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...abiding by its own proprietary 100-point scoring rubric—considered by many of the top brands as the industry standard. Interested parties can submit their items regardless of financial status on an ongoing basis and trust that SER does not financially benefit from the sale of any product bought or sold. The organization has issued its authentication to 68.2% or 1,577 out of 2,311. The top 65 or 4% of those items authenticated (2.8% total) have made this year’s Newsweek Best In STEM list.

STEM.org Educational Research™ takes into consideration the following criteria:

1. STEM SUBJECTS
2. 21st CENTURY SKILLS
3. SUPPORT MATERIALS
4. DIVERSITY & INCLUSIVITY
5. SOCIALIZATION & COMMUNICATION
6. IMAGINATION & COGNITION
7. KINESTHETICS & ACTIVE PLAY
8. STEM CAREERS

INTRODUCTION

Asked to imagine an inventor, most people probably picture a lone genius toiling in solitude: Einstein working out physics formulae or Edison in his patent office or Steve Jobs in his garage. But some of the most creative and dedicated inventors are surrounded by other hardworking—often unacknowledged, everyday people. They’re educators—a category that includes parents. They’re working to raise the next generation of scientists and engineers by providing new ways of learning.

Behind these parents and teachers is an army of tinkerers, toymakers and entrepreneurs who continue to

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INSIGHTS INTO THE ASCENT OF AN EMERGING INDUSTRY TREND

While the subjects that comprise the acronym STEM aren’t new, grouping these subjects of study—science, technology, engineering and mathematics—into a pedagogical approach didn’t become a trend in educational circles in the early 2000s. Today, as the movement has gained momentum across the globe, more parents are taking action when faced with traditional curricula that don’t offer their children the kind of content and pedagogy that will best prepare them for a career of innovation and problem-solving. Some families are advocating for better courses or enrolling their children in extracurricular STEM programs, while others have turned to the marketplace to find the answer they seek.

That’s right: STEM toys. STEM toys have actually been around for several years now. As the New Yorker reported back in 2013, the industry was already welcoming an increase in STEM-related toys for almost a decade. According to data from a research firm on the toy industry, “Sales of building sets rose 22% from 2011 to 2012, from $1.63 billion to $1.99 billion; sales of scientific toys and educational toys, while a tiny fraction of overall toy sales, grew as well, by 17% and 25%, respectively.”

STEM TOYS CAN HELP ALL STUDENTS, BUT ARE ALL STEM TOYS HELPFUL?

One trend that clearly stands out in the toy market: subscription services. Amazon’s STEM Toy Club, which launched in 2017, is perhaps the most visible major company to offer such an option, but the e-commerce juggernaut is not the only retailer that’s gotten involved with STEM toys. A recent piece in Retail Dive makes clear that several other large companies, including Walmart and Target, also offer STEM subscription services. The idea is simple: Parents pay a flat rate per month, and their children receive a different STEM toy or kit each month.

Subscriptions services are a great way to build curiosity and interest in STEM for kids who might not otherwise be interested. After all, who among us under age 12 would refuse a new toy in the mail each month? But as a product editor quoted in the RD article makes clear, it can be hard to tell if retailers are offering truly educational, engaging in problem-solving as opposed to playing with something fun that just makes them look the part. After all, hard work can definitely feel like play, especially in the STEM fields, so look for toys that offer that sweet spot of cognitive thinking and motor skills.

Solid academic toys include math and science kits, as well as language learning toys, and these should actually engage children in skill acquisition or application. In other words, children should not be passive observers—a good academic toy should require them to think, interact with and/or manipulate concepts and ideas.

Cognitive thinking toys for younger children can include puzzles and construction sets that require children to think logically and apply reason. Cognitive skill-building toys for older students include classics like the Rubik’s Cube, as well as more advanced construction sets from companies like LEGO, which require older students to apply concepts of both geometry and engineering.

Motor skill-building toys are a growing subset of STEM toys and primarily apply to the youngest of learners. Toddlers and preschoolers can benefit from workbench sets or even simple, well-designed building blocks, which allow young learners to develop the physical skills they need to move and manipulate objects.

