

aspiring innovators!

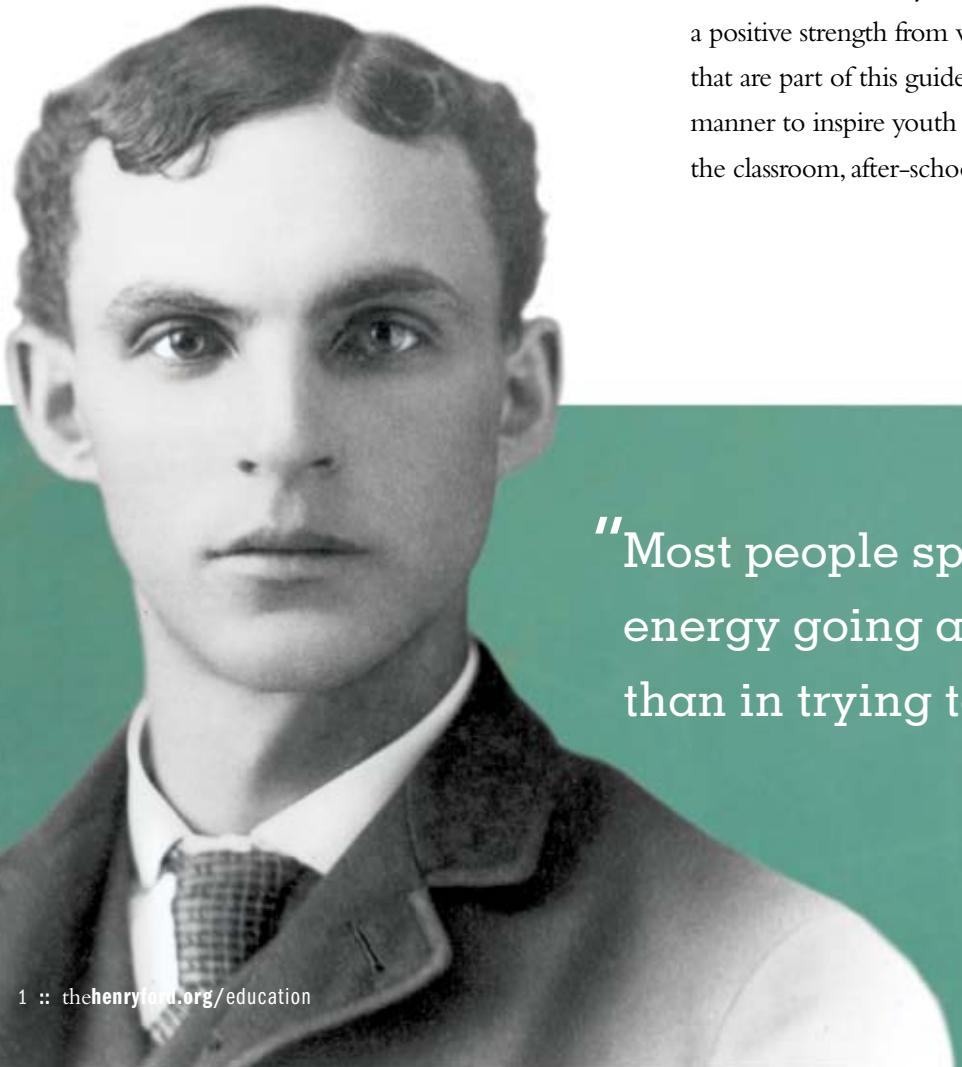
A resource guide to **inspire a culture of creativity** and **innovation** in the classroom and...beyond!



In the 21st century, probably more than ever before, there is a dire need to rekindle the spirit of creativity and innovation among our youth.

The world today faces many challenges, including global interconnectedness, rapid technological change, human conflict and environmental sustainability. As educators and community stakeholders, we strive to prepare our youth to become successful adults who can have a positive impact on the world. Creativity, the ability or power to imagine and express something new, and innovation, a radical improvement or change that can benefit others, will allow our youth to make, interact, adapt and ultimately change the world.

