

Enrich your field trip experience with these new “for the teachers, by the teachers” itineraries. Created by **The Henry Ford 2009 Teacher Fellows** and tested with their students, these new curriculum-aligned tools for teachers, group leaders and students will deepen student learning and understanding of selected topics, sites and exhibits.

## SUGGESTED PRE-VISIT ACTIVITIES

- Learning Statement/Premise: Innovation is a highly desirable trait in the design/technology community. Creative problem solving is a hot topic for classes and workshops alike and, the command “think outside the box” has become the mantra of the business world as well. *But what are the traits of innovative people? Who are they and how do they dream up their ideas? What role does imagination play in inventing new ideas or applications, and can we all become innovators in our daily lives? Can we all effect change?*
- Essential Questions:
  - What is innovation? How does it occur? Can it be taught/forced/promoted? If so, how? Is it related to creativity? Are the traits of imagination/creativity enough to cause innovation to occur or is there another quality that must be present as well?
  - How does innovation arise? Is it a response to need? How does it impact our daily lives? Does design itself have the capacity to further our creative thinking?
- Pre-Visit Research/Integrated Curriculum Research:
  - Anticipatory Set: Show videos such as the profiles of contemporary and historic innovators found on **The Henry Ford** website at [www.oninnovation.com](http://www.oninnovation.com).
  - Video: “Birds on the Wire”  
<http://vimeo.com/6428069>
  - Carl Sagan – “A Glorious Dawn” featuring Stephen Hawking (Cosmos Remixed)  
<http://www.youtube.com/watch?v=zSgiXGELjbc>

**1. BIOGRAPHY** – Divide students into pairs or groups and brainstorm a list of innovative Americans (starter list below or refer to [www.oninnovation.com](http://www.oninnovation.com) interviews on **The Henry Ford** website). What traits do innovative people have in common? Research and share out. Chart characteristics and circumstances of these individuals and identify trends.

## Entrepreneurs:

Henry Ford, Thomas Edison, Madame C.J. Walker, Steve Wozniak, Steve Jobs, Bill Gates, Martha Stewart, Elijah McCoy, George Washington Carver, Alexander Graham Bell, Benjamin Franklin, Eli Whitney, Orville and Wilbur Wright

## Artists/Writers/Entertainers:

Georgia O’Keeffe, Jackson Pollock, Twyla Tharp, Robin Williams, Gertrude Stein, Maya Angelou, Andy Warhol, Lenny Bruce, Dr. Seuss, Henry Thoreau, Gwen Frostic, Langston Hughes, Louise Nevelson, Gilda Radner, Jim Carrey, Carole King, Martha Graham, Oprah Winfrey, Annie Oakley, e.e. cummings, Marlon Brando, James Thurber, Amiri Baraka

## Journalists:

Arianna Huffington, Ben Franklin

## Scientists/Naturalists:

Gerty Radnitz Cori, Maria Goeppert-Mayer, Barbara McClintock, Rosalind Franklin, Jocelyn Bell Burnell, Amelia Earhart, Juliette Low, Mae Jemison, Sally Ride, Rachel Carson

**2. CHAIR DESIGN** – You will draw your own designs for a chair. Consider the innovative features that will fulfill a contemporary need that is not yet being accommodated, such as a multi-tasking chair that accommodates the use of a laptop while eating a snack while watching TV and talking on the phone! Experiment with the use of unusual and/or eco-friendly materials for your chair rather than hardwoods from the rain forest, for example. Consider what types of fabric, paints or dyes and preservatives might be involved, if any.

- Distribute catalogs from furniture companies such as Herman Miller, Ethan Allen, Art Van, Pottery Barn, IKEA, etc. and have students discuss the various styles, features, materials and costs as to practicality vs. high design. Note color and patterns offered in high and low-end furniture and discuss possible reasons for this.
- Herman Miller Company based in Zeeland, MI, designed a sofa known as the Marshmallow. To see this sofa and many other examples of Herman Miller Company-designed furniture, visit <http://dlxs.lib.wayne.edu/cgi/i/image/imageidx?c=hmcc>. Students will brainstorm ideas

for themed chairs and create models of chairs using common materials such as sticks, buttons, pipe cleaners, paper clips, tacks, pretzels, pasta, spools, etc.

- Ray and Charles Eames kept over 350,000 slides of objects photographed from unusual angles or crops. They dubbed this their “cabinet of curiosities.” Students will create their own “cabinet” in a sketchbook by drawing common objects from above, below or sideways perspectives that bring a fresh viewpoint to the object. They may also maintain an online library of clip art with these features as well. Students will choose one favorite item and use it for the basis of a design for a chair.

### 3. INNOVATION IS EVERYWHERE

- It’s a well-documented phenomenon that many inventors have had the vision of their discovery emerge during times when their minds were allowed to dream and wander—to think freely. As scientist Roger Sperry put it: “The 3 Bs: the bed, the bath and the bus!” Elias Howe, inventor of the sewing machine, came up with the idea of putting the hole in the other end of the needle in a dream. He dreamed that he was being chased by people holding spears with holes in the pointed end. He woke up and fashioned a prototype for the sewing machine needle, with the hole near the tip.
  - **Dream On!** Students will create a “Dream Journal” which will be kept by their bed—with a pen or pencil—and used to record any unusual images or ideas, on awakening, that occurred to them while asleep. This could be logged anywhere from a week to a month or more.
  - **What’s Up? Surprise!** Have students try turning the problem upside down with upside down drawings. Also, try naming and describing a common object from unusual angles: introduce the idea that an object is typically represented from only one angle. How does changing the angle of the image change one’s thinking about the object (and its description/potential)?

