



Virtual Field Trips

SUPERHEROES OF INNOVATION

Grades 3-5 | Social Studies and STEM



Driving Question

How can we learn from innovators of the past to become superheroes of innovation ourselves?



Individual Lesson Overview



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The Wright Brothers, Innovators in Flight | p. 3



George Washington Carver, Innovating the Way We Eat | p. 10



R. Buckminster Fuller, Innovating the Way We Live | p. 15



Rosa Parks, Innovating Society | p. 19



Connector Activity | p. 24



Highlighted Model i Habits and Actions



STAY CURIOUS

Learn something new.
Ask questions.



UNCOVER

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



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Virtual Field Trips

SUPERHEROES OF INNOVATION

Introduction

Virtual Field Trip Overview

This virtual field trip includes four lessons that focus on learning from great American innovators: Rosa Parks, the Wright Brothers, Buckminster Fuller and George Washington Carver. Each lesson includes a behind-the-scenes video to introduce students to innovators of the past and an activity to encourage students to learn by doing. Students will consider how each person changed the world and shaped the future.

The following lessons are designed to encourage your students to explore the Habits of Innovators. After completing two or more lessons, students will be able to compare innovators of the past to their own lives with the **Connector Activity**.

If you would like to familiarize yourself with The Henry Ford's Model Innovation learning Framework, please visit the Model i Primer Curriculum Resource.

Welcome to The Henry Ford

Before you begin your virtual field trip, it's important for your students to have some context. You can familiarize them with The Henry Ford by showing them the following video. Welcome! We hope you enjoy your time with us!

Virtual Field Trips - Welcome to The Henry Ford:
<https://vimeo.com/546002995/a748bd0acf>





Virtual Field Trips

SUPERHEROES OF INNOVATION

The Wright Brothers, Innovators in Flight | 45 minutes

Driving Question

How do people turn their ideas into reality?

Learning Objectives

Students will be able to:

- Understand that even great inventors and innovations had ideas that required testing and redesigning.
- Design and test a straw airplane.
- Analyze the test results to understand how a design can be optimized.

Standards

Common Core: CCSS.ELA-LITERACY.SL.3.1, 4.1, 5.1, CCSS.

ELA-LITERACY.SL.3.4, 4.4, 5.4; **NGSS:** 33-5-ETS1-1, 1-2, 1-3; **C3**

Framework: C3 D2.His.14.3-5; **Social-Emotional Learning:** Social Awareness, Self-Management, Relationship Skills

Materials

- Printer paper, one sheet per student
- Construction paper, one sheet per student
- 2 straws per student, each cut in half
- Tape
- Scissors
- Habits of an Innovator Chart - p. 25
- Flight Test Worksheet - pp. 8-9





Virtual Field Trips

SUPERHEROES OF INNOVATION

The Wright Brothers, Innovators in Flight



Prep Activity | 5 minutes

Begin class by asking students: Have you ever had a crazy idea for an invention? In a think-pair-share, ask students to imagine their greatest idea(s) for an invention or a way to improve something that already exists. Students should begin their sentence with "What if ...". For example: What if shoes could tie themselves?

Anything is possible during this activity. Encourage students to think without limitations.



Virtual Field Trips

SUPERHEROES OF INNOVATION

The Wright Brothers, Innovators in Flight

Core Activity | 30 minutes

Show students the virtual field trip video *The Wright Brothers, Innovators in Flight*. In this video, students will hear The Henry Ford's master presenter Ray Pisani share the history of the Wright brothers' journey to build the world's first controlled, powered aircraft.

While watching the video, students should note instances where the Wright brothers were motivated by their dream to keep trying new ideas, regardless of how many times they seemed to fail.

Virtual field trip video — *The Wright Brothers, Innovators in Flight*:
<https://vimeo.com/454513170/33b2017e65>

After viewing the virtual field trip, discuss the times when the Wright brothers believed in their dream, learned from their failures and tried new ideas.

Learn from Failure — Straw Airplane Activity

Students will create and optimize their own straw airplanes.

Working with a partner, students will cut four strips of construction paper down the long edge of the paper.