WHAT TO LOOK FOR WHEN MAKING A SELECTION

So, how can parents—and educators—determine which of the new crop of STEM toys are actually beneficial and which are just getting in on the trend of STEM? Tech firm Technavio, which released a report forecasting the growth predicted in the STEM toy industry, breaks down educational toys into three categories: academic, cognitive, and motor skills.

For parents who want to give their children additional opportunities to learn and practice STEM skills, quality STEM toys can be a great option. A growing market means that retailers are looking to capitalize on the opportunity, so it’s important to do your research and look for toys that offer dynamic, hands-on learning as opposed to just encouraging students to pretend to “do science.” While imagining a world in which they can grow up to be an engineer or a web designer is valuable, it’s most important that children actually get real-world experience by engaging in problem-solving as opposed to playing with something fun that just makes them look the part. After all, hard work can definitely feel like play, especially in the STEM fields, so look for toys that offer that sweet spot of rigor and joy, and watch your child’s interest in STEM take flight.
Great STEM toys spark imaginative, open-ended play while helping children develop skills related to science, technology, engineering, and math. STEM.org reviews hundreds of toys and games each year to help parents and educators provide a rich, engaging, and fun learning experience to children of all ages.

These are our picks for the top STEM toys of 2020–2021.

1500 Piece Mixed Color Series
Pix Brix
Pix Brix are interlocking bricks that can be used to create 2D designs or 3D sculptures. Sets come with a rainbow of squares for hands-on play that seamlessly blends art and engineering skills. There's also an app to pixelate favorite photos for personalized puzzles.

$14.95 EACH

Dissect-It
Top Secret Toys, LLC
Dissect-It allows kids to explore the skeleton and organs of a frog without harming any animals. A unique, refillable gelatin material can be sliced with plastic tools to reveal what's inside, creating a realistic dissection kit that's safe and engaging for very young learners.

$17.99 EACH

SHAamory
Blockchain is one of the most critical technologies of the future, and SHAamory makes it easy to explain to kids and adults alike. This card game will have you Bitcoin mining and building blockchain in no time, and challenge cards step up the difficulty as kids learn the ropes.

$14.99 EACH

Moody Goat Terrarium Kit
Moody Goat, Inc.
The Moody Goat Terrarium Kit comes with everything kids need to grow a miniature garden, including layers of sand and soil that promote healthy roots. The kit also has decorations and a nightlight to spark imaginative stories about this tiny DIY ecosystem.

$14.99 EACH

STEM LAB Counter
UGears
The STEM Lab Counter provides double the fun. First, kids build a working mechanical click counter to understand the ancient mechanism behind common odometers. Then, kids can use their counter to measure any repeated action or object in household experiments.

$19.90 EACH
Merge Cube
Merge Labs, Inc.
The Merge Cube lets kids explore objects from dinosaur bones to spacecraft with their own hands. When you point your tablet at the Merge Cube, it transforms into one of thousands of objects that kids can engage with for a fascinating tactile learning experience.

Stack By Numbers – Rocket
BrickMates
Stack By Numbers kits contain interlocking bricks that kids can use to build 3D puzzles. The template snaps under the clear baseplate to tell kids how high to stack bricks to complete the design. Free printables let kids make their own templates, too.

Play 22 Toy Rocket Launcher
Home 4U
Soft foam rockets take to the sky when kids step—or jump!—on the air pump. The Toy Rocket Launcher is a great way to get even the youngest learners outside and experimenting with cause and effect as they send colorful rockets into the air.

Stacks of Circles
Sassy Baby
Finding great educational toys for the littlest learners is always a challenge, but Stacks of Circles delivers. Bright rings can be stacked in any order to build early hand-eye coordination. As baby grows, rings can be counted and sorted by color, texture, weight, and pattern.

STEM Bolts & Nuts Building Set
Smart Wallaby
The colorful STEM Bolts and Nuts Building Set comes with a toy hex wrench that kids use to build anything they can imagine. Blocks, straps, and spinning wheels provide an engineering foundation as kids create their own toys and works of art.
**Ant Farm Castle 2.0**

**NAVADeal**

Ants are industrious, fascinating creatures, so they’re perfect for budding biologists to study. The Ant Farm Castle 2.0 uses an innovative blue gel instead of soil to provide a clearer look at your colony—and to provide nutrients to ants for a foolproof ecosystem.

