Invention Convention Curriculum

Introduction

The Invention Convention Curriculum uses hands-on, real-world, project-based learning activities to introduce students to a world in which they solve problems and gain the 21st-century skills needed to invent their own future.

This curriculum is designed to be flexible enough for use in classrooms, virtual environments and out-of-school experiences. All lessons can be used as stand-alone activities. Teachers may use all of the lessons in sequence for a complete invention program of 6-12 weeks or select the most relevant ones for their students.

Our curriculum is organized under a framework that uses the seven steps of the invention process. Introductory lessons provide a starting point for students to develop an understanding of invention. Students look at real-world examples and learn how to record their own invention process in a logbook.

Identifying, Understanding and Ideating lessons prompt students to uncover problems and brainstorm and research creative solutions.

Through Designing and Building lessons, students explore existing inventions to uncover how they work. By taking inventions apart, they learn how to design and build a prototype of their own.

Testing lessons show students how to begin optimizing their solutions by encouraging them to become comfortable learning from failure. They learn to test, rebuild and re-enter the invention process.

Communicating lessons teach students how to communicate their invention effectively via a display board and pitch.

Why This Matters

Researchers with Opportunity Insights and Harvard University find that, while talent is widely distributed, opportunity is not. Invention Convention seeks to bring access to the teaching of invention skills. By identifying problems and building solutions, young inventors learn to challenge what is and see what could be. Unstructured creative problem-solving will develop skills like collaboration and perseverance while establishing the innovative mindset necessary for future progress.

Curriculum Overview

The accompanying chart outlines the Invention Convention Curriculum for grades 3-5 and how the lessons align to the seven steps of invention. You'll also see the time required to complete lessons and the resources available for use in the classroom. Each lesson consists of one PDF file that includes the lesson plan, worksheets and other resources. If the lesson includes a PowerPoint, it can be found as a separate file.

If you are using this curriculum to prepare students for an Invention Convention competition, please consult your Regional Hub or State Affiliate for pacing guidelines.

The 7 Steps of Invention

Students will complete the seven-step invention process to develop an invention that is original and well-constructed and that solves an identified problem or need. The steps are: Identifying, Understanding, Ideating, Designing, Building, Testing and Communicating.

Model i Connectors

Throughout the Invention Convention Curriculum, students will have opportunities to practice and develop The Henry Ford's innovation learning framework, Model i. Its Habits of an Innovator and Actions of Innovation align and support the seven steps of the invention process. To learn more about implementing this learning framework in your classroom, visit https://www.thehenryford.org/education/teaching-innovation/modeli/.

Learn from Other Kid Inventors

View the library of Invention Convention Worldwide kid inventors as they share their inventions for Invention Convention U.S. Nationals competition. Use these videos in conjunction with the Invention Convention Curriculum to encourage your students to learn from others and invent it forward.

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Curriculum Overview

Introduction

Lesson	Time	Worksheets	Resources	Description
What is an Invention?	30-40 minutes	Frayer Model Invention Walkabout Where Did That Come From?	PowerPoint	This lesson introduces students to the concept of an invention.
Innovation Madness	45 minutes	Innovation Madness Bracket	PowerPoint Blank Bracket Artifact Background	This lesson helps students understand the concept of innovation and compare historic innovations.
Invention Logbook		Logbook Scavenger Hunt Logbook Blueprint	PowerPoint	This lesson introduces students to a logbook and how it supports the invention process.

Identifying

Lesson	Time	Worksheets	Description
SCAMPER Part 1	55 minutes	SCAMPER	The lesson helps students learn to identify clear problems and needs through brainstorming. SCAMPER 1 is the first of a three-part series. These lessons must be completed in order.

Understanding

Lesson	Time	Worksheets	Description
Understanding My Problem	55 + minutes	Research Guide Creating a Survey	This lesson introduces students to the importance of researching a problem before designing a solution.

Ideating

Lesson	Time	Worksheets	Description
Wishing	55 minutes	Wishing	This lesson helps students learn creative brainstorming as a means of ideating.

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Designing

Lesson	Time	Worksheets	Description
Take Apart	55 minutes	What Makes Me Go?	Through reverse engineering, this lesson helps students understand how objects work.
SCAMPER Part 2	55 minutes	Draw My Model	This lesson builds upon SCAMPER Part 1 to teach students paper prototyping and design evaluation.
Jungle Survival	70 minutes	Building a Shelter	This learning project will help students work through the design process in a fun, hands-on activity.

Building

Lesson	Time	Worksheets	Resources	Description
Marble Spill	55 minutes	Marble Spill	PowerPoint Materials List	This learning project will help students work through the building process in a fun, hands-on activity.
Does My Invention Already Exist?	55 minutes	Patent Research		This lesson will help students understand originality and why it is important in the invention process.
Intent to Invent	55 minutes	Intent to Invent		This lesson will help students plan out how they will build their invention.