Using two strips of construction paper that are the same length, students will roll the paper to make two circles that are roughly the same size and secure them with tape. Then they will attach the circles — one to each end of one straw — with tape. For best results, they should place the straw inside the circle and secure it.

Specify the area where students will be able to throw the airplanes. Be sure to mark a starting point on the floor to allow students to measure distance. Students should use the **Flight Test Worksheet** to record their data.





Virtual Field Trips

SUPERHEROES OF INNOVATION

The Wright Brothers, Innovators in Flight

Note to Teacher

This design is not meant to fly well; it is a starting point to encourage students to optimize and learn from failure.

Straw Airplane Activity - Continued

Encourage students to discuss their test flight with their partner by asking the following questions:

- Do you think the plane could fly farther or straighter?
- What changes to the design could you make to meet your goal?

Next, have students work together to sketch the adjustments they plan to make to their design. They could adjust the size of the circles or straws, the weight or the length. Students should then build and test their new designs, again using the **Flight Test Worksheet** to record their data.

Note to Teacher

The straw airplane will work best if the two circles are different sizes. The different sizes allow for air flow and balance. Avoid giving this answer to students outright; the focus of this lesson is to get comfortable learning from failure and trying new things.



Virtual Field Trips

SUPERHEROES OF INNOVATION

The Wright Brothers, Innovators in Flight

Post Activity | 10 minutes

After completing the test flights, students should take time to answer the following questions about persistence.

1. After your first flight test, were you happy with the plane's distance and flight path? Were you frustrated?
2. After you changed the design, did your plane fly farther or straighter?
3. How did you feel after the second flight test? Were you happy with the progress you made, or did you want to try again?

Discuss with your students that having a big idea is one thing, but change happens when innovators keep trying new things and learning from their failures. Though failure can be frustrating, we wouldn't know what to improve without it.

Note to Teacher

After completing the Post Activity, have students take a few minutes to complete the Wright Brothers section of the **Habits of an Innovator Chart** found on page 25. Students will use the completed chart in the Connector Activity.



Virtual Field Trips

SUPERHEROES OF INNOVATION

Flight Test Worksheet

Design 1

Test 1

How far did your straw airplane fly?

Draw the flight path of your plane. (Did it fly in a straight line? Did it go to the left or right? Did it make a loop?)

Test 2

How far did your straw airplane fly?

Draw the flight path of your plane. (Did it fly in a straight line? Did it go to the left or right? Did it make a loop?)



Virtual Field Trips

SUPERHEROES OF INNOVATION

Flight Test Worksheet

Design 2

Test 1

How far did your straw airplane fly?

Draw the flight path of your plane. (Did it fly in a straight line? Did it go to the left or right? Did it make a loop?)

Test 2

How far did your straw airplane fly?

Draw the flight path of your plane. (Did it fly in a straight line? Did it go to the left or right? Did it make a loop?)





Virtual Field Trips

SUPERHEROES OF INNOVATION

George Washington Carver, Innovating the Way We Eat | 55 minutes



Driving Question

How can we use science and art to educate others and improve food security?



Learning Objectives

Students will be able to:

- Understand the concept of food security.
- Discuss how George Washington Carver used his research to help educate farmers.
- Design an informational brochure to help local residents plant gardens to improve their food security.



Standards

Common Core: CCSS.ELA-LITERACY.SL.3.1, 4.1, 5.1, CCSS.ELA-LITERACY.SL.3.4, 4.4, 5.4; **NGSS:** NGSS 3-5-ETS1-1, 1-2, NGSS 5-LS1-1; **C3 Framework:** D2.His.14.3-5; **Social-Emotional Learning:** Social Awareness, Self-Management, Relationship Skills



Materials

- Printer paper
- Colored pencils
- Markers
- Crayons
- Habits of an Innovator Chart - p. 25



Virtual Field Trips

SUPERHEROES OF INNOVATION

George Washington Carver, Innovating the Way We Eat



Prep Activity | 5 minutes

Begin class by asking students: Who grows or raises all the food they eat? Likely no one will raise their hand.

Ask students: Why don't you all grow or raise the food you eat? Allow time for responses.

Ask students: Who buys their food at a grocery store or farmers market? Likely most students will raise their hands.