$21.99 each

**Recycle Rally**

**Adventerra Games**

Your kids know it’s important to fill the recycling bin, but what happens after it’s emptied? Recycle Rally is a fun board game that gets kids talking about trash, what happens to it, and how we can all work to make more eco-friendly choices.

$24.95 each

**Bullseye Math Game 2nd Edition**

**JEM Games**

Designed by a math teacher, Bullseye is deceptively simple: just roll the dice to create an equation that gets you to the designated answer. Endless combinations and easy play help kids internalize math facts while building strong mental math skills.

$22.50 each

**Butterfly Garden with Voucher**

**Insect Lore**

Insect Lore has been providing kids with up-close-and-personal learning for decades. Their classic Butterfly Garden is a mesh enclosure for watching caterpillars change into beautiful butterflies—just turn in the voucher for the live insects when you’re ready to begin.

$24.99 each

**Europa Kids Outdoor Explorer Kit**

**Europa, LLC**

The Outdoor Explorer Kit has everything kids need for a backyard nature safari, including a butterfly net, specimen jar, binoculars, and more. This kit is perfect for bird watching, bug collecting, or imaginative play that encourages an exploration of your own ecosystem.

$24.90 each

**Light-up Crystal Growing Kit for Kids**

**Dan & Darci**

Encourage young chemists to explore crystals with the Light-Up Crystal Growing Kit. After mixing the crystal starter and growing three different colored crystals, kids can enjoy them as part of a nighttime set to study the crystals’ unique details.

$24.99 each
Primo Kangaroo
Dolce Toys
This cuddly kangaroo is an ideal first toy for babies and toddlers. The Primo, Kangaroo features shakers, squeakers, crinkles and even a separate baby joey to promote age-appropriate play. The soft toy is also designed for safe teething and tactile exploration.

48 Piece Beads And Accessories In Zipper Bag
Lalaboom
Large Lalaboom Beads stimulate babies and toddlers with different textures, shapes and colors. As children get older, they can enjoy stringing beads together, stacking them, and playing with them in the bath or at the beach. This multi-age toy grows with children through several stages of development.

Geomag - Mechanics - Magnetic Motion 86 Piece Building Set
Geomagworld SA
Geomag Mechanics combines magnetic Geomag balls and rods with mechanical pieces that allow kids to build a real moving machine. The set provides hands-on learning about the power of attraction and repulsion to build and then power their creations.

AniBlock Puzzle Challenger III
AniBlock
Parents who remember Tetris will love AniBlock, Puzzle Challengers. Each set has puzzle blocks with different configurations of squares. Young children can place the pieces on the board any way they like, while older children will enjoy the challenge of creating specified designs with the accompanying app.

Sweet Friends 74 Piece Set
Clicformers
Interlocking plastic squares click, bend and fold to create 3D creations in the Clicformers Sweet Friends set. After following directions to build the cute puppies in this set, kids can reconfigure the pieces to build anything they like with this clever construction toy.

DoodleMatic / Pixicade Interactive Mobile Game Creating Starter Kit
Tink Digital, Inc.
What goes into designing a great video game? The DoodleMatic Mobile Game Maker lets kids turn original drawings into real mobile games they can play on an app. The included guidebook teaches kids the basic elements of game design for interactive fun.

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**Human Body Educational Puzzle - 100 Pieces**

**Janod Toys**
The Human Body Educational Puzzle is actually four puzzles in one: an anatomically correct boy, girl, skeleton, and internal organ cross-section. Kid-friendly artwork and the jumbo 39-inch size help youngsters connect new concepts to their own bodies.

$32.99 – $49.99

**Galton Board**

Four Pines Publishing, Inc.
The Galton Board is a miniature lesson on probability and the bell curve. Just flip the board, and the beads fall into a standard distribution pattern. It’s a great way to see that there’s mathematical order in what seems like random chaos.

