

Young Inventors

Some students may have a hard time connecting with inventors and the invention process. This is a simple activity you can do with your class to inspire the students and promote discussion about inventions. There are different ways you can do this activity, but outlined below are some suggestions you might try.

1. Print one copy of this document and pass it out to the students (1-2 pages per student) or allow the students to select which inventors they want.

Alternatively, you could provide the students with the websites that this information was collected from and allow them to select inventors from there.

2. Give the students a few minutes to read about their inventors and answer the following questions.
 - a. Inventor's Name?
 - b. Inventor's Age? (when they invented it or when they first had the idea)
 - c. What problem were they solving? (some do not list an obvious problem)
 - d. What was their invention (solution)?
 - e. What do you like most about this inventor/invention?
3. Have each student tell their classmates (entire class or small groups) what they learned about their inventor(s).

Depending on the age/grade of your students and the time available, you can scale this activity accordingly. Lower elementary students could work together (entire class or small groups) to identify the information. Middle school could complete it as described above. For older students or high school, you might choose to expand this into a mini essay/report that they complete as homework before discussing with the class.

Sources:

<https://www.ovoenergy.com/blog/lifestyle/nine-incredible-kid-inventors.html>

<https://inventionland.com/blog/ten-kid-inventors-that-changed-our-lives/>

<https://time.com/collection/davos-2020/5765632/young-inventors-changing-the-world/>

<https://sphero.com/blogs/news/5-kid-inventors-who-are-saving-lives>

<https://www.rd.com/list/things-kids-invented/>

<https://www.greatbusinessschools.org/10-great-inventions-dreamt-up-by-children/>



10. Abbey Fleck (Age 8) – Makin' Bacon



[Image Source](#)

Young entrepreneur Abbey Fleck was only eight years old when inspiration struck. She and her dad had just finished cooking bacon, only to discover that there weren't any paper towels to soak up the fat. Much to Fleck's mother's dismay, the pair improvised and used the classified section of a newspaper instead. Suddenly, Fleck had an idea: "Why not hang the bacon up while it cooks?" Not only would this render paper towels unnecessary, but it would also make the bacon healthier.

In 1993, after Fleck and her dad had spent some time experimenting, the duo brought forth a microwave-safe dish with three upright bars on which to hang bacon on while it cooked. They patented their idea a year later and eventually struck a distribution deal with Walmart. Fleck's grandfather took out a loan on his farm to pay for the first 100,000 dishes – but it seems to have been worth it. In 2002, Entrepreneur.com reported that the new company was earning more than \$1 million in royalties annually, and Makin' Bacon dishes are still sold at Walmart, as well as Kmart and Target.

Albert Sadacca: Christmas Lights

Prior to electric Christmas lights, people would simply use candles to decorate their Christmas trees. Believe it or not, people initially had more difficulty trusting the safety of electric lights than open flames. Nevertheless, public trust started to sway toward the electric lights, but they were ridiculously high priced. That is until Albert came along and invented a version of electric lights that were much more affordable. He used his parents' novelty lighting company to produce them in 1925 and now, because of him, they've become a staple of Christmas tradition.



ARINA P HABICH/SHUTTERSTOCK

Christmas lights

Christmas trees used to be a big fire hazard, back in the day when lit candles adorned the trees. But in 1917, 15-year-old Albert Sadacca helped put an end to that by [inventing less expensive strings of light bulbs](#) to add pizzazz to the holiday—without the potential for burning the house down. Get the inside scoop on [some of the most ironic inventions ever](#).



ILYA ANDRIYANOV/SHUTTERSTOCK

Hot Seat

Alissa Chavez was upset about the stories of children who died when they were accidentally left in hot cars—and she wanted to do something to help prevent it. In 2014, at age 14, she came up with the idea of the [**Hot Seat**](#), a small cushion with a sensor that's placed in the car seat and connects to the parent's smartphone. If the cushion senses that the smartphone has moved more than 20 feet from the car with the baby still in the seat, it sounds an alarm. Here are some more [**inventions that have changed the world in the last decade.**](#)

Ben Franklin: Swim Flippers

We typically know Ben Franklin for his later-in-life accomplishments, but did you know he was actually a child inventor? In the early 1700s, at age 11, he realized he could cut through the water more easily while swimming if he had more surface area through which to push. His original design was handheld fins made out of oval-shaped planks with holes in the middle for his hands and feet.



LIUDMYLA LIUDMYLA/GETTY IMAGES

Swim fins

Noted inventor and Founding Father [Benjamin Franklin](#) was just 11 years old when he fashioned fins to make swimming easier. However, unlike today's rubbery fins on your feet, his 1717 invention was hard paddles that were attached to your hands. Impress your friends with this bit of trivia next time you go snorkeling! Next, check out these [10 life-changing things that were discovered by accident.](#)

