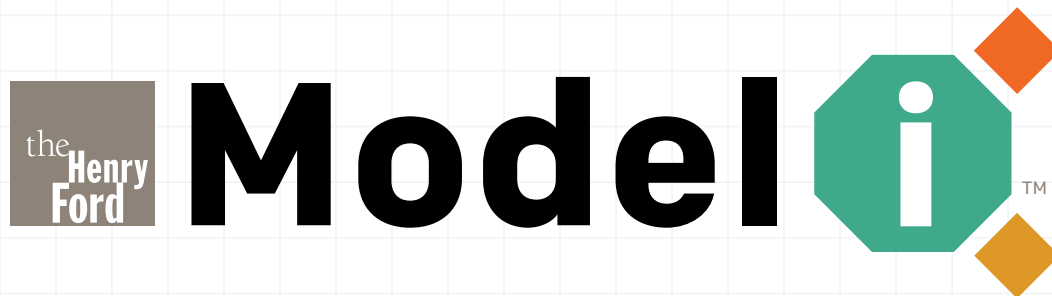


Introduction to



Innovation Learning Framework

PRIMER

Grades: 3-12

Driving Question: How might we use The Henry Ford Model I learning framework to learn about and incorporate the habits and actions of innovators in our daily lives?

Overview

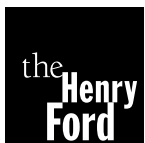
The Henry Ford Model I is a unique learning framework for developing an innovative mindset. Model I is comprised of two frames: Actions of Innovation and Habits of an Innovator. Together, they form a language that describes any person's unique innovation journey and guides students to think and act like innovators.

This facilitator guide outlines a set of activities that integrates Model I with stories and artifacts from The Henry Ford Archive of American Innovation, as well as students' own experiences. The activities complement one another, but you can extract individual activities or customize them to meet your needs.

Preparation Notes

The activities in this guide use a variety of online materials from The Henry Ford (photographs, videos, articles), so you will need computer equipment and an internet connection to display these materials in a classroom. If students are using their own devices, they will need to be able to connect to the internet to view the online materials.

Activities 2 and 3 require some supplies, which you may need to prepare ahead of time.



The Henry Ford in Dearborn, Michigan, is an internationally recognized cultural destination that brings the past forward by immersing visitors in the stories of ingenuity, resourcefulness and innovation that helped shape America.

A National Historic Landmark with an unparalleled collection of artifacts from 300 years of American history, The Henry Ford is a force for sparking curiosity and inspiring tomorrow's innovators. Learn more at thf.org

Innovation Powered by Perspective 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 ways people innovate across 300 years of American history. For over 90 years, our curators and historians have studied its content, curating stories of American ingenuity, resourcefulness and innovation that continue to evolve with today's breakthroughs. It is this experience combined with our decade-long focus on innovation education that provides the expertise behind Model I. The Model I framework consists of two frames: Actions of Innovation and Habits of an Innovator. Together, we use them as a language to describe Innovation Journeys within our collection — and activate learners through their own innovation journeys.

Curriculum Connections

Common Core State Standards

ELA History/Social Studies Grades 6–8

RH.6-8.1 — Cite specific textual evidence to support analysis of primary and secondary sources.

RH.6-8.2 — Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.

RH.6-8.3 — Identify key steps in a text’s description of a process related to history/social studies.

RH.6-8.7 — Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

ELA Science & Technical Subjects Grades 6–8

RST.6-8.2 — Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

Mathematics K-12

MP.1 – Make sense of problems and persevere in solving them.

National Social Studies Standards

D2 Civics: Processes, Rules, and Laws

D2.Civ.14.6-8 — Compare historical and contemporary means of changing societies, and promoting the common good.

Next Generation Science Standards

Engaging in Argument from Evidence

MS-ETS1-1 – Define the criteria and constraints of a design problem with sufficient precision and ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2 — Evaluate competing design solutions based on jointly developed and agreed upon design criteria using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-4 – Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Getting Started

Introduce the concept of innovation by asking students to look around the classroom or whatever environment they are in. Ask if they spot anything that could use improvement (for example, the furniture, the equipment, the lighting or the layout of the room). If needed, expand beyond their immediate environment to look for examples from their school or neighborhood. Use the examples to explain that there are opportunities for positive change everywhere and creating positive change is the purpose of innovation.