Testing

Lesson	Time	Worksheets	Description
Paper Airplane Fun	55 minutes	Paper Airplane Fun	This lesson helps students explore the importance of testing in a fun, engaging activity.
Testing My Idea	70 minutes	Claim, Evidence, Reasoning Partner Meetings	This lesson teaches students to make claims about their invention, supporting them with evidence and optimizing with peer feedback.

Communicating

Lesson	Time	Worksheets	Resources	Description
SCAMPER Part 3	95 minutes	Marketing Plan		This lesson builds upon SCAMPER Parts 1 & 2 to introduce entrepreneurial skills to the invention process.
Designing My Display Board	40 + minutes	Designing My Display Board	PowerPoint Display Board Procedures	This lesson helps students communicate and present their invention to others.
Pitch Practice	60 minutes	Pitch Practice Guidelines Constructive Feedback		This lesson helps students create and practice a pitch for their invention.

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The 7 Steps of Invention

Identifying a problem means brainstorming and using research to discover problems and who might be experiencing them. You might uncover these problems at home, at your school, with your sports team, listening to the news or somewhere else entirely.

Understanding the problem means you know what is causing the problem and exactly what you want to have happen when the problem is solved. The better you understand the problem, the better your solution will be.

Ideating means thinking about the problem: brainstorming and researching different ideas and options to solve the problem.

Designing means deciding what your invention solution will be made of, what it will look like and how it will work.

Building means assembling your invention based on your solution design using the materials and the process you have decided to use.

Testing your solution is how you find what works and what doesn't. You will modify or change your design, build in those changes and test the changes. Testing also includes an analysis of the pros and cons of the invention, its impact on society and the environment, its marketability and its social value. You keep repeating this process until your invention or prototype works and works well.

Communicating means explaining the problem and your research, how your invention solution solves the problem, who might use your invention, your process in creating this invention and how you might make it even better.

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Model i Connectors

To unleash everyone's potential to innovate, The Henry Ford has developed Model i, a unique learning framework based on artifacts and stories in The Henry Ford Archive of American Innovation. This remarkable collection provides unprecedented insight into the way people have innovated across 300 years of American history.

Throughout the Invention Convention Curriculum, students will have opportunities to practice and develop this framework. The Habits of an Innovator and Actions of Innovation align and support the seven steps of the invention process. To learn more about implementing this framework in your classroom, visit https://www.thehenryford.org/education/teaching-innovation/modeli/.

Developing Habits of an Innovator

Stay Curious
Learn something new. Ask questions.

Collaborate
Share what we know.
Respect what others bring.

Take Risks
Think BIG. Embrace uncertainty.

Be Empathetic
Walk in other people's shoes to understand their needs.

Challenge the Rules
Turn can't into can do. Dare to be different.

Learn from Failure
Be resilient. Use feedback to make improvements.

Practicing Actions of Innovation

Uncover
Connect with user to identify needs, develop insight and gain perspective.

Define
Use new perspective to provide scope and clarity to the problem.

Design
Brainstorm solutions and create a prototype for testing that solution.

Optimize
Use feedback to improve the design through iteration.

Implement
Take prototype to market, seek new insight and re-enter the cycle.

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Learn from Other Kid Inventors

Description

View the library of Invention Convention Worldwide kid inventors as they share their inventions for Invention Convention U.S. Nationals competition. Use these videos in conjunction with the Invention Convention Curriculum to encourage your students to learn from others and invent it forward.

Clip 1

Click here to watch video.

Inventions Featured:
Nourishing Spoon, Survive, SociEmoti

Grades Featured:
1, 5

Clip 2

Click here to watch video.

Inventions Featured:
Sam's Handy Helper, Biodegradable Straw Design Enhancements

Grades Featured:
2, 10

Invention Steps Highlighted:
Building, Testing

Clip 3

Click here to watch video.

Inventions Featured:
Vital Guard, Cool on the Go, Fly Trap (title unknown)

Grades Featured:
12, 7

Invention Step Highlighted:
Communicating

Clip 4

Click here to watch video.

Inventions Featured:
CPR Smart Glove, Piezo Power

Grades Featured:
6

Clip 5

Click here to watch video.

Inventions Featured:
Sure Contact Cane, Straw Cycler, Masks (title unknown)

Grades Featured:
2, 5, 7

Clip 6

Click here to watch video.

Inventions Featured:
AstroTrack, Window Escape (title unknown)

Grades Featured:
8, 12

Clip 7

Click here to watch video.

Inventions Featured:
Water Conservation in Aquaponics, ATOM

Grades Featured:
4

Clip 8

Click here to watch video.

Inventions Featured:
AnswerIT, Title Unknown, Bit Blaster

Grades Featured:
3, 8

Clip 9

Click here to watch video.

Inventions Featured:
Jump Smart, Slider Binder

Grades Featured:
Unknown

Invention Step Highlighted:
Design

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