$34.95

**Motorized Ferris Wheel**

Smartstoy
The wooden Motorized Ferris Wheel construction kit comes with a motor and all the tools you need to build a working model of an engineering marvel. This is a great project to promote the problem-solving and fine-motor skills used in construction.

$39.95

**Ooze Labs Chemistry Station**

Thames & Kosmos
The Ooze Labs Chemistry Station comes complete with pipettes, test tubes, beakers and plenty of other tools that scientists use to conduct experiments. Non-hazardous chemicals and easy-to-read instructions make it fun to explore chemical reactions in real life.

$39.95

**Pix Perfect Deluxe Pixel Art Kit**

Pix Perfect, LLC
The Pix Perfect Deluxe Pixel Art Kit puts a crafty spin on math and geometry as kids create masterpieces on a grid. Sparkly sequins can be reused to create patterns, tessellations, and other pictures that can be displayed easily on the wall.

$39.95

**Moving Creations with K’NEX**

Hand2mind
Get young minds thinking about pneumatic and hydraulic power as they build their own machines with K’NEX components. Moving Creations with K’NEX comes with a notebook full of challenging builds and fun experiments that are perfect for budding engineers.

$39.99

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STEM Epic Heroes Collector’s Edition

Mythic Lab

Teens will love the strategy of this competitive card game, STEM Epic Heroes, which has players using famous scientists in a race to make discoveries and collect more cards. This special collector’s edition features additional scientists and special foil cards not available elsewhere.

Gridopolis

Gridopolis Games, LLC

Gridopolis is a 3D checkers game that you build as you play, combining engineering, geometry, and strategy into one dynamic activity. The game is never the same twice, so it grows with kids’ skills for years of fun.

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DISCOVER

Makedo

Makers everywhere love building models out of cardboard to get their ideas out in the world. The Makedo DISCOVER kit is the ultimate toolbox for cardboard construction and includes safety saws, a perforator wheel, and plastic screw connectors and screwdrivers to build 3D creations.

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Circuit Blox 120 - E-Blox Circuit Board Building Blocks Toys for Kids

E-Blox, Inc.

This battery-powered circuit board lets kids use interlocking bricks to create working lights, alarms, motors and more. A variety of specialty bricks work to power inventions that gradually grow more complex—including an FM radio receiver. E-Blox are also compatible with other interlocking bricks.

Helio Base LED Projector

Helio Productions, Inc.

Helio is an award-winning nightlight that serves as a projector in your child’s room. Interchangeable discs project everything from math facts to images of the solar system onto bedroom walls to reinforce important STEM concepts in a beautiful, relaxing way.
The Entrepreneur Game by EESpeaks
DM Media, Inc.
This board game walks players through everything it takes to run a successful business. In addition to math and money skills, The Entrepreneur Game sparks kids’ imaginations about starting their own businesses—a crucial skill for future makers and inventors.

Fun Forts Glow in the Dark
81 Piece Building Set
Power Your Fun
Extra-large rods and spheres form a life-size building set that kids can use to frame a play fort indoors or out. Rods glow in the dark so the frame remains visible, even under blankets. Fun Forts Glow in the Dark is perfect for small hands and big imaginations.

$49.99
EACH

$49.99
EACH

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STEM • STEAM product standards
by becoming a member today!
LEARN MORE AT STEM.ORG
Circuit Explorer Deluxe Base Station

Educational Insights

The Circuit Explorer Deluxe Base Station lets future astronauts build a space station with lights, battery powered rovers, and a voice synthesizer. Learning is twofold as kids learn about construction and circuitry to make the imaginative gadgets turn on and off.

Rubik’s Connected Cube

Rubik’s Brand, Ltd.

The Rubik’s Connected Cube brings the classic puzzle into the twenty-first century with internet connectivity. Kids can use a mobile app to learn to solve the puzzle, then build their speed skills to battle other players online.

Gujo Destination Mars Rocket

Lukilab

The Gujo Rocket lets kids connect detailed panels with plastic pieces to get kids building. Follow the directions to build a rocket, then recombine pieces to design other vehicles. Once the rocket is complete, kids can act out their own space adventures with the included astronaut.