Tell students that some people, today and in the past, don't have enough healthy food to eat. This is called food insecurity.

A scientist, George Washington Carver, shared his research with farmers to help them learn how planting certain foods can improve the soil and thus help them grow more and healthier food.



Virtual Field Trips

SUPERHEROES OF INNOVATION

George Washington Carver, Innovating the Way We Eat

Core Activity | 40+ minutes

Show students the virtual field trip video *George Washington Carver, Innovating the Way We Eat*. In this video, students will hear The Henry Ford's Curator of Agriculture and the Environment Debra Reid share the work and life of George Washington Carver.

Virtual field trip video — *George Washington Carver, Innovating the Way We Eat*: <https://vimeo.com/496951066/41a2172096>

Following the video, review how Carver helped farmers. Define food security and insecurity. Use the following information to guide your discussion.

- Food security involves eating better (reducing consumption of sugars, certain fats and heavily processed foods).
- Food security may start by increasing access to healthy foods (improving the quality of access to markets, including farmers markets).
- Food security includes learning how to prepare healthy food.
- Food security results from growing more of your own food, including in community gardens, urban gardens and pots on your porch if you have no backyard.
- Food security means you have overall better health, and a healthy body means that you have more energy, stamina and awareness to meet other challenges in life.

Using Science to Help Your Community

With guidance from the teacher, students should work with a partner to identify a plant that will grow well in the local area. This plant must also act as an important food source and/or provide support in another way (as a byproduct).





Virtual Field Trips

SUPERHEROES OF INNOVATION

George Washington Carver, Innovating the Way We Eat



Using Science to Help Your Community Continued

Students should conduct research to find the following information about their plant:

- Name
- Ideal weather conditions for growth
- Ideal soil composition
- Benefits to people

Students should then research recommendations for people to plant this food:

- Where they might buy seeds
- How and when to plant in a backyard garden
- How and when to plant in a porch pot
- How to care for and water the plant
- When to harvest

Once students have completed their research, students should design a flyer or pamphlet to share this information with their community. Students might consider designing a digital flyer to be shared through their school's newsletter or community board.

Remind students that George Washington Carver used illustrations and drawings to help educate people. This should be an important part of their flyer.



Virtual Field Trips

SUPERHEROES OF INNOVATION

George Washington Carver, Innovating the Way We Eat

Post Activity | 10+ minutes

Students will hang their flyers for a gallery walk or present their digital flyers to the class. If possible, share the information with the broader community and school.

Note to Teacher

After completing the Post Activity, have students take a few minutes to complete the George Washington Carver section of the **Habits of an Innovator Chart** found on page 25. Students will use the completed chart in the Connector Activity.



Virtual Field Trips

SUPERHEROES OF INNOVATION

R. Buckminster Fuller, Innovating the Way We Live | 55 minutes

Driving Question

How do innovators find inspiration in nature?

Learning Objectives

Students will be able to:

- Understand that nature can be a source of inspiration.
- Understand that great inventors and innovators find inspiration in nature.
- Learn that inventors and innovators learn from failure and keep trying their ideas.
- Design and draw a structure that is inspired by the natural world.

Standards

Common Core: CCSS.ELA-LITERACY.SL.3.1, 4.1, 5.1, CCSS.

ELA-LITERACY.SL.3.4, 4.4, 5.4; **NGSS:** NGSS 3-5-ETS1-1, 1-2;

Social-Emotional Learning: Social Awareness, Self-Management, Relationship Skills

Materials

- Printer paper for drawing
- Magazines
- Glue
- Scissors
- Colored pencils, markers or crayons
- Habits of an Innovator Chart - p. 25



Virtual Field Trips

SUPERHEROES OF INNOVATION

R. Buckminster Fuller, Innovating the Way We Live

Prep Activity | 5 minutes

Begin class by asking students: Have you ever looked into the sky and thought the cloud shapes took the form of a car, animal or other shape? Are there other areas of nature that have inspired you to imagine interesting sights?

Tell students that many great inventors, innovators, artists and designers find inspiration in nature.

One such person was R. Buckminster Fuller, who designed the Dymaxion House. The Dymaxion House is often called a "successful failure" because it was built as a prototype and had many innovations but was never produced or sold. Fuller was inspired to build and design many things by observing the world around him.



