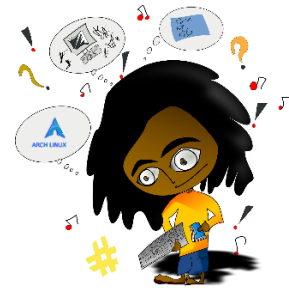




My STEM Stories™

Introduction to Invention

Did you know that
ideas are valuable?



**STEM
Inventor:**

Vocabulary

Term	Definition	Picture or Simplified Definition
Brainstorming	Brainstorming is collecting and sharing a lot of ideas to solve a problem.	
Creative Thinking	Creative thinking is using your knowledge and things you learn in school to come up with a new idea.	
Inventor	An inventor is a person who comes up with a new way to solve a problem.	
Intellectual Property	Intellectual property is a law that protects inventions.	
Entrepreneur	An entrepreneur is someone who turns ideas into a business and then gets to be their own boss!	

Ideas and Invention

Have you ever had an idea ?



I bet you have!

Maybe it was something new you wish you had, such as a new toy or piece of playground equipment.



Maybe it was something you wanted to change, such as making it easier to clean

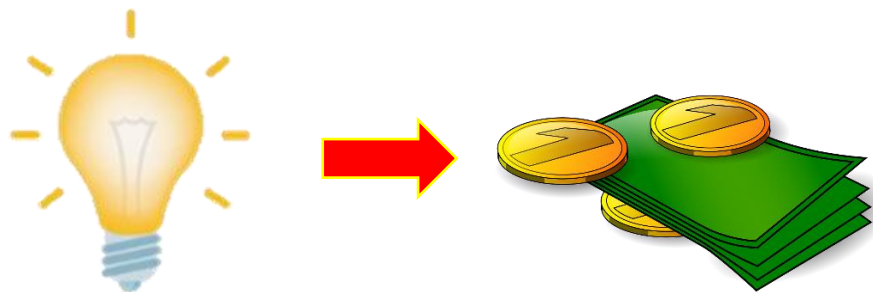
a messy room.



How do you know if your idea is valuable?

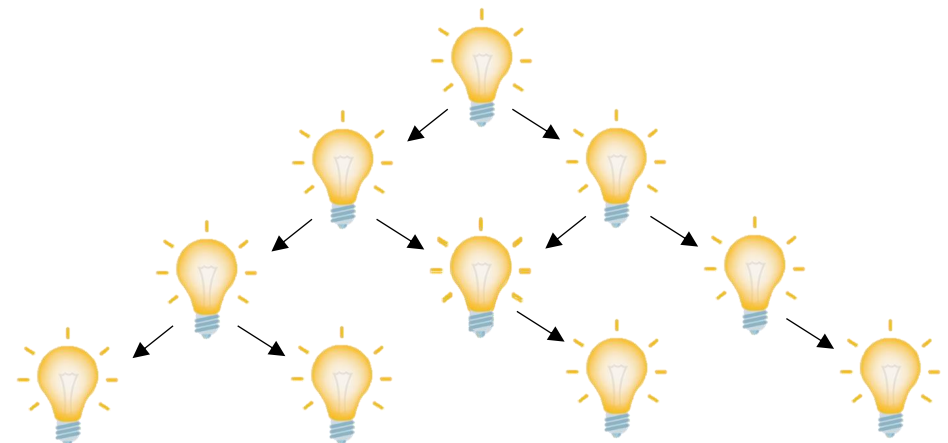
Would you believe me if I told you that

ALL ideas are valuable?

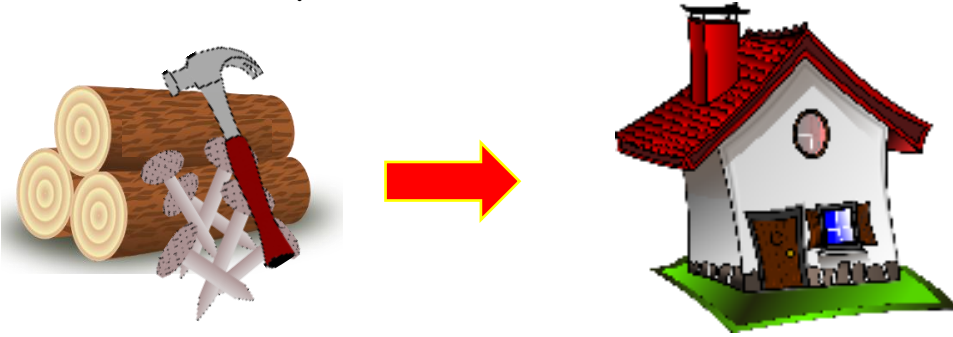


It's True!

