

## 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?

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## My STEM Stories™

### Introduction to Invention

Did you know that ideas are valuable?



STEM  
Inventor:

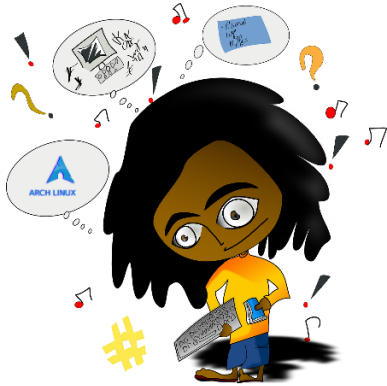
# Vocabulary

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

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# 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.

# Useful Phrases for Having Constructive Discussions

## Asking Clarifying Questions

Can you explain your answer further?

Can you repeat what you said?

Can you tell me more?

## Adding to an Idea

I would like to add to that idea.

I think you are right, and I also think \_\_\_\_\_.

I believe this is true because \_\_\_\_\_.

## Respectfully Disagreeing with an Idea

Could you explain, because I have a different idea?

I respectfully disagree because \_\_\_\_\_.

I disagree with that idea because \_\_\_\_\_.



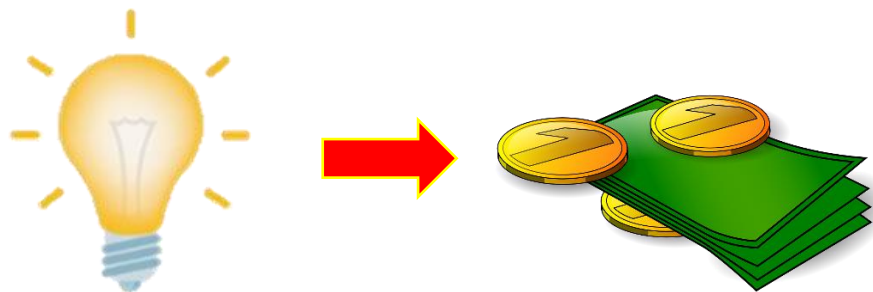
Maybe it was something you wanted to change, such as making it easier to clean a messy room.



How do you know if your idea is valuable?

Would you believe me if I told you that

ALL ideas are valuable?

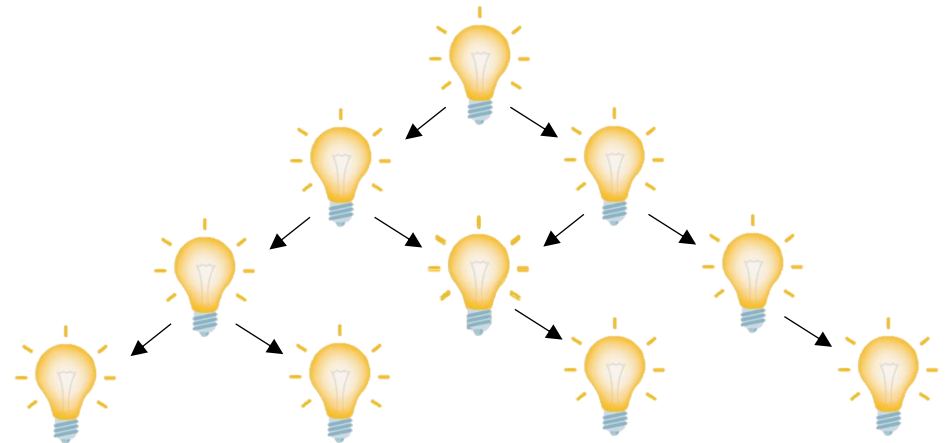


Katherine Wu, 14, can't even drive yet, but she knows that people sometimes fall asleep while driving and how dangerous that is. She noticed that on long drives her mom would talk to her dad to help him stay awake. That gave her the idea for her invention—"...I created a device to be like my mom talking to my dad to make sure he's awake and he's safe,". Her invention is a headset that the driver driver wears which monitors their brain. When it notices the driver is getting tired it tells them to take a break. Katherine has been working with Dr. Jesse Miller, who is a product development specialist in 3M's food safety department, to help develop her idea.