1. Cassidy Goldstein (Age 12) – Crayon Holders

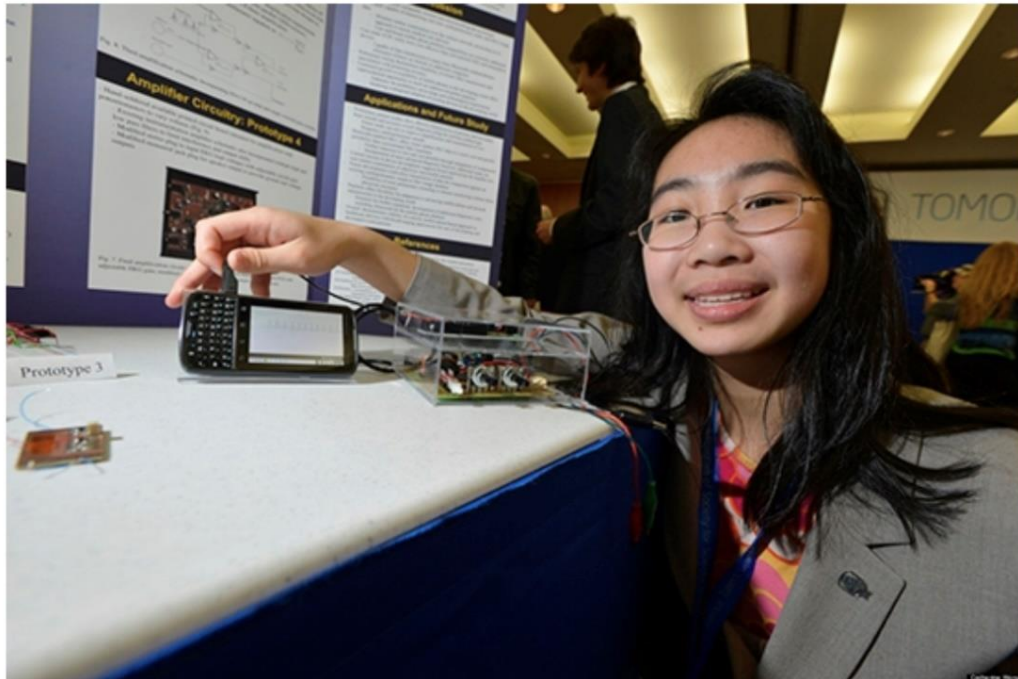


[Image Source](#)

At age 11, Cassidy Goldstein encountered a problem that has vexed creative kids for generations: her crayons were broken and the pieces were too small to hold onto. Still, undeterred, she searched through her arts and crafts supplies until she found a plastic tube designed to keep roses fresh during shipping. Goldstein inserted a crayon piece into the tube and unwittingly created her first prototype. In 2002, she filed a patent for her Crayon Holders and soon struck a licensing deal with Rand International that ensured her five percent of royalties per sale. Her Crayon Holders not only make it easy to use broken crayons, but they also help kids with fine motor difficulties to hold onto the wax pastels.

In 2006, the Intellectual Property Owners Education Foundation named Goldstein Youth Inventor of the Year. According to CNBC, the invention earned Goldstein enough money to cover most of her college costs and helped to get her set up in New York City after she had graduated.

Catherine Wong - 17 Years Old



We often take access to healthcare for granted in the UK, but there are countless places in the world where it is much harder to come by. In many of these places computers and fully equipped hospitals can be scarce - but mobile phones are commonly found. Enter [Catherine Wong](#), a 17 year old science student from Morristown, New Jersey who, in 2012, invented a tiny device that displays a patient's heartbeat right on the screen of their phone. Using the device, they are able to undertake an electrocardiogram to check for any problems. The invention could potentially improve medical care for millions of lives.

2. Chester Greenwood (Age 15) – Earmuffs



[Image Source](#)

While he was 15 years old, Chester Greenwood's ears got painfully cold one day when he was ice skating in his hometown of Farmington, Maine. Although he tried wrapping a scarf around his head, it simply didn't do the trick – so he set out to find a better solution to the problem. Greenwood made a wire frame and asked his grandmother to sew beaver skin pads to it, creating the world's first earmuffs.

In 1877, at age 19, Greenwood patented his invention. He went on to perfect and manufacture the ear protectors in a local Farmington factory, eventually selling his earmuffs to soldiers during the First World War. By the time he died in 1937, he had made a veritable fortune, selling as many as 400,000 pairs in a single year. What's more, earmuffs weren't Greenwood's only invention; in fact, he took out more than 100 patents in his life.

Erin Smith

In 2016, Erin Smith, then 16, watched old videos of Michael J. Fox. She recalls noticing that “when he laughed or smiled, it came off as emotionally distant.” The early symptom of Parkinson’s is called facial masking, and for a science-fair project, Smith chose to explore it. She filmed some 15 nursing-home residents as they watched Super Bowl commercials, then screened their expressions using off-the-shelf facial-recognition software. After seeing the results, the Michael J. Fox Foundation funded a more robust study with around 500 patients that led Smith to develop FacePrint, an AI tool that analyzes video footage for signs of Parkinson’s.



Illustration by Aiste Stancikaite for TIME

Now 19, Smith is studying neuroscience and computer science at Stanford University, and working with its medical school to get FacePrint to the point where it can diagnose Parkinson’s long before traditional tests are able to do so. —*Shay Maunz*

Fionn Ferreira

As a child growing up near the ocean in West Cork, Ireland, Fionn Ferreira loved the sea. He liked to go kayaking and would regularly volunteer at beach cleanups. He's also loved science "since I can remember," Ferreira, 19, told TIME. His two passions met when, in 2017, he began looking for an environmentally safe way to extract microplastics from water.