Lux Blox STEAM Inventor with Accessories Rainbow Set

LUX BLOX

Lux Blox plastic squares are deceptively simple but can be clicked together in thousands of way to make 3D creations. The STEAM Inventor set comes with wheels, axles, and rubber bands for building vehicles, machines, and even a friendly dog.

U-505

The Atom Brick, Inc.

The Atom Brick is three-quarters the size of a standard interlocking brick, so it’s ideal for teens taking their skills to the next level with more detailed builds. The U-505 is a scale model of German U-boats—perfect for STEM and history lovers alike.

3Doodler Start “Learn from Home” Pen Set

3Doodler

No 3D printer? No problem! 3Doodler has invented a handheld 3D printing pen that lets kids draw their creations. Extruded plastic is cool to the touch, BPA-free, and compostable, allowing kids hours of free-form design time to bring their ideas to life.
**Turing Tumble**

**Turing Tumble, LLC**

Named for mathematician Alan Turing, the Turing Tumble teaches coding concepts with analog switches, interceptors, and gears. Kids follow an engaging graphic novel with puzzles that they build a machine to solve. Simple initial problems evolve into challenges that even adults will love.

**£69.95 EACH**

**Tileblox Rainbow 20 Piece**

**Tileblox**

Young builders will love how easily magnetic Tileblox snap together. This set of 20 square and triangle tiles comes in a rainbow of hues that let children build strong spatial skills as they create colorful 2D and 3D projects.

**£69.99 EACH**

**HUE Animation Studio**

**HUE**

HUE Animation software was invented by teachers to provide an easy-to-use system for creating stop-motion animation. The simple interface works on most operating systems and will have kids creating animated movies, time-lapse videos, and special effects in no time.

**£69.95 EACH**

**Toaster Pets Cartoons Studio Kit**

**Toaster Party, Inc.**

Toaster Pets Cartoon Studio Kit lets kids create animated cartoons with a simple app. The kit comes with 10 plastic characters that kids can manipulate, film, and import onto a range of backgrounds to their story. AI helps characters mimic kids’ mouth movements for realistic dialogue and reactions.

**£69.99 EACH**

**Chain Reaction**

**Smartivity**

Smartivity’s Chain Reaction game is a fun way for kids to discover cause and effect in kinetics. Wooden modules can be set up to trigger a chain reaction that launches a marble to play skee ball, bowling, or a knock-down game for hours of fun.

**£69.99 EACH**
### Arcade Coder

**Tech Will Save Us**

Arcade Coder works with your iPad to teach kids all about coding and game design. After learning to play classic arcade games, they can then change the games, design their own characters, and code a whole new game. Learning to code is fun every step of the way.

#### $83.99 each

### Botley 2.0

**Learning Resources**

Botley 2.0 teaches young kids to code—without the excess screen time. This 78-piece kit includes everything needed to teach Botley to solve a maze, run an obstacle course, and more. Lights, sounds, and a few “hidden” features make Botley an engaging companion.

#### $84.99 each

### Crayon Edition: Triple Fun

**Set of 3 – VertiPlay STEM**

**Marble Run**

Oribel Pte, Ltd.

This modular peel-and-stick Marble Run hangs on the wall and supports a collection of levers and tracks that kids combine to guide the marble to its final destination. Hands-on experimentation leads to a deeper understanding of the laws of physics.

#### $79.99 each

### MyHome

**Elenco Electronics**

Budding electrical engineers will love designing a working electrical system with the MyHome building kit. After using the base plates to construct a house or high-rise, kids add circuits, switches, doorbells, a security system, and more to power their creations.

#### $70.40 each

### Magformers Backyard Adventure 61 Piece

Magformers

The Magformers Backyard Adventure Set includes 61 magnetic tiles and shapes that stick together to create 3D builds. Magnetic pieces always attract rather than repel, so the set is ideal for small hands. Extra pieces help children create a backyard swing set to encourage young imaginations.