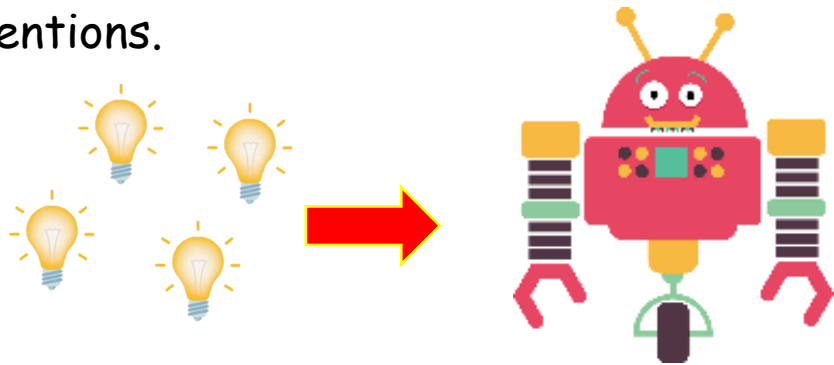
Even if an idea does not turn into an invention it is still valuable. All ideas are valuable because they all help create new ideas! And those ideas help create even more new ideas.



Just like wood, nails, and hammers are the tools that help build a house,

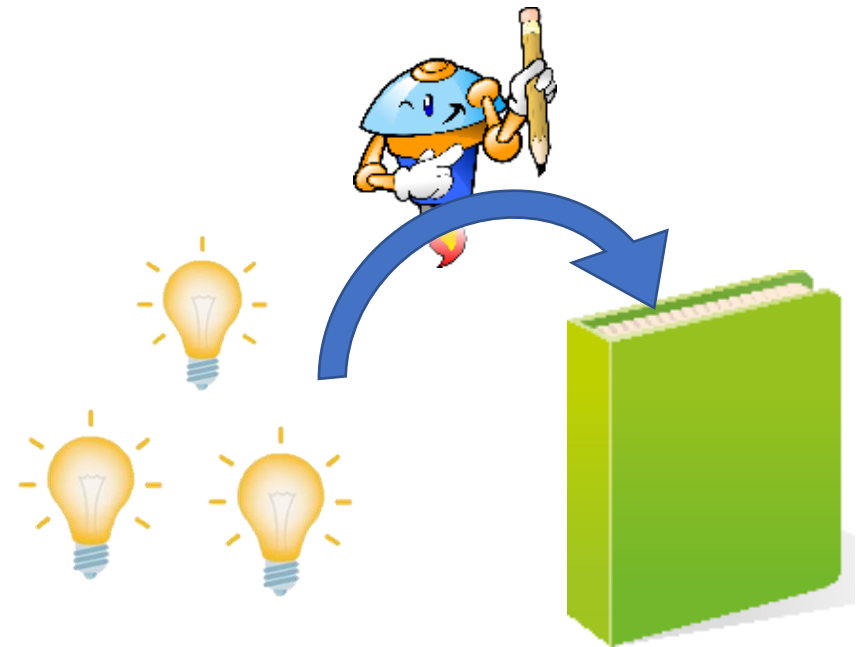


ideas are the tools that create new inventions.



A house needs a lot of wood and nails, and an invention needs a lot of ideas.

Did you know that many inventors carry a small notebook? They write down ideas as they think of them. They do not want to forget their ideas.

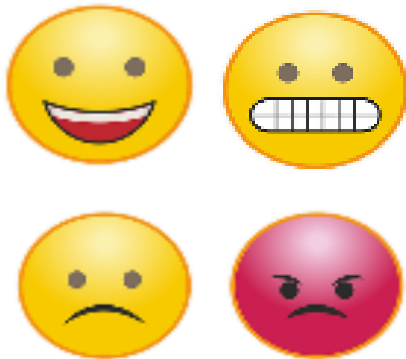


They know that even if they cannot use their idea now, they might use it in the future.