Illustration by Aiste Stancikaite for TIME

The method he discovered made him the winner of the 2019 Google Science Fair. It uses a magnetic liquid called ferrofluid which, when added to water, sticks to microplastics. Magnets can then be used to remove the ferrofluid from the water, along with more than 85% of microplastics, according to Ferreira.

Ferreira lived far from any labs, so he built most of the equipment he needed to test his method at home. There were hiccups along the way as he developed a spectrometer to measure microplastics in the water. "Some worked, some didn't, some things blew up, some caught fire," says Ferreira. "My parents weren't very happy with me when the fuses of our house were constantly blowing."

Now, Ferreira is a student at the University of Groningen, in the Netherlands. After graduation, he wants to continue his research and inspire greater interest in STEM. "The more people who have engaged in science generally, the more ideas we generate," he says. —*Karena Phan*

5. Frank Epperson (Age 11) – Popsicle



[Image Source](#)

On a winter's night in 1905, the temperature in San Francisco had fallen to a record low, by chance freezing a concoction that 11-year-old Frank Epperson had left out on the porch. As the story goes, Epperson mixed soda water powder and water in a glass and then left the stirring stick in the mixture. After a night out in the cold, the mixture had frozen solid – and the accidental inventor had created the world's first Popsicle.

Epperson didn't do anything more with his invention until 1922, when he gave out the treat at a fireman's ball. Everyone loved it so much that he patented his idea under the name "Eppsicle." However, he changed the name after his children started calling the treat a "Popsicle." Epperson sold on the rights to the Popsicle brand name to New York's Joe Lowe Company in 1925. Three years later, Popsicle sales had topped 60 million, bringing Epperson royalties on each sale.

George Nissen: Trampoline

George invented the trampoline in 1930 at the age of 16. He came up with the idea after seeing trapeze artists drop into a net at the end of their performance. He thought the act would be more exciting if they kept bouncing around so he began working in his parent's garage. The original invention had a metal frame and a canvas stretched over it, but as he got older he perfected the design with a nylon canvas, giving it more bounce.



MARTINAN/GETTY IMAGES

Trampoline

If you love to bounce, you can thank [George Nissen](#). At age 16, he invented the trampoline after watching trapeze artists drop into the safety nets beneath them. He thought it would be cooler if they could bounce out of the net instead. The trampoline turns 90 years old this year; it was invented way back in 1930. Find out [the most famous invention from your state](#).

Gitanjali Rao

Gitanjali Rao, 14, is already a seasoned inventor. In 2017, she won the 3M Young Scientist Challenge for a device called Tethys that uses carbon nanotube sensors to detect lead in drinking water. A year later, she won a prize in the TCS Ignite Innovation Student Challenge for inventing Epione, a tool that diagnoses early-stage prescription opioid addiction. "So many teens, especially my age, were starting to get addicted," she says. Epione works by testing blood for increased protein production in a specific gene. Gitanjali's latest brainchild is Kindly, an app that spots and prevents cyberbullying messages. Beta testing began last year.

