



# SCIENCE & TECHNOLOGY APPLIED TO THE REAL WORLD

“I see how information is presented in textbooks,” says Susan Tate, an eighth-grade teacher and education specialist at **The Henry Ford**. “Every teacher does.

“And sometimes, it’s very frustrating. I teach earth sciences. And the piece that is really missing from the textbooks is the role that businesses and industries have in this whole greening of America process.”

She’s not suggesting that America’s industries have perfect environmental records. But the more she has learned about the modern environmental movement, the more she has come to realize that many businesses have not just leaped onto the environmental bandwagon but are now leading the way. “I never heard the term ‘responsible manufacturing’ until I came to **The Henry Ford**,” says Tate.

get up close...  
SEE THE WORLD'S  
LARGEST LIVING ROOF  
AT THE *FORD ROUGE*  
FACTORY TOUR.

But after taking the *Ford Rouge Factory Tour*, the phrase was immediately clear. “When it comes to the environment, you rarely hear about companies that are doing the right thing,” says Tate. “A visit like this is a really good chance for older students to debate what is going on in the world and how they can be a part of it.”

It's not about selling cars or trucks. Rather, it's about observing ways that science and technology – the very lessons studied in school – are applied in real-world situations.

“That's one of the cool things about the Heroes of the Sky exhibit,” says Mary Wyatt, **The Henry Ford's** associate curator for education and a former science teacher. In class, students study the theories of flight, about the importance of wing shape and how various designs force airflow over or under the wing. “But here in the Museum, they learn how to fold a paper airplane in a very specific way to optimize the airflow. They can test the plane and see how far it goes. Then, they can take the model and change the shape of the wings and see the difference it makes.”

Is it fun? Absolutely. But it's educational, as well.

“What's best about this is that students remember the science. It's practical. It's hands-on. And they understand it.” And that's the key to success, says Tate: framing the lesson in a context that makes it stick in a young person's mind.

Nowhere are the practical uses of science and technology championed quite so vigorously as at Thomas Edison's Menlo Park laboratory in *Greenfield Village*. It was an unprecedented facility.

“Before Edison, science was very academic,” says Wyatt.

“If you were a real scientist, you weren't supposed to be interested in applied science. It was all theory.” But the Menlo Park lab, launched in 1876, had one primary goal – to create commercial products, making it the world's first research and development facility.

Here, as in so many other places at **The Henry Ford**, the relationship between the theoretical and practical is profound. And Edison's research is so enduring that the connection between his ideas and students' daily lives is immediately obvious. And those connections, says Wyatt, are the key to educational success.

“People's perception about **The Henry Ford** is always tied to history, and there is nothing incorrect about that assumption,” says Paula Gangopadhyay. “Most people don't realize that there is a lot more than just history at **The Henry Ford**. There's science, technology, engineering and math (STEM), literally put into action through our exhibits, our sites and the stories behind the artifacts.”

“We want to further capitalize on this unusual asset we have at **The Henry Ford**. We did it through our new Racing in America curriculum. The Racing DigiKits are tools to teach principles of science through our artifacts. We don't have to create supporting props to teach science as in most museums. We use the artifacts to show how aerodynamics, friction, energy and other principles work to make a real race car run. From the historic Menlo Park to some of the simple and complex machines to the best in environmental science and technology, **The Henry Ford** has it all.” ■

## PHYSICAL SCIENCES

### on-site programs

#### Heroes of the Sky

EXHIBIT

FREE with Museum admission

When your students enter *Henry Ford Museum*, the first thing they see is a sleek, silvery airplane hanging high above the Museum floor. That's our 1939 DC-3, the centerpiece of Heroes of the Sky, an exhibit that explores the wild and woolly early days of flight.

**Location:** Henry Ford Museum

**Program Length:** Flexible

**Online Resources:** Unit plan, online exhibit, self-guided exhibit exploration guide

#### Test Drive Smart Tools

SELF-GUIDED ACTIVITY

FREE with Ford Rouge

Factory Tour admission

Handle a "smart tool" that workers use on the factory floor and simulate steering wheel installation on a Ford F-150 pickup truck. Discover the connections between advanced tooling (process), skilled workers (people) and the end quality of the vehicle (product).

