



2020 Spark!Lab Dr. InBae and Mrs. Kyung Joo Yoon

Invent It Challenge

ENTRY GUIDE



Smithsonian



inventitchallenge2020.epals.com

ME? AN INVENTOR? YES YOU!

Everyone can invent and the 2020 Spark!Lab Dr. InBae and Mrs. Kyung Joo Yoon Invent It Challenge is a fun way to learn the invention process by actually creating something new, either by yourself or with a group of friends!

Whether this is your first time inventing or your 100th, this Challenge is for you.

To enter the contest, YOU will create a new invention and then submit your idea **before April 10, 2020.**

What is an invention?

It's any useful creation that didn't exist before you thought of it!

What kind of invention should I make?

We're challenging you to use your brain power to **create an invention that improves access to healthy food for everyone, everywhere, every day.**

Everyone needs access to healthy food. From creating an invention that improves how food is produced to how it is delivered, stored, and cooked, there are many different ways you can help.

Ask someone in your life what issues people face around the world accessing healthy food.

Then, choose one issue and see if you can help solve or improve it with an invention!



How do I get started with creating my invention?

It's Just 7 Steps and you start with STEP ONE! Use this guide to learn the 7 steps in the invention process. Follow the steps and you'll end up with an invention of your own! (We've even left space for you to jot down your ideas and notes as you go in this guide!)

Got Questions? Ask! Head over to the [Website](#) to connect with Invention Experts at the Smithsonian, Judges, and other Kids who have won the Challenge in the past! They are all excited help you, if you run into trouble!



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Why should I try inventing?

It's fun to invent! The creative process of creating something brand new is fun!

You learn to solve problems! There are problems all around you in the world. The Challenge teaches you how to work through a process to solve problems like an inventor. As an inventor, you'll start to see problems as opportunities to invent. You don't have to settle for what already exists—you can think of a better way!

You can improve our world, now! There have been MANY successful kid inventors that have changed our world with their ideas. You don't have to wait until you're an adult to make an invention that can be used by people around the world!

What do I turn in?

To enter the contest, you need to turn in a video or PPT showing us how you used ALL SEVEN STEPS to create your invention. Don't forget to document your process—that means to keep records (pictures, video and notes) about each step! If you'd like to start with our PowerPoint template, you can [download it here](#).

How can I win the prizes?

The secret to success is not a secret! The scoring guide (p. [13](#)) tells you what the judges are looking for. Read it!



Dear Parents and Teachers,

We are delighted to bring you the 2020 Spark!Lab Dr. InBae and Mrs. Kyung Joo Yoon Invent It Challenge, designed to ignite the inventive spirit in children ages 5-18 and provide a hands-on opportunity to invent. The goal of our Challenge is to teach and engage young people in the process of inventing, opening their eyes to a new way to view and tackle everyday problems in the world around them. With your help, we're training the next generation of inventors to look beyond what exists for better solutions and empowering them to recognize that they can generate those solutions!

Invention takes students beyond just the creation of a new object, and into a mindset of creativity and problem-solving. Building on the rich Smithsonian Spark!Lab 7-step process for inventing, the Challenge guides students to identify problems, explore existing solutions, brainstorm and sketch a new creative solution, choose the right tools, techniques and materials to construct a prototype, test the invention and ask others to test it, tweak the invention based on feedback and consider how to market the new invention. Inherent in the process are skills of science and engineering, but also life-skills of persistence and dedication. The process trains students to break a problem and solution down into parts and encourages them to brainstorm multiple ways to find a workable solution, either on their own or collaboratively with a team.

For the Challenge, we are asking students to create an invention that helps improve access to healthy food for everyone, everywhere, every day. The need for healthy food presents a unique opportunity for students to develop empathy and consider how healthy food helps create the foundation for a good life. You'll find that the Challenge resources present you with ways to spark your child or your students' thinking and support their discovery of a need they can address.

We encourage you to use this guide to support the engagement of your child, or your students, in the Challenge.

Happy Inventing!

*Cricket Media and
Lemelson Center for the Study of Invention
and Innovation*



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HOW TO USE THIS GUIDE

New to invention? Not a problem! This guide, in tandem with the Challenge website, provides you with everything you need to support young inventors' participation in the Challenge and facilitate their submission of an invention.

To Get Started—Prepare Yourself!