This Aspiring Innovators guide is aimed at helping teachers, after-school providers and parents to create a culture that can foster creativity and innovation among youth on an everyday basis so that creativity and innovation become habits of mind and a positive strength from within. Ideas, tips, tools and resources that are part of this guide are designed to be used in a flexible manner to inspire youth with a can-do attitude whether it is in the classroom, after-school programs or at home.

A black and white portrait of Henry Ford, an American industrialist and the founder of the Ford Motor Company. He is shown from the chest up, wearing a dark suit jacket, a white shirt, and a patterned bow tie. His hair is dark and wavy, and he has a serious expression.

“Most people spend more time and energy going around problems than in trying to solve them.”

— Henry Ford

How to implement Aspiring Innovators in the classroom, home or after school

Build up excitement and interest by creating a **mini-environment** that can ignite and nurture creativity!

- 1.** Start by dedicating a space in your classroom, home or community center that says something like: Tinker Station for Aspiring Innovators, or Mrs. J's Creativity Corner.
- 2.** Place a computer with a looping slide show of quotes from aspiring innovators. At the start of each day, ask youth to share something they read that is inspirational.
- 3.** Put up posters/photographs in the area of past and present innovators and creators. Let the youth guess or want to know who these people are. Change posters of innovators and makers to keep triggering interest. Make sure you include less famous people like local inventors.

- 4.** Put up a poster with the list of current and future world issues that need solutions to provide a framework of need.



- 5.** Place a creativity kit with supplies and drawing papers for kids to sit, ideate and create on their own.
- 6.** Every week have a quick 15-minute show-and-tell or informal discussion so that youth start to think about creativity and innovation in their daily lives instead of as a temporary disconnected project.



How to inspire Aspiring Innovators

EMPOWER

WITH
Innovation 101
Reading Inspiration

ENGAGE

WITH
Innovators/Makers
Creative Projects

ENLIGHTEN

WITH
Events to share and celebrate creativity
America Invents online portal

CREATE A CULTURE OF CREATIVITY AND INNOVATION

Week 1.

Setting the Context

Contextual stories of creative people or innovators, their successes and their failures will bring relevance to learning and help make the connection about the “why” before the “how.” These learning hooks also help motivate youth with a spirit to make a difference in the world, and give them hope and empowerment that they can contribute in solving larger problems.

The **Henry Ford** has created some 21st-century educational tools like the Innovation 101 curriculum and Reading Inspiration: The Henry Ford Story program that can help set this essential context for youth before they begin their hands-on creative projects. Here are some suggested unit plans for elementary-age children as well as for high school-age youth that use these context-setting educational resources.

45
min.

Each daily activity should take approximately 45 minutes.

GRADES
2-5

Elementary Unit Plan

DAY 1.

Introduction:
What is Innovation?
Who was Henry Ford and what did he innovate?

Reading Inspiration:
The Henry Ford Story (pages 1-6)

What are some modern innovations? What are some of the problems today, and how can you solve them?

Brainstorming activity

DAY 2.

Introduction:
What are the traits of an Innovator?

Reading Inspiration: My Innovation Word List (pages 7-8)

Innovation and 21st-Century Skills

Hands-on activity

DAY 4.

Who are some of the legendary Innovators?

Reading Inspiration:
The Henry Ford Story (pages 13-14)

Who are some of today's innovators? Visit Oninnovation.com and show the clip from <http://www.oninnovation.com/about/about-oninnovation.aspx>.

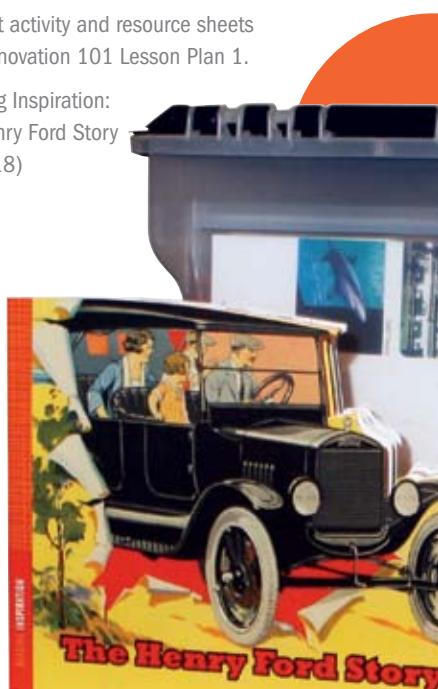
Student activity and resource sheets from Innovation 101 Lesson Plan 1.

