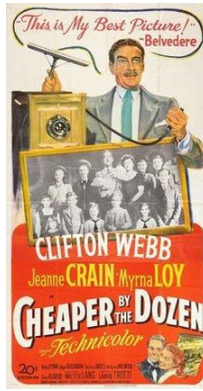


Mother of invention



Cheaper By the Dozen (1950) is the true story of motion study experts and industrial management pioneers Frank Bunker Gilbreth (1868-1924) and Lillian Moller Gilbreth (1878-1972) and their family of 12 children, six girls and six boys. Both Frank and Lillian Gilbreth were important figures in real life. After her husband's death Lillian went on to become the world's leading efficiency expert and the [*TIME* magazine](#) Woman of the Year in 1948. She is credited with transforming the efficiency of the kitchen workspace inventing and applying ergonomic principles to the home.

The true story of how an industrial psychologist, and mother of 12, revolutionized the way we cook and clean....



While Frank Gilbreth was alive, he and Lillian worked for industry. She wrote or co-wrote many of his books, but often took no credit, as the male executives only wanted to deal with her husband!

After his sudden death in 1924, Lillian had to re-establish herself as a solo female practitioner. In the 1940s, what Gilbreth called “circular routing” became known as the kitchen “work triangle,” a concept that designers still rely on today. In an efficiently planned kitchen, the perimeter of the triangle formed by stove, sink and refrigerator should be no greater than 26 feet, with a typical distance of 5.5 feet between appliances. By no means the most exciting invention ever, but Lillian also went on to invent the pedal bin. We can see how her experiences as a mother and engineer led her to that!

Women Inventors

Stories of invention -

International Women's Day 8th March 2018

Have you ever observed a problem or situation and thought wouldn't it be great if?

Today's lesson is about the woman that did!

“Create the things you wish existed...”

Get **SAVVI** HEALTH

Women Inventors

A Sampling of Women Inventors and Their Inventions

2000



Mandy Haberman invented the Haberman Feeder, a special bottle for infants with sucking difficulties and the Anywayup Cup, the world's first non-spill cup.



1995

Isabella Helen Lugoski Karle developed a 3D modelling process to identify and show the structures of hundreds of complex and important molecules resulting in the number of published molecular analyses increasing from about 150 to over 10,000 per year.



1966



Stephanie Louise Kwolek invented Kevlar, a polymer fibre five times stronger than the same weight of steel, used in bullet-proof vests, helmets and trampolines, etc.



1965



Ann Moore invented the Snuggly baby carrier.

1959



Rosalyn Sussman Yalow and Dr Solomon A Benson co-invented the radioimmunoassay (RIA), a method of chemically analysing human blood and tissue, used to diagnose illness like diabetes, detect drug use, high blood pressure and infertility, etc.

RIA

1952



Virginia Apgar invented the Apgar tests which evaluate a baby's health upon birth.



Patsy O Sherman invented Scotchgard™, a versatile fabric stain repellent and material protector.



Grace Murray Hopper invented the computer compiler (A-O) which translated high-level instructions into machine code and with a team developed the first user-friendly business programming language, COBOL. (There is an unconfirmed story that an error in the early Mark II computer was caused by a trapped moth, coining the term "computer bug".)



1951



Marion Donovan invented the disposable diaper.



1950



Bessie Neamith invented Liquid Paper®, a quick-drying liquid used to correct mistakes printed on paper. It was based on white tempera paint (Neamith was also an artist).



1944



Gertrude Belle Elion invented many drugs, including 6-thioguanine which fight leukemia. She is named on 45 patents for drugs and her work has saved the lives of thousands of people.

1935



Katharine Blodgett, an American physicist, invented a micro-thin barium stearate film that makes glass completely nonreflective and "invisible", used in eyeglasses, camera lenses and telescopes, etc.

1917



Ida Forbes invented the electric hot water heater.



