School Show Study Guide:

INNOVATION NATION - LIVE

Based off of the award-winning CBS morning show

Thursday, March 7 and Friday, March 8, 2019 at 10:00am
Baker Hall at Zoellner Arts Center
Dear Educator,

On Thursday, March 7 or Friday, March 8, your class will attend a performance of Henry Ford’s *Innovation Nation - Live*, at Lehigh University’s Zoellner Arts Center in Baker Hall.

You can use this study guide to engage your students and enrich their Zoellner Arts Center field trip. Materials in this guide include information about the performance, what you need to know about coming to a show at Zoellner Arts Center and interesting and engaging activities to use in your classroom prior to and following the performance. These activities are designed to go beyond the performance and connect the arts to other disciplines and skills including:

- Innovation
- Entrepreneurship
- Social Justice
- Sciences
- Technology
- Activism

**Before attending the performance**, we encourage you to:

- Review the *Know Before You Go* items on page 4.
- Learn about *The Show, The Henry Ford* and the *Griffin Theatre Company* on page 5.
- Acquaint your students with *Vocabulary* on page 6.
- Engage your class with the *Learning Activities* on pages 8-10.

**At the performance**, we encourage you to:

- Encourage your students to stay focused on the performance.

**After the show**, we encourage you to:

- Use the reflection questions on page 11 to guide a classroom discussion.

We look forward to seeing you!
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KNOW BEFORE YOU GO</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>THE SHOW, THE HENRY FORD AND THE GRIFFIN THEATRE COMPANY</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>VOCABULARY</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>LEARNING ACTIVITIES</td>
<td>8-10</td>
</tr>
<tr>
<td>5</td>
<td>REFLECTION QUESTIONS</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>NATIONAL ACADEMIC STANDARDS AND CORE CURRICULUM</td>
<td>12</td>
</tr>
</tbody>
</table>
Whether this will be your students’ first visit to a theatre or one of many visits, it is always a good idea to speak with them about proper theatre etiquette. Please review the notes below to help make the experience enjoyable for all audience members, staff, and performers.

1. **Be prepared and arrive early.** Ideally, you should arrive at the Zoellner Arts Center 20-25 minutes before the show. Allow for travel time and bus unloading or parking and plan to be in your seats at least 15 minutes before the performance begins.

2. **Be aware and remain quiet.** The theater is a “live” space. You can hear the performers easily, but they can also hear you. Even the smallest sound, like rustling papers and whispering, can be heard throughout the theater. It is best to stay quiet so everyone can enjoy the performance without distractions. Please remember to silence your mobile devices too!

3. **Show appreciation by applauding.** Applause is the best way to show your enthusiasm and appreciation. Performers return their appreciation for your attention by bowing to the audience at the end of the show. It is always appropriate to applaud at the end of a performance, and it is customary to continue clapping until the curtain comes down or the “house lights” (the lights over the audience’s seats) are turned on again.

4. **Participate by responding to the action onstage.** Sometimes during a performance, you may respond by laughing, crying or sighing. By all means, feel free to do so! Appreciation can be shown in many different ways, depending on the art form. For instance, an audience attending a string quartet performance will sit very still, while the audience at a popular music concert may be inspired to participate by clapping and shouting.

   The artists may ask you questions or invite you to participate in the show by clapping or even joining them on stage. You should feel free to join or not, but if spoken to directly, please respond politely.

5. **Concentrate to help the performers.** These artists use concentration to focus their energy while on stage. If the audience is focused while watching the performance, the artists feel supported and are able to do their best work. They can feel that you are with them!

6. **Please note:** Backpacks and lunches are not permitted in the theater. There is absolutely no food or drink permitted in the seating areas. **Recording devices of any kind, including cameras, cannot be used during the performances. Please remember to silence your cell phone and all other mobile devices.** The artists are performing challenging and sometimes dangerous work which can become more dangerous by outside distractions.
The two-time Emmy® Award winning Saturday morning show comes to life in a brand new production. Like the television show, The Henry Ford’s INNOVATION NATION – LIVE! is designed to inspire audiences with entertaining and educational stories about yesterday and today’s visionaries and innovators – highlighting major turning points in the past and present with influence on the fields of science, technology, engineering, math, the environment, and social justice. The Henry Ford’s Innovation Nation is produced in partnership by The Henry Ford and Litton Entertainment, a leading independent production and distribution company. The Griffin Theatre Company production brings to stage the world-changing innovations featured in the television show and preserved in the museum’s archives.