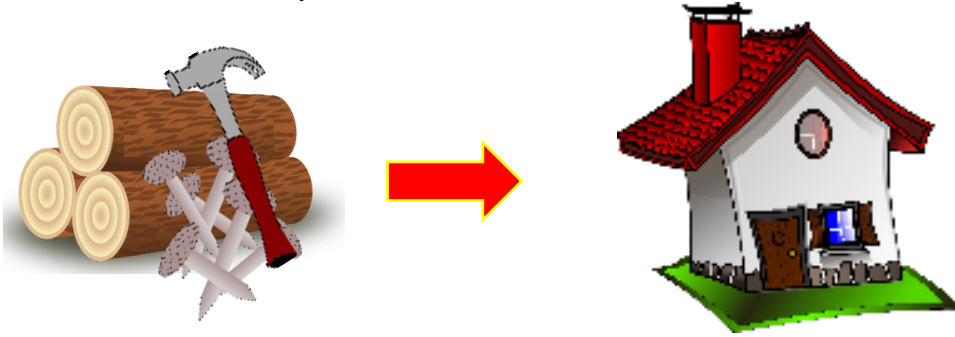
Max Walak, Natick MA, is almost 20 years-old today but has been inventing devices to help those around him since he was 6! His first invention was the *Great Granny Booster Step* to help his great grandmother get into the family van. Another invention, the *Home Dome*, came when he was a few years older. It was a shelter for homeless people, he built by reusing waste Styrofoam peanuts. These days he focuses his invention powers on creating puzzles specially designed to help people with Alzheimer's. Max says "Many people have asked me what it takes to be a kid inventor. I've thought about that and decided that what it takes is being very observant. A person has to notice what is happening around him, and notice what people really need."

## It's True!

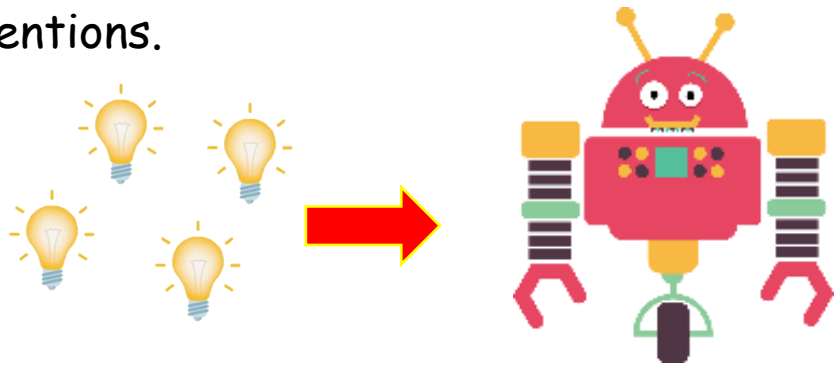
Even if an idea does not turn into an invention it is still valuable. All ideas are valuable because they all help create new ideas! And those ideas help create even more new ideas.



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.

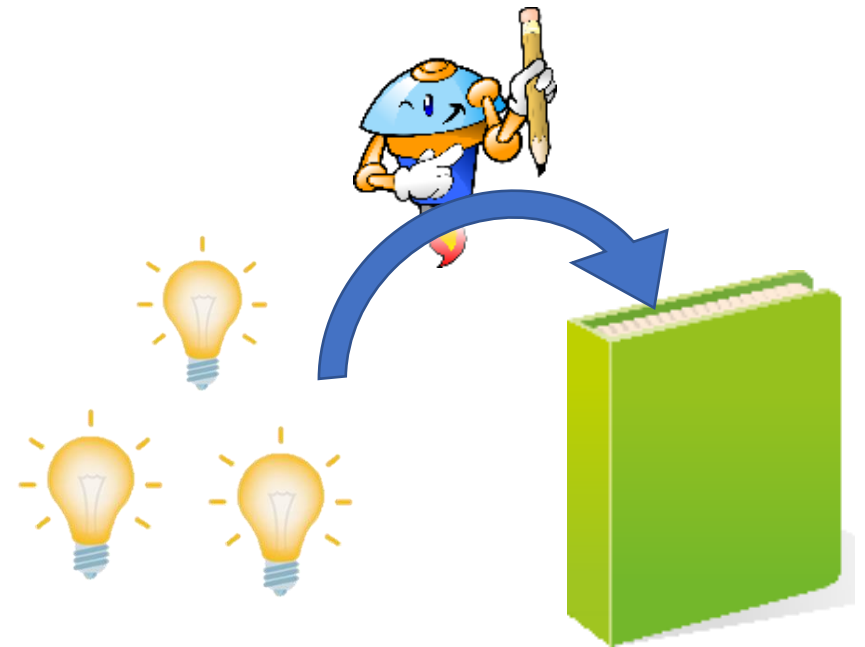
Kathryn "KK" Gregory, a 10-year-old from Bedford, MA loves to play in the snow. What she doesn't love is getting snow up the sleeves of her coat! So she decided to do something about it. She designed a pair of "Wristies" that could cover the space between your gloves and your arms. She made her first prototype from scraps of fleece around the house. It took her a few attempts to make a design that was comfortable and kept the snow out. But after some trial and error she was successful! At this point she applied for a trademark (which was granted) and a patent (still pending) and started her company Wristies® Inc. Kathryn now sells all sorts of styles and has expanded her product line to include hats, leggings and more!