- **Get yourself familiar with the invention process.** Take a look at the 7-steps recommended by experts at Smithsonian. Check out our lessons on how to teach and facilitate each step. (On the How to Enter Page)
- **Look at the scoring guide.** It's always good to start with the end in mind, so flip to page 13, to take a peek at how our expert judges have defined success—it won't be a surprise to see that it's linked to the process more than the product!
- **Get to know the submission requirements.** Review the PowerPoint template ([downloadable here](#)) to see how we recommend students document their inventive journey through the 7-steps. It's important that they capture evidence of going through each part of the process, and share that evidence in their submissions. Pictures are great!
- **Think about the timeline.** Submissions are due on Friday, April 10, 2020. Map out a timeline to work through each step in the process. (You'll want to set aside at least an hour for each step, typically with the Create It step requiring 2-3 hours.) It's helpful to do the steps over the course of a month to give your young inventor(s) time to grow their thinking and internalize the process.
- **Develop a Documentation Plan.** It's critical that students document and capture evidence as they go through each part of the process. Think about how and when documentation will take place – what devices you will use (still camera, video camera, etc.) and what help the students will need from you.

Accept the Challenge and Get Started

- **Explore the topic.** We recommend viewing the Topics and Related Resources document (p. 10) to learn about different ways to improve access to healthy food!
- **Start chatting and brainstorming about the topic.** To brainstorm, think about how you access healthy food; then, take time to talk to an adult about how they access healthy food and what unique challenges people face in accessing it.
- **Use the Entry Guide.** Be sure to review the 7-Step process, Topics and Resources, Scoring Guide, and Entry Guidelines.
- **Start the invention process!** Start the process by diving into the first step, Think It! On the following pages, you'll find specific guidance on each step.





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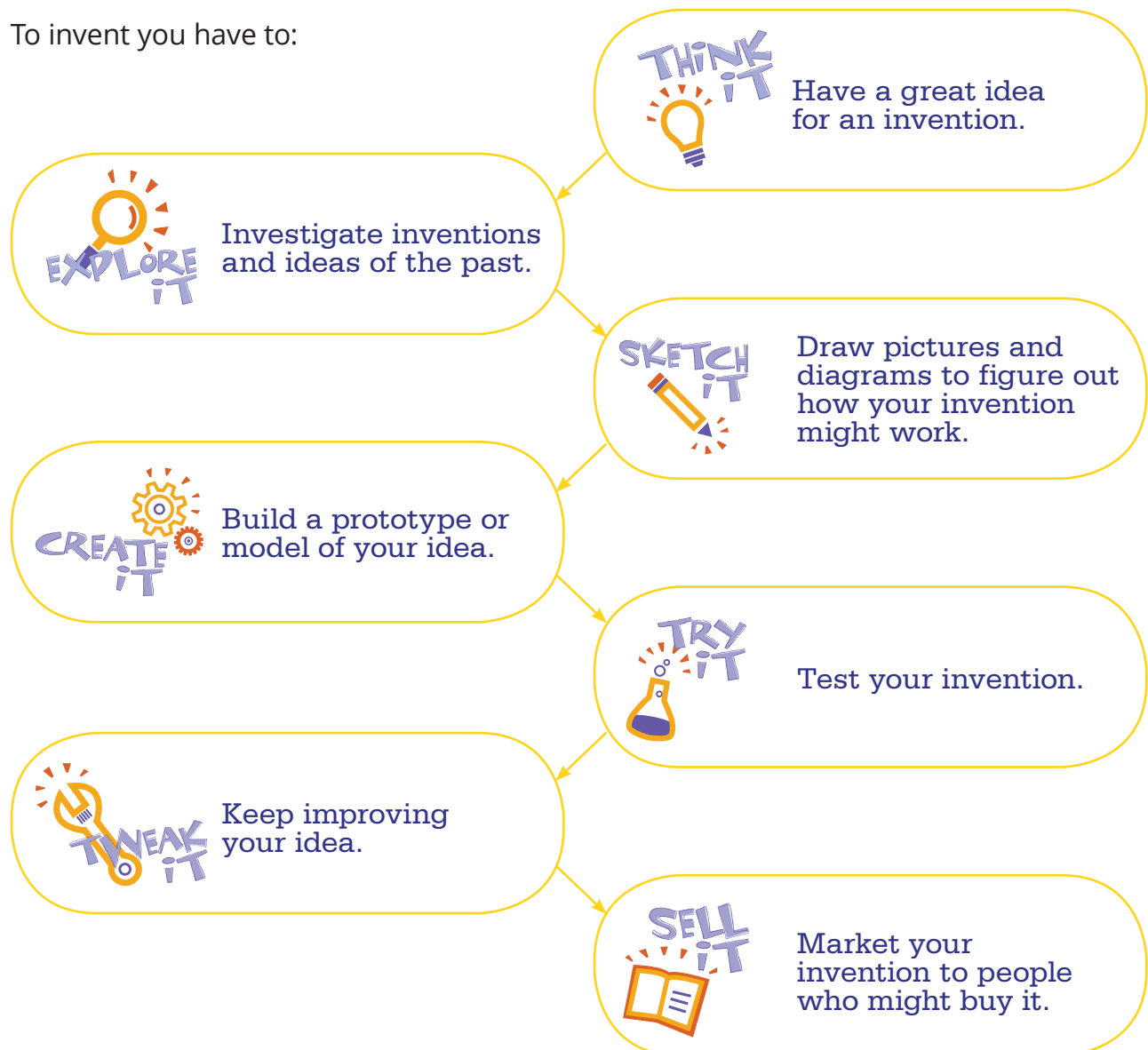