#### $99.99 each

### BAKOBA Pioneer

**BAKOBA**

Soft, machine-washable foam BAKOBA blocks are large enough for small hands to manipulate easily for creative building projects. The BAKOBA Pioneer kit includes wheels, eyes, and connectors that allow BAKOBA to connect to LEGO bricks to expand construction possibilities.

#### $99.99 each

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#### $99.99 each
Oregon Scientific SG268R Smart Globe Adventure AR

Oregon Scientific

The Oregon Scientific Smart Globe lets students explore the world to learn about geography, science and social studies in an interactive way. Just touch the smart pen to the globe to learn about 25 different topics. The globe connects to your tablet for engaging learning games, too.

STEM Blocks 50 Piece Kit

Kontu

Magnetic Kontu STEM Blocks are a tactile delight for early learners as they explore counting, magnetism, building, and more. Sustainably made wooden blocks can be stacked and manipulated to solve the included puzzle cards or used in free-form imaginative play.

$99.95

$99

Each

$99.99

Each

$70.40 – $99.99

GET YOUR PRODUCTS

JOIN THE ALLIANCE!
Applying STEM To Better Understand it

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STEM Jr.™ Wonder Lab™
MGA Entertainment, Inc.
The STEM Jr. Wonder Lab lets toddlers pretend to be scientists with a play laboratory set. This sturdy Little Tykes play set include plenty of age-appropriate tactile stimulation and over 40 hands-on experiments to conduct with accessories that include kid-friendly plastic test tubes, an eyedropper, goggles, and more.

$119.99 EACH

2+

Cubelets Discovery Set
Modular Robotics
What happens when you add a tiny computer to a set of building blocks? You get the Cubelets Discovery Set. Each block has its own function, so kids can experiment with coding cause and effect to build a range of miniature robots.

$139.00 EACH

4+

ThinkPlay Gears Extreme
ThinkPlay, Ltd. / Morphun
Explore the basics of physics with ThinkPlay Gears Extreme, a building set of colorful plastic gears, chains and pulleys. Kids learn how gears work together to create friction, power, and motion as they build their own clocks and working machines.

$139.99 EACH

5+

STEM@Home Kits 5-pack
Science Explorers
The STEM@Home Kit comes with five hands-on science lessons and the materials needed to experiment with super string slime, air pressure, an owl pellet, and more. Each activity comes with detailed instructions for loads of hands-on science fun.

$129.99 EACH

6+

Mini Unit Beams Bridges
Unit Bricks
Take block play to the next level with the Mini Unit Beams Bridges Builder Set. Solid hardwood Unit Bricks come with large beams and other specialty pieces made for building suspension bridges. Budding engineers learn by doing as they experiment with bridge design.

$159.99 EACH

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$159.99 EACH

5+
## Piper Computer Kit

**Piper, Inc.**

The **Piper Computer Kit** is a laser-cut wooden pieces and a full slate of electronics allowing kids to build their own working computer. Young computer engineers can build, dismantle, and rebuild the computer several times to understand the hardware, then enjoy 11 different coding projects with Raspberry Pi.

**Price:** $249.99 each

**Target Age:** 8+

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## Jade Robot

**Mimetics, Inc.**

The **Jade Robot** is packed with features—all of which are visible on its unique exterior circuit board. There are light and object sensors, a spectrometer, and a line-following sensor. Kids can use the mobile app to program Jade to perform a wide range of tasks.

**Price:** $224.95 each

**Target Age:** 10+

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## Bluetooth Speaker

**Creation Crate**

The Creation Crate Bluetooth Speaker is a project kit that includes everything teens need to build their own Bluetooth speaker to connect to a smartphone. A complete course online course teaches all about sound and wireless technology while providing step-by-step building instructions.

**Price:** $29.99–$49.99 each

**Target Age:** 12+

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## Kano PC

**Kano**

**Kano PC** is the perfect first computer for kids. Durable parts click in and out so kids can build their own machine, then learn to use basic programming and Windows computer apps with the included kid-friendly software. Webcam and accessories are also available.

