



MISD Born to Invent: Michigan and Beyond!

Resource Guide

The aim of Little Inventors workshops is to allow students to express the far reaches of their imagination. We want to inspire students to think up and draw original, ingenious, funny, fantastical or perfectly practical invention ideas. There are no limits!

Students will be able to draw and submit their own inventions to appear on misd.littleinventors.org, where they will be reviewed by the Little Inventors team and MISD. Their idea might be chosen as a Little Inventors Team Favorite, turned into an animation, or even made into a real object by one of our Magnificent Makers.

Key Project Dates

Teacher training session & Kick off	January 16, 2024
Challenge close	March 20, 2024 *
Winner selection & Making process	Throughout April 2024
Exhibition and challenge celebration	May 30, 2024

*** Please note: All invention submissions need to be uploaded prior to March 20th. All details for submissions can be found on the last page of this guide.**

The Project at a Glance

MISD Born to Invent offers a creative approach to learning using invention. It is a learning program designed for Macomb County Intermediate School District in partnership with Little Inventors. Hearing about your experience using these resources in your school is really important to us so we ask that you complete an evaluation at the end of the project.

Part	Pack name	Timings
0	Challenge Launch Video	2 mins
1	Back in the day	40 - 90 mins*
2	Right here, right now!	60 - 120 mins
3	Into the future	40 - 90 mins
4	The challenges	60 - 180 mins
5	Take your ideas further	10 - 120 mins

**All of the timings are approximate and lessons and activities can be adapted to suit your specific learning environment and students' needs.*

MISD Born to Invent pack overview

Challenge Brief

Inventors of Michigan have changed the world with their ideas, from the humble lightbulb to futuristic fiber optic and many more jaw-dropping inventions in between. For this year's challenge we're going to be learning from the past and looking to the future to find out if your students have what it takes to make history with your invention ideas!

In the past hundred years, our world has changed more than ever before. There are more humans on the planet and people are living much longer due to amazing medical and technological innovations. But this brings many challenges too, like a bigger demand for food and electricity, less space for plants and animals, changes in the weather, and many other problems big and small.

With the spirit of famous inventors before you such as Thomas Edison and Marie Curie, we are challenging your students to come up with genius solutions to real challenges people are facing in Michigan and beyond. Who knows, perhaps your students too will become a famous inventor and be written into the history books for years to come!

Watch the challenge launch video [here!](#)

Learning and Exploration Content

Students will explore global topics through a creative lens, delving into the past, present and future of inventing. Using the powerpoint presentations provided in the resource pack you will introduce them to creative thinking techniques and teach them the content they need to know to come up with their own brilliant inventions.

They'll learn about inventors of the past, inventions born out of Michigan, and the makers still inventing today investigating the human desire to make our everyday lives better, easier and more enjoyable. Students will think about what the future holds and get creative about how they can reinvent everyday life.

Using their Inventor's Log, students will gather information and creative ideas to develop some unique and exciting sparks of inspiration that will guide them on to designing their final invention!

The teaching powerpoint is also available as narrated videos which can be played directly to your students to speed things up or used for yourself to revise the content. Find them on the MISD Born to Invent challenge page at misd.littleinventors.org

The challenges

Your students will hear from 8 real people across the world, from right at home in Michigan to far away in Samoa. They will be introduced to these real people and their real problems each faces in their work or daily lives.

The challenge videos can all be watched online at <https://misd.littleinventors.org/challenges/misd-born-to-invent-michigan-and-beyond>

Using their invention drawing sheets, your class will have the opportunity to respond to these challenges with their own invention solutions. They can choose from any of the challenges that inspire them and can respond to more than one.

The 5 best invention ideas from your class will be selected by you (their teacher) and uploaded to misd.littleinventors.org for a chance to be made real.

These invention ideas will be in response to one or more of the challenge videos from real people around the world. It's up to you, as their teacher, which you select.

Take your ideas further

For students who really enjoy the Born to Invent challenge and want to do more they can use the 'Take your ideas further pack' included in the resources to expand their invention ideas. They can create badges, draw a comic strip, and get thinking in 3D!



This project has been designed to be totally supportive and flexible to suit the needs of your students. You are best placed to select the activities and slides that will work best in line with your schedule. To support in-class delivery, each slide contains accompanying notes to ensure the main learning points are clear.