KEY STEPS OF THE INVENTION PROCESS

Learn about each step of the process, and all the fun and hard work that goes into inventing.

To invent you have to:





Think-It: Have a great idea for an invention. Developing an idea is sometimes the hardest step in the invention process! Invention is all about solving problems. The best invention ideas often address issues that affect lots of people. This year's Challenge is about addressing people's need for healthy food. So, the first step is to identify a way to improve people's access to healthy food.

Thinking about this Challenge:

Observe, research, and interact with the world around you and write down any challenge you see presented in accessing healthy food:

- Look around you—how do people access healthy food in your community, region, nation, or across the globe?
- Look at your local newspaper or on the Internet—what are the issues related to accessing healthy food that people in your community and globally are talking about?
- Ask friends, teachers, and family members or people working in agricultural or other food-related organizations (like farmers, store managers, or entrepreneurs) about aspects of accessing healthy food that can be challenging for people.

If possible, talk through what you've discovered with partners and groups of other students to spark more ideas.

Every invention starts with an idea.

What's yours?

What problem are you trying to solve?

A large, rectangular area of graph paper with a light gray grid. At the top, there is a series of white, rounded shapes representing a spiral binding. A single horizontal red line is drawn across the grid, approximately one-third of the way down from the top.



Explore-It: Investigate inventions and ideas of the past.

Have an idea?

If you've identified an aspect of accessing healthy food that you want to improve, you're probably not the first inventor to try to solve it. Don't let this discourage you—instead, do some research to learn how others have addressed the problem!

- What do you like about their solutions?
- What do you think you can improve?
- How can your invention be different?

Many inventions build and improve on ones that have come before. Identify specific features and benefits of your invention that builds on inventions of the past. Think carefully about who your invention helps and make sure your idea clearly solves the identified problem in a way that is uniquely yours!

*Many inventions
build off of
other ideas.*

*How have other
people tried
to solve the
problem you're
working on?*

*How will your
invention be
different?*





Sketch-It: Draw pictures and diagrams to figure out how your invention might work.