1904



Elizabeth Magie created The Landlord's Game, teaching players about the unfairness of land-grabbing, disadvantages of renting, and the need for a single land value tax on owners. Magie patented the board game in 1904 and self-published it in 1906. Nearly 30 years later, Charles Darrow changed the board design and message and sold it as Monopoly.



1903



Mary Anderson invented the windshield wiper.



1899



Florence Parpart invented the street-cleaning machine.



1891



Catherine Deiner invented the rolling pin.



1887



Maria Beaseley invented the Life raft.



1886



Josephine Cochran invented the first working automatic dishwasher.



Anna Connelly invented the fire escape.

1881



Mary Walton invented the elevated railway.



1875



Ellen Fitz, an American governess who worked in Canada, patented her invention for globes which mounted the earth, showing the sun's position, the length of days, nights and twilight for the entire year.

1859



Sarah Mather invented the submarine lamp and telescope.



1813



Tabitha Babbitt invented the circular saw. She was the first to suggest that lumber workers use a circular saw instead of the two-man pit saw that only cut when pulled forward. She made a prototype and attached it to her spinning wheel. Babbitt's Shaker community didn't approve of filing a patent, but they took full advantage of the invention.



Martha Coston invented signal flares, after finding plans in her late husband's notebook. She spent 10 years working with chemists and pyrotechnics experts to make the idea a reality, but was only named administratrix in the patent (Her husband got credited as the inventor).



Women inventors

Copy
keyword

At the end of the 20th century, only 10 percent of all patents were awarded to female inventors. It's not that women lack ingenuity or a creative spirit, more that women have faced many hurdles in receiving credit for their ideas.

Property laws prevented many women from acquiring **patents** for inventions. Women were also less likely to receive a technical education that would help them turn an ingenious idea into an actual product. Many women faced prejudice and ridicule when they sought help from men in actualizing their idea. And some women came up with ideas that would improve life in their households, only to see their inventions treated with scorn for being too *domestic* and thus unworthy of praise.

The dishwasher was an example of a very hard to market invention by a woman! People exclaimed 'why would anyone want one when a woman could simply do the job!'

Keyword: **Patent** -A licence granting the sole right to exclude others from making, using, or selling an invention.

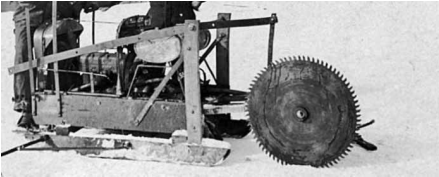

1. What percentage of patents were awarded to women in the 20th century?
2. Give 3 examples of the hurdles which made it difficult for women to receive credit for their inventions.

EXT: Why do you think this could be turned on it's head to make it an advantage?


Task

- Study one of the women inventors profiled in your chronologically muddled sheets.
- Can you organise the information and clues to help you write a story of how the insight and experiences of your woman inventor led to the invention?


Tabitha Babbitt - circular saw

<p>She came up with a prototype, attaching a circular blade to her spinning wheel. Using the pedal of her wheel to power it.</p>		<p>Her basic design was soon copied and popularizing the use of the circular saw in mills.</p>	<p>She observed men cutting wood with a pit saw, a two-handed saw that requires two men to pull it back and forth. This only cuts the wood when it's pulled forward; the return stroke is useless.</p>
<p>Babbitt realized a round blade would be more efficient.</p>	<p>The community thrived on the forestry industry, and she would observe men hard at work sawing logs.</p>	<p>Sarah Tabitha Babbitt (1779-1853) was a quiet weaver living in a Shaker community in Massachusetts.</p>	<p>It's one of history's great ironies. Then and now, construction has been a field dominated by men.</p>
<p>As the blade spun, no movement was wasted. Wood could be cut faster with half the manpower needed for the pit saw.</p>		<p>She did not patent the circular saw so that it could be used by others,</p>	<p>In the late 18th century, a religious sect known as the Shakers emerged. Shakers valued living communally (albeit celibately), equality between the sexes and hard work.</p>