Has someone ever tried to copy your answer on a test?



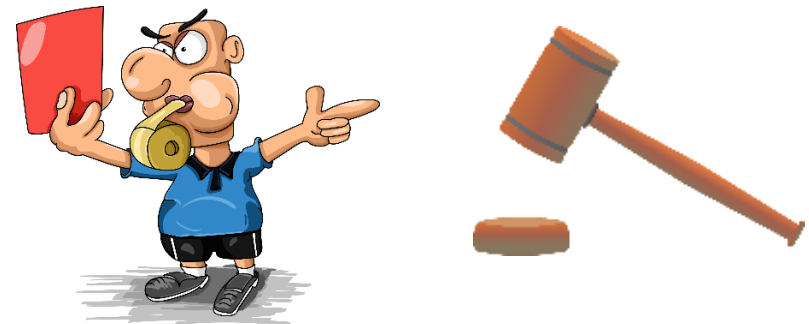
If so, how did that make you feel?



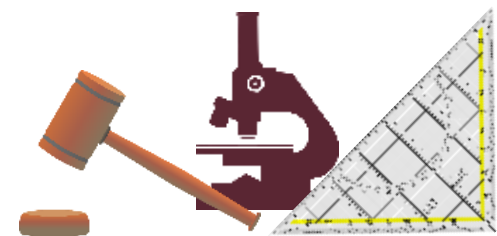
I am guessing you did not like it.



Just like teachers have rules to keep students from copying answers on tests, governments have laws to keep people from copying ideas. These laws are called **intellectual property laws.**



People who work in this field must understand a lot about law, science, and engineering.



LET'S MEET SOME INVENTORS

Andrea Sreshta and Anna Stork,
Co-Founders of LuminAID



The Challenge: In 2010 Anna and Andrea were architecture students in New York City. During this time, they heard about a very big earthquake in Haiti. They wondered what they could do to help the people who had lost their homes. They also wondered what they could do to help the rescuers.



They heard that people needed food, water, and shelter. They also heard that people needed light at night. They heard it was dangerous at night because there were no streetlights or building lights—there were no lights anywhere.



The Solution: Andrea and Anna designed an inflatable solar-powered lantern. In 2015, they pitched their product on *Shark Tank* and received offers from all five investors! This has helped them get their lantern to people in more than 100 countries.



Anna and Andrea's invention is inexpensive. It also packs flat to make shipping easier. This is very helpful for places affected by natural disasters or other emergencies. LuminAID's lantern replaces candles or kerosene lamps, which can cause fires.



The light battery can be recharged using the small solar panel on the top of their lantern. There is a built-in USB port to recharge your cellphone or tablet. LuminAID can also be used by people who enjoy hiking and camping in remote areas.



