

Teacher Tool 191: Explore Trains Study Guide

Study Guide for Transportation 15: Explore! Trains

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Explore! Trains

Original Air Date: February 11, 2016

Grade Levels: 3-6

Program Description:

How do trains impact our lives? America has over 140,000 miles of freight railroad lines and over 21,000 miles of passenger tracks. Have you ever wondered: How would auto parts get to the factory without trains? How would coal get to electric power plants without trains? How would many people get to work without trains? Each day, thousands of people and products are moved by trains. How do trains operate? What is it like to ride a train? Want to find out? Climb aboard and view this program archive.

Through the course of this energetic and interactive cross-curricular program, students get a chance to answer our big picture question for themselves and listen to the answers of others as they engage in activities related to trains and learn from an expert on trains and rail transportation.

To investigate the program's theme and big picture question through a cross-curricular approach, each episode of *Explore!* utilizes Who, What, Where, When, Why and How questions:

Who does that? gives students a chance to meet someone who works in the field or does an activity related to the program's theme.

What do you want to know? guides our segments when we go to questions from participating groups.

Where is that? focuses on a geographic exploration related to the program's theme.

When did that happen? takes us back in time to people, places, events related to the program's theme.

How does that work? lets students discover the workings of a machine or concept related to the program's theme.

Why you ask? delves into more detail/explanation/background on a topic related to the program's theme.

For this episode, we explore those questions in a number of ways. We define important vocabulary words related to the topic. We participate in interactive activities focused on the operation of trains and their track systems. We take a tour of a railroad switchyard and learn what it takes to move and operate trains safely and successfully. We ride a train to see what it's like to travel by rail. We learn from engineers and mechanics who operate and repair trains. We hear from participating students themselves as they share their responses to pre-program activities. We meet an expert on trains and rail transportation, and, as always, have plenty of time to weave in student questions for the expert joining us.

Program Objectives:

Students will:

1. Engage in critical and creative thinking.
2. Engage in interactive activities and discussion about trains and rail transportation systems.
3. Interact with an expert on trains and rail transportation systems.
4. Develop an answer for themselves to the question: "How do trains impact our lives?"

Program Format:

Time codes are provided in blue to help you find specific segments in the program.

I. Welcome and Introduction—An overview of the program’s theme and importance of the topic will be presented as student groups are welcomed to the program. (00:00 to 01:51)

A. Big Picture Question for the Program

How do trains impact our lives?

B. Overview Information

We talk about why trains matter and the cool topics we’ll cover in the program.

C. The Word Is...

As we discuss cool things about maps, we define a number of the program’s vocabulary words including:

Railroad

Track

II. Maps Across the Curriculum—We look at trains through a variety of curricular lenses.

A. When Did That Happen? (01:52 to 03:43)

We highlight five events in the history of trains.

B. Where Is That? (03:44 to 05:55)

We highlight geographic locations related to the topic of trains.

C. What Happens When You Ride a Passenger Train? (05:56 to 08:06)

Students see what it’s like to ride a train and learn interesting information about Amtrak, America’s passenger rail system.

D. The Power of the Locomotive (08:07 to 09:51)

We define our vocabulary word, “locomotive,” and go inside a locomotive to see how it is powered and operated.

E. When Did That Happen? (09:52 to 11:30)

We highlight five more events in the history of trains.

F. How Does That Work? (11:31 to 16:09)

We spend a little time on what may be the future of trains—magnetic levitation. Students learn how they work and are able to travel so fast.

III. Interactive Segment—In this portion of the program students interact with the program host and guests. While listed separately below for clarity, the events of this segment will be woven together as students interact with our program guests: Norbert Shacklette—retired railroad conductor, brakeman and engineer; Samuel Aufmuth—train collector and volunteer at the Saint Louis County Museum of Transportation.

A. Meet Our Guests (16:10 to 18:36)

Norbert Shacklette—Mr. Shacklette is a retired train operator. He worked on the Missouri Pacific and Missouri-Illinois Railroads as a telegraph operator and station agent from May 17, 1960 until December 21, 1970. He also worked as a brakeman, switchman, hostler, and conductor for the Missouri Pacific and Union Pacific Railroads from December 21, 1970 until March 12, 2002.