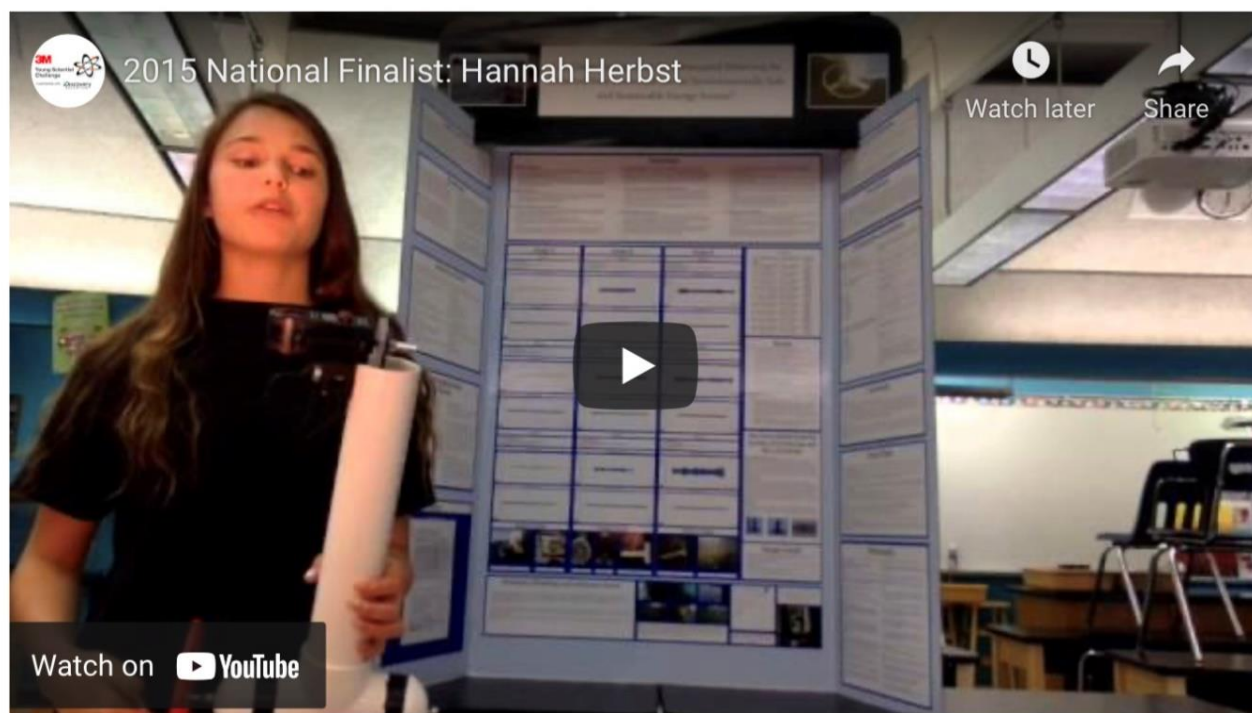


Illustration by Aiste Stancikaite for TIME

In what remains of her spare time, Gitanjali enjoys teaching; her "innovation sessions" have attracted about 20,000 young people. "I want to work with students to find and develop their passion for STEM," she says. —*Jaime Joyce*

Inventor #4: The 15 Year Old & Her Ocean Energy Probe

Hannah Herbst wants to provide fresh water and a source of sustainable power to people in developing countries. So she invented the Ocean Energy Probe, a device that converts ocean currents into usable power through a generator. Hannah 3D printed her design after modeling it using CAD, and she estimates that if she scales up her prototype she'll be able to convert enough current into energy to power three car batteries in under one hour! Hannah wants to use her invention to power water desalination pumps to convert salt water to potable water. "I'm excited to aid the world's energy crisis. I can't wait to save lives with my invention!" Hannah's invention won first prize in [Discovery Education & 3M's Young Scientist Challenge](#).



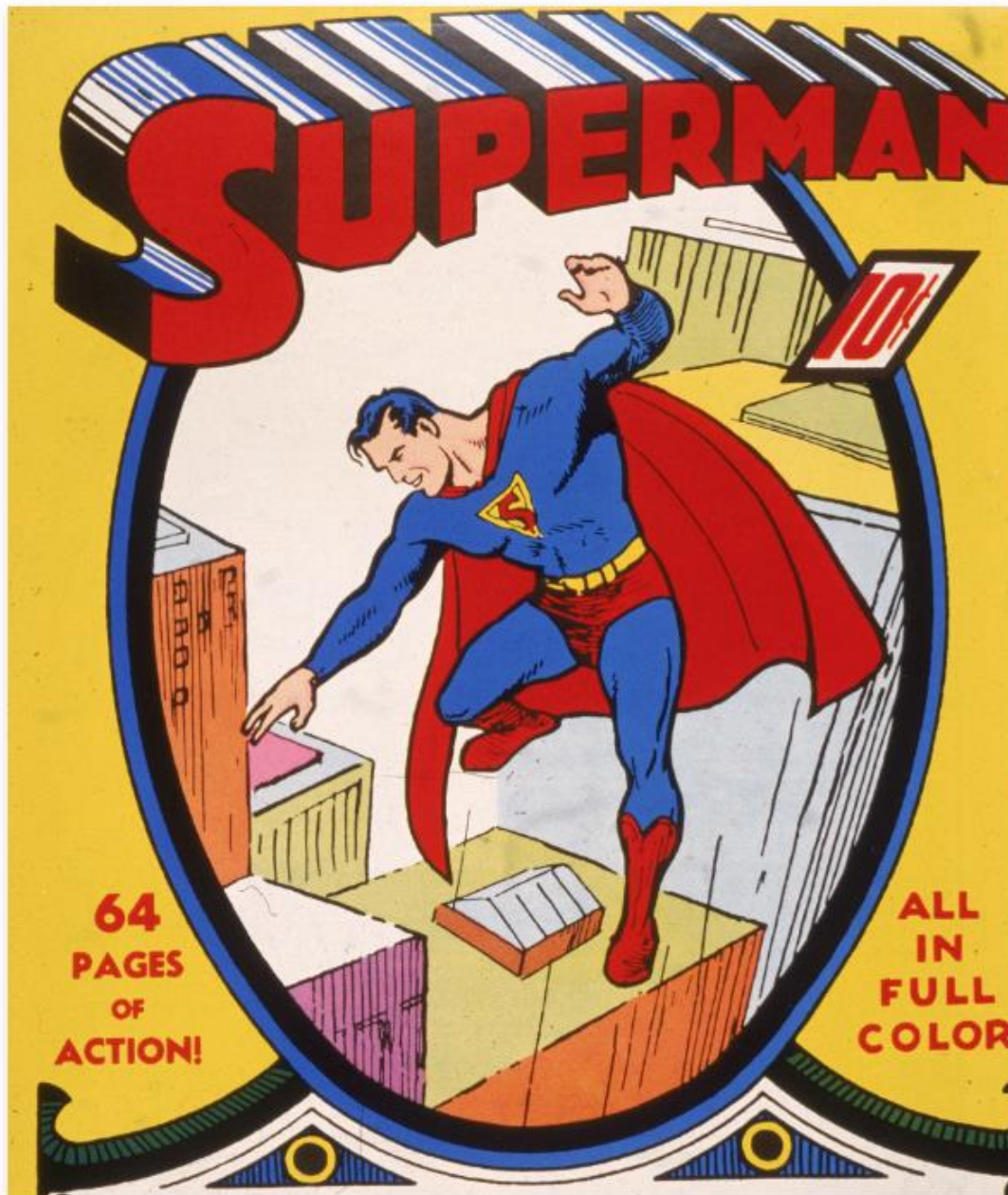
6. Hart Main (Age 13) – ManCan



Image Source

Hart Main's business started out with a joke. In 2010, the 13-year-old made fun of the girly-scented candles his sister was vending at a school fundraiser and kidded that she ought to try more manly scents. However, his parents overheard him and encouraged Main to pursue the idea himself. So it was that Main used \$100 he had earned from his newspaper route and gave it a go. He purchased scents and wax online and decided to make his ManCan candles in recycled soup cans, choosing aromas like Coffee, New Mitt, Bacon and Fresh Cut Grass.