**Location:** Ford Rouge Factory Tour

**Offered:** Daily

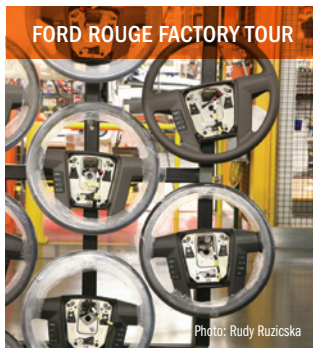
**Program Length:** Variable, self-directed

### field trip enhancements

#### Heroes of the Sky

SELF-GUIDED ACTIVITY

Student "Pilot Logs" and downloadable lesson plans to use during your visit will help you meet science, social studies and English language arts content expectations.



FORD ROUGE FACTORY TOUR

Photo: Rudy Ruzicka



HEROES OF THE SKY

### classroom resources

#### Science, Life Skills and Innovation in American Auto Racing

EDUCATOR DIGIKIT

Grades 3-8

Explore how American auto racing uses scientific concepts such as force, change in motion, speed and energy to make technological improvements. Learn about scientific innovations, teamwork and the risks of racing through oral histories from race car drivers, engineers, mechanics and owners.

#### Physics, Technology and Engineering in American Auto Racing

EDUCATOR DIGIKIT

Grades 9-12

Explore how the principles of physics – net force, acceleration and momentum – are an integral part of American auto racing. Examine how racing innovators achieve major technological advancements and learn about scientific innovations, teamwork and the risks of racing through oral histories from race car drivers, engineers, mechanics and owners.

## ENVIRONMENTAL SCIENCE

### on-site programs

#### Outdoor Living Lab

GUIDED ACTIVITY

FREE with Ford Rouge Factory Tour admission

**Location:** Ford Rouge Factory Tour

**Offered:** Mid-April to mid-October, weather permitting

**Program Length:** 15 minutes

### field trip enhancements



#### History Hunters: Science & Technology

SCAVENGER HUNT

**Location:** Ford Rouge Factory Tour

- Investigating Environmental Innovations
- Investigating Manufacturing

Check [thehenryford.org/education](http://thehenryford.org/education) for the latest History Hunters.

#### NEW! The Rouge: They Said It Could Not Be Done

FIELD TRIP HELPER FOR FORD ROUGE FACTORY TOUR

Grade 6

This self-guided exploration tool is designed to help students discover the science and history of the Rouge.

### classroom resources

#### NEW! Sustainability: Environmental Management and Responsible Manufacturing at the Ford Rouge

TEACHER PACKET

High School

How is environmental sustainability affected by personal and business decisions? Students will explore the principles of sustainability, learn how to choose a green lifestyle, understand green design and make a responsible-manufacturing case study of the Ford Rouge Complex.

#### NEW! Human Impact on Ecosystems

TEACHER PACKET

Middle School

In this unit, you and your students will use resources, documents and photographs from the *Ford Rouge Factory Tour* to consider the question, "What role do citizens, industry and government play in ecosystem restoration?" Students will explore the parts of an ecosystem, the ways in which it can be damaged and how remediation can help restore an ecosystem.

#### NEW! Life Requirements

TEACHER PACKET

Elementary School

What do plants and animals need to survive, and how do humans impact the environment? Students will explore the needs of plants and animals, the balance of nature, and follow the example of the Ford Rouge Complex to make a difference.

#### The 21st-Century Factory: Environmental Innovations at the Rouge

POWERPOINT SLIDE SHOW

Learn about the technological and environmental innovations that were built into Ford's Rouge Factory and how they protect the environment by using emerging technologies to manage water, soil and daylight.



Visit [thehenryford.org/education/resourcebank.aspx](http://thehenryford.org/education/resourcebank.aspx) for curriculum connections.