Alina Morse loves lollipops, but she knows too many lollipops aren't good for you. But maybe they could be. When she was only 9-years-old Alina decided to challenge the idea that lollipops are bad for you. She developed the healthy and delicious, Zollipop. She did a lot of research, and talked with a lot of experts, to figure out what they could use that would taste good and be good for your teeth. It took a lot of different experiments to find the perfect Zollipop recipe—one that even Alina's little sister, Lola, would like. Today you can find Zollipops for sale online and in stores.

At 16 Arsh Shah Dilbagi invented a speaking device called TALK that speech impaired people could run using only their breath. This is the only breath-started personal communication device in the world. "I wanted to bring about change and develop something that could be used to help everyone. TALK is something I believe in and hope it will change the lives of those who need it."

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.

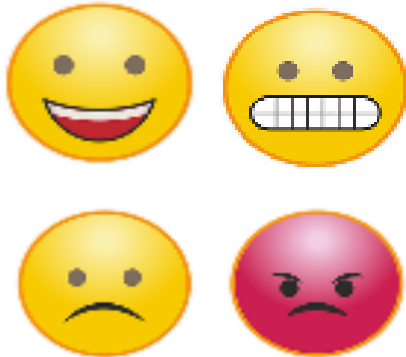


They know that even if they cannot use their idea now, they might use it in the future.

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.



Trisha Prabhu, of Naperville, Illinois, loves to code, so she was extra sad when she heard that kids were being bullied online. At just 14 years old, Trisha decided to do something about it. She developed ReThink, a computer program that asks bullies to think again, or re-think, before they post something mean online. Early testing with her program shows that over 90% of the time kids decided NOT to post something mean online when the program asked them to re-think what they were doing.

Bishop Curry V, a 10-year-old from McKinney, Texas, is working on an invention to help prevent the hot car deaths of babies. His invention, called Oasis, is placed on a car seat. When the car is parked, the Oasis device senses temperature and movement. If it detects something is wrong, it will blow air on the baby and call for help.

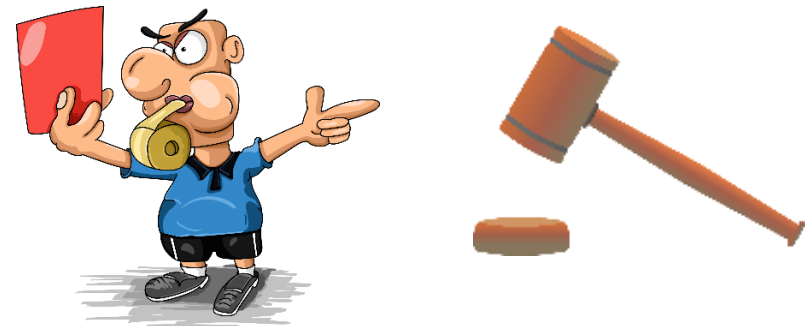
# LET'S MEET SOME KID INVENTORS

Riya Karumanchi, a 14-year-old from Burlington, Ontario, Canada, has developed a smart cane to help the blind and visually impaired. Inspired by her friend's grandmother, who was in town for a visit and is visually impaired, she developed a cane that can:

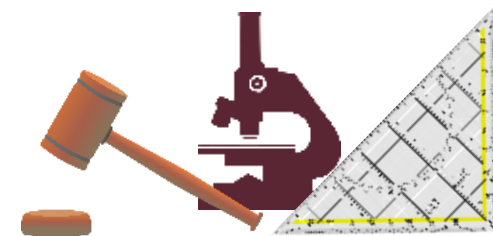
- Detect and warn of tripping hazards,
- Work with a map application to help direct the user to where they want to go.
- Alert emergency personnel or family if the user falls.

Riya sums it up this way, "I kind of wanted to be the change I wished to see. I didn't want to wait for someone to come up with something. I wanted to start 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.



Draw or write some reasons to explain the following sentence.

“Even though you can’t hold an idea in your hand like you can money or jewelry, ideas are still valuable.”

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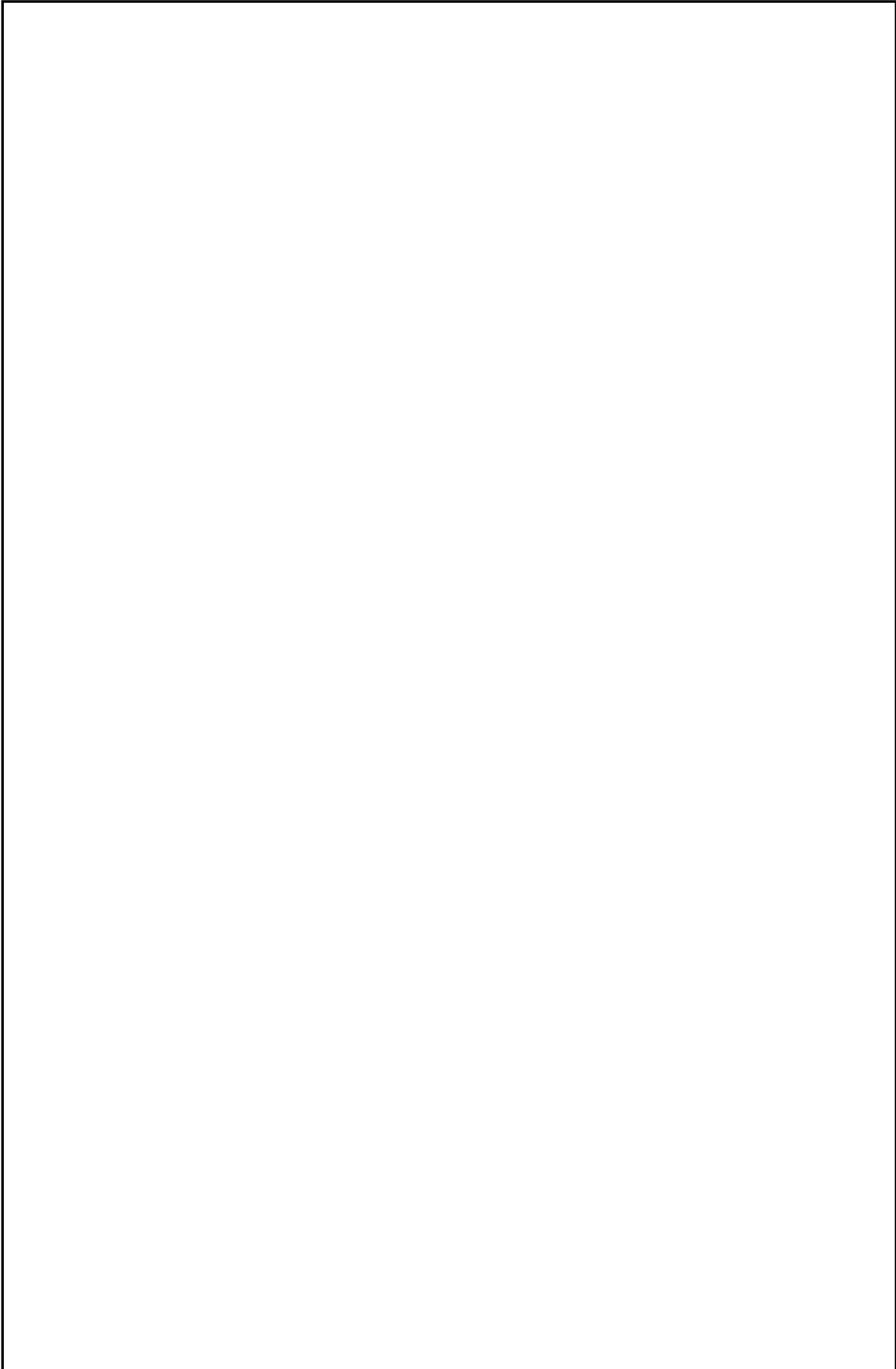
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JD wanted to help other people with their ideas. He works as an engineer and also teaches new inventors at the University of Pennsylvania.