Main's imaginative product also serves a dual purpose. To empty the soup cans, Main donates their contents to soup kitchens across Ohio, before cleaning the recycled cans and using them for his candles. Two years after ManCans' inception, business was still booming – so much so that Main rented warehouse space and employed five people part-time and had to upgrade with his automation solutions with <https://www.aagard.com/> to cover his orders. In 2011, he shifted 25,000 ManCans.



HULTON ARCHIVE/GETTY IMAGES

Superman

The Man of Steel was first imagined by a pair of 17-year-olds, **Jerry Siegel and Joe Shuster**, in 1933 and made his first appearance in comics in 1938. Some comic book historians believe the origin of the idea came from the death of Siegel's father Mitchell in an armed robbery at his store.

Joseph-Armand Bombardier: Snowmobile

Joseph was always interested in mechanics and in 1922, at the young age of 15, he invented the snowmobile. According to Mental Floss, "He mounted the engine of a Ford Model T to four runners, with a handmade propeller perched on the back." The original model of the invention traveled half a mile across the snow before finally stopping. He continued to tinker with the invention and by 1959 he had created the Ski-Doo AKA the world's first ultralight snowmobile model.



THEPALMER/GETTY IMAGES

Snowmobiles

Joseph-Armand Bombardier, 15, strapped a car engine to four ski runners and a propeller to create the very first of these fun wintertime vehicles way back in 1922. He tinkered with it for years, before releasing the ultra-popular Ski-Doo. Here are **7 inventors who actually regretted their inventions.**

3. Kelly Reinhart (Age 6) – T-Pak



[Image Source](#)

Whilst stuck indoors one rainy afternoon, six-year-old Kelly Reinhart's parents challenged their daughter and her siblings to draw a picture of an invention. The prize for coming up with the best idea was getting a prototype made. Inspired by cowboy gun holsters, Reinhart drew a thigh pack that would allow kids to carry their video games around.

After getting feedback from other children, Reinhart and her parents made improvements to the design and obtained a patent in 1998. They started out selling the packs at flea markets and trade shows, but interest grew, and pretty soon they had an investor for their company T-Pak International. Reinhart's father even became his daughter's full-time employee. The company's earnings were invested in other companies, he explained, adding that if they had kept the profits, "we would have made millions." In 2001, his industrious daughter sold the firm, at the age of nine. Then in 2002, Reinhart started her own non-profit organization to teach other kids how to become inventors.

Inventor #2: The 18 Year Old & His Alzheimer Alert System

Alzheimer's disease is the fastest-growing threat to Americans' health, and its symptoms not only affect the patients, but also their loved ones. Kenneth Shinozuka knows this all too well. He remembers being 4 years old, walking in a park in Japan with his grandfather, when his grandfather suddenly got lost. It was then that his family learned that his grandfather has Alzheimer's. Kenneth needed a way know when his grandfather wandered out of his bed in the middle of the night. So at age 15, Kenneth designed a sock with a pressure sensor that, when activated by a step, would send a message to the smartphone of his grandfather's caretakers. Not only was Kenneth successful in taking care of his grandfather, but his invention won first prize and the \$50,000 Scientific American Science in Action Award. Kenneth is now attending Harvard, and was a judge in our [Invent For Good](#) challenge. You can learn more in Kenneth's TED Talk from 2014.



7. K-K Gregory (Age 10) – Wristies



[Image Source](#)

In 1994, 10-year-old Massachusetts native Kathryn "KK" Gregory was playing in the snow when her wrists began to hurt from the cold. Determined to find a way to keep her hands and forearms warm and dry during the winter, she invented Wristies – fuzzy "sleeves" that can be worn beneath coats and mittens. After testing them out on her Girl Scout troop, Gregory and her mother worked hard to get the invention off the ground. Gregory says that she enjoyed learning so much about business, even at that tender age. "As the inventor of Wristies, my childhood was not like most kids. My mom and I went to meetings with the patent attorney, shopped for fabrics and met with companies like Turtle Fur to write license and sale agreements," she recalled.