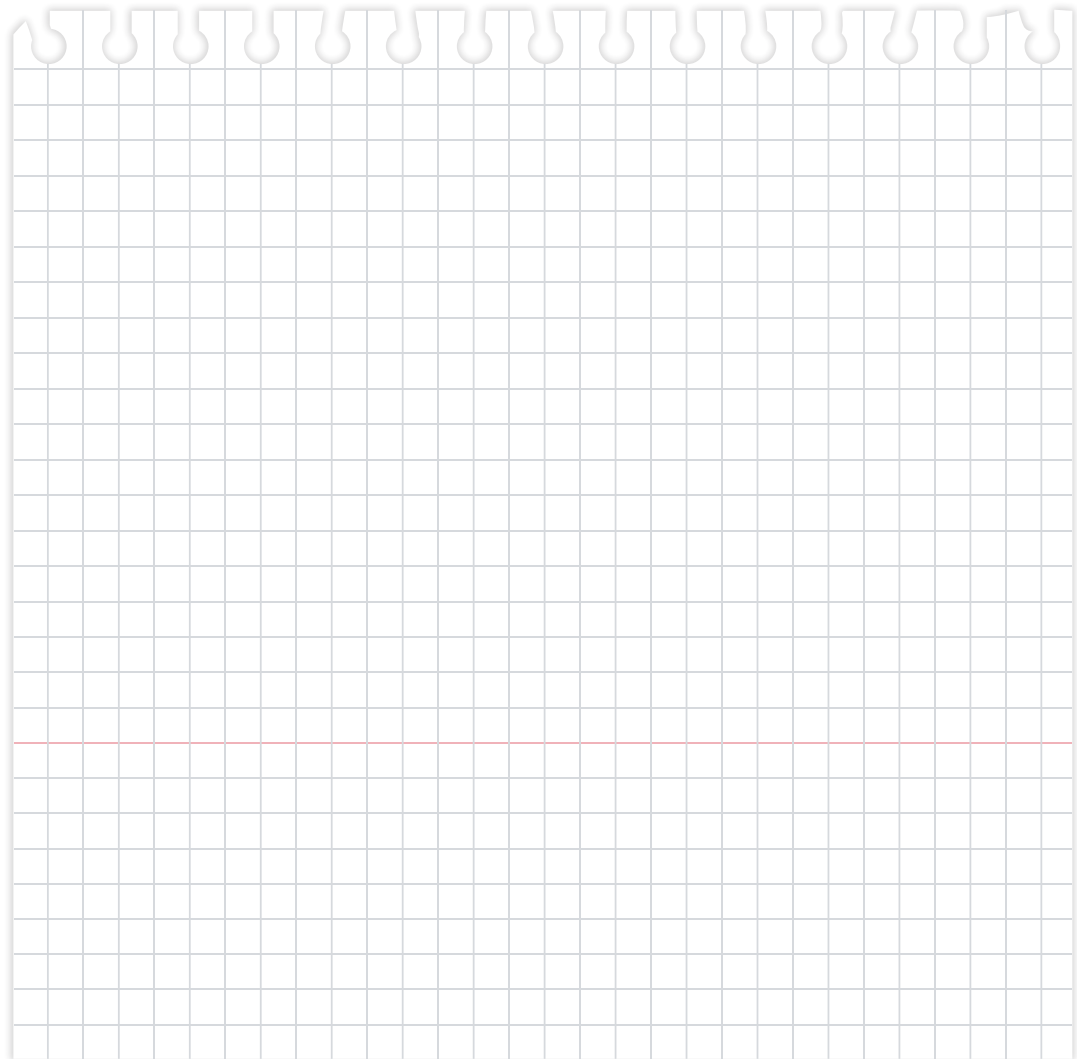
Once you have a basic concept of what your invention will be, make some simple sketches of your idea. Sketches help you take the idea in your head and put it on paper. Your sketches do not have to be perfect or artistic.

Sketches can help you think through not only what your invention will look like, but how it will work. You may want to make several sketches of your invention—from the front, side, looking down from above, or from the inside—to show how it will work.

Be sure to label your sketches to explain how the various parts and pieces function, so that you (and others) will know what you're/they're looking at!

Can you draw your ideas out on paper?

Inventors use pencil and paper to sketch their ideas.



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Create-It: Build a prototype or model of your idea.

For many inventors, this is the most fun part of the invention process! This is when you create a prototype, or model, of your invention.