Bette Nesmith Graham - liquid paper

<p>Using her blender Bette mixed up a water-based tempera paint with dye that matched her company's stationery.</p>	<p>Mainly used to correct typewriting the past, correction products now mostly cover handwriting mistakes</p>	<p>She took it to work and, using a fine watercolor brush, she was able to quickly correct her errors. Soon, the other secretaries were asking for the product</p>	<p>One day, Bette watched workers painting a display on a bank window. She noticed that when they made mistakes, they simply added another layer of paint to cover them up</p>
<p>She made a mistake by typing in <i>her</i> company name (Mistake Out Company at that time) instead of her employer's name (Texas Bank and Trust) on a piece of correspondence.</p>	<p>It was the 1950s, and the electric typewriter had just been introduced. Bette Nesmith Graham was not a very good typist.</p>	<p>She believed that women could bring a more nurturing and humanistic quality to the male world of business, and did so herself by including an employee library, and a childcare center in her new company headquarters in 1975.</p>	<p>She renamed the product Liquid Paper and receive a patent in 1958.</p>
<p>Secretaries often found themselves retyping entire pages because of one tiny mistake, as the new model's carbon ribbon made it difficult to correct errors.</p>	<p>By 1968, the product was profitable, and in 1979 the Liquid Paper Corporation was sold to the Gillette Corporation for \$47.5 million with royalties.</p>	<p>Bette was fired from her job for spending so much time distributing what she called "Mistake Out,"</p>	 A photograph of a white plastic bottle of Tipp-Ex Rapid correction fluid. The bottle has a white cap and a blue label with the brand name 'Tipp-Ex' in red and 'Rapid' in white on a blue background. Below the name, it says 'Supercorrection' and 'Corrigez sans Corriger sans'. The volume '20 ml' is printed at the bottom of the label. Next to the bottle is a white plastic applicator brush with a long handle and a flat, brush-like tip.


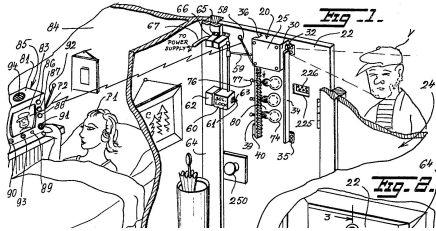
Stephanie Kwolek - Kevlar

<p>The spinneret operator almost refused to let Kwolek use the machine to test her new found fiber as he was convinced it would ruin the spinneret.</p>	<p>Kevlar is used to make bulletproof vests, so even though Kwolek didn't make it to medical school, she still saved plenty of lives.</p>	<p>She was amazed at her new fibre - it would not break when nylon typically would, and had a stiffness at least nine times greater than anything she'd made before! She and her supervisors immediately recognized the significance of her discovery, and the company set to work creating applications for this incredible new fibre.</p>	<p>Aside from protective clothing, the fibre is found in a variety of products, including aeroplanes, mobile phones, and sailboats.</p>
<p>The inventor of Kevlar, the lightweight fibre used in bulletproof vests and body armour, has died aged 90</p>		<p>Whilst experimenting Stephanie created a strange solution. It should have been a clear, thick fluid, like nylon polymer, but instead was thin and cloudy. "I think someone who wasn't thinking very much or just wasn't aware would have thrown it out." But her curiosity and passion for discovery won out.</p>	<p>As part of her job she was given the task of finding a new lightweight strong fiber to use for light but strong tires.</p>
<p>Bullet proof vest, which are tailored to each officer's body, can cost between \$700 and \$1,000.</p>	<p>DuPont was founded in 1802 as a gunpowder mill by American chemist and industrialist Éleuthère Irénée du Pont. In the 20th century, DuPont developed many innovative polymers such as nylon, lycra, teflon and kevlar.</p>	<p>DuPont realized that there was a need for a new type of tyre as a gasoline shortage was anticipated. Her group began researching how to turn polymers into extra strong synthetic fibers.</p>	<p>Stephanie Kwolek took a position at DuPont in 1946 so she could save enough money to go to medical school. It was just supposed to be a temporary job.</p>

