefer to challenge their students with a creative problem-solving approach. They offer all the parts necessary to construct a vehicle of the students own design. Because each student receives the same material, the instructor maintains control - the only variable being the effort and creative problem-solving abilities of the student.

Includes:

- Mousetrap (power supply) - Balsa blocks (chassis, wheels, superstructure)
- Plywood discs (wheels) - Dowels (axles)
- String (transmission) - Rubber bands (tires)
- Brass eyelets (bearings) - Suggested rules for competition

Grades 6 -12

MID541 12 pack MSRP \$79.99 ..... **\$51.95**



**AC's RAT RACER KIT**

This "AC Rat Racer " provides students with all the necessary materials required to build their own "personalized" mousetrap racer. It is a study in creative problem solving and contains a body, axles, washers, mousetrap, plastic wheels and more. A basic outline for competition is provided with broad guidelines to allow students to customize their racers with any variety of materials.

MST100 MSRP \$6.29 ..... **\$4.69**



**MOUSETRAPS**

Victor Brand - The same mousetraps used in all our popular assts.

MST1000 MSRP \$81.99 100 per package..... **\$64.42**  
 MST1010 MSRP \$15.99 10 PER PK ..... **\$6.85**

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1 1/2" ping pong balls

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 12 + pks (price per pk) ..... **\$3.50**



**America's**

**STEM Building Solution**

Early Learning, Elementary, Middle & High School



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**K'NEX Education**

**STEM Solutions**

STEM Education focuses on science, technology, engineering and mathematics concepts taught through problem-solving, discovery, exploratory learning and critical thinking. It requires students to be active participants in the learning.

Dynamic K'NEX models offer hands-on learning opportunities that encourage scientific inquiry, investigation and experimentation. Models are fully-functioning replicas of real-world machines/structures enabling students to relate the concepts to the world they live in. Color-coded building instructions allow students of varying levels to participate and succeed.

K'NEX Education Teacher guides, with inquiry-based lessons, challenge students as they build, investigate, problem solve, discuss, and evaluate scientific and design principles in action. The lessons include objectives, activities, key concepts, journals and worksheets, everything you need to introduce the concepts and assess what the students have learned. All K'NEX Education Teacher guides are aligned to National Science, Technology, Engineering, and Math standards, including Common Core Mathematics and Next Generation Science Standards.

Visit [knex.com](http://knex.com) at [knexeducation.com](http://knexeducation.com) to download sample lesson plans, table of contents and standard alignments for their entire curriculum-supported product line.

*K'NEX is proud to manufacture K'NEX Rods and Connectors in the USA.*

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