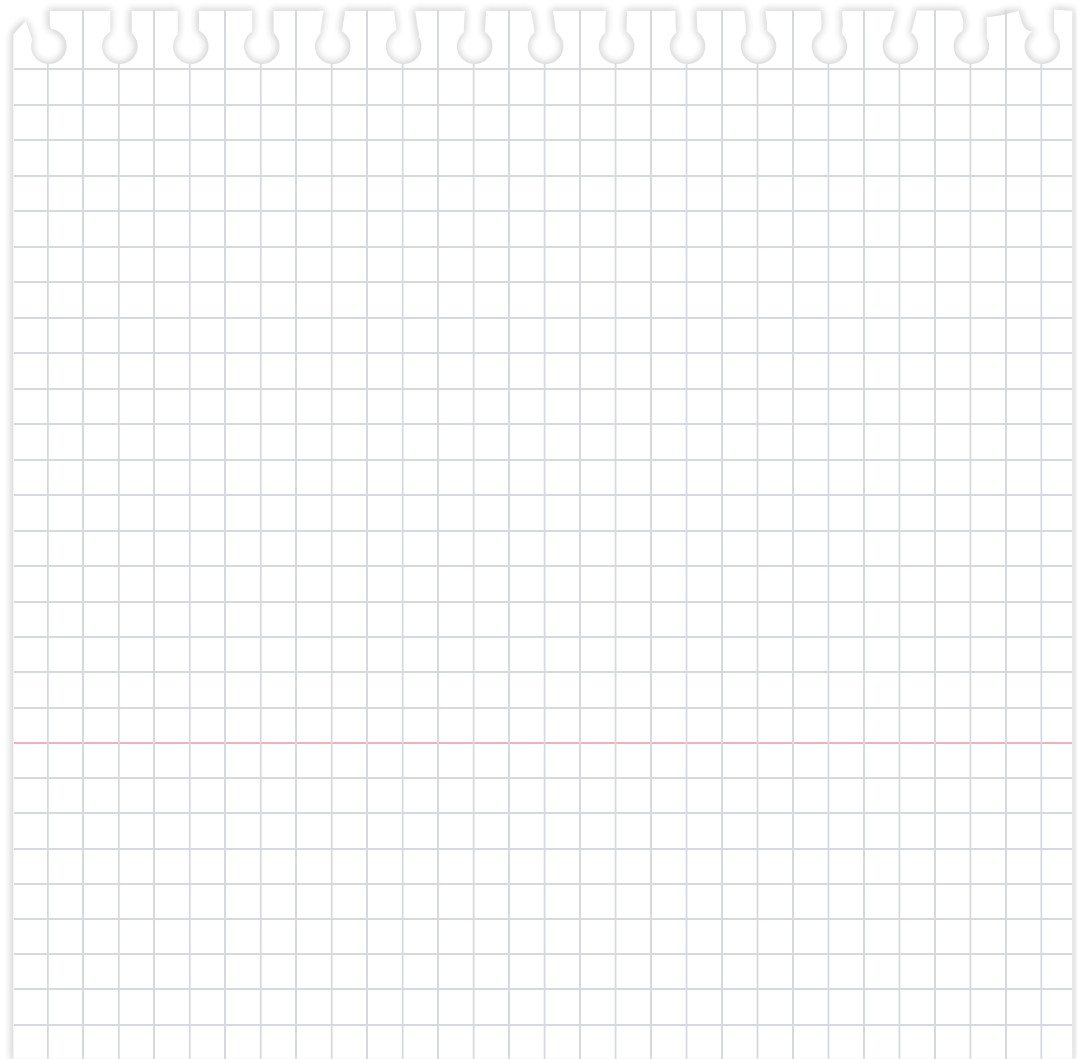
Using your sketches as a guide, build your first prototype. (Don't worry, this doesn't have to be perfect or even work!) Making your prototype/model helps you turn your concept into a three-dimensional form.

When you build your prototype/model, try using materials that you already have. Though the model does not need to actually work, it should show others what the pieces and parts look like. Remember to capture the steps you take building your prototype/model by video or photos.

A prototype is a model or a real-life example of your idea.

Inventors use simple materials to bring their ideas to life.

Create a prototype.





Try-It: Test your invention. Once your prototype/model is finished, ask friends, teachers, parents, and neighbors to try it! (If possible, ask some of the people you interviewed in the Think-it step or an older adult whose daily life and activities your invention is intended for.) Have your testers perform some experiments to find out how well your prototype works. Write down the results of each test.

Ask your testers:

- What they like about your invention?
- What suggestions they have for making your invention better?

Be sure to write down what your testers say about your invention, so you have good notes for the next step of the process.

Test your
invention.

What works
well?





Tweak-It: Keep improving your idea. Using the feedback you got in the Try-it step, identify ways you can improve your invention.

Consider:

- Do you want to modify the design or change the materials it's made from?
- Do you want to add a new part to your invention, or take something away to make it simpler?
- How could you make your invention more environmentally friendly?

Many inventors go through multiple rounds of trying & tweaking to keep improving their invention, until they get it just the way they want it!

*How can you
improve your
prototype?*

*Inventors work
to make their
ideas better.*





Sell-It: Market your invention to people who might buy it. Once you have your final invention idea, it's time to introduce your idea to other people and encourage them to start using it!

Create a "fact sheet" and/or a video or written pitch about your invention.

Be sure to include the following information about your invention:

- Who is your "target audience"? Who should use your invention?
- What aspect of accessing healthy food does it improve?
- How is it different from other inventions?
- How does it work?