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.



# LET'S MEET SOME INVENTORS

Andrea Sreshta and Anna Stork,  
Co-Founders of LuminAID



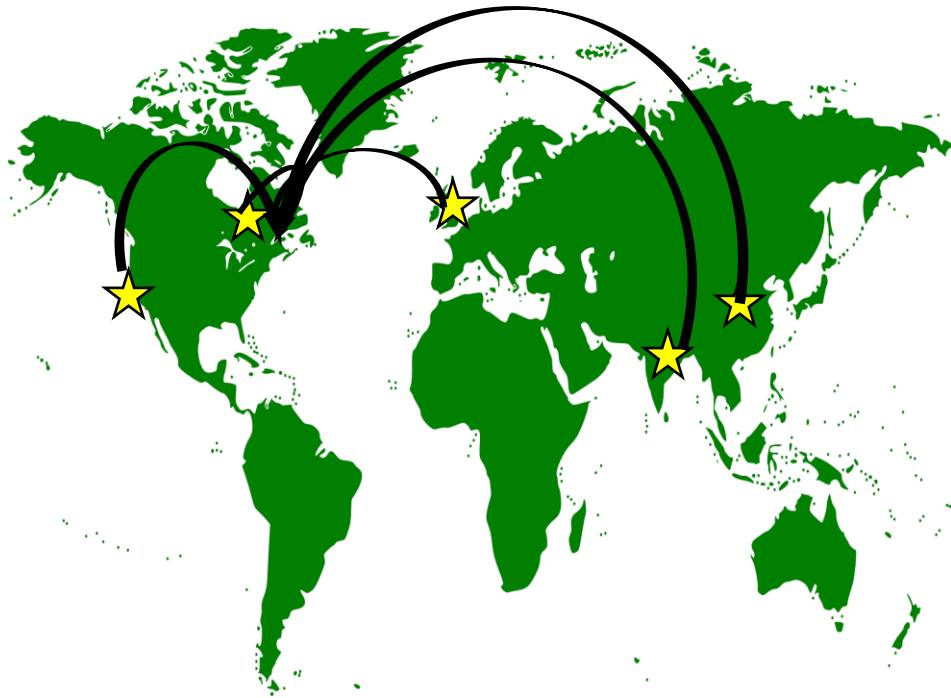
**The Challenge:** In 2010 Anna and Andrea were architecture students in New York City. During this time, they heard about a very big earthquake in Haiti. They wondered what they could do to help the people who had lost their homes. They also wondered what they could do to help the rescuers.

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.

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.



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.