Virtual Field Trips

SUPERHEROES OF INNOVATION

R. Buckminster Fuller, Innovating the Way We Live

Core Activity | 40 minutes

Show students the virtual field trip video *R. Buckminster Fuller, Innovating the Way We Live*. In this video, students will hear The Henry Ford's master presenter Tim Pendell share the history of Buckminster Fuller's Dymaxion House.

Virtual field trip video — *R. Buckminster Fuller, Innovating the Way We Live*: <https://vimeo.com/488625858/d9e5ef1730>

Using Nature to Build a House

Students will design and draw their own structures inspired by nature.

Working with a partner, students should brainstorm inspiring scenes, shapes and colors from nature. If possible, students should work outside for this step, look out windows or search for nature scenes on the internet. Remind students that animals are also part of our natural world.

Once students have built a list, ask them to think about how these ideas might be useful in designing a structure. Example: A student might recognize that bird feathers are beautiful but also repel water. What if we were able to design roof shingles to act like birds' feathers?

Allow students to think creatively. Once they have an idea, they should work together to draw their designs. Students might also use images cut out from magazines or taken off the internet to design their living structures.

Remind students that Buckminster Fuller's idea is unique. They shouldn't be afraid of being original, too.





Virtual Field Trips

SUPERHEROES OF INNOVATION

R. Buckminster Fuller, Innovating the Way We Live

Post Activity | 10 minutes

Students should present their living structures to their peers. Allow time for feedback and ways they might improve their structures. Remind students that Fuller's Dymaxion House wasn't successful, but he used his failure to learn and eventually design the geodesic dome.

Note to Teacher

After completing the Post Activity, have students take a few minutes to complete the R. Buckminster Fuller section of the **Habits of an Innovator Chart** found on page 25. Students will use the completed chart in the Connector Activity.



Virtual Field Trips

SUPERHEROES OF INNOVATION

Rosa Parks, Innovating Society | 40 minutes

Driving Question

How do people work together to change the rules and laws of society?

Learning Objectives

Students will be able to:

- Understand how laws and rules are challenged and changed through peaceful actions.
- Study historic peaceful campaigns for change to understand the main components of such a movement.

Standards

Common Core: CCSS.ELA-LITERACY.RI.3.2, 4.2, 5.2, CCSS.ELA-LITERACY.RI.3.3, 4.3, 5.3, CCSS.ELA-LITERACY.SL.3.1, 4.1, 5.1, CCSS.ELA-LITERACY.SL.3.4, 4.4, 5.4; **C3 Framework:** D2.Civ.12.3-5, 13.3-5, 14.3-5; **Social-Emotional Learning:** Social Awareness, Responsible Decision-Making

Materials

- Habits of an Innovator Chart - p. 25



Virtual Field Trips

SUPERHEROES OF INNOVATION

Rosa Parks, Innovating Society



Prep Activity | 10 minutes

Begin class by asking students: Who makes the rules at school? Why are those rules made? Do students get a voice in making the rules?

Allow for a brief discussion.

Ask students: Who makes the rules (laws) in their communities? Why are those laws made? Do the people in those communities get a voice in making the laws? Allow for a brief discussion.

Ask students how people can change laws if they don't think they are serving the greater good?

Students might say:

- Elect different representatives to make new laws.
- Challenge the laws in court.
- Protest.

Tell students that the United States was born from people protesting the actions of the British king who imposed taxes and other restrictions on the American colonists. The colonists felt that these taxes were unfair and unjust. Depending on the depth of student knowledge, the teacher might explain this in more or less detail.

Remind students that protests happen because people are standing up for something they believe will make the world a better place.



Virtual Field Trips

SUPERHEROES OF INNOVATION

Rosa Parks, Innovating Society



Core Activity | 25 minutes

Show students the virtual field trip video *Rosa Parks, Innovating Society*. In this video field trip, students will hear The Henry Ford's master presenter Tim Pendell share the history of Rosa Parks' arrest and the Montgomery bus boycott.

While watching the video, students should note the examples of protests they see.