Use a story from The Henry Ford to further illustrate what innovation means. Use one of the two options below, or curate your own by searching [The Henry Ford's website](#). Whichever story you choose, use it to guide students toward these key points:

- To innovate is to make a significant contribution or improvement to an existing product, process or service.
- The resulting innovation addresses a need and solves a problem.
- An innovator helps to shape a better future.



Story Option 1: Thomas Edison and the Incandescent Light Bulb

Thomas Edison was not the first to invent an electric light bulb. Other inventors developed electric light bulbs before Edison, but their lamps were experimental and impractical for everyday use. Edison and his team experimented repeatedly with different materials and in 1879 developed the first marketable bulb that was safe, affordable and dependable. The Henry Ford has several online resources you can use to tell this story, including the following:

- Photographs: [Edison Paper Horseshoe Filament Lamp, 1879](#)
- Photographs: [Menlo Park Laboratory](#)
- Video segment from *The Henry Ford's Innovation Nation: Menlo Park* (03:48 minutes)
- Profile and interview about Edison: [Visionaries on Innovation: Thomas Edison](#)
- Article: [What If Thomas Edison Hadn't Turned Failure into Success?](#)



Story Option 2: Jessica O. Matthews and the Soccket

Jessica O. Matthews had a unique idea: turn a soccer ball into a battery that powers lights for people in the developing world. Her story shows how an ordinary object can be transformed to address a need and improve people's quality of life. Show students the following segment from *The Henry Ford's Innovation Nation: Soccer Ball That Generates Energy* (03:50 minutes).

Pre-Activity: Introducing Model I

The pre-activity helps students understand Model I as a language to talk about innovation through artifacts and stories of innovators. Show the Model I framework, which is available online at thf.org/modeli. Explain the Actions of Innovation and Habits of an Innovator using the descriptions and graphics.

The best way to understand the Actions and Habits is to experience them, so try not to dwell on specific definitions at this stage. Instead, help students understand the big picture and purpose of Model I.

Actions of Innovation are guideposts that help innovators move forward as they develop an idea or solve a problem. The process usually starts with Uncover, but Actions can take place in any order.



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Habits of an Innovator describe ways of seeing, thinking and doing. Habits connect to Actions. Together, they increase the innovator's chances of success.



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To help put the Actions of Innovation and Habits of an Innovator into context, get students to identify Actions and Habits from an innovator story. For example, if you used Thomas Edison’s or Jessica O. Matthews’ story, you can circle back to it and help students connect the innovator to the Actions and Habits as follows:

| THOMAS EDISON | JESSICA O. MATTHEWS |
|--|---|
| <p>Collaborate: A team of people worked with Edison at the Menlo Park laboratory. Edison knew the importance of working with people who brought different skills to the table.</p> <p>Learn From Failure and Stay Curious: Edison and his team experimented repeatedly with different materials before they developed a practical light bulb. This means they went through numerous failures before they found the right combination.</p> <p>Optimize and Implement: Edison and his team constantly made improvements to their designs to ensure his electrical distribution system could become a commercial success. In 1882, he demonstrated the system’s functionality when the Pearl Street generating station began to supply reliable electricity to streets and buildings in a small area of New York City.</p> | <p>Challenge the Rules and Take Risks: Most people would not look at a soccer ball and see it in a completely different light, the way Matthews did. The Soccer challenges what a soccer ball is and what it can do.</p> <p>Be Empathetic: Matthews empathized with children who need a source of light at night, and she addressed that need with something that fit naturally into their lifestyle: soccer.</p> <p>Uncover and Define: In her travels to Africa, Matthews noticed that children, despite poor living conditions, were happy and carefree when playing soccer. She also observed that people had a serious lack of access to sustainable power, which prevented children from studying at night because it became too dark.</p> |

Activity 1: Digital Scavenger Hunt

Driving Question: What are the Habits of an Innovator?

Learning Objective: Recognize Habits of an Innovator in artifacts and stories of innovation.

Building on the pre-activity, the Digital Scavenger Hunt asks students to investigate an innovator story on their own and to identify as many habits as they can, highlighting ones that they have identified that are specific to the Habits of an Innovator. Students may discover other habits in addition to the Model I.

Give students options to choose from as a starting point—for example, Buckminster Fuller or Amelia Earhart (more options are listed below). Provide guidance on how to search The Henry Ford’s website for digital artifacts, articles and videos. In addition, students can search The Henry Ford’s YouTube channel for relevant segments of Innovation Nation.

Grade-Level Suggestions:

- Elementary School: Focus students with the six preset options.
- Middle and High School: Encourage students to find their own innovators using the sources listed in the Where to Look section.