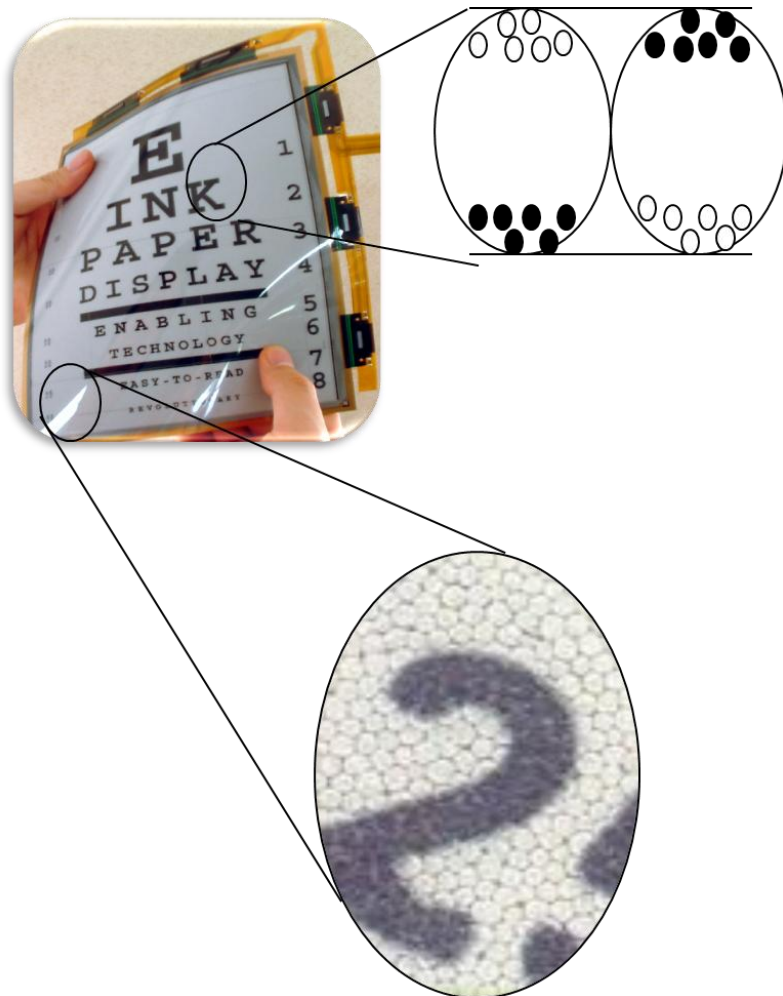
Anna and Andrea's invention is inexpensive. It also packs flat to make shipping easier. This is very helpful for places affected by natural disasters or other emergencies. LuminAID's lantern replaces candles or kerosene lamps, which can cause fires.

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.





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.



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.

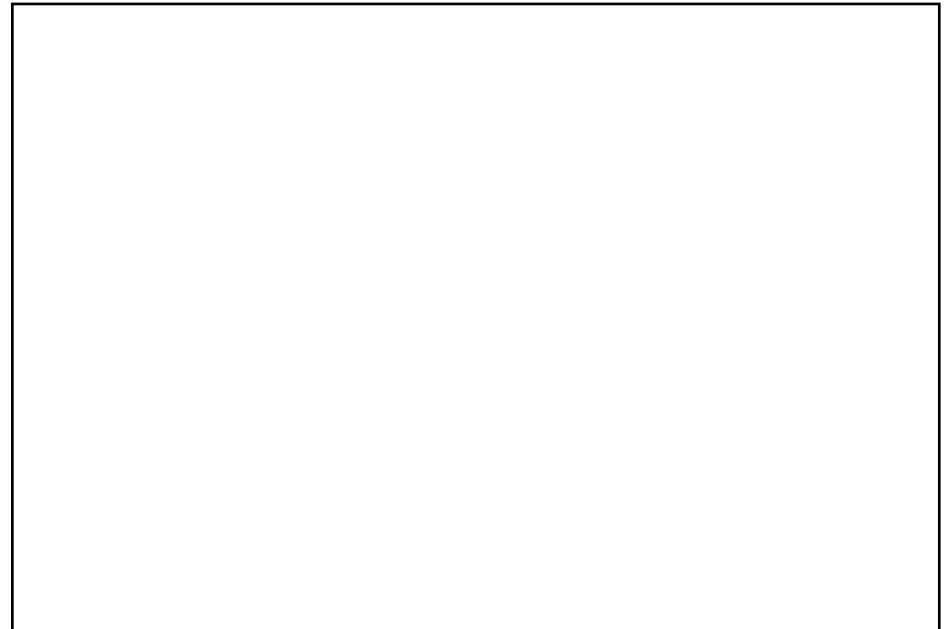


Even though they were studying different subjects—JD was studying mechanical engineering while Barrett was studying math—they both joined the MIT Media Lab.