JD Albert and Barrett Comiskey,

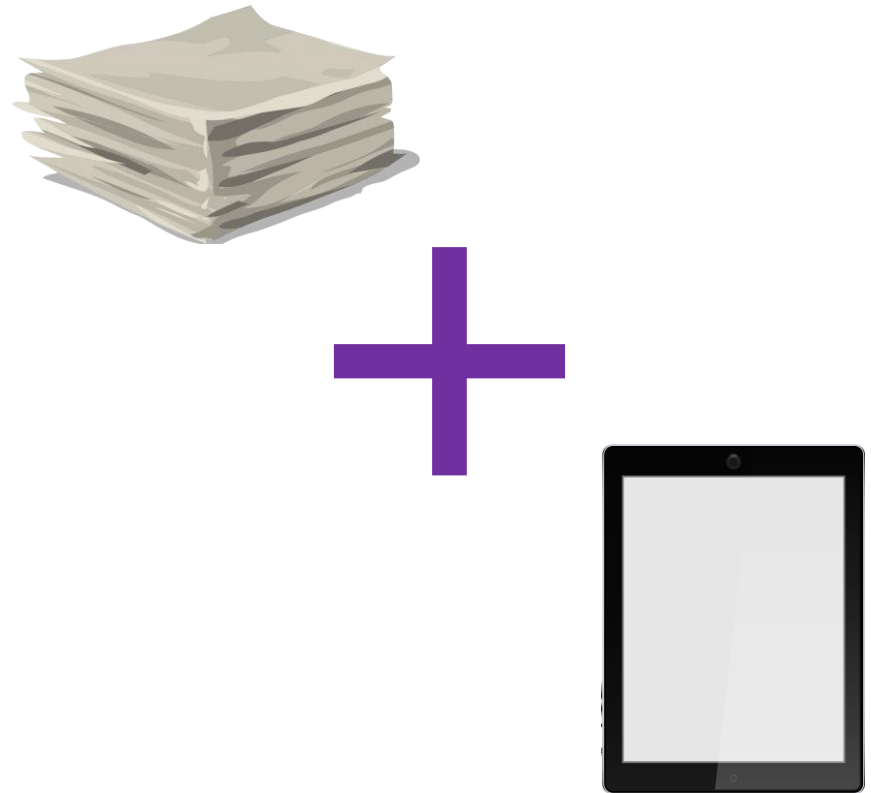
Co-Founders of E Ink

JD Albert and Barrett Comiskey met when they were in college in Cambridge, Massachusetts.



Even though they were studying different subjects—JD was studying mechanical engineering while Barrett was studying math—they both joined the MIT Media Lab.

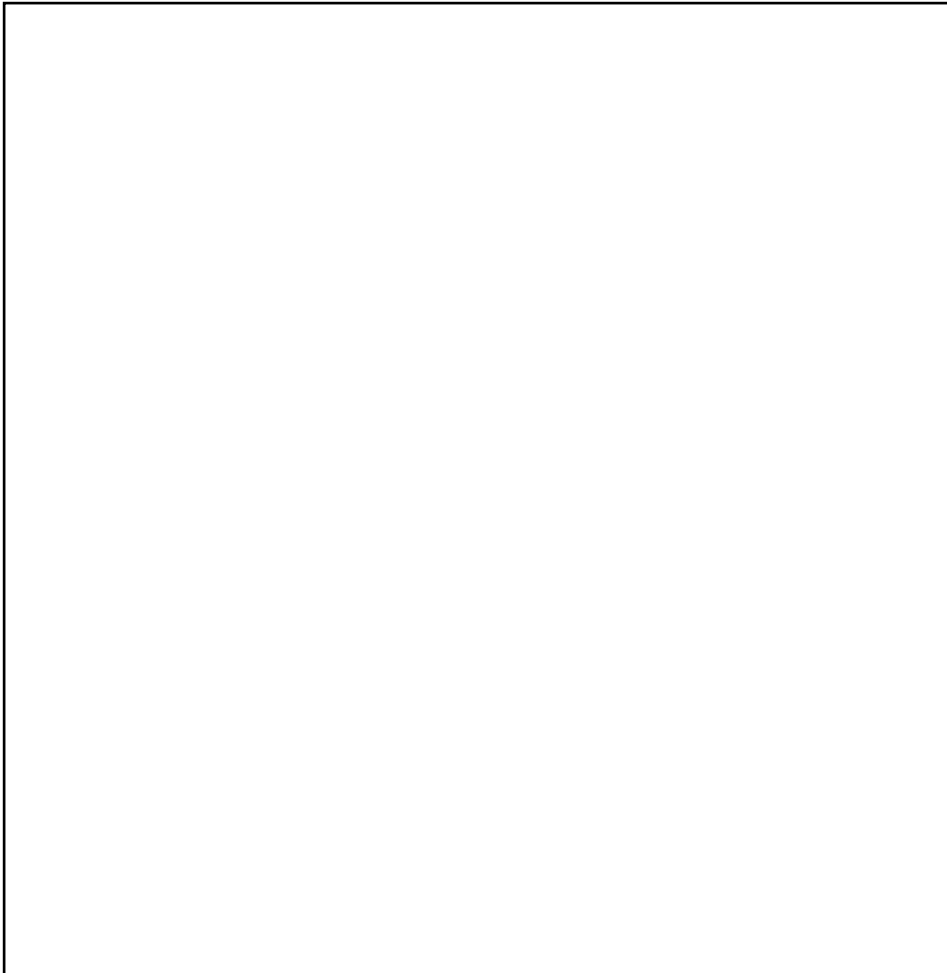
The MIT Media Lab is an organization that focuses on bringing together ideas and ways of doing things that people normally don't think go together. At the Media Lab, JD and Barrett had the idea to make electronic paper.