Inventors think about how to convince other people to try or buy their invention.

How would you talk about your idea to other people?





IMPROVING ACCESS TO HEALTHY FOOD FOR EVERYONE, EVERYWHERE, EVERY DAY

Use these ideas and resources to spark your inventions!

Ask yourself: “How can I improve access to healthy food for everyone, everywhere, every day?”

Food Production

How food is grown and processed from raw food into food products impacts its nutritional value, its availability to people, and its cost. Inventions that help both small farmers and large agricultural companies grow and process healthy food more efficiently can help increase both the amount and quality of healthy food available to people and lower its cost. What can you invent to help improve food production?

Think About...

- How can food be grown so that more food is produced using the same or less amount of resources such as land or water?
- How can new technologies be used make food production more efficient?
- How can farmers better determine when and what to plant in response to climate changes?
- What could help local farmers make better use of resources available to them?
- What could help local farmers better adapt to weather and climate patterns?

Resources

- [International Food Information Council Foundation](#)
- [Grist](#)
- [Eufic](#)
- [Foreign Agricultural Service](#)
- [Crop Production](#)



Food Distribution

How food is distributed from growers to sellers and eventually the people who buy it is important because it affects both the availability of healthy food and its cost. Inventions that improve how food is distributed can help make healthy food more accessible to people. What can you invent to help improve food distribution?

Think About...

- What ways of distributing food can be created or improved to expand people's access to healthy foods?
- What can be invented to help give nutritious meals to those in need?
- What can be invented to help make school lunches healthy?
- How can people learn how to find fresh, healthy food in their communities?
- How can food delivery methods be improved so food gets to people more quickly and easily?

Resources

- [US Department of Agriculture](#)
- [Food and Nutrition Service](#)
- [Mission 2014](#)
- [A Well-Fed World](#)
- [Farm to School](#)

Food Storage/Preparation

How food is stored and prepared is an important part of making sure people have access to healthy food. Food can spoil if not stored correctly, or it can lose its nutritional value if prepared in unhealthy ways. Inventions that improve how food is stored and prepared can help people get more nutrition out of what they eat. What can you invent to help improve food storage and preparation?

Think About ...

- How can food be stored so it is safe and healthy?
- How can cooking methods be improved to make food safer/healthier?
- How can existing food storage technologies be improved?
- How can food be stored so that it lasts longer?
- What can be invented to make prepared food healthier?

Resources

- [BYJUS](#)
- [Better Health](#)
- [US Department of Agriculture](#)
- [Australian Institute of Food Safety](#)



Food Affordability

The cost of food impacts people's ability to buy it. Some healthy foods are relatively high in price because of the steps required to grow, store, and distribute it. Some healthy foods are relatively high in price because there are only limited amounts available to people at specific times of the year. Inventions that help lower the cost of healthy food can make it easier for people to eat more healthy foods and lead better lives. What can you invent to help make healthy food more affordable for people?

Think About...

- What can be invented to help people with limited resources obtain healthy food every day?
- How can farmers grow food in more cost-efficient ways?
- How can methods of storing and transporting food be made less costly?
- How can people or companies organize to sell food in more cost-efficient ways?
- How can local, state, and national governments help provide more affordable access to healthy food for people?

Resources

- [US Department of Agriculture](#)
- [CNBC](#)
- [Public Health Law Center](#)
- [Public Health Post](#)
- [International Food Policy Research Institute](#)

Food Choices

What people choose to do when they search for food and what people decide to do with the food they don't intend to eat is an important part of making sure people have access to healthy food. Inventions that help people make healthy choices when selecting foods or provide people a way to handle food waste that benefits others increases people's access to healthy foods. What can you invent to help improve food choices?

Think About...





- How can people be inspired to learn how to make better decisions about food?
- How can people—from individuals to households to organizations—help to reduce the amount of healthy food that is wasted?
- How can households/people/families waste less healthy food?
- How can restaurants or businesses use healthy food they might otherwise throw away?

