



7TH GRADE CURRICULUM

7TH GRADE CURRICULUM OUTLINE

TRANSPORTATION MODULE

Lesson 1: 7th grade

Transportation and Energy Use: Powershift DVD and Discussion

- Watch Powershift DVD
- Class discussion about the video and personal views on global energy use issues and renewable energy ideas.

Lesson 2: 7th grade

Transportation: Trains, Planes, and Automobiles. . .and Bikes and Boats

- Brainstorming session
- Create word maps: different modes of transportation
- 2-minute transportation slide show

Lesson 3: 7th grade

Transportation through Time: Creating A Transportation Timeline

- Brainstorming session
- Creating a transportation timeline

Resources:

DK Visual Timeline of Transportation, Anthony Wilson, 1995, ISBN# 1-56458-880-7

Lesson 4: 7th Grade

Investigating Transportation: A Small Group Research Project

- Part #1: Begin history of transportation research project
- Discussion and exercises on how to participate in effective small group projects

Lesson 5: 7th Grade

Investigating Transportation: A Small Group Research Project

- Part #2: Discuss challenges, obstacles, questions

Lesson 6: 7th grade

Investigating Transportation: A Small Group Research Project

- Part #3: Presentations and discussion

Lesson 7: 7th grade

A Cursory Glance: Gasoline Production

- Class reading & discussion lecture / note-taking assignment

Lesson 8: 7th grade

A cursory glance: The Four-Stroke Internal Combustion Engine

- The history of the combustion engine
- How do they work
- Combustion chemistry
- Drawing combustion engines
- Teacher-led demonstration: potato rockets

Lesson 9: 7th grade

Automobile emissions and pollutants, and global warming

- Reading and discussion about global warming
- Discuss the automobile's role in global warming

Lesson 10: 7th grade

Creating Change: Personal Decision-making and Automobiles

- U.S. driving habits and gasoline consumption: analysis and calculations
- Hybrid vehicle technology: reading and discussion
- Understanding feedback loops—global warming and the impacts of personal decision-making

Lesson 1: 7th grade

Transportation and Energy Use: Powershift Video and Discussion

Lesson Overview: Exploring global energy impacts.

Lesson Concept: All life is connected throughout the world. We share a world of finite resources with a variety of beings and though we profess to have widely varying needs, our most primary needs are quite similar—water, food, and shelter.

Materials:

- Note-taking journals
- Pencils
- Erasers
- Powershift video (26 minutes)

Standards:

- **English:**
 - **IX.11.MS.1** (Inquiry and Research: Define and investigate important issues and problems using a variety of resources).
- **Science:**
 - **I.1.MS.1** (Construct new Scientific and personal Knowledge: Generate scientific questions about the world based on observation).
 - **II.1.MS.3** (Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge: Show how common themes of science, mathematics, and technology apply in real-world contexts).
- **Social Studies:**
 - **II.3.MS.4** (Geographic Perspective: Describe the major economic and political connