

HOW-TO GUIDE

Planning for Educators and Administrators



Intro
Getting Started
Planning
Rules
Rubric
Resources

Intro

Ignite the spark of invention and entrepreneurship in your students — and set them on a course to shape a better future.

Through Invention Convention Worldwide, you can introduce your students to a world in which they will solve their own problems and gain the confidence and 21st-century skills to invent their own future. The STEM + Invention + Entrepreneurship (STEMIE) experiential learning program offers:

- Hands-on, real-world, project-based learning activities
- Free curriculum
- Professional development workshops
- Exciting events at school, state and national levels

Invention Convention Worldwide is easy to implement, flexible enough to meet diverse student needs, adaptable to a broad range of disciplines and accessible to virtually any young learner.

Why Is This Important?

At the heart of Invention Convention Worldwide is STEMIE education, which recognizes the foundational skills that Science, Technology, Engineering and Math create in combination with Invention and Entrepreneurship learning. (We like to illustrate this as STEM + Invention + Entrepreneurship = Innovation.) STEMIE education prepares students for the needs of the 21st-century economy, creating critical thinkers and problem solvers and empowering a new generation of innovators.

What's in It for Your Students?

Your students will gain a new and innovative mindset for life. Along the way, they'll become part of a global ecosystem that allows them to gain new skills, friendships, recognition and perspectives. Invention Convention Worldwide is intended to inspire young people to become innovators, inventors and entrepreneurs over the course of their K-12 careers.

How Do You Begin?

Bring Invention Convention Worldwide into your classroom! Simply register for access to our free Invention Convention Curriculum and use this flexible, project-based learning tool to help enhance student understanding of invention and its context in the real world.

Getting Started

Invention Convention Worldwide helps activate STEM, Invention and Entrepreneurship (STEMIE) learning to instill problem-identification, problem-solving and creativity skills for life, inspiring young people to become innovators, inventors and entrepreneurs over the course of their K-12 careers.

Any child can participate in Invention Convention programs. Qualifying students may go on to compete in state events and at the Invention Convention U.S. Nationals event.

Invention Convention Worldwide brings together learners, educators and others from many different places and backgrounds. It fosters conversations and collaborations among learners, educators, parents, organizations and policymakers worldwide.

Get Your Students Involved!

Educators of school and after-school programs serving student populations in grades K-12 (see local affiliate for grade range in your state) are welcome to participate.

Contact your local affiliate for more information. If your school or district does not currently have a state Invention Convention program, contact us at inventionconvention.org.

Events

- Local Invention Fair
- Regional or State Invention Fair
- Invention Convention, U.S. Nationals

Student Eligibility

Participating students must:

- Be in grades K-12 (see local affiliate for grade range in your state).
- Compete at their Local Invention Fair organized by local ambassador.
- Be nominated by an educator or school to compete at a Regional or State Invention Convention.
- Compete as an individual or on a team (see local affiliate for team rules in your state). Teams may compete against individuals and vice versa.

How to Compete

Students will need to develop an invention that solves a problem in their life, the life of a loved one or their world. Students will develop, test and then pitch their project at the convention.

Students who compete and qualify at their state's highest competition will be invited to the Invention Convention U.S. Nationals.



Display Board

Prototype

Logbook

All Projects Must Have:

- Inventor's log (logbook or journal)
- Display board
- Prototype
- Pitch video (optional; inquire with your local program contact)

Logbook:

- Students use logbooks to document their journey. They should not be just reports completed after the fact.
- Logbooks need to document all aspects of the invention process: identifying, understanding, ideating, designing, building, testing, refining.

Display Board:

- Students will need to create a visual display (trifold poster board) to compete.
- The display should communicate significant aspects of the invention process.

Prototype/Model:

- Students should create a model that demonstrates the key characteristics that make the invention valuable, usable and unique.
- Prototype does not have to be fully functioning.

Pitch Video:

- The national events require students to record and submit a 4-minute unedited and continuous video of student(s) pitching their invention.
- Not all events require a pitch video; see local or state rules for requirements.

Contact Us

For more information on how to get involved, please contact us at inventionconvention.org with your name, organization and how you hope to participate.

We look forward to supporting you and your students as you explore the benefits of innovation and project-based learning.

Planning

Thank you for your interest in Invention Convention Worldwide.

Here are some tips for organizing your Local Invention Convention program.

1. Contact your local or state affiliate to get started. What subject do you teach?

How many students are you hoping to have participate at your school? How can we support you?

2. Organize your team. Decide which teachers and how many students will participate (a rough estimate will do at this early stage).

3. Schedule professional development (optional).

4. Introduce invention learning to your students, and integrate free invention curriculum into participating classrooms.

Teachers on average spend a minimum of 6-8 weeks on invention learning, beginning as early as October. You may choose to do this during normal school hours or in

after-school clubs. The Henry Ford has compiled a list of resources that you may use, including Invention Convention Curriculum. Access at nationalinventioncurriculum.org.

5. Set a budget. Set a budget. Depending on how big you wish your convention to be, you may not need a budget at all. Some possible expenses are:

- Invention Convention curriculum professional development.
- Cost of materials - no more than \$25 per prototype. Some of the best prototypes have been built with little to no money.
- Awards and incidentals for Local School Invention Fair (if needed).
- Bus to transport students to the State Invention Convention.

FREE

K-12 Invention Convention Curriculum

- Interdisciplinary and standards-based with dynamic activities to fit any subject.
- Flexible: Delivered in 6-12 weeks in class, after school, at home or independent study.
- Framework guides students through seven steps of the invention process.
- Invention log documents every step students take in making their invention, recording what they did, why they did it and how they did it.

Access for FREE at nationalinventioncurriculum.org.

Developed by educators and tested for 30 years.



Quick List

- Contact Invention Convention team.
- Organize your team.
- Professional development session (optional).
- Introduce invention learning to your students, and integrate free invention curriculum.
- Set a budget.
- Support students while they create their inventions.
- Hold a kickoff event (optional).
- Schedule your Local Invention Fair.
- Recruit volunteer judges.
- Hold your Local Invention Fair.
- Determine which projects should apply to State Invention Convention.
- Attend State Invention Convention.
- Attend Invention Convention U.S. Nationals.

6. Support students while they create their inventions. We recommend that you use the convention rules and judging rubrics set by the State Invention Convention and Invention Convention U.S. Nationals when creating lesson plans and teaching the invention process. To qualify for Local or State Invention Convention, each project must include the following:

- Logbook
- Display board
- Prototype
- Pitch video (see local and state rules)

7. Hold a kickoff event (optional). Your Local Invention Fair kickoff can include a formal event, a letter to parents and/or putting up posters around your school.

8. Schedule your Local Invention Fair. To participate in the Invention Convention U.S. Nationals, your local event must be held before your state cutoff date. You are free to choose any date before the cutoff for your Local Invention Fair that works best for your schedule.

9. Recruit volunteer judges (ongoing). Judges can be anyone from parents and teachers to professionals and local officials. Judges must judge and score each student project according to a preset rubric. The judging results will help you determine which projects should apply to the State Invention Convention. Judging form and rubric included in this packet.

10. Hold your Local Invention Fair. Hold your local convention before the cutoff date for your Regional or State Invention Convention. Invite parents, teachers, administrators, local businesses and local organizations to attend and view student projects. Judges should score and comment on all projects.

11. Teachers determine which projects should apply to Regional or State Invention Convention. Teachers will help all students competing in Invention Convention register via the online application. Students, families, teachers, judges and other guests will need to register.

12. Students attend Regional or State Invention Convention. Teachers are encouraged to accompany their students.

13. Invention Convention U.S. Nationals: Qualifying projects at Regional or State Invention Convention may be invited to apply to Invention Convention U.S. Nationals at The Henry Ford.

Remember that:

- Projects should be student-driven. Teachers and parents can support students with curriculum, lesson plans and prototype-building help, but projects should ultimately be the original work of students.
- The Invention Convention team is here to help! You can ask questions at any time by emailing your local affiliate or contacting us at inventionconvention.org.

Invention Convention U.S. Nationals

Competition Rules

Selection

This is an invitation-only event. Inventors are carefully selected based upon criteria set by Invention Convention U.S. Nationals.

Eligibility

Inventors and entrepreneurs who have entered affiliate member competitions and won an invitation from your affiliate member are eligible to take part in this competition.

In order to be eligible to apply to the Invention Convention, students must be in grades K-12, depending on local, regional and state rules, and be nominated by their local school, district or regional hub. All projects must have an inventor's log (logbook or journal), a poster board, a prototype (which may be nonworking) and a 4-minute unedited and continuous pitch video (if required by local, regional or state event). Projects must also be of sufficient accomplishment and design to be at a state competition level, as determined solely by the judges. All accepted inventors will be deemed finalists upon acceptance to the Invention Convention U.S. Nationals.

This competition is open to both individual and team competitors. Teams may compete against individuals, and vice versa, for select award categories. There is a limit of four (4) team members who may be on a team. All team members in attendance must take

part in the team pitch for the video and on competition day. Check with your affiliate for their requirements.

Logbooks or journals must be brought to the competition when invention displays are set up. They will be judged that day. Teams only need to submit one logbook for their project.

Each student can enter only one entry into the Invention Convention U.S. Nationals. No student can participate in both team and individual competition.

Project Restrictions

This is a large, public venue and proper expectations about behavior and projects should be considered. The following items are not allowed on your person or in your project:

- Electric stun guns, martial arts weapons or devices
- Guns, replica guns, ammunition and fireworks
- Knives of any size
- Mace and pepper spray
- Razors and box cutters
- Balloons, glitter or confetti
- Please inquire with your affiliate about the use of water, electricity and Wi-Fi

Award Categories

The awards are determined by your local, regional or state affiliate; it is common to have different categories of awards. Categories that are consistent with the National competitions include: Grade Awards, Industry Innovation Awards, Patent Awards, Global Change, Global Impact and Inventor Communication.

Many of these are determined based on the different dimensions of the rubric. You will want to check your local rules as to whether or not a student must be present at the awards ceremony to receive their award and possible prizes, and if any prizes are shared among teams.

If your State Invention Convention allows teams to compete, teams will take part in the same judging processes as individuals. Rules for teams will mirror those of the individuals. Invention Convention staff and judges reserve the right to combine and/or reconfigure awards categories.

Awards provided to students, including any plaques and monetary awards, are the property of the awarded students and not the school or organization they are representing.



Rubric

Grade Award Rubric: Points

Category	Dimension	Points
Invention Process (45)	Identifying and Understanding	15
	Ideating.....	10
	Designing and Building	10
	Testing and Refining	10
Invention Impact (25)	Value Proposition	5
	Market Potential	5
	Social Value.....	5
	Originality	10
Inventor Communication (30)	Logbook	5
	Display Board	5
	Prototype or Model	5
	The Online Pitch	5
	The Live Pitch and Q&A	10
TOTAL		100

Invention Process (45)**Goal****Exemplar Example****Identifying and Understanding (15)**

The identifying stage is where inventors seek or find a problem that they want to solve. It is important to ask inventors how they uncovered this problem and who else might experience the same problem and to what end.

Understanding a problem refers to the research that an inventor has done to understand what else exists to solve the problem as well as the full impact the problem may have on others.

An example of a well-defined problem: 17,000 kids age 18 and under experience an infection from their IV when hospitalized; this costs insurance companies over \$X dollars and kids are hospitalized for X days longer than anticipated.

An inventor has researched multiple (4+) sources to understand the problem, including but not limited to:

- Google
- USPTO.com
- Subject matter experts (interviews)
- Visiting stores
- Looking at industry news

Ideating (10)

Ideating refers to the brainstorming or imagination stage that a student goes through to generate original ideas and begin to develop idea/s into specific requirements to determine the likelihood of success.

Student explains that he/she identified 2+ ideas and explains the elimination process. Could include a personal story.

Designing and Building (10)

Designing an invention or a prototype requires critical-thinking skills; students should be able to articulate how they wanted the invention to work and why they chose the materials they did for executing their invention.

Includes a written diagram with labeled materials that takes the judge through the journey of the design process.

Testing and Refining (10)

The key to this step is iterations, improvements and perseverance. The best inventors know that the first build is often not the best and seek feedback through testing and refine their design accordingly.

The best inventors include a written diagram with labeled materials that takes the judge through the journey of the design process. Example: One young inventor, who was creating a battery from bananas, discovered in her first batch of banana mush that she did not get much electrical output. She modified the design numerous times based on the detailed graphs and charts that she kept of her electrical output from various iterations. Eventually, her redesigned battery produced more electrical output.

Invention Impact (25)**Goal****Exemplar Example****Value Proposition
(5)**

Does the inventor clearly summarize why a consumer or user should buy or use his/her invention? This statement convinces a potential consumer that one particular product or service will add more value or better solve a problem than other similar offerings.

The best answers provide a clear age-appropriate description and understanding of users and benefactors. (Note that the inventor can describe these roles using different terms. The key is to assess his/her understanding of value creation.)

**Market Potential
(5)**

Market potential assesses the scope and likelihood of an invention gaining users.

1. How large and/or viable is the potential market for the invention?
2. To what extent was the market appropriately researched and scoped?

The best answers address quantitative research and understanding of the size of the potential market. Example: An invention that removes CO₂ from the environment included research of the number of organizations that already use similar technology to approximate the number of early adopters.

**Social Value
(5)**

Some inventions may address pressing social issues. The social impacts may not be easily quantifiable in a traditional economic sense but are nevertheless important to consider in the context of overall invention impact.

1. Does the inventor consider and address the potential environmental, societal and other nontraditional impacts of his/her invention?
2. To what extent does the invention improve environmental/social conditions or have a minimal adverse impact?

The inventor considered a broad range of social impacts and clearly articulated their potential impact.

**Originality
(10)**

Is the student's invention unique, novel and creative? Is it distinguishable from prior inventions and those of his/her peers?

The invention is beyond incremental and is something the judge has not considered or seen before.

Inventor Communication (30)

Inventor Communication (30)	Goal	Exemplar Example
Logbook (5)	<ol style="list-style-type: none"> 1. Does the logbook document a journey, not just a report done after the fact? 2. Does the logbook document all aspects of the invention process? 	<p>Logbook contains topic research, indicating that the young inventor is exceptionally knowledgeable about his/her problem and understands the issue thoroughly, including statistics about the significance of the problem. Logbook contains research about the existence of similar inventions and how this invention is different or better. Logbook documents research from at least four sources, including interviews with experts in the field. Logbook contains documentation to show progression of prototype iterations and improvements. Was the journal organized, effective and complete? If not, score cannot be greater than 2.</p>
Display Board (5)	<ol style="list-style-type: none"> 1. Does the display have strong visual appeal? 2. Is the display eye-catching, with color, pictures, graphs and variety? 3. Is grammar, spelling and punctuation correct and, if hand-printed, neatly done? 4. Does the display communicate significant aspects of the invention process? 5. Are there unique aspects to the display, such as shape (display is not a basic cardboard trifold)? 	<p>The 2016 National Invention Convention "Best Display" winner went outside the box when designing his outhouse-shaped display for his Porta Potty Survival Kit invention. In addition, he created a QR code for viewers to scan and listen to his own words explaining his invention.</p>
Prototype or Model (5)	<p>Does the prototype clearly communicate the key characteristics that make the invention valuable, usable and unique?</p> <p>Note: Outside assistance and collaboration is acceptable as long as the student is driving the process and documents outside help. The student should only do what he/she can safely do. Credit should be given where help is given.</p>	<p>Examples of strong prototypes: 1) working apparatus of real mashed bananas hooked to wires to generate electricity that had been tested and modified repeatedly to improve the electrical output and 2) a detailed environmental model to help endangered turtle hatchlings find their way back to the ocean, composed of a metal tray with sand on half and simulated water with glossy blue paper on the other half that included small plastic turtles and UV lights around the perimeter to show how the lights would help the turtles.</p>

Inventor Communication (30)

The Online Pitch (5)

Goal

The online pitch is a single recording that clearly and succinctly communicates the invention process and impact. It will be recorded and uploaded well in advance of the Invention Convention U.S. Nationals event.