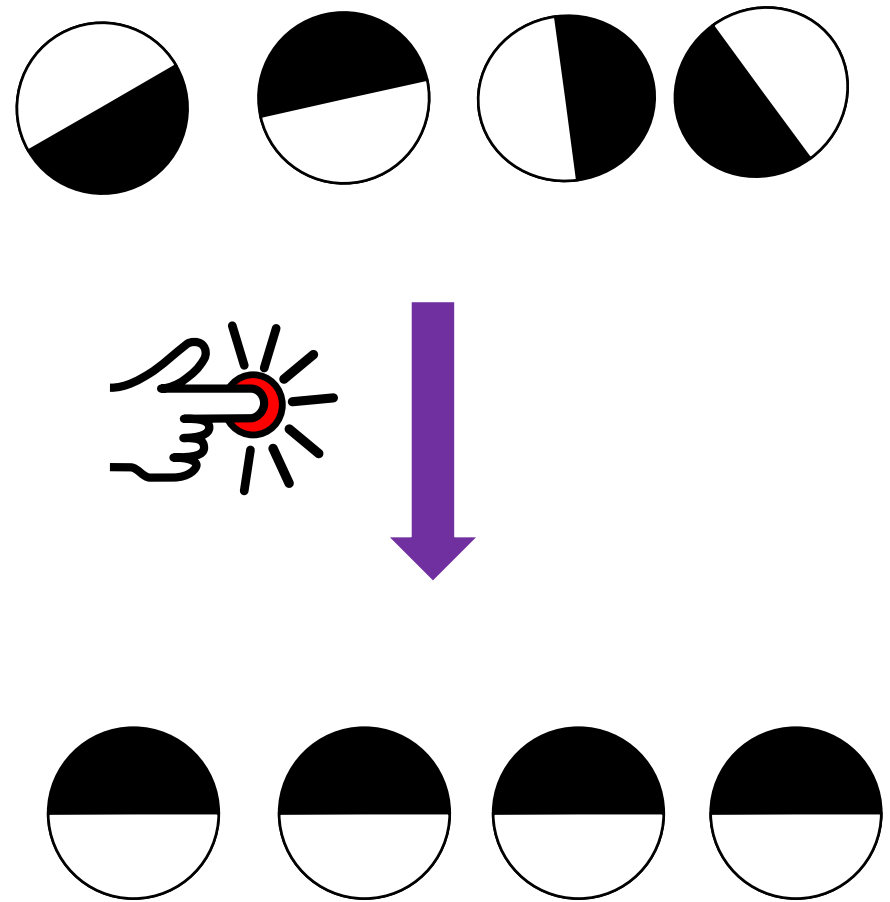
Read more about the MIT Media Lab here:
<https://www.media.mit.edu/about/mission-history/>

Electronic paper is something that would feel like paper but would work like a tablet. They also wanted it to be thin, light, and something you could bend or fold.

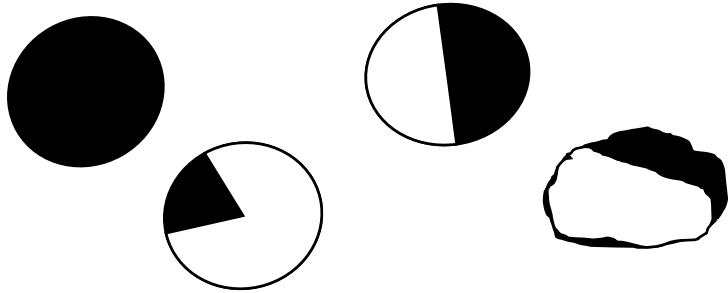
Can you imagine electronic paper?



JD and Barrett tried out a lot of different ideas. One idea was to make tiny balls the size of a piece of birdseed. These balls were white on one side and black on the other. Electricity would make the balls spin around so that the black side would show any writing on the paper.



Unfortunately, it was very hard to make the number of balls they would need for their electronic paper.