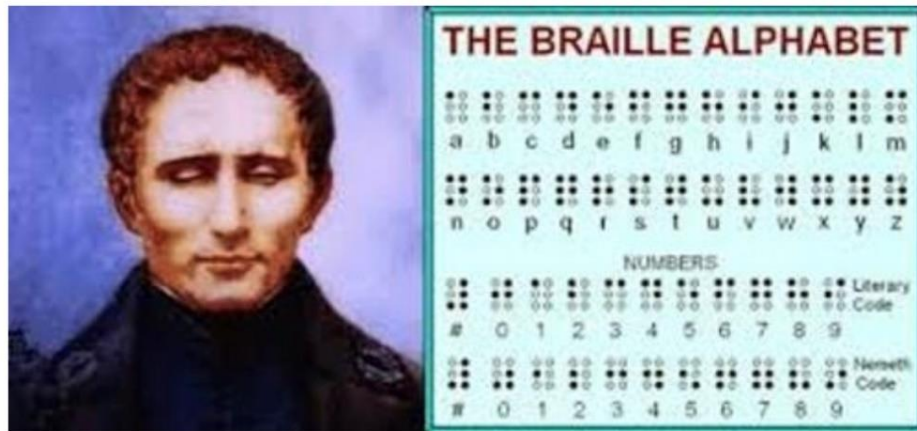
In 1997, Gregory appeared on the QVC Network to promote Wristies. She was the youngest person to sell a product on the network, and the spot earned her \$22,000 in sales within six minutes. Gregory went on to discover rock climbing, major in humanities at Southern New Hampshire University and travel the world. She also spent several years working as a videographer. In 2010, 16 years after inventing Wristies, she returned to business and is now the CEO of Wristies, Inc.



Inventor #1: The 11 Year Old Cancer Survivor & Her Pediatric Backpack

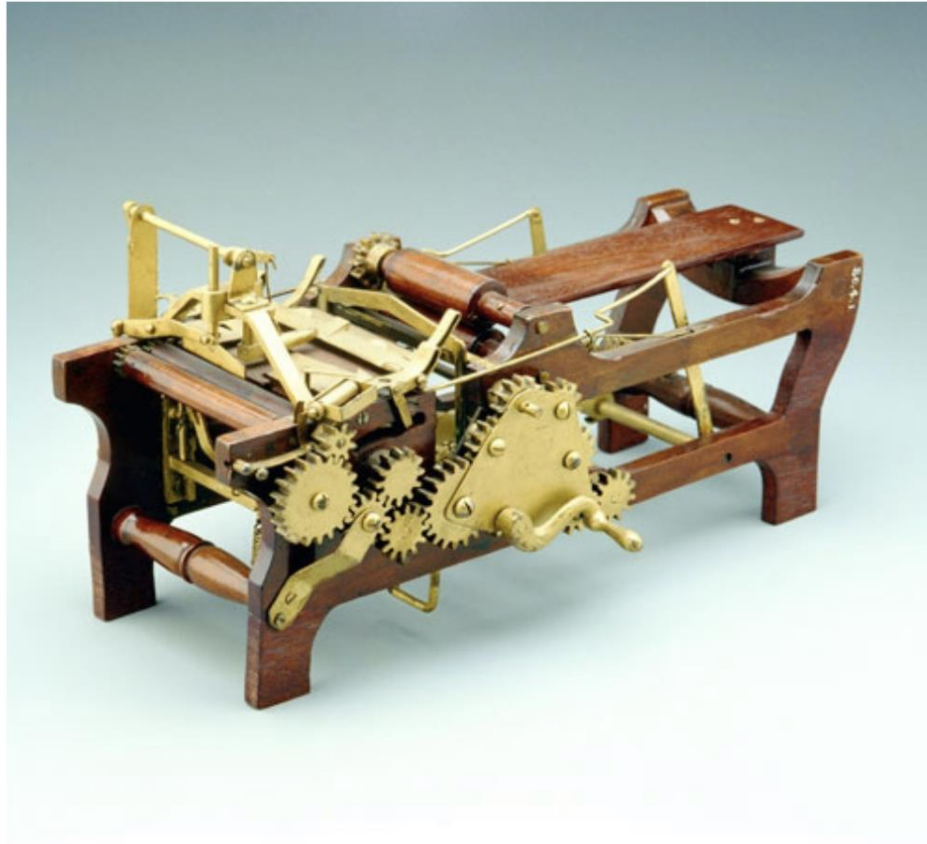
After beating cancer at age 9, Kylie Simonds wanted to solve a problem that plagued chemotherapy patients. During her time in the hospital, Simonds' movement was limited due to being connected to a large IV bag. Simonds told [ABC News](#) that she remembered "tripping over all the wires, getting tangled up and having to drag this big thing around." So she designed and built a Pediatric IV Backpack that allows children receiving medical transfusions to move around, and makes their treatment a little more bearable. Kylie Simonds is currently taking donations on her [GoFundMe page](#) in hopes of manufacturing her backpacks and turning her invention into a product.

Louis Braille - 15 years old



When Louis Braille was three years old, a tragic accident caused the loss of his sight. As a teenager studying at The National Institute for Blind Youth in Paris, he found that the school's specially embossed books were unwieldy and difficult to read. After a visit from French soldier Charles Barbier in 1821, fifteen year old Braille was inspired to adapt Barbier's code language 'sonography' - a system of feeling raised dots that allowed soldiers to communicate in the dark - into his famous system for visually impaired reading that is still used the world over.

Margaret Knight - 12 years old



Margaret E. Knight, Patent Model of Machine for Making Paper Bags

Mattie Knight - often referred to as 'the female Edison' - was the 19th century's most famous woman inventor. Credited with almost ninety inventions - including, most famously, the flat bottomed paper bag - she has been inducted into the American National Inventors Hall of Fame in 2006. Born in 1838, Knight came up with her first major invention at just the age of 12. Working at a cotton mill, she witnessed the unfortunate death of a young boy who was struck by the loose shuttle of a textile loom. Knight went away and developed a safety mechanism that prevented the shuttle coming free, a design that was so effective that it became universally adopted and saved countless workers from injury or death.