- **Innovation Station** Teachers will create an area within the classroom where common materials are available for students to tinker with (a la Steve Wozniak), create designs—individually or as a team—and record their constructions in notebooks which they share regularly with their team.

### 4. THE DYMAXION HOUSE

- Visit <http://www.thehenryford.org/exhibits/dymaxion/index.html> to learn more about the Dymaxion House.
- Draw a picture of YOUR house, apartment or townhouse before your museum visit.
- The word Dymaxion was coined by combining parts of three of Buckminster Fuller’s favorite words: DY (dynamic), MAX (maximum) and ION (tension). Choose three words that have meaning to you and combine parts of each to create a new word that has special significance to an idea of your own. (Example: My attendance pencil kept disappearing so a student taped a spork to a pencil for me so that no one would take it. A spork is a spoon with a fork-like tip, so we decided to call this innovation a spork-cil!)

### ON-SITE ACTIVITIES

Use the self-guided itinerary to visit and examine four areas in *Henry Ford Museum*: the Newcomen Steam Engine, Historic Kitchens exhibit, the Eames Lounge Chair and the Dymaxion House.

### SUGGESTED POST-VISIT OR EXTENSION ACTIVITIES

1. **You Be the Designer!** Pretend you have been commissioned by **The Henry Ford** to update the Historic Kitchens exhibit with a fifth wedge added to the exhibit. Draw your plan for this exhibit, labeling the innovations that we presently enjoy and those that may be available in the future. Present your plans to the class. If time permits, build the model and join in with other groups to build a carousel of innovations in the 21st century.
2. **What’s the Use?** Explore and enter contests for young inventors at the National Museum of Education at <http://www.nmoe.org/>.

## 3. Housing: Past, Present and Future

- Individually or in small cooperative groups, students will construct a diorama/model of the Dymaxion House, using found objects such as cardboard boxes, ice cream pails, aluminum foil, etc. Option: Cut away part of the box or make a lift-off roof to expose the interior. Dollhouse furniture (purchased or made from matchboxes, etc.) could be added by design students.
- Show the movie *"It's a Wonderful Life"* for background about the economic issues surrounding home ownership versus renting after the Great Depression and WWII, and the construction of new suburban areas in burgeoning communities. Although only two prototypes of the Dymaxion House were ever constructed, have students imagine how an entire suburb filled with these constructions might have appeared. Using Hershey's Kisses to represent the houses, create an ideal community for the young families who would have wanted to live there. What features would have been desirable in this planned community? What accommodation would have been available for growing families over time? \*Global Connection: Research the planned community of Brasilia to find out how successful this idea was, in attracting new residents to inland Brazil.
- Students will present their "House of the Future" to other classes, with student docents giving tours to younger students about the history of this design and the innovative features it represents.
- Have younger students look up the word "compromise" and role-play, in small groups, conflict situations that could end either in disagreement or resolution. Present these to the class and discuss the possible alternative. Ask older students to research why the Dymaxion House design never took off. Consider why Buckminster Fuller was unable to get backing from investors. What is the scope of responsibility that a designer needs to consider when inventing an architectural design? Should Fuller have compromised on his design to allow it to be manufactured? By not doing so, Americans never had the opportunity available to them and the ranch house ruled American suburbs. What was the difference in impact on our natural resources and environment, if any?

Discover innovation in design throughout *Henry Ford Museum*. Explore, draw and imagine innovations past, present and future!

Visit the Historic Kitchens exhibit in *Henry Ford Museum* and draw or describe the kitchen tools and equipment in each of the four kitchens.

Make a sketch of your own kitchen and compare this to the ones you've seen at the museum.

What are the most notable or interesting changes?

Visit the Furniture Collections exhibit in *Henry Ford Museum* and think about and answer the questions below:



If "form follows function," how do we define "function" when it comes to furniture?

Is a chair made out of steer horns "functional" because it follows the basic lines of the resting human body, or would the lack of comfort in this structure make it a sculpture rather than a chair?

Is it justifiable for a designer to create furniture for the purpose of attracting attention or showing status alone?

At what point does such a piece stop "functioning" as a chair and become art?

Which one(s) would you want to own?

While at **The Henry Ford**, find and draw or describe five pieces of furniture and consider whether or not they've crossed the line of function.

Visit the Newcomen Steam Engine and the Watt Steam Engine:



The Newcomen Engine was created for one purpose only, to remove water from the shafts of mines in England. However, through observation of this process, James Watt had an idea for an innovative way to utilize this mechanism. Voila! The steam-powered engine was born!

Draw and compare and contrast the two engines.

Make a chart with drawings or descriptions.

#### Characteristics of Your Home:

- Shape
- Number of Bedrooms
- Materials Used
- Square Footage
- Heating and Cooling System
- Construction Date
- Number of Floors/Levels
- Number of Bathrooms

Visit R. Buckminster Fuller's Dymaxion House



Make a chart with drawings or descriptions.

#### Characteristics of Dymaxion House:

- Shape
- Number of Bedrooms
- Materials Used
- Square Footage
- Heating and Cooling System
- Construction Date
- Number of Floors/Levels
- Number of Bathrooms

What is the same?

What is different?

What features do you imagine will be in the house of the future?

#### RELATED MICHIGAN CONTENT STANDARDS ARTS EDUCATION

**Standard 3:** Analysis, describe and evaluate works of art.

**Standard 4:** Understand, analyze and describe the arts in their historical, social and cultural contexts.

**Standard 5:** Recognize, analyze and describe connections among the arts; between the arts and other disciplines; between the arts and everyday life.

Ready to teach innovation skills to your students? Try The Henry Ford's Innovation 101 curriculum at [www.OnInnovation.com/education.aspx](http://www.OnInnovation.com/education.aspx).