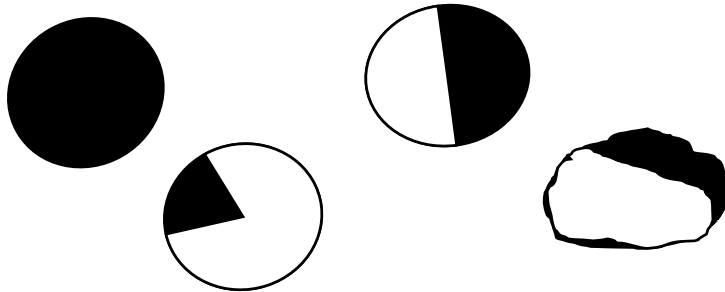
JD and Barrett were sad that they had to start over again, but that didn't stop them. They went to the library and to the lab to research and test new ideas.

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?



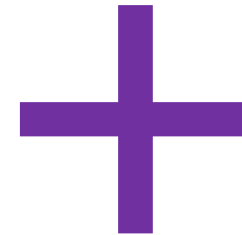
Unfortunately, it was very hard to make the number of balls they would need for their electronic paper.



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!



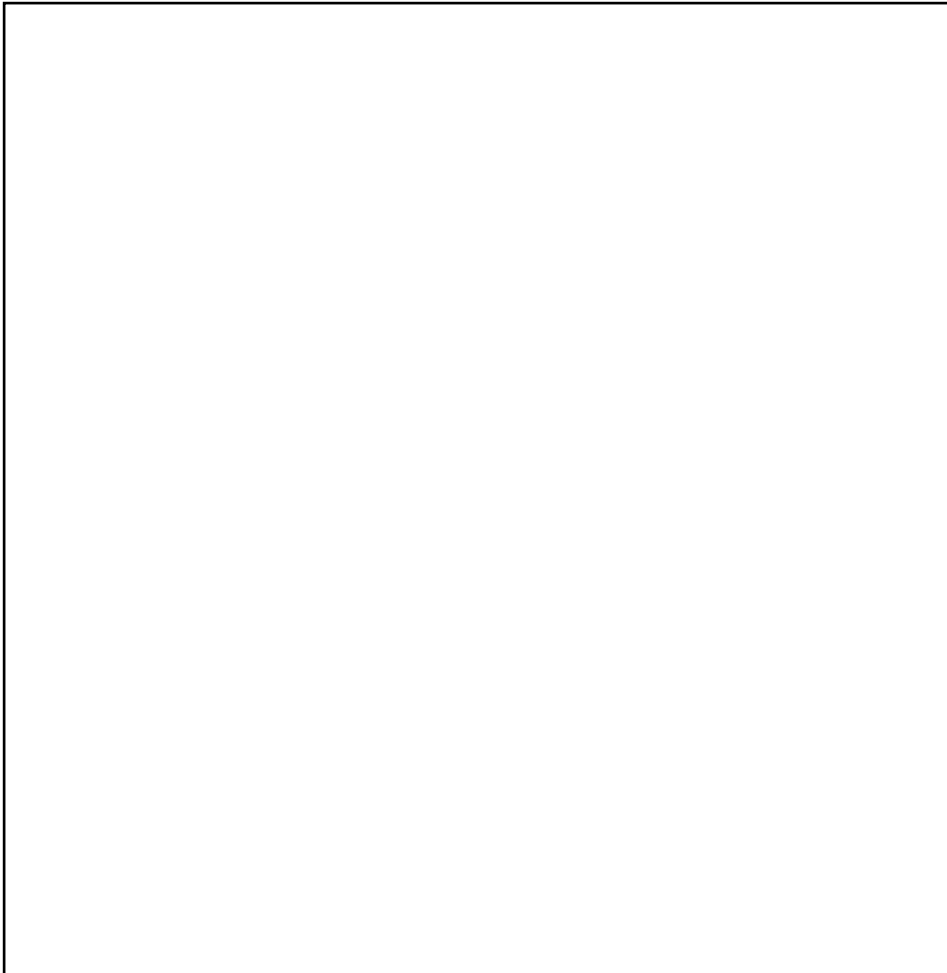
The MIT Media Lab is an organization that focuses on bringing together ideas and ways of doing things that people normally don't think go together. At the Media Lab, JD and Barrett had the idea to make electronic paper.



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.