Reading Inspiration:
The Henry Ford Story (page 18)

DAY 5.

Can You Be an Innovator?
Ask the students if they think they can be an innovator like Henry Ford. Why or why not?

Reading Inspiration:
The Henry Ford Story (pages 15-17)



GRADES
6-12

Secondary Unit Plan

DAY 1.

Innovation 101 –
Lesson One:
What is Innovation?

DAY 2.

Innovation 101 –
Lesson Two:
Traits of an Innovator

DAY 3.

Innovation 101 –
Lesson Three:
Process of Innovation

DAY 4.

Innovation 101 –
Lesson Four:
Keys to Innovation

DAY 5.

Innovation 101 –
Lesson Five:
Intellectual Property
Rights and More!



“One of the greatest discoveries a man makes, one of his great surprises, is to find he can do what he was afraid he couldn’t do.”

– Henry Ford



Week 2.

Project-Based Learning: Time to be creative and innovative!

DAY 1.

Invite a local innovator or maker from your community to be a guest speaker in your classroom.

Have the person discuss his or her innovations and background and how he or she got started.

Invite the students to ask questions of the guest speaker.

If you are unable to bring someone into the classroom, you can tap the Oninnovation website and America Invents section to show inspirational videos of successful innovators or creative makers.

Tips

Innovator/maker visit to the classroom/after-school program

Tap your own local network to find an innovator or maker.

Contact the innovator or maker at least one month before starting the Aspiring Innovator project.

Get approval from principal for visit.

Discuss with the innovator or maker about voluntary participation in this project.

Schedule date and time in advance for the visit.

Plan and schedule context-setting lesson, and ensure there is enough time to finish lesson before innovator/maker visits.

Request parent volunteers if needed to assist in hands-on project.

Determine materials or technological needs beforehand.

Be prepared! Understand the maker's topic; do research and deliver pre-visit lesson so students have background.

Questions

Provide to guest/innovator/maker or to students

What or who motivated you to be an innovator or maker?

Did you have a creative family? Did your family encourage your creativity or stifle it?

Did you have a mentor?

What are the key materials you use? Where do you obtain your materials?

Explain some of the frustrations you've experienced. How did you overcome them?

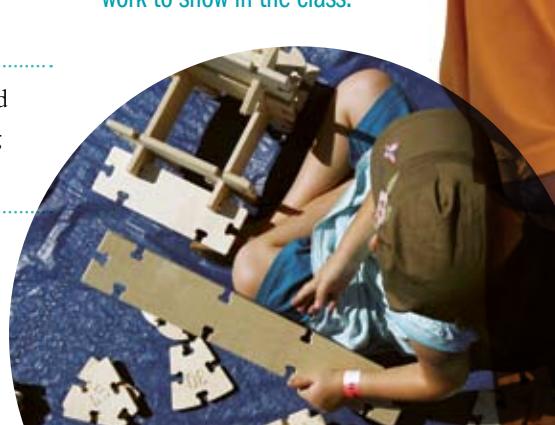
Do you consider your creative work a hobby or your primary job?

Where do you get your ideas?

What were you like in school?

When did you really find your niche with creating innovating or making?

What inspires you?



DAY 2.

"Vision without execution
is hallucination."

—Thomas Edison

Introduction: Challenges of today's world

- Brainstorm challenges the world faces today.
- You may want to categorize them in a graphic organizer, under one of the four categories of world challenges (global interconnectedness, rapid technological change, human conflict or environmental sustainability).

Activity 1

Have the students brainstorm innovations they could create to help solve one of the world's challenges.

Activity 2

Have each student choose one innovation and make a visual representation of what they wish to make.

45
min.