Inventor #5: The 10 Year Old & His Self-Disinfecting Hazmat Suit

While following coverage of the Ebola scare of 2014, 9 year old Mark Leschinsky of Mahwah, New Jersey, felt that he wanted to help. He saw a problem in the way hazmat suits were designed, realizing that “900 healthcare workers got infected despite wearing conventional suits.” So Mark invented a Self-Disinfecting Hazmat Suit designed to keep workers safe when treating patients. The suit has three layers, an impenetrable inner layer, a center layer with pockets filled with disinfecting solution, and an external perforated layer that lets the solution out to kill viruses on the suit. In 2015, Mark was inducted into National Gallery of Young Inventors. PopSci visited Mark last October to learn more about his life-saving invention.



Neil Deshmukh

Neil Deshmukh's introduction to AI came three years ago. In a ploy to keep his little brother out of his room and away from his Nintendo DS, at age 14 Neil built a device that could recognize the difference between his face and his brother's and would unlock the door accordingly. "In the very beginning, I was a tinkerer," he told TIME.

Now 17, Neil lives in Macungie, Pennsylvania, and has created two apps. He is the founder of PlantumAI, which uses crowdsourced data to assist farmers around the globe with detecting and diagnosing variations of crop disease. He also cofounded VocalEyes, at MIT Launch. This app helps people who are blind or have low-vision to "see" by audibly describing photographs shot on a smartphone. Both of the problems Neil chose to tackle are personal. He witnessed the devastation of crop disease firsthand on a visit to the Indian village near where his parents were born, and his grandmother has low-vision, so he set out to create VocalEyes with her in mind.

Neil's work has won international and country-wide contests, including ones held by companies such as Google, T-Mobile, and General Motors. He advocates for increased human involvement in AI. "AI can't replace fundamental human contact," Neil says. "I like to put power in the hands of the users themselves." —
Rebecca Katzman



Illustration by Aiste Stancikaite for TIME

Param Jaggi - 16 years old



All the inventors on this list made their breakthroughs a long time ago, but that doesn't mean that the spirit of invention isn't present in today's young generation. Param Jaggi started working with environmental technologies when he was just 13, and a few years later while learning to drive he was inspired to build a device that converted the carbon dioxide emitted from a car into oxygen. His invention - the Algae Mobile - was patented in 2011 and has won countless awards, and has been tipped to potentially one day revolutionise air quality. He was recently included on a [Forbes 30 under 30](#) list of innovators that are changing the energy sector.

Philo T. Farnsworth - 15 years old



Many fifteen year olds spend far too much time watching television; at the same age, Philo T. Farnsworth was busy inventing it. Born in 1906, his teenage years Farnsworth had already completed a number of sketches and designs for instruments that would eventually be crucial to the invention of the television. Most famously, Farnsworth would go on to design the first video camera tube - or 'image dissector', as he called it. (Fun fact: He was also the inspiration behind the name of [Futurama's Professor Farnsworth](#).)

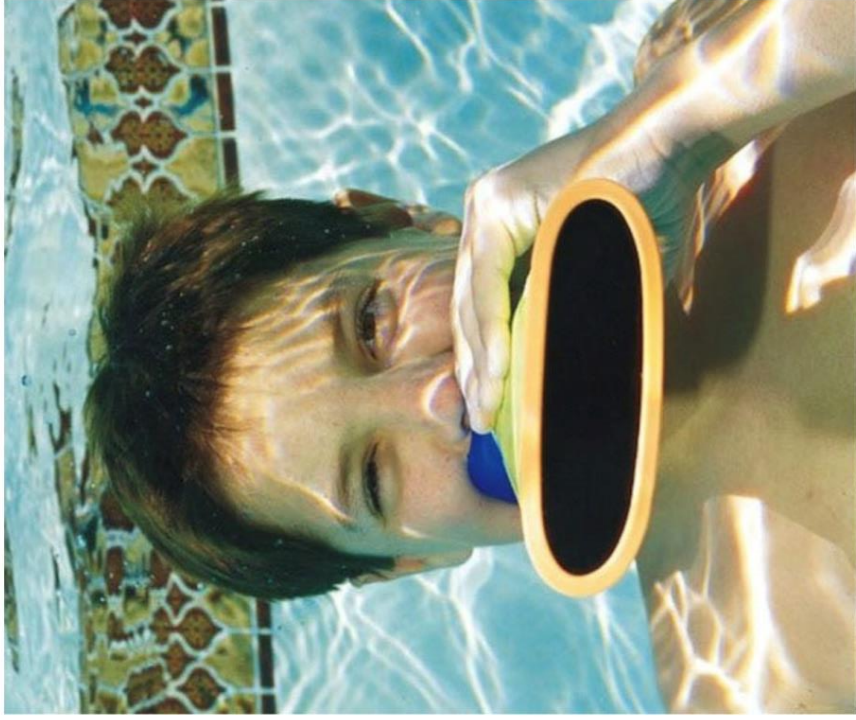


FOTOKOSTIC/GETTY IMAGES

Water skis

At 18, Ralph Samuelson wanted to combine his passion for snow skiing with his love of the water and aquaplaning. In 1922, he built his **first water skis** from strips of wood by softening the ends and bending them up.