The best pitches include the following:

- Introduction: invention name, inventor's name, state, grade, etc.
- An overview of all invention process elements outlined in the invention scoring criteria (above).
- Use of and/or reference to all physical communication elements (including the logbook, display board and prototype).
- Explanation of origination of the idea (helping to assess the originality).
- Other recommendations include:
 - Clear, concise, minimal stammering or superfluous words, correct grammar.
 - Enthusiasm, passion, inflection, appropriate body language.
 - No reading from cue cards; explanation in own words.
 - Not answering questions from someone off/on camera.
 - No longer than 4 minutes.
 - Equal participation of all team members.

Exemplar Example

A good example of a video pitch came from the You Get It All Insulin Plunger. The student tells judges who she is and where she is from and the name of her invention. She recounts the story of her grandfather needing insulin after he had run out and not being able to afford more. The student found that normal insulin vials were inefficient and that more insulin could be squeezed from a vial with a better plunger. She walks judges through the different prototypes and testing she conducted, her failures, and touts her successes. By citing the research into diabetes statistics and the costs of insulin, she clearly demonstrates the benefit of her invention and how much people could save by using it. This is all done clearly, with no prompting from parents or reading from a script, and well under four minutes.

Inventor Communication (30)

The Live Pitch and Q&A (10)

Goal

The Live Pitch and Q&A takes place during the Invention Convention U.S. Nationals event and is very similar to the online pitch but with the addition of a judge question-and-answer (Q&A) portion.

The best pitches include the following:

- Introduction: invention name, inventor's name, state, grade, etc.
- An overview of all invention process elements outlined in the invention scoring criteria (above).
- Use of and/or reference to all physical communication elements (including the logbook, display board and prototype).
- Explanation of origination of the idea (helping to assess the originality).
- Other recommendations include:
 - Courteous and professional to peers in judging circle.
 - Concise, appropriate pace, clearly heard and understood.
 - Professional eye contact and posture.
 - Enthusiasm, passion, inflection, appropriate body language.
 - No reading from cue cards; explanation in own words.
 - No longer than 5 minutes.

Exemplar Example

Invention was clearly created by the student as evidenced by the ability to clearly and thoroughly explain the invention.

How does the student handle live questions? Composure? Do they use the question in their answer?

Resources

Invention Convention Curriculum

nationalinventioncurriculum.org

Educational Resources

thf.org/education

Innovation Learning Framework

thf.org/modeli

The Henry Ford's Innovation Nation

Season 1

youtube.com/playlist?list=PL15GihUisSLQlgUpHW6bK9Csr0CFjeGlp

Season 2

youtube.com/playlist?list=PL15GihUisSLRIm4i_dJKgz5kn-YzF9iNK

Season 3

youtube.com/playlist?list=PL15GihUisSLQWV9qKLapErcmJMsogQuiT

Season 4

youtube.com/playlist?list=PL15GihUisSLREIHb5ZVQbCODkb3lEmRUp

Hollow Flashlight Girl

Season 1: Episode 5

Learn about the steps, risks and failures this young innovator experienced in creating a battery-free flashlight.

youtube.com/watch?v=RCWVIDwnpIA&feature=youtu.be&list=PL15GihUisSLTqur5bibKgLFNbNuPI-mqs



DEAR PARENTS AND GUARDIANS,

Your child's teacher has elected to participate in the 2019 Michigan Invention Convention program. The Michigan Invention Convention program provides students in grades 3-12 an interactive and interdisciplinary opportunity to use the invention process to create and pitch an original product at a statewide convention. Students will build their critical-thinking and entrepreneurial skills. Qualifying projects may even compete in the Invention Convention U.S. Nationals.

The Henry Ford hopes that the Michigan Invention Convention will bring together problem solvers, inventors and entrepreneurs of all ages, backgrounds and disciplines.

This letter outlines the important things to know about the process and convention as you support your child this year.

If you have any questions, please contact your child's teacher. Thank you for your support!

Michigan Invention Convention at The Henry Ford

Important Events

- **Local Invention Fair:** Your child's teacher will incorporate invention learning into the classroom, culminating in a Local Invention Fair at your school or local hub.
- **Michigan Invention Convention:** Qualifying projects from Michigan schools will be invited to present their projects to their peers and a panel of judges at Michigan Invention Convention on April 27, 2019, at The Henry Ford.
- **Invention Convention U.S. Nationals:** Students who do well at Michigan Invention Convention may be invited to participate at the Invention Convention U.S. Nationals, to be held May 30-31, 2019, at The Henry Ford.