Each daily activity should take approximately 45 minutes.



DAY 3.

"Determine that the thing can and shall be done and then we shall find the way."

— Abraham Lincoln

Create a timeline that outlines the steps you will take to create a prototype of your innovation or something you want to create.

Develop a list of materials you will need to create your prototype.

Keep a daily journal of your progress. Be sure to explain the following things in your journal:

- a. Explain your creative process. What steps are you taking to develop your innovation?
- b. What are some of the problems and frustrations that you are encountering along the way? What worked? What didn't work?
- c. How could you improve your innovation?
- d. What type of people would adopt your innovation?
- e. How would your innovation impact the world?

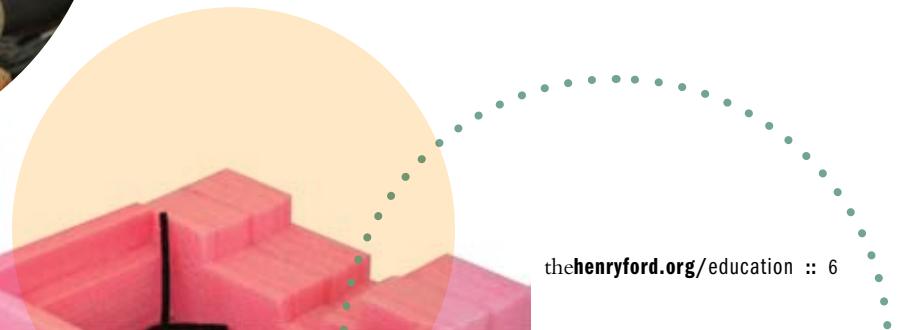
Provide supplies for the students to start working on their 3-D prototypes of their innovations. Students can work in teams or individually.

DAYS 4. + 5.

"Genius is one part inspiration and ninety-nine percent perspiration."

— Thomas Edison

Give students time to finish their 3-D prototypes.





Glossary of Terms

Adapt –

To adjust oneself to different conditions or to make suitable to requirements or conditions.

Antiestablishment –

Opposed to or working against the existing power structure or mores, as of society or government.

Apprentice –

A person who is learning a trade or art by experience under a skilled worker.

Believe –

To have faith or confidence in the existence or worth of something.

Collaborate –

To cooperate or work with others.

Connectivity –

The quality, state or capability of being connected.

Creative –

The quality of having the ability or power to create.

Curiosity –

A desire for learning.

Determination –

A firm or fixed intention to achieve a desired end or action.

Discovery –

The act or process of discovering or exploring.

Entrepreneur –

One who organizes, manages and assumes the risks of business or is enterprising.

Experiment –

To try out new procedures, ideas or activities.

Exploration –

The act of searching or examining something.

Failure –

An omission of occurrence or performance; failing to perform a duty or expectation.

Culminating Sharing and Celebration of Creativity and Innovation:

Allow time as needed for students to present their innovations in the classroom, school or another venue.

Have each student/group present and discuss their innovations in front of the class.

Have a classroom exhibition event or creativity parade, where the students/groups could present their innovations to the teacher and the rest of the class.

Record their presentations using a flip camera to submit to America Invents on the OnInnovation site. Directions on format, etc., are available at <http://www.oninnovation.com/america-invents.aspx>.

Determine how your students can present their work at a local innovation event or at the Detroit Maker Faire®.

Visit The Henry Ford website at <http://www.thehenryford.org/events/makerFaire.aspx> to learn how to fill out an application to be a youth maker at the Detroit Maker Faire that's held in July every year.

Genius –

A very gifted person.

Hacker –

A person who takes something and alters or changes it for a new purpose.

Ideation –

The act of forming or entertaining ideas.

Ignite –

To set something in motion.

Imaginative –

Being able to form a mental image of something not present to the senses or never before wholly perceived in reality.

Innovation –

- 1.) An invention, idea or improvement adopted by society.
- 2.) The introduction of something new, or a new idea, method, device or method of doing something.

Innovative –

Having the power or ability to introduce something new, or a new idea, method, device or method of doing something.

Inspire –

To move the intellect or emotions.