Resources

- [Family Doctor](#)
- [Food Company](#)
- [Olio](#)
- [US Department of Health](#)






Invent It Challenge Scoring Guide

Invent It Steps	1 - Requires Development	2 - Approaches Standard	3 - Meets Standard	4 - Exceeds Standard
 Identifies a way to improve access to healthy food for everyone, everywhere, every day.	Mentions a way to improve access to healthy food for everyone, everywhere, every day, but doesn't define or explain it.	Presents a way to improve access to healthy food for everyone, everywhere, every day, but provides a minimal explanation.	Presents, defines, and explains a way to improve access to healthy food for everyone, everywhere, every day.	Clearly presents and defines the scope of a way to improve access to healthy food for everyone, everywhere, every day, providing detailed background and explanation.
 Demonstrates invention's originality	Presents an invention that copies existing ideas or products rather than building on them.	Presents an invention that shows some originality (relying heavily on existing ideas or products).	Presents an original invention and shows how it builds on similar past ideas.	Presents an innovative invention with attributes that reflect but go well beyond similar past ideas.
 Demonstrates how the invention might work	Sketch is incomplete and doesn't show how the invention improves access to healthy food for everyone, everywhere, every day.	Sketch is complete and somewhat demonstrates how the invention improves access to healthy food for everyone, everywhere, every day.	Sketch is detailed and clearly labeled, demonstrating how the invention improves access to healthy food for everyone, everywhere, every day.	Multiple sketches clearly demonstrate and provide examples of how the invention improves access to healthy food for everyone, everywhere, every day.
 Builds a prototype or model	Prototype or model is incomplete and does not reflect the sketch or plan.	Prototype or model minimally reflects the sketch or plan.	Prototype or model is complete and accurately represents the size, shape and function.	Working prototype or detailed model clearly shows how the invention will function and is accompanied by video, audio, or textual explanation.

Invent It Challenge Scoring Guide



Invent It Steps	1 - Requires Development	2 - Approaches Standard	3 - Meets Standard	4 - Exceeds Standard
 Tests the invention	States that invention has been tested or feedback has been gathered but does not provide evidence.	Shows evidence of some testing of the invention or that minimal feedback has been gathered.	Shows evidence of thorough testing of the invention and/or gathering of comprehensive feedback from potential users or experts in the field.	Shows evidence of extensive and repeated testing of different versions of the invention, and/or gathering of comprehensive feedback from both potential users and experts in the field.
 Tweaks the invention	Proposes changes to the invention, but changes do not accurately reflect the testing of the invention or the feedback student received.	Proposes changes or improvements to the invention that somewhat reflect the testing and feedback.	Clearly improves the invention based on test results or feedback.	Significantly improves the invention based on test results or feedback and adds additional innovations of their own.
 Includes a "sales pitch" convincing others of the value of the invention	Provides basic information about the invention, but no reasons for using it.	Provides information about how the invention improves access to healthy food for everyone, everywhere, every day, but doesn't include compelling reasons for using it.	Targets an appropriate audience, clearly defines the invention, shows how it is differentiated from similar products, and explains how it improves access to healthy food for everyone, everywhere, every day.	Includes a convincing and compelling "sales pitch" that clearly explains how the invention improves access to healthy food for everyone, everywhere, every day, and is different from any similar products that came before it.

Total Points for all categories, (possible 28): _____

**Entries will be assigned a score of zero if no criterion are met.*



HOW TO DOCUMENT YOUR INVENTION PROCESS

Your submission requires you to give us proof that you've done each step of the invention process! So, you need to DOCUMENT—or create a physical record—of your progress through each step.

Some ways to do that are:

- Make selfie videos of you explaining what you've done in any step.
- Ask a friend or family member to film you as you are doing any step.
- Take photos of you doing each step.
- Keep a journal outlining what you do in each step.



Invent It Challenge



inventitchallenge2020.epals.com

HOW TO ENTER

Use this checklist to ensure your entry meets the submission requirements.

- ☐ 1. Follow the 7-step Process of Invention described in this guide to create an invention that improves access to healthy food for everyone, everywhere, every day.



- ☐ 2. Document your journey through each step by taking notes and pictures, making drawings, and recording audio and video.
- ☐ 3. Gather your notes, pictures, drawings, and audio and video recordings and use them to create a single video or PPT documenting your journey through the 7-step Process of Invention. Videos must be no larger than 2GB in size and be one of the following file types: .mp3, .mp4, .avi, .mov, .mpg.
- ☐ 4. Once you have finished your video or PPT, use the Scoring Guide to check that your entry has addressed each of the 7 steps of the Invention Process.
- ☐ 5. Create a cover photo of the inventor(s) to submit along with your entry.
- ☐ 6. Anytime on or after December 6, 2019, go to the How to Enter page on the Challenge Website and download a Parental Consent Form (one for each entrant). Have the parent/guardian of each entrant complete and sign the form and take a picture of it or scan and save it.
- ☐ 7. Anytime on or after December 6, 2019, go to the Submit Entry page on the Challenge Website and follow the instructions to submit your video or PPT entry file, cover photo, and Parental Consent Form. If submitting a team entry, you must submit consent forms for each participant. (Entries must be received by 11:59 PM EST on April 10, 2020.)