Preset Options for the Scavenger Hunt:

The following are recommended innovators and artifacts. The items listed in the last column, Items to Gather, are some of the resources that students should find in their scavenger hunt if they use the research avenues listed under Where to Look. The stories in these resources reveal different ways in which the innovators exemplify Habits of an Innovator.

| Area of Innovation | Innovator | Artifact | Items to Gather |
|--|--------------------------|---|---|
| Design & Making | Buckminster Fuller | Dymaxion House | <ul style="list-style-type: none"> ▪ What If We Reimagine How We Construct Houses—and Humanity? ▪ <i>Innovation Nation: Dymaxion House</i> |
| Social Transformation | Rosa Parks | Rosa Parks Bus | <ul style="list-style-type: none"> ▪ What If I Don’t Move to the Back of the Bus? ▪ <i>Innovation Nation: The Rosa Parks Bus</i> |
| Agriculture & Environment | George Washington Carver | Microscope Used by George Washington Carver, Circa 1900 | <ul style="list-style-type: none"> ▪ Visionaries on Innovation: George Washington Carver ▪ What If an Artist Becomes a Scientist? |
| Information & Communication Technology | Steve Wozniak | Apple 1 Computer, 1976 | <ul style="list-style-type: none"> ▪ What if Everyone Could Have a Personal Computer? ▪ Visionaries on Innovation: Steve Wozniak ▪ <i>Innovation Nation: Steve Wozniak’s Apple 1</i> |
| Mobility | Amelia Earhart | Amelia Earhart Speaking at the Elks Air Circus, July 11, 1929 | <ul style="list-style-type: none"> ▪ Amelia Earhart: The Iconic Aviatrix ▪ Amelia Earhart: Across the Atlantic and into the Headlines ▪ <i>Innovation Nation: Female Aviators</i> |
| Power & Energy | George Corliss | Corliss Steam Engine, 1859 | <ul style="list-style-type: none"> ▪ What If the World Ran on Steam? |

Where to Look

Here are some of the different places where students can find resources.

| Source | Description |
|--|--|
| thf.org | A good starting point for the scavenger hunt is The Henry Ford website's general Site Search feature, identified by a magnifying glass in the top-right corner of the website. Students should look at both "Website Pages" and "Artifacts" in the search results. |
| Digital Collections from The Henry Ford Archive of American Innovation | Use the Digital Collections area to look specifically for artifacts and "Expert Sets"—groups of related artifacts that are compiled by The Henry Ford's staff. |
| Stories of Innovation | In the "Explore" area of The Henry Ford website, students can find a series of "What If?" articles that chronicle how innovators such as Thomas Edison and Rosa Parks challenged the status quo. Students will also find video interviews with and about innovators in a series called Visionaries on Innovation. These articles and videos provide insight into how innovators practice the Habits. |
| The Henry Ford YouTube channel | The Henry Ford catalogs all episodes of <i>Innovation Nation</i> on its website, but the easiest way to find segments that are relevant to a specific innovator is to search The Henry Ford's YouTube channel. Students should use the "Search Channel" feature on the homepage of the channel . |

Activity 2: Paper Aircrafts

Driving Question: What are the Actions of Innovation, and how do they link up to Habits of an Innovator to form an innovation journey?

Learning Objective: Practice the Actions and Habits through an innovation journey.

This activity gives students an opportunity to experience Actions of Innovation as they build paper aircraft. Start by doing a quick review of the Actions diagram, then have students design, build, test and improve a paper aircraft using the following supplies and process.

Grade-Level Suggestions:

- Elementary School: Focus on the aircraft’s flight distance.
- Middle and High School: Focus on the aircraft’s flight distance plus the number of passengers it can transport.

Supplies:

- Two types of paper (for example, printer, notebook or construction) for aircraft
- Two sizes of paper clips (large and small) representing passengers
- Space for testing aircraft