About The Henry Ford
The Henry Ford is an “umbrella term” for all the venues and facilities at the internationally recognized historical landmark that explores the American experience of innovation, resourcefulness, and ingenuity. Nearly 1.8 million people annually visit the complex located in Dearborn, Michigan. Its five attractions include: Henry Ford Museum of American Innovation, Greenfield Village, Ford Rouge Factory Tour, Benson Ford Research Center, and The Henry Ford Giant Screen Experience. The museum has displays and replicas that illustrate where past innovations fuel the imagination of generations to come. Greenfield Village has precisely reconstructed historical buildings connected with innovations including the Wright Brother’s cycle shop, Henry Ford’s birthplace, and Thomas Edison’s laboratory in Menlo Park. The Ford Rouge Factory Tour provides an inside look at the making of America’s most iconic truck, the Ford F-150, with insights into manufacturing’s most progressive concepts. The Giant Screen Experience provides documentary type films, including IMAX. The Henry Ford is also home to Henry Ford Academy, a public charter high school that educates over 500 students a year on the institution’s campus, and the Benson–Ford Research Center that provides public access to an unparalleled Archive of American Innovation. For more information, please visit their website http://www.thehenryford.org.

About Griffin Theatre Company
Established in 1988 and celebrating its 29th season, the mission of the Griffin Theatre Company is to create extraordinary and meaningful theatrical experiences for both children and adults by building bridges of understanding between generations that instill in its audience an appreciation of the performing arts. Through artistic collaboration, the Griffin Theatre Company produces literary adaptations, original works, and classic plays that challenge and inspire the audience. The Griffin Theatre Company is the recipient of 115 Joseph Jefferson Award nominations for theater excellence in Chicago. The Griffin was the repeat winner of the 2016 Jeff Award for “Best Production of a Play” for London Wall having won the same award in 2015 for its production of Men Should Weep.
Wright Brothers Terms:

West Side News — The newspaper that Orville and Wilbur opened before they got into airplanes.
Wing Warping — The Wright brothers observed how birds angle their wings for balance and control in the air, and tried emulating it, calling it wing warping.

Wilbur concluded that birds changed the angle of the ends of their wings to make their bodies roll right or left. The brothers decided this would also be a good way for a flying machine to turn—to "bank" or "lean" into the turn just like a bird—and just like a person riding a bicycle, an experience with which they were thoroughly familiar. Equally important, they hoped this method would enable recovery when the wind tilted the machine to one side (lateral balance). They puzzled over how to achieve the same effect with man-made wings and eventually discovered wing-warping.

Rudder — steering mechanism.
Manufacturing — assembling parts into a product.
Engineer — someone who designs machines or structures.
Anemometer — an instrument to measure the force or speed of wind.
Aeronautics — the science of designing, building, and operating aircrafts.
Airborne — in flight.
Hangars — buildings for storing aircrafts.
Pilot — a person who flies the plane.
Glider — a light aircraft that is designed to fly without an engine.
Airplane Lift — a force that directly opposes the weight of an airplane and holds the airplane in the air.

Lift is generated by every part of the airplane, but most of the lift on a normal airliner is generated by the wings. Lift is a mechanical aerodynamic force produced by the motion of the airplane through the air.

Rosa Parks Terms:

Comply — to go along with a request.
Resigned — giving in without resistance.
Boycott — an organized protest in which the participants refuse to buy, sell, or use a product or service.
Oppression — the act of controlling or governing by the cruel or unjust use of force or authority.
Inferior — lesser, lower.
Unconstitutional — illegal, unlawful.
Activism — efforts to promote, impede, direct, or intervene in social, political, economic, or environmental reform with the desire to make changes in society.
Civil Rights Movement — the decades-long movement that began in the 1950s with the goal of securing legal rights for African Americans that other Americans already held.
NAACP — National Association for the Advancement of Colored People
Civil Disobedience — active, professed refusal of a citizen to obey certain laws, demands, orders, or commands of a government.
Montgomery Bus Boycott — a political and social protest campaign against the policy of racial segregation on the public transit system that occurred from December 5, 1955 to December 20, 1956.
Racial Segregation — the separation of access to facilities, services, and opportunities such as housing, medical care, education, employment, and transportation based on race.
George Washington Carver Terms:

Botanist — person who studies plant biology.

Tuskegee Institute — a private, historically black university in Tuskegee, Alabama.

Soil Depletion — occurs when the conditions necessary to support soil’s fertility are not replaced or maintained.

Crop Rotation — the system of varying successive crops in a definite order on the same ground in order to avoid depleting the soil and to control weeds, diseases, and pests.

Soil Depletion leads to poor crop yield and poor nutrition.

Nitrogen — a colorless, odorless, gaseous element is present in combined form in animal/vegetable tissues, especially in proteins.

Legumes — a large plant family that include beans, peas, lentils, and peanuts.

Sweet potatoes — a plant of the morning glory family, grown for its sweet, edible roots.

Environmentalist — any person who advocates or works to protect the air, water, plants, and other natural resources from pollution or its effects.

Nutrition — the process by which organisms take in and utilize food.
HABITS OF AN INNOVATOR™

A FRAME OF MIND
The best way to learn them is to live them.

Developing our mindset — the way we see, think and interact with something — turns out to be especially useful for staying motivated and inspired to explore new ideas and overcome challenges.

ACTIONS OF INNOVATION™

A SET OF GUIDEPOSTS
Look to them to help point the way forward.