Timeline

Dec 6, 2019
Official
Start

April 10, 2020
Submission
Deadline

May 8, 2020
Winners
Announced

May 22, 2020
ePals Choice Award
Winner Announced

Summer 2020
Winners Trip
to D.C.*



*U.S. only



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Standards Alignment: Invent It Challenge



ISTE NETS'S Standards http://www.iste.org/standards/standards-for-students	Next Generation Science Standards http://www.nextgenscience.org	21st Century Learning Standards www.p21.org	Common Core State Standards for English Language Arts www.corestandards.org	STEAM www.steamedu.com
<ol style="list-style-type: none"> 1. Creativity and Innovation 2. Communication and Collaboration 3. Research and Information Fluency 4. Critical Thinking, Problem Solving, and Decision Making 	<p>Dimension 1: Practices Asking questions; Developing and using models; Planning and carrying out investigations; Analyzing and interpreting data; Constructing explanations and designing solutions; Engaging in argument from evidence; Obtaining, evaluating and communicating information</p> <p>Dimension 2: Crosscutting Concepts</p> <ul style="list-style-type: none"> • Cause and Effect • Scale, Proportion, and Quantity • Systems and System Models • Structure and Function <p>Dimension 3: Disciplinary Core Ideas</p> <p>Life Science LS1B: Growth and Development of Organisms</p> <p>Earth and Space Sciences ESS3A: Natural Resources ESS3C: Human Impact on Earth's Systems</p> <p>Physical Science PS2 Stability and Instability in Physical Systems</p> <p>Engineering, Technology, and Applications of Science ETTS1A: Defining and Delimiting an Engineering Problem ETTS1B: Developing Possible Solutions ETTS2A: Interdependence of Science, Engineering, and Technology ETTS2B: Influence of Engineering, Technology, and Science on Society and the Natural World</p>	<p>Learning and Innovation Skills</p> <ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration <p>Information, Media and Technology Skills</p> <ul style="list-style-type: none"> • Information Literacy • Media Literacy • ICT (Information, Communications and Technology) Literacy <p>Life and Career Skills</p> <ul style="list-style-type: none"> • Initiative and Self-Direction • Productivity and Accountability 	<p><u>CCSS.ELA -Literacy.CCRA.W.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p><u>CCSS.ELA -Literacy.CCRA.W.6</u> Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.</p> <p><u>CCSS.ELA -Literacy.CCRA.W.7</u> Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.</p> <p><u>CCSS.ELA -Literacy.CC RA.W.8</u> Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.</p> <p><u>CCSS.ELA -Literacy.CC RA.W.9</u> Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p><u>CCSS.ELA -Literacy.CC RA.SL.5</u> Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.</p>	<p>Science</p> <ul style="list-style-type: none"> • Conduct scientific inquiry through the Spark!Lab Process of Inquiry <p>Technology</p> <ul style="list-style-type: none"> • Conduct online research • Communicate an invention idea through a digital presentation <p>Engineering</p> <ul style="list-style-type: none"> • Solve a problem • Design an invention • Build a prototype <p>Arts</p> <ul style="list-style-type: none"> • Imagine and sketch an invention • Create a 3-D prototype <p>Math</p> <ul style="list-style-type: none"> • Measure and create a scale model of the invention • Analyze data to refine invention



GETTING HELP

You may find that you need assistance as you document your progress through the 7-step Process of Invention and create your final video or PPT entry. It is normal to need assistance, and we are definitely here to help you!

There are two basic ways for you to get help as you complete your journey through the 7-step Process of Invention and create your entries.

1. If you need technical help on creating your video or PPT entry, please send an email to invent@cricketmedia.com and let us know how we can support you.
2. If you need guidance on how to progress through one of the 7-steps of the Invention Process, please post a question on the Community page of the Challenge Website. One of our Past Student Winners or Experts from Cricket Media and Smithsonian will respond to you within 48 hours!

ENJOY THE CHALLENGE!