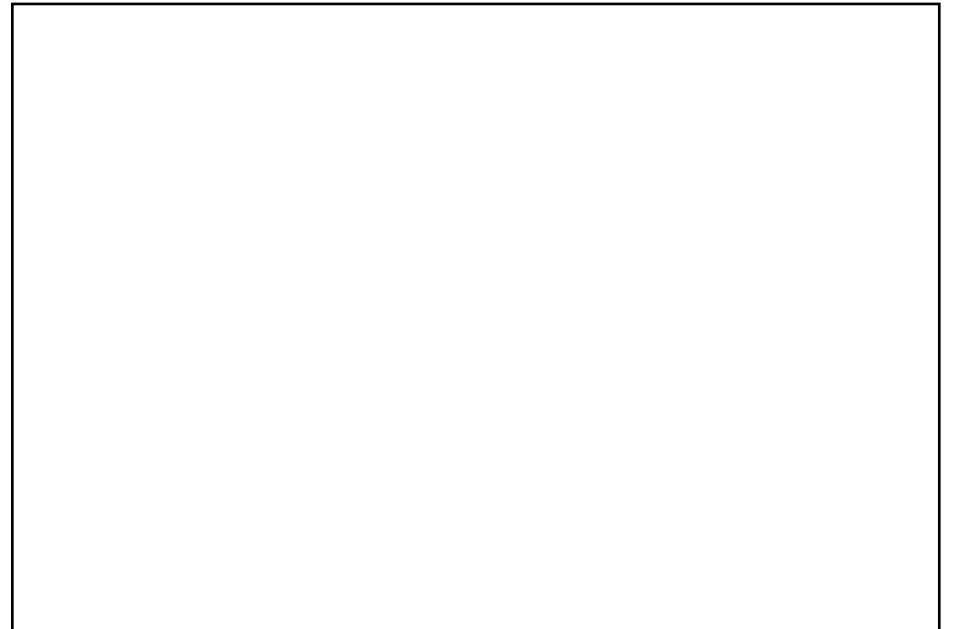
They also discovered that someone else already thought of the idea and had a **patent**. A patent is sort of like a note from the government saying that you are the only one who can use an idea. So they had to think of something new!



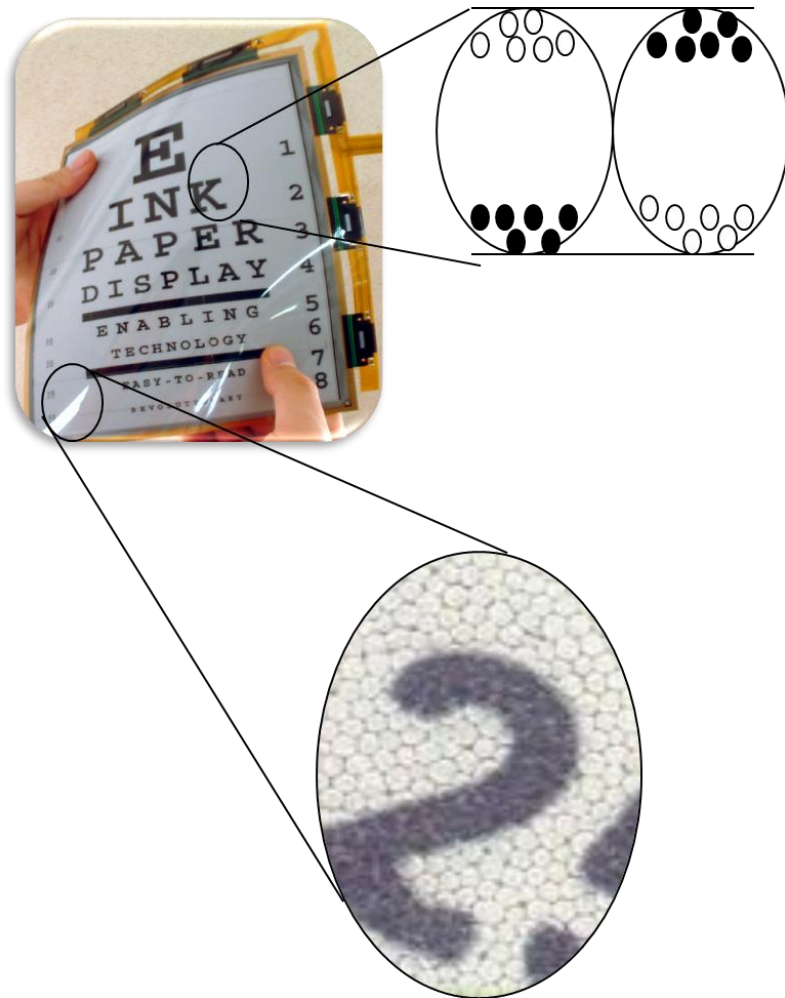
JD and Barrett were sad that they had to start over again, but that didn't stop them. They went to the library and to the lab to research and test new ideas.