**Price:** $299.00 each

**Target Age:** 6+

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## Square Panda Literacy System

**Square Panda, Inc.**

The **Square Panda Literacy System** helps kids build reading readiness skills and confidence. Sets of print books and flashcards work seamlessly with online books and SwipePhonics technology to promote independence. Square Panda makes learning phonics both engaging and effective.

**Price:** $49.50 + $17.95 per month

**Target Age:** 2+

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## Toys Over $100

- **Piper Computer Kit:** $249.99 each
- **Jade Robot:** $224.95 each
- **Bluetooth Speaker:** $29.99–$49.99 each
- **Kano PC:** $299.00 each
- **Square Panda Literacy System:** $49.50 + $17.95 per month
If you were to close your eyes and imagine an inventor, what would you picture? For most people, the image of a lone genius toiling away in solitude is a strong one. From Einstein figuring out physics formulas, to Edison in his patent office and Steve Jobs in his garage, many of our greatest thinkers needed lots of time and a space to work out their ideas before stunning the rest of the world with their innovations.

But some of the world’s greatest minds aren’t just determined to make something new. Instead, they strive to find ways to pass novel ideas on to others. These inventors are also educators, solving the problem of how to raise the next generation of scientists and engineers by providing new ways of learning. They are the tinkerers, toymakers, and entrepreneurs who continue to innovate, providing fun ways for students of all ages to internalize the science, technology, engineering, and math (STEM) skills that they will need to solve the problems of tomorrow.

**STEM TOY V1.0**

In 1974, a professor of architecture was obsessed with finding a way to help his students understand and solve problems in three dimensions. This is, after all, the work of architects and engineers. However, back then traditional schooling too often favored—and still tends to lean towards two-dimensional thinking, rote memorization and pen-and-paper problem solving.

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**STEM TOY MARKET EVOLUTION**

The late 1960s and early 70s welcomed notable rumblings of the now-booming STEM toy industry, although the official acronym wouldn’t be coined until the 1990s or brought into wide use until the twenty-first century. In addition to the Rubik’s Cube, Carlos White’s Insect Lore was an early pioneer in this space, creating a product that shipped caterpillars to children so they could see the process of metamorphosis with their own eyes and then release a butterfly into the wild. Lego USA began operations in 1972, leading to a huge demand for the interlocking brick, which is still a staple of makerspaces and playrooms around the world. Meanwhile, in the suburbs of Chicago, Gil Cecchin and Arthur F. Seymour along with their wives Carol and Maryann began building, distributing and marketing a product to help television repairmen and Elenco Electronics, Inc. was born. It now serves the world with its innovative toys, gadgets and bestselling educational products. Arthur has since left Elenco and has gone on to start a separate STEM toy brand named E-Blox, Inc.—both remain family owned and operated companies.

As academic leaders began to develop curriculum to better prepare students for the important science and technology careers that would drive the economy of the new century, toymakers wittingly stepped up their game.

To give his students a concrete way to visualize and manipulate 3D problems kinesthetically, the professor spent nearly all of his free time assembling blocks of wood and paper, searching for ways to connect them that would let architectural students twist and turn the shapes to understand how they interacted with each other in space. The result of all of that tinkering was what the inventor ended up calling a “Magic Cube.”

Today, we all know this as a Rubik’s Cube, one of the most popular puzzle toys ever made—and over 450 million sold to prove it.

Hungarian inventor Ernő Rubik himself wasn’t sure exactly how to solve the puzzle he had created at first, and no wonder. Mathematicians have calculated that the Rubik’s Cube has over 43 quintillion move combinations, and is the ideal tool for exploring the concept of group theory. Rubik, having limited experience with his newly-created twisty puzzle, took a month to solve it on his own. But this is fitting for the prototypical STEM toy: its maker passionately believes in the power of self-teaching and often “bristles at the idea that those in authority are in the best position to impart knowledge.”

And that is the idea behind all the best STEM toys: learners will do whatever it takes to explore a task, apply new skills, and hone effective ways of thinking to solve a problem—provided that it is presented in an inherently fun and engaging way.
Large companies like Fisher-Price followed suit. It partnered with Compaq to make more realistic electronic toys in the mid-1990s, and by the 2010s they were making toys designed to teach programming and coding skills to kids as young as age three.