Innovation is messy and there’s no one formula, but when we set out to pursue a new idea or solve a new problem, we can learn and act in ways that increase our chances of success. For would-be innovators, this set of guideposts helps to point the way forward.
Here is an example of the innovation journey:

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 1894, the world leader in glider flight died when his glider plunged into 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.”

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.

Design / Take Risks
In 1900, they tested their glider at Kitty Hawk, but the wings failed to produce enough lift.
Now walk through an example of your own!
1. What lessons can be learned from the story of *Innovation Nation*?

____________________________________________________________________________________________________________________________________________________

__________________________________________________________________________

2. What does it mean to be a) an innovator b) collaborate and c) learn from failure?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

3. Describe a time you had a great idea and acted on it.

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

4. What was most impressive about the way the innovations were created?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

5. What kind of innovations did you see on stage?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

6. How do you think innovation has shaped the America we know today?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

7. If you could create something new right now, what would you create and how would it benefit the world?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

8. What do you believe to be the most important habit of an innovator? Why?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

9. What do you find to be the most exciting part of innovation or the innovative process? Why?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________

10. Has the performance changed or enhanced how you view change and innovation?

____________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________
Note: This Monday Matinée Study Guide was compiled, written, edited, and (especially) designed with material adapted by study guides offered by the Cal Performances of the University of California, Berkeley. Other material gathered from the PA Dept. of Education Standards Aligned Systems website, and listed website and reading sources cited.

**PA Curriculum Framework for Inquiry and Design:**
Big Idea Categorization

### SCIENCE LONG TERM TRANSFER GOALS

Students will be able to independently use their learning to:

1. Approach science as a reliable and tentative way of knowing and explaining the natural world.
2. Weigh evidence and use scientific approaches to ask questions, investigate, and make informed decisions.
3. Make and use observations to analyze relationships and patterns in order to explain phenomena, develop models, and make predictions.
4. Evaluate systems, in order to connect how form determines function and how any change to one component affects the entire system.
5. Explain how the natural and designed worlds are interrelated and the application of scientific knowledge and technology can have beneficial, detrimental, or unintended consequences.

### INQUIRY AND DESIGN BIG IDEAS AND ESSENTIAL QUESTIONS

<table>
<thead>
<tr>
<th>Big Ideas</th>
<th>Essential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Idea 1: Asking questions and defining problems are essential to developing scientific habits of mind.</td>
<td>What kinds of questions do scientists and engineers ask?</td>
</tr>
<tr>
<td>Big Idea 2: Scientists construct mental and conceptual models of phenomena to represent current understandings, aid in developing questions and experiments, and to communicate ideas to others.</td>
<td>How do scientists and engineers develop and use models?</td>
</tr>
<tr>
<td>Big Idea 3: Scientists and engineers plan and investigate and observe the world to systematically describe it and to develop and test theories and explanations about how the world works.</td>
<td>What do scientists and engineers do to find out more about our world and how it functions?</td>
</tr>
<tr>
<td>Big Idea 4: Data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others.</td>
<td>In what ways are data analyzed, interpreted, and communicated?</td>
</tr>
<tr>
<td>Big Idea 5: Mathematics enables numerical representation of variables, symbolic representation of relationships between physical entities, and prediction of outcomes.</td>
<td>How is mathematics utilized in doing science?</td>
</tr>
<tr>
<td>Big Idea 6: Scientific theories are developed to provide explanations about the nature of particular phenomena, predicting future events, or making inferences about past events.</td>
<td>Why are theories valuable constructs in helping scientists understand and explain our world?</td>
</tr>
<tr>
<td>Big Idea 7: Scientists and engineers use reasoning and argumentation to make a justified claim about the world.</td>
<td>How do scientists and engineers communicate to others in order to advance science and engineering?</td>
</tr>
<tr>
<td>Big Idea 8: Science and engineering are ways of knowing that are represented and communicated by words, diagrams, charts, graphs, images, symbols, and mathematics.</td>
<td>In what ways do scientists and engineers communicate their knowledge?</td>
</tr>
</tbody>
</table>
Upcoming Events:
Evening Show:
The Henry Ford’s Innovation Nation-Live! Fri. 03/08/19 - 7pm
FREE Curtain Warmer | Lobby Show | 6PM | Brian Slocum, Managing Director LU Design Labs | Involved in many aspects of Lehigh University, his primary role revolves around the act of 'making.' In addition to managing Lehigh’s premier Makerspace, the Wilbur Powerhouse, he also serves as Director of the Lehigh University Additive Manufacturing Lab, and the Design Labs, which include both wood and metal shops.

Murphy’s Celtic Legacy
Wednesday, Mar 13, 2019 @ 10am
Just days before St. Patrick’s Day, Murphy’s Celtic Legacy will take the stage to showcase its original choreography that blends Irish and Modern dance techniques with multimedia elements, song and live music. Inspired by Irish folklore, the performance will take students through an invigorating tale that explores queens, kings, magic, and the battle between good and evil.

Appropriate for all ages 7 and above