Their success came when they combined ideas from medicine and physics. They created electronic paper using very small rubber "bubbles" and special sand!

Can you imagine rubber bubbles and special sand?



Inside the rubber bubbles there was liquid and very small pieces of special colored sand-like material. This sand-like material could move around inside the bubble, or "microcapsule," and allow you to write different things on the electronic paper.



JD and Barrett tested their idea and shared it with people they knew. They decided to start a company called E Ink and asked people from around the world to join their company and help them turn their idea into a product.



They hired people from India, China, England, and Canada to help them. Everyone worked together sharing ideas, successes, and even failures. Sometimes, when they had to solve a really hard problem and needed more ideas they would work with other companies.



After years of hard work, JD, Barrett and the team at E Ink started selling their electronic paper! The first product didn't look exactly as they imagined it back in the Media Lab, but that was OK. They had invented something totally new even if there was still a lot of room for improvement.



Barrett, Katharine, and Kim from the E Ink research team.

After working on their inventions and company for almost 10 years, both Barrett and JD decided to try something new. Barrett went to business school and has since started many new companies.



JD wanted to help other people with their ideas. He works as an engineer and also teaches new inventors at the University of Pennsylvania.



LET'S MEET SOME KID INVENTORS

Maikaila Ulmer, of Austin Texas, was just four years old when she came up with the idea for her special Me & the Bees lemonade. She started with her grandmother's family recipe for flaxseed lemonade and combined that with her new interest in bees (which came after she was stung twice!). She has created many different flavors and has been running her business for over 10 years.

Missing your dog? At age 12, Brooke Martin of Spokane came up with a new way to stay in touch with her golden retriever. She developed the iCPooch. This app allows owners to use their phones, tablets or e-books to have a video chat with their dog and even give them a treat from far away.

Chris Hass was just nine years old when he came up with the idea for the Hands On Basketball. He wanted to help his friends to get better with their basketball shots. The Hands On Basketball has hand outlines on it to show you where to hold it for different shots. After Chris designed his product he applied for, and got, a patent. He has also created a Hands On Football. He has partnered with the company Sporttime to manufacture and sell these special basketballs.

At 10 years old, Allie Webber of South Dakota was outside playing when she got frostbite on her pinky finger. This event inspired her to develop a new type of glove that would warn you if your fingers got too cold. She called it the Frost-Stopper. One year later, Allie applied for a patent. It took her three years, but by the time she was 14 she was able to show that her invention was different enough that it deserved a patent.

Eight-year-old Xóchitl Guadalupe Cruz from Mexico has invented a new low-cost water heating device. This device uses only recycled materials. She was inspired to design this water heater when she noticed that families who could not afford to buy heaters had to cut down trees for firewood.

Donovan Tye Smith, was only 10 and living in Albuquerque, New Mexico, when he started making soaps shaped like donuts, pies, hamburgers and other fun things. He quickly turned his hobby into a business, called Toil and Trouble Bath. He started selling his fun soaps at the local market. In addition to selling soaps at the market, Donovan donates soaps, blankets, and other necessities to some of the local homeless shelters.

Useful Phrases for Having Constructive Discussions

Asking Clarifying Questions

Can you give an example?

Can you please explain your thinking?

Could you say that one more time?

Adding to an Idea

I would like to add to that idea.

I agree with _____ and, would like to add _____.

I know that too because _____.

Respectfully Disagreeing with an Idea

Could you explain, because I have a different idea?

I disagree with that idea because _____.

Term	Definition	An example of the term in the inventor stories
Brainstorming	Brainstorming is collecting and sharing a lot of ideas to solve a problem.	
Creative Thinking	Creative thinking is using your knowledge and things you learn in school to come up with a new idea.	
Inventor	An inventor is a person who comes up with a new way to solve a problem.	
Intellectual Property	Intellectual property is a law that protects inventions.	
Entrepreneur	An entrepreneur is someone who turns ideas into a business and then gets to be their own boss!	

Discussion

When you are working on something new it is important to have a lot ideas.

Do you agree or disagree with that statement and why?