Resource pack checklist

All activities will be found in the printed Inventors Log

#	Name of pack	Overview of resources	Resources included	Page/slide numbers
1	Back in the day	<ul style="list-style-type: none"> An introduction to the history of inventing Inventors that changed the world A history of inventing in Michigan Funny inventions from the past 	<ul style="list-style-type: none"> Challenge Powerpoint Activated Powerpoint - Part 1 Activity 1. Office of Odd Activity 2. Time Traveler 	Slide 3 - 11 Page 3 - 4 Page 5 - 6
2	Right here, right now!	<ul style="list-style-type: none"> How to start inventing Manufacturing in Michigan today Who to invent for Different people, different problems 	<ul style="list-style-type: none"> Challenge Powerpoint Activated Powerpoint - Part 2 Activity 3. Mix-up Machine Activity 4. Switch It! 	Slide 12 - 24 Page 8 - 9 Page 10 - 14
3	Into the future	<ul style="list-style-type: none"> Population on the rise Threats to our environment Making a difference Inventing for the future 	<ul style="list-style-type: none"> Challenge Powerpoint Activated Powerpoint - Part 3 Activity 5. My problem treasure hunt Activity 6. Meet the future you 	Slide 25 - 34 Page 16 Page 17
4	The challenges	8 Invention Challenge Videos from real people around the world - from marine biologists to climate activists and more. It culminates in the invention drawing sheet where students can respond to one or more of the real world invention problems.	<ul style="list-style-type: none"> Challenge Powerpoint Activated Powerpoint - Part 4 8X challenge videos Activity 7. World map Activity 8. Real world challenges Activity 9. Mind map Activity 10. Invention inspiration Activity 11. What's the story Activity 12. My invention comic Invention drawing sheets 	Slide 35 - 41 Page 19 Page 20 Page 21 - 22 Page 23 - 24 Page 25 Page 26 Page 28 - 30
5	Take your ideas further	This is an additional activity pack for students looking to expand on their invention ideas independently. It includes activities such as writing a story about an invention idea or planning a prototype.	<ul style="list-style-type: none"> Take your ideas further pack 	

How to Use the Resources

The resources are designed to be worked through from top to bottom intersected with hands-on activities along the way to keep the students engaged and developing their inventing skills.

Before running this project with your students, explore the resources and watch through the [Teacher Guide to Activities video](#) which will give you an explanation of what is expected from each activity including some optional extensions. Your students will have all of the required worksheets in the printed student copy of the Inventor's Log.

Each student will need -

- Inventor's Log* (containing all activities)
- Take Your Ideas Further (additional activity pack for students wanting to expand further on their idea independently)
- Invention drawing sheets (these will be included in the Inventor's Log but if you are welcome to print more if your students have more ideas)

*The MISD will provide 1 printed Inventor's Log per student participant

Materials required (in addition to worksheets) -

- Scissors
- Pens and pencils for sketching activities
- Junk materials for students that prefer to think with their hands rather than sketching - this could simply be cardboard boxes, plastic soda bottles, pipe cleaners...anything destined for trash that can be re-used to make a model
- Voice recorder for students that prefer to record their ideas over voice messages

Submitting your students best invention ideas (required)

Each classroom is permitted to submit their top 5 ideas. If you are a specials teacher with 3 classrooms, you can submit 5 ideas per class.. **All invention submissions need to be uploaded prior to March 20, 2024** and it is up to you the teacher to do this.

The selections can be a response to any of the The Challenges, but if possible try to choose a variety of invention responses to submit as your chosen ideas. Invention drawings should be scanned (rather than photographed) and uploaded as either JPEG

or PNG file at

<https://misd.littleinventors.org/challenges/misd-born-to-invent-michigan-and-beyond/upload>.

Use this free converter to convert pdf files to jpg format if needed -

<https://www.adobe.com/uk/acrobat/online/pdf-to-jpg.html>

The judging panel comprising the Little Inventors Team, MISD and professional makers will select the final winning ideas to be brought to life in animation or even get made into real objects.

Here's our criteria recommendations for selecting your five submissions (but feel free to create your own criteria):

- Most fun
- Most detailed
- Most innovative
- Most likely to really work
- Most focused on the end user
- Wild card - this could be an invention from a student that rarely gets picked in school or a student that is a little shy/needs a little confidence boost!

Take your ideas further (optional)

There is a whole host of extension activities included for students who have really enjoyed the challenge and want to take their invention ideas further. These activities can take between 10 mins - 2 hours depending on how many of the activities they engage with. You can do these extra activities in class time or give to your students to complete at home.

Celebrate all of the hard work completed by the whole class. You may want to explore ideas of how you can showcase all of the inventions at your school. How about an invention exhibition? You could invite the school community to come and explore all of the fantastic ideas!

Top Tip: Give students extra invention sheets to come up with more invention ideas at home. These can be found in the resource pack and downloaded for free on misd.littleinventors.org

Help and contact details

If you have any questions or need any help please get in touch at hello@littleinventors.org

We wish you and your students the best of luck with the challenge and can't wait to see the inventions!



4th Grade

Learning Opportunities and Curriculum fit

Little Inventors provides incredible opportunities for students to develop their creative and problem solving skills as well as literacy skills. This integrated model engages students in STEM and literacy and increases exposure to NGSS Standards including science and engineering practices, disciplinary core ideas and crosscutting concepts.

Learning objectives and outcomes

Through the powerpoint presentations:

- Students will begin to see that inventions are all around us, and invention is a way to create solutions to problems or challenges.
- Students will discuss topics around inventing for themselves and others that strongly link to curriculum in 4th grade.
- Students will be presented with a design challenge with specified criteria for success and investigate constraints on materials, time and cost.

Students will:

- Generate ideas for inventions
- Describe how they are geographically connected to other people around the world and start to understand the different problems people face in different areas of the globe
- Learn about the history of inventing in Michigan and beyond
- Describe the steps involved in creating an invention
- Design an invention to solve a problem related to our pressing topics such as climate change or aging and predict how this will be useful in solving the identified problem
- Articulate and communicate their ideas in drawing, writing and speech for an audience, as well as plan and evaluate their writing.
- Become aware of related careers and exposure to manufacturing

Curriculum fit

By promoting creative thinking and problem-solving skills, **Little Inventors** offers many opportunities to link to several curriculum areas with an integrated approach.

Science and technology

Little Inventors is a great way to invite your students to use scientific and technological processes to begin to understand the oceans and our role in the interactions we have with them. Using creativity and imagination, **Little Inventors** allows students to design products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Students learn how to become resourceful and innovative. The resource offers students opportunities to:

- Use creative thinking, inquiry, problem-solving, decision making, and innovation to create an invention.
- Increase knowledge of scientific concepts.
- Develop questions, identify a problem, and use innovation to suggest a solution.

3-5-ETS1-1 Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Engineering Design

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Disciplinary core idea:

ETS1.B: Developing Possible Solutions

Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.

At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.

Crosscutting Concept:

Influence of Science, Engineering, and Technology on Society and the Natural World

Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

ISTE

Innovative Designer

1.4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems

1.4d Students exhibit tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

Literacy and Language

Little Inventors offers opportunities to support literacy development, and specifically for students to articulate and communicate their ideas in speech and writing for an audience as well as plan and evaluate their writing. The resource offers students opportunities to:

- Use language to represent their idea.
- Write clearly, accurately and coherently, adapting their language and style in and or a range of contexts, purposes and audiences (e.g. students could be challenged to advertise their design through media text)
- To present their designs orally to the rest of the class, or within smaller groupings in the classroom and be able to explain clearly their idea and design choice.
- Journal/reflect on why they chose the particular design and how it relates to their experiences.

CCSS.ELA-LITERACY.RI.4.3

Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

CCSS.ELA-LITERACY.RI.4.7

Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS.ELA-LITERACY.W.4.7

Conduct short research projects that build knowledge through investigation of different aspects of a topic.

CCSS.ELA-LITERACY.SL.4.4

Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Art (Visual Arts)

Little Inventors fully support the arts curriculum by encouraging students to produce creative work and explore their ideas using drawing, design and crafts, and learn about artists, craft makers and designers. The resource offers students opportunities to:

- Use drawing to develop and share their ideas, experiences and imagination.
- Be provided a range of materials to use in the visual representation of their design – pencils, pastels, textured materials, paint, etc. to allow for creativity and self-expression, and in older students, to increase their learning around the elements of design (e.g. line, shape and form, space, texture, color, etc.)
- Make 3-D versions of their design using various materials and processes to create a visual art piece
- Be exposed to the work of craft makers and designers.

Standard 2 (Create) :

Apply skills and knowledge to create in the arts. (VPAA: C1, C2, C3, C4, C5, P1, P2, P4, R1, R4)

The World in Spatial Terms

3 - G1.0.3 Use a world map to describe North America in relation to the equator and other continents and oceans, and Michigan within North America.