Virtual Field Trip Video — *Rosa Parks, Innovating Society*: <https://vimeo.com/487312327/8237262755>

Following the virtual field trip, ask students:

1. Why did Rosa Parks refuse to give up her seat?
2. We often think of protesting as marching in the street. Can refusing to do something be a protest? (Point students to the components of a protest.)
3. After Rosa Parks refused to give up her seat, how did people continue to protest? (Montgomery bus boycott)

Explain to students that a boycott is actively avoiding something. A boycott could be refusing to buy goods from a certain place because those goods are harming the environment or not taking the bus because the bus drivers are mistreating people.

Introduce the idea to students that protesting isn't always easy; it takes sacrifices to make real change. Reiterate that the Montgomery bus boycott lasted almost a year — a year of people refusing to take the bus and having to find new ways to get to church, school and work.





Virtual Field Trips

SUPERHEROES OF INNOVATION

Rosa Parks, Innovating Society



Be Empathetic - School Bus Boycott

Tell students that they will spend some time being empathetic by putting themselves in the shoes of boycotters. Ask them to imagine that kids who wear blue shoes are no longer allowed to ride the school bus. To protest the unfairness, a group of students have organized a school bus boycott.

Split students into three large groups based on how they get to school.

- Students who walk to school.
- Students who are driven to school.
- Students who take the bus.

Ask each group the following question:

You know that the bus boycott is important and could lead to a big change. How would not taking the bus change how you get to school?

Encourage students to discuss how people are impacted differently. Some kids may not be impacted at all, while others might have to walk miles to school. Tell students that they will work together to plan how everyone can support the protest.

Put students into small groups with at least one student who walks, one who is driven and one who takes the bus.

Tell students to spend five minutes brainstorming how each person in their group can support the protest. Once they have a few ideas, have students write down their top two.

Have each group share their top two ideas, writing them where everyone can see. As a class, discuss the ideas and build an action plan that allows each student to participate in the boycott.





Virtual Field Trips

SUPERHEROES OF INNOVATION

Rosa Parks, Innovating Society

Post Activity | 5 minutes

After coming up with a boycott action plan, ask students how this plan might change their daily lives. Would they have to get up earlier, give up some of their free time, walk a long distance?

Tell students that the people of the Montgomery bus boycott had to give up the same things for almost a year, but it paid off. The segregation of buses in Alabama ended as a result of the boycott.

Even though they had to make sacrifices, it was worth it to make a change for those that were suffering injustice.

Note to Teacher

After completing the Post Activity, have students take a few minutes to complete the Rosa Parks section of the **Habits of an Innovator Chart** found on page 25. Students will use the completed chart in the Connector Activity.



Virtual Field Trips

SUPERHEROES OF INNOVATION

Connector Activity | 15 minutes



Superheroes of Innovation and You

Once you have implemented the selected lessons, have your students revisit the **Habits of an Innovator Chart** they have filled out at the end of each lesson.

Students should look at how our Superheroes of Innovation have used each habit and begin thinking about how they can use these habits in their own lives. Give your class five minutes to complete the last row of the **Habits of an Innovator Chart**.

After completing the chart, have students share their experiences with the class. Use this time to explain to students that the Habits of an Innovator are not traits. They are not something that you are born with the ability to do well; they are meant to be practiced. Our Superheroes of Innovation had to practice them, too.

After the discussion, have students circle the one habit they want to get better at. Then, on the back of the page, have them record three ways they plan to practice this habit.





SUPERHEROES OF INNOVATION

Habits of an Innovator Chart

Name: _____

Directions: Complete at least three boxes for each innovator. You may find that not every innovator uses each habit.

Superheroes of Innovation	Wright Brothers	George Washington Carver	R. Buckminster Fuller	Rosa Parks	Me
Stay Curious How did ___ ask questions? How did ___ try to learn something new?					
Collaborate How did ___ work with others? How did ___ share what they learned?					
Take Risks What did ___ try that was new to them? How did ___ face the unknown?					
Be Empathetic How did ___ look at the needs of other people?					
Challenge the Rules How did ___ try something in a new way? How did ___ work to make a change in our world?					
Learn from Failure How did ___ keep trying after failing? How did ___ make changes to their ideas after something went wrong?					