Process

| Action of Innovation | Task | Guiding Questions |
|----------------------|---|--|
| Uncover | Identify qualities of good paper aircraft. | <ul style="list-style-type: none"> What makes a good paper aircraft? How do you know if you have made a good paper aircraft? |
| Define | Select a criterion by which to judge a paper aircraft. Pick materials that would work best according to the criterion. | <ul style="list-style-type: none"> What do you want your paper aircraft design to focus on? For example, will you build an aircraft that holds as many passengers as possible, or flies a long distance? Which type of paper will you use? Which size paper clips? |
| Design | Make and test the aircraft. | <ul style="list-style-type: none"> What does a paper aircraft usually look like? Can it look different? Are there different ways of making them? How will you test the aircraft to determine if it works well? |
| Optimize | Make observations and make improvements (or make a new version). | <ul style="list-style-type: none"> What worked? What didn’t? How can you improve your design? |
| Implement | Test the improved aircraft. Look at other people’s aircraft designs and learn from each other; give each other feedback. | <ul style="list-style-type: none"> Did performance improve? Why or why not? What did you learn from other people’s designs or feedback? What might you do differently next time? |

Follow-Up Discussion

Follow the paper aircraft activity with a discussion to integrate students’ knowledge about Actions and Habits.

- Ask students if they practiced any of the Habits while they were doing the paper aircraft activity.
- Show how Habits connect to Actions, using the example provided below. (The example is a visual aid only; it is not based on any actual innovation.) Note that any Action can connect to any Habit, and everyone takes a unique innovation journey. The dotted lines represent variable paths and directions that an innovator might take.
- Help students understand that Model I is a guide to innovation, but there is no single “correct” path to take. For example, when building a paper aircraft, there might be a need to repeat Optimize multiple times, or even return to Uncover, Define or Design to gain more clarity.
- If you have time, have students map out their own paper aircraft innovation journey with pencil and paper, integrating both Actions and Habits.

An Innovation Journey

On paper, innovation is a step-by-step process. In reality, it rarely happens that way. However the journey unfolds, we make the best progress when our habits and actions work together.

Explore the innovation journey of the Wright brothers' first flight.



Collaborate

Orville, Wilbur and their sister Katharine lived, played and worked together.



Stay Curious

Their father bought them a rubber-band-powered flying toy, which stimulated their first interest in flying machines.



Define / Challenge the Rules / Take Risks

The Wrights recognized that successful flight required three things: wings for lift, an engine for propulsion and – the key problem – a way to control flight.



Uncover / Be Empathetic

In 1896, the world leader in glider flight died when his glider plunged to the ground. This reawakened the Wrights' interest in aviation, so they searched local libraries for anything related to aeronautics and even penned a letter to the Smithsonian requesting information about "mechanical and human flight."

Stay Curious

Observing birds in flight led to their breakthrough moment when Wilbur twisted a bicycle inner-tube box and discovered "wing warping," the key concept to controlling flight.



Design / Take Risks

In 1900, they tested their glider at Kitty Hawk, but the wings failed to produce enough lift.

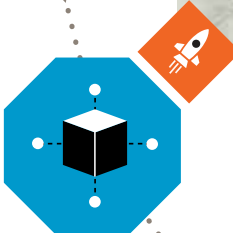


Chart out the rest of the Wright brothers' journey at thehenryford.org/explore/stories-of-innovation/what-if/wright-brothers/

Activity 3: Innovation Journey

Driving Question: Can we identify the Actions and Habits used to solve problems?

Learning Objective: Identify Actions and Habits within an innovation journey, and explain how they lead to a solution for a problem.

The Wright brothers' innovation journey is the foundation for this activity. Students will see that the Wright brothers' journey to solving the problem of human flight started in their youth and required a great deal of learning and persistence. The hands-on component gets students to analyze an innovation experience of their choosing and illustrate it as a journey.

(Note: The following story on the Wright brothers produced by The Henry Ford was used to develop the innovation journey. Refer to it if you would like more context: "[What If Bicycles Held the Secret to Human Flight?](#)")

Supplies:

- Sheets of paper
- Markers in different colors
- Optional: Computer/tablet access for creating journeys with digital apps

Process:

Go over the Wright brothers' innovation journey. Reiterate that innovation journeys can go in many directions and can take place over different time frames. A journey can apply to a specific project, such as the paper aircraft activity, or a lifetime of discovery and practice. Furthermore, Habits and Actions can be linked, but they can also stand alone.

Then, have students map out an innovation journey of their choosing, either with markers and paper or by using digital presentation apps like Microsoft PowerPoint or Keynote. You can give them one or both of the following options:

- Create an innovation journey based on a time they solved or overcame a problem.
- Represent the innovation journey of someone they know who solved or overcame a problem. This person does not have to be famous but can be.

Once the journeys are done, get students to do the following:

- Present what they created.
- Explain how the Actions and Habits in their journey led to a solution.
- Share ideas on how they can continue to use the Actions and practice the Habits.