Invention –

A product, device, contrivance or process originated after study and experiment.

Maker –

A person who makes or produces something.

Mentor –

A trusted counselor or guide.

Persistence –

The action or fact of persisting; going on resolutely or stubbornly in spite of opposition, importunity or warning.

Perseverance –

Being unwilling to give up, even when things are difficult.

Prototype –

An original model on which something is patterned; a first full-scale functional form of a new type or design of a construction.

Serendipity –

The gift of finding valuable things when one is not looking for them.

Spark –

To cause to get going.

Tinkerer –

A person who repairs or adjusts something in an experimental manner.

Unintended consequence –

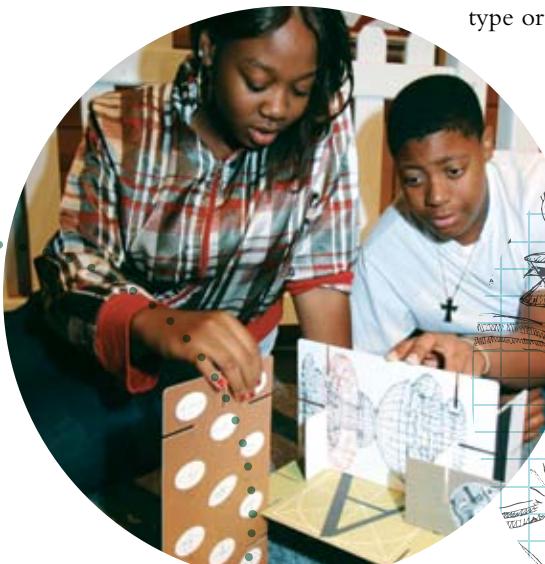
An action's unexpected effects.

Vision –

An idea or plan for the future.

Visualize –

To see or form a mental image of something.



Suggested Resources



- www.thehenryford.org/events/makerFaire.aspx
- www.iskme.givezooks.com
- www.oercommons.org
- www.iskme.givezooks.com/campaigns/iskme-big-ideas-fest-2009
- www.i3detroit.com
- www.omnicorpdetroit.com
- www.hackerspaces.org/wiki>List_of_Hacker_Spaces
- www.curiositytech.com

Books

Online Resources

Explore the following and other sites that provide free and open source access to many creative ideas and resources:

- www.incite-focus.org/Home.html
- www.sites.google.com/site/mcstemhs/
- www.exploratorium.edu
- www.partsandcrafts.org
- www.workshophouston.org
- www.makezine.com
- www.makeprojects.com
- www.instructables.com
- www.howtoons.com
- www.inventables.com
- www.ifixit.com
- www.mtelliottmakerspace.com
- www.oninnovation.com
- www.oninnovation.com/education/innovation-101.aspx

- Nomad Press, Build It Yourself Series, <http://www.nomadpress.net/series/build>
- Nelson, David Erik. *Snip, Burn, Solder, Shred: Seriously Geeky Stuff to Make with Your Kids.* San Francisco, CA: No Starch Press, 2011.
- Gabrielson, Curt. *Stomp Rockets, Catapults, and Kaleidoscopes: 30+ Amazing Science Projects You Can Build for Less Than \$1.* Chicago, IL: Chicago Review Press, 2008.
- Roberts, Dustyn. *Making Things Move: DIY Mechanisms for Inventors, Hobbyists, and Artists.* McGraw-Hill, 2010.
- Fraunfelder, Mark. *The Best of MAKE: 75 Projects from the Pages of MAKE.* O'Reilly Media / Make: 2007.