Mary Anderson- windscreen wiper

<p>Cars had not yet captured the American imagination and were quite rare when Anderson took that trip</p>	<p>When she returned home, Anderson developed a squeegee on a spindle that was attached to a handle on the inside of the vehicle.</p>	<p>Rain and snow were thought to be things drivers had to deal with, even though they resulted in poor visibility!</p> 	<p>When in 1905 Anderson tried to sell the rights to her invention they rejected her application saying "we do not consider it to be of such commercial value as would warrant our undertaking its sale."</p>
<p>Now when the driver needed to clear the glass, he/she simply pulled on the handle and the squeegee wiped the precipitation from the windshield.</p>	<p>10 years later, thousands of Americans owned a car with her windshield wiping invention.</p>	<p>In November 1903 Anderson was granted her first patent for an automatic car window cleaning device controlled inside the car, called the windshield wiper.</p>	<p>At the dawn of the 20th century, Mary Anderson went to New York City for the first time. Whilst being driven in terrible weather conditions Mary made a ground breaking observation.</p>
<p>She noticed that rather inconveniently the driver had to stop the vehicle every few minutes to wipe the snow off his front window.</p>	<p>By 1893, Mary Anderson had moved west to California where until 1898 she operated a cattle ranch and vineyard.</p>		<p>Simpsons debate about about gender equality:</p> <p>Marge: "Well, a woman also invented the windshield wiper!"</p> <p>Homer: "Which goes great with another male invention, the car!"</p>

Marie Van Brittan Brown - cctv

<p>Marie Van Brittan Brown (October 30, 1922 – February 2, 1999) was an African-American inventor, becoming the originator of the home security system.</p>	<p>The crime rate in their neighborhood had increased, and everyone in the neighborhood knew that police response time in their area was notoriously slow.</p>	<p>The system included a device that enabled a homeowner to use a television set to view the person at the door and hear the caller's voice</p>	<p>Marie Brown's invention was listed in her husband's name. As a black woman on her own, it would have been very difficult to sell an idea into what was totally a male business world. They did not profit from her invention.</p>
	<p>If the homeowner was concerned about the person at the door, a button could be pushed that would sound an alarm to signal. If, however, the person was a friend, a button could be pushed that would unlock the door remotely so that the visitor could come in.</p>	<p>The popularity and potential of Brown's device also led to the more prevalent CCTV surveillance in public areas, 100 million concealed closed-circuit cameras are now in operation worldwide.</p>	<p>The patent drawings show a receiver resembling a small bedside television set, with a screen displaying a video picture of the visitor....A microphone and speaker permit voice communication with the visitor.</p>
<p>Brown needed a way to feel safer in her apartment. Specifically, she wanted a way to see and hear who was at the door — from any room in the house.</p>		<p>Brown envisioned a series of three to four peepholes at various heights; a camera would slide over these peepholes to assess the outside area.</p>	<p>She became a nurse, who like most nurses, did not work regular 9-5 hours. Her husband, Albert Brown, was an electronics technician. When she was home alone at odd hours of the day or night, she sometimes felt concerned.</p>

Emily Cummins



Emily is an award-winning inventor and entrepreneur whose interest in sustainable design led her to create several life-changing products including a sustainable fridge. It's powered by dirty water and keeps the contents clean and cool. Living in an African township, she refined her fridge before giving away the plans to help improve the quality of life for millions of people living in poverty across southern Africa.

As a result of her work, Emily was named as One of the Top Ten Outstanding Young People in the World 2010. She's here to talk about the importance of turning thoughts into deeds and deeds into life saving products that can be accessed by all.

All of these things were invented by women!

- Syringe
- Car heater
- Central heating
- Fire escape
- Disposable nappy
- Windscreen wiper
- Dishwasher
- Pedal bin
- Tippex (liquid paper)
- Life raft
- Spill proof cup....