Samuel Aufmuth—Samuel is a St. Louis area high school student who is an avid train collector and historian who currently volunteers at the Museum of Transportation in St. Louis County.

C. Sharing Your Ideas and Asking Your Questions (18:37 to 29:48)

As students interact with our program guests, we cover more topics related to our big picture question: How do trains impact our lives? Topics include:

1. Roles of a conductor, brakeman, and hostler
2. How train movement is controlled across the country
3. How railroad switchyards work
4. How wheels on trains help keep them on the rails
5. How train cars are repaired and maintained.

We also answer many student questions including the ones listed below.

Student Questions Included in this Segment:

1. Do trains have speed limits?
2. How fast can the fastest train in the world go?
3. How big is the Amtrak system? About how many people ride on it each year? When is the most popular time?
4. What is the weight of a bigger train and how wide is it?
5. What kind of tools do you use to repair trains?

IV. Summary and Closing—We summarize major concepts learned today, say thank you and goodbye. (29:49 to 30:59)

Featured National Standards:

The following **Common Core Standards for English/Language Arts and Literacy in History/Social Studies, Science and Technical Subjects** are referenced in this program:

Grades 3-6 College and Career Readiness Anchor Standards for Reading

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

Grades 3-6 College and Career Readiness Anchor Standards for Writing

6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Grades 3-6 College and Career Readiness Anchor Standards for Speaking and Listening

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Grades 3-6 College and Career Readiness Anchor Standards for Language

6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Program-Related Activity Suggestions: The activities below are designed to get your students learning more about the topics explored in the program or responding to specific information learned while watching the program.

1. Passenger Trains in America—This activity is designed to give your students information about Amtrak, America’s passenger rail system.

a. Videos for Activity 1—Multiple videos on the topic are available on our Educate.Today website. Have students view the following:

Transportation 1: What happens if I’m going to ride a train?

Transportation 2: What’s the size of a train?

Transportation 3: What do the engineer and other personnel do to make the train runs smoothly?

2. Controlling Train Traffic—This activity is designed to get your students thinking about the equipment used and skills needed for operators to successfully navigate train traffic through railroad switchyards and across the country. The activity consists of the following videos available on our Educate.Today website:

Transportation 4: Control Panel Explanation

Transportation 5: Operator in Action

3. Maintaining Trains—This activity is designed to get your students thinking about the processes and equipment used to maintain trains in good working order. The activity consists of the following videos available on our Educate.Today website:

Transportation 6: Removing the Wheel Carriage

Transportation 7: Explanation of Wheel Carriage

Transportation 8: Locomotive Power Plant

Transportation 9: Starting a Locomotive

4. Railroad Speed Activity—This activity is designed to get your students thinking about the speed of trains and how that speed affects the length of train trips they might take. Have students view our Educate.Today video entitled: Transportation 10: Railroad Speed Activity.

5. Learn More From Other Students—This activity lets your students learn more information about trains from the questions students asked during our live, interactive programs. The activity consists of the following videos on our Educate.Today website:

Transportation 11: Explore! Trains Student Questions 1

Transportation 12: Explore! Trains Student Questions 2

Transportation 13: Explore! Trains Student Questions 3

6. Thank A Guest—Have students write a letter to one or both of our guests detailing an insight the student gained from interacting with them, an appreciation for their participation, and/or another focus area of their choice. Letters can be e-mailed to us at live@hectv.org or mailed to us at:

HEC-TV

Attn: Kristy Houle

3221 McKelvey Road

Suite 106

St. Louis, MO 63044

Vocabulary:

The following terms and their definitions are highlighted in the program:

Flatcar
Grade
Junction
Locomotive
Monorail
Railroad
Track

Supplemental Resources:

There are numerous Internet resources with excellent train activities for you to consider using with your students. Here are a few:

1. Amtrak— <https://www.amtrak.com/home>

Learn about Amtrak and investigate learning activities related to trains.

2. National Railroad Museum— <http://www.nationalrrmuseum.org/learn/education/>

Check out many educational resources at the website of the National Railroad Museum.

3. Smithsonian— http://smithsonianeducation.org/educators/lesson_plans/trains/index.html

Learn more about the history of trains and railroads at the Smithsonian Education website.