Today, thanks to innovative manufacturers as well as “edupreneurs,” individual inventors, and toy companies of all sizes, the global market for STEM toys is expected to grow by nearly $474 million through the year 2024. Though STEM toys are just a small splice of the overall toy market, it’s no doubt one of the fastest-growing segments.

One can now find STEM-themed toys online and in their own aisles at Target, stuffed end caps at office supply stores like Staples and even center displays at some of the most unlikely of places—Michaels which is known mostly for its art supplies. With major retailers firmly on board, STEM toys are as much a part of childhood today as Slinkys and hula hoops were in decades past.

THE REAL VALUE OF STEM TOYS

The best STEM toys support learning and help encourage critical thinking. They instill a love for design and exploration. But creative toymakers are often the overlooked, unsung heroes of the STEM movement. These passionate inventors and designers took the dream of educators and brought it into the public consciousness in a way that traditional pedagogy could never achieve. STEM toys are the keystone in the arch that bridges the gap between school and home.

And this connection is crucial. Researchers have long known that strong school-home connections reinforce lessons and democratize learning by turning the whole world into a classroom where students become self-motivated learners. Best practices encourage teachers to develop projects and activities that involve parents and draw connections between schoolwork and real life. These connections strengthen community and support deeper, more critical thinking.

Such skills are key when facilitating solid STEM learning outcomes, and toymakers leapt to the task of filling the gap. In doing so, they created real positive buzz around STEM learning in general. Witnessing firsthand often incredibly dry concepts brought to life with colorful toys, some parents found it much easier to accept the movement. As toy shelves began to fill with an assortment of products donning beautiful packaging marked “STEM,” it tangibly began to deliver a somewhat abstract and intimidating concept into the mainstream. Parents were now free to embrace the idea that play could be more valuable and that they could support their child’s learning on their own, not just in the classroom.

This was the final piece of the puzzle that took STEM from an educational buzzword—one that could have easily gone the way of so many pedagogical fads—and turned it into a powerful movement that has captured the imagination and attention of dueling politicians, school boards, creative teachers, and fun-loving families alike. Toymakers managed to do what even the most civic-minded educational leaders could not: they made STEM accessible for all stakeholders.

A STEM DAY TO REMEMBER

For a perfect example of the influence that toy companies have on the overall [STEM Education] movement, one needs look no further than National STEM Day. Celebrated across the country on November 8th, STEM Day is meant to shine a spotlight on the importance of strong STEM education for today’s youth. Many schools celebrate with fun STEM activities, and even NASA has recommendations on making the day both inspirational and educational.

But do you know why STEM Day lands on November 8th? It’s not because a group of university professors or government officials decreed it. It’s because MGA Entertainment, one of the world’s largest privately held toy companies, did the work to establish the day to support STEM while promoting their Project Mc2 Franchise of dolls, apps, and entertainment. In the Project Mc2 world, a group of smart girls work in a secret organization called NOV8 (pronounced “innovate”). The Nov 8 date for National STEM Day in America was created as a result.

Although #NOV8 may have initially appeared like a brand promotional strategy, it—like so many STEM toys, games and puzzles—has enriched everyone’s connection to the movement as a whole. And for this, we all owe a debt of gratitude to toymakers and their associated brands large and small. Their creativity is leading to a bright future for young people everywhere.

STEM education is teaching and learning in science, technology, engineering and math. It includes both pedagogical and andragogical activities across all developmental levels—from pre-school to post-doctorate—in both formal and informal settings, which has grown into an international movement to serve the greater good.

Editor’s Note: The Newsweek Best In STEM Top Toys and Games list for 2020–2021 powered by STEM.org Educational Research™ is one of the few unsolicited roundups where brands do not pay to be listed. In addition, both the evaluating organization and the publisher have abstained from paid affiliate partnerships associated with this program. Readers can have confidence that all of the items selected are based solely on product merit versus the size of each organization’s marketing budget or industry influence.

—Andrew B. Raupp is the founder and executive director at STEM.org Educational Research™
BEST in STEM
Top Toys and Games 2020–2021

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