Homework



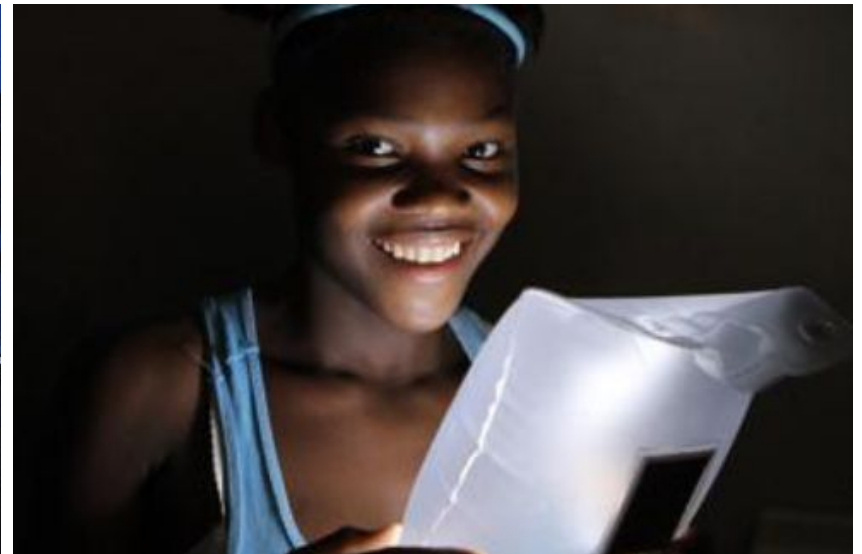
Homework - Produce a case study on one famous invention by a woman of your choice. Write/present at least 5 interesting facts detailing their story of invention.

You can find out about *Josephine Cochrane*, *Emily Cummins*, *Mandy Haberman*, *Maria Beasley*, *Anna Stork* and *Andrea Sreshta of Luminaid*, or any product/innovation that interests you.



When we think of our most basic human needs, we often think of food, water, and shelter. But when architecture graduate students Anna Stork and Andrea Sreshta were asked to design a product to assist post-earthquake relief efforts in Haiti, they considered the dangerous conditions at night in the tent cities and turned their attention to another critical need: Light.

- 1000 LuminAID solar lanterns are distributed in Haiti as part of the Give Light, Get Light program after Hurricane Isaac.
- A second utility patent is filed for the LuminAID design (which has since been filed internationally).
- CNN's *Start Small, Think Big* features LuminAID solar lanterns. Chicago Booth's Social New Venture Challenge awards first place and \$25K to LuminAID's budding start-up.



In 2010 there was a huge earthquake in Haiti. Andrea and Anna, who were studying at University at the time wanted to design something that could help.

They considered the dangerous conditions at night in the tent cities and turned their attention to another critical need:

Light

They invented an idea for an inflatable solar light that packs flat.



luminAID[®]



LuminAid is LAUNCHED! **2011**

They file for their first prototype and begin to field test their invention.

It is launched with the funding from a crowdfunding campaign that raised 500% of their target.

2017

Camping Lantern
Watersport Light
Night Light
Reading Light
RV Lighting
Emergency Flashlight
Phone Charger

1000 LuminAID solar lanterns are distributed in Haiti as part of the Give Light, Get Light program after Hurricane Isaac.

20,000+ LuminAID lights are supplied to international NGOs including Shelterbox and Doctors Without Borders.

2014



LuminAid continued to gain recognition and funding and is now expanding and creating more innovative, life-changing products.

Thousands of the solar lights now get given out to help victims of natural disasters.

HOMWORK COMPETITION

Why do you think it is important women are encouraged into design and engineering roles?

Think of an idea or invention that you wish existed!
Present it to your teacher on an A4 sheet.

The best homework from each class will go on display with cool prizes to be won!

*“Create the things you
wish existed....”*