Inspiring Quotes from Henry Ford

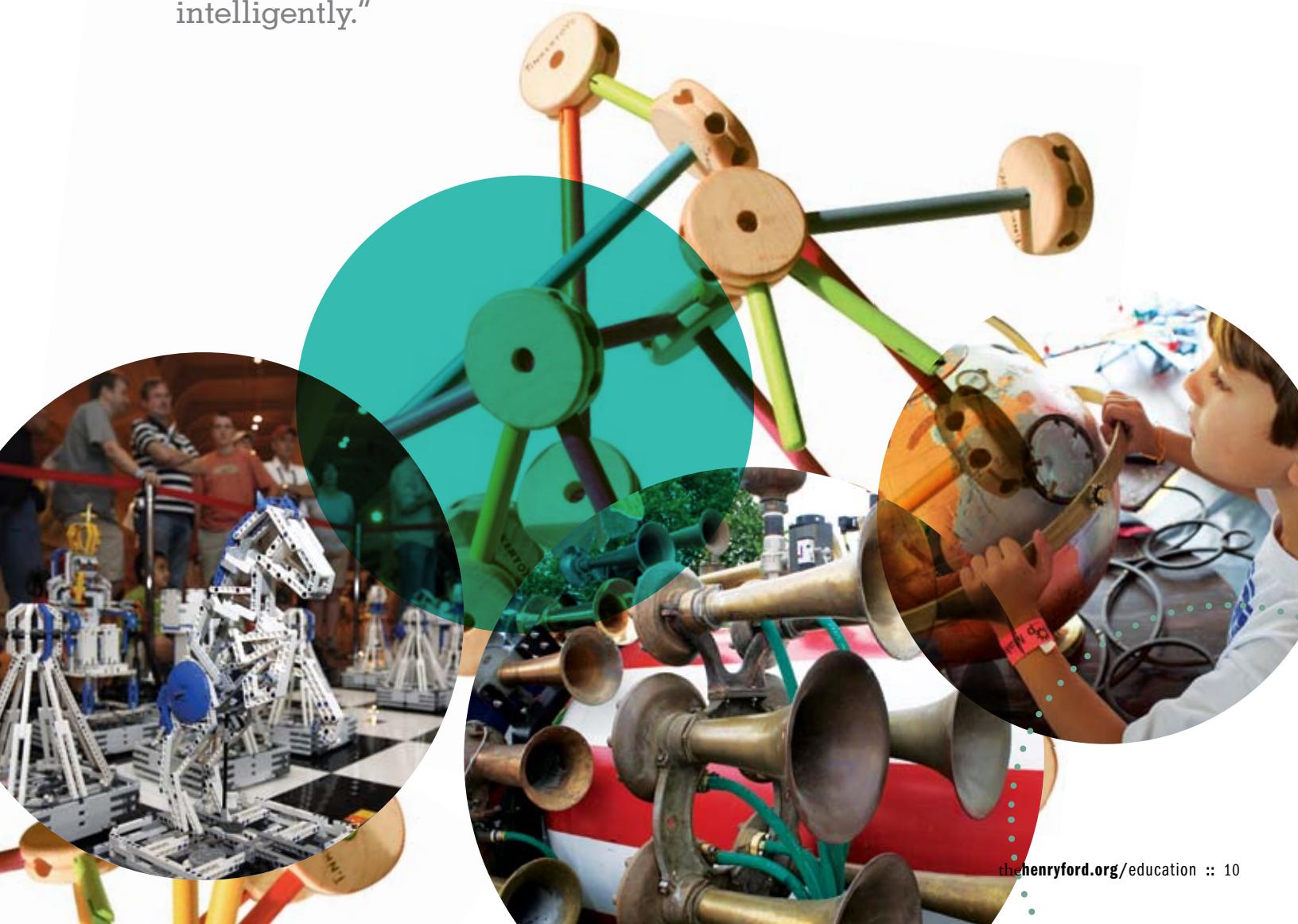
"Don't find fault, find a remedy."

"Even a mistake may turn out to be the one thing necessary to a worthwhile achievement."

"Failure is simply the opportunity to begin again, this time more intelligently."

"I cannot discover that anyone knows enough to say definitely what is and what is not possible."

"Whether you think that you can, or that you can't, you are usually right."



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To learn about how some of the early innovation adopter teachers are implementing the Aspiring Innovators project in their classrooms.

Visit <http://www.oninnovation.com/america-invents.aspx>



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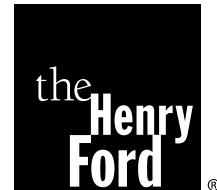
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