9. Richie Stachowski (Age 10) – Water Talkie



In 1996, 11-year-old Richie Stachowski went on a trip to Hawaii with his family. "I was surfing with my dad. When we dove under, there were so many beautiful things to see. I wished we could talk underwater," said Stachowski. After finding out that there were no inventions for this kind of sub-aquatic communication, Stachowski started researching underwater acoustics and trying out prototypes in the family pool and the public pool too, he got the [pool management](#) staff interested and they let him tinker away. Eventually, he came up with the Water Talkie – a conical device with a blow valve and plastic membrane that enables swimmers to talk with one another underwater from as far as 15 feet away.

Next, Stachowski went to New Jersey and pitched his idea to Toys"R"Us. At the end of the interview, he had an order for 50,000 units. With the help of his mom, Stachowski started a company called Short Stack LLC (named in honor of his love for pancakes) and went on to invent other successful pool toys. Then in 1999, at age 13, he sold his company to Wild Planet Toys. While it has been reported that Stachowski made millions through the deal, Wild Planet said that the sale was worth less than that but would not disclose the exact amount, only divulging that it was "a substantial amount of money."

Riya Karumanchi

When she was 14, Riya Karumanchi met a woman who used a white cane to navigate. Riya was surprised that even with the cane, the woman struggled to get around. As a tech-obsessed teenager, she assumed the cane came loaded with cutting-edge technology. "It's just a stick," Riya says. "My initial thought was like, What? How is nobody working on this?" So she engineered a device now called SmartCane. This stick can sense wet surfaces and other obstacles, vibrating to alert the user to treacherous situations. GPS navigation gives directions using patterned vibration and audio. An emergency button acts as a lifeline to emergency responders or loved ones.



Illustration by Aiste Stancikaite for TIME

Riya is now 16, the SmartCane team numbers three, and the effort has more than \$83,000 in funding. The team's hope is to one day distribute the product through the Canadian National Institute for the Blind. —*Shay Maunz*



PATTAMA M/SHUTTERSTOCK

Toy trucks

One of the very youngest inventors was Robert Patch, who was **granted the patent for the toy truck** when he was just six years old, back in 1963. He built his prototype out of bottle caps and cardboard, and his invention was meant to be taken apart and refashioned into different types of trucks, like a very early Transformer.

4. Sarah Buckel (Age 14) – Magnetic Locker Wallpaper



[Image Source](#)

In 2006, Sarah Buckel had just finished the eighth grade when she dreamt up the idea for magnetic locker wallpaper. Like her peers, Buckel loved to decorate her school locker – but dreaded scraping it clean at the end of the year.

When her father became chief operating officer at MagnaCard, Buckel asked him to make magnetic wallpaper for her. He thought it was a great idea – and just what the company needed. “We were a neat little company with boring products,” he said. When he heard his daughter’s idea, he knew he’d struck gold. Buckel helped choose patterns and age-appropriate accessories that contributed to the product’s success. The magnetic locker decorations were sold at Target, Rite Aid and Staples, and within one year, Sarah Buckel’s invention had made \$1 million in sales.

Shubham Banerjee

Like many kids, Shubham Banerjee had a love for LEGO. But instead of building spaceships, he used the classic plastic bricks to address an issue that affects visually impaired people around the world: a lack of accessible braille printers.

Shubham was born in Hasselt, Belgium, and moved to California with his family when he was 4. At age 12, while contemplating science-fair topics, he was inspired by a flyer asking for donations for the blind. Shubham used the materials in his LEGO Mindstorms EV3 robotics kit to create the first open-source, portable braille printer.



Illustration by Aiste Stancikaite for TIME

After winning first prize in the science fair, Shubham founded Braigo Labs Inc. with his parents. A more advanced, non-LEGO prototype for the printer followed later that year, in collaboration with Intel Capital and other investors. At \$350, Shubham's design would be about five times more affordable than the standard industry printer.

Now 18, Banerjee is a freshman at the University of California, Berkeley. He's focused on his studies in Business and Engineering. "Right now, I'm on the studious grind," he says. The final Braigo product is still to come, in one form or another—Shubham holds the patents to the printer and is considering his options for moving the company forward. —*Ellen Nam*

Xóchitl Guadalupe Cruz López

When she was 8, Xóchitl Guadalupe Cruz López lived in a home that was often without hot water. The same was true for many other residents of San Cristóbal de las Casas. “People here have to take baths with cold water. They have a lot of respiratory diseases,” she told *TIME* through an interpreter. “I wanted to do something.” So Xóchitl created Warm Bath, a solar-powered water heater made of easy-to-get recycled objects, including water bottles, plastic connectors and rubber hose. It costs about \$30 to assemble.



Illustration by Aiste Stancikaite for *TIME*

Xóchitl made Warm Bath with the National Autonomous University of Mexico's adopt-a-talent science program, PAUTA. In 2018, she was the first child to receive the university's Institute of Nuclear Sciences' Recognition for Women award. Now 11, Xóchitl plans to apply for a patent this year. —*Constance Gibbs*