Student Eligibility

Participating students must:

- Be in grades 3-12.
- Compete at their Local Invention Fair organized by local ambassador.
- Be nominated by educator or school to compete at Michigan Invention Convention.
- Compete as an individual or on a team (no more than four members). Teams may compete against individuals and vice versa.

How to Compete

Students will develop an invention that tries to solve a problem in their life, the life of a loved one or their world. Students will develop, test and then pitch their project at the convention.

All Projects Must Have:

Logbook

- Students use the logbook/journal to document their journey. It should not be just a report done after the fact.
- Logbooks need to document all aspects of the invention process: identifying, understanding, ideating, designing, building, testing and refining.

Display Board

- Students will need to create a visual display (trifold poster board) to compete.
- The display should communicate significant aspects of the invention process.

Prototype/Model

- Students should create a model that demonstrates the key characteristics that make the invention valuable, usable and unique.
- Prototype does not have to be fully functioning.

Pitch Video

- Michigan and Invention Convention U.S. Nationals require students to record and submit a 4-minute unedited and continuous video of student(s) pitching their invention.

Your Role

As a parent, your role is to support your child as he or she learns the invention process and develops his or her own invention. It is important to note that outside assistance and collaboration are acceptable as long as the student is driving the process and documents outside help.

Team Name:

Grade:

Judge:



Judging Form

Evaluation Criteria

Start at the average/middle score (8 out of 15, 5 out of 10 and 3 out of 5), then add and deduct points.

Invention Process (45%)	Points	Comments
Identifying and Understanding <ul style="list-style-type: none">Identifies and defines problem being solvedHas researched problem and possible solutions Exemplar: Clearly defines problem and has researched 4+ sources to understand problem	/15	
Ideating <ul style="list-style-type: none">Identifies ideas for solving problemExplains how the best idea was determined Exemplar: Explains that 2+ ideas were identified and the elimination process	/10	
Designing and Building <ul style="list-style-type: none">Explains purpose and process for the design and build Exemplar: Clearly explains the journey of the design, including a written diagram with labeled materials	/10	
Testing and Refining <ul style="list-style-type: none">Explains how the invention was tested and optimized Exemplar: Clearly explains the journey of the design, including a written diagram with labeled materials	/10	
Invention Impact (25%)	Points	Comments
Value Proposition <ul style="list-style-type: none">Explains who would buy/use the invention and why they would use the invention rather than other products Exemplar: Provides a clear description and understanding of users and benefactors	/5	
Market Potential <ul style="list-style-type: none">Has researched and demonstrated knowledge of how viable the market is for invention Exemplar: Addresses quantitative research and understanding of users and benefactors	/5	

Invention Impact (25%) cont.**Points****Comments****Social Value**

/5

- Understands and describes positive and negative impacts of invention on the environment and society

Exemplar: Considers a broad range of social impacts and clearly articulates their potential impact

Originality

/10

- Invention is unique, novel and/or creative

Exemplar: Something you have not considered or seen before

Inventor Communication (30%)**Points****Comments****Logbook**

/5

- Documents invention journey
- Needs to be organized, effective and complete to receive a score greater than 2

Exemplar: Contains research about problem, research about similar inventions and thoroughly explains what makes this invention better/different; references 4+ sources including interviews with experts in the field

Display Board

/5

- Displays components of invention process and invention's potential
- Visually appealing

Exemplar: Display is outside the box (e.g., QR code for viewers to scan and listen to inventor's words explaining invention)

Prototype/Model **Does not need to work******

/5

- Communicates key characteristics
- Useful visual of invention

Exemplar: Working apparatus or detailed model that effectively demonstrates intent and function of invention

Live Pitch and Q&A

/10

- Best pitches introduce inventors, explain their process, reference project components (prototype, logbook, board) and articulate the origination and potential of invention idea
- Composure and ability to handle live questions

Exemplar: Invention was clearly created by the student as evidenced by the ability to clearly and thoroughly explain the invention

____/95 + Online Pitch: ____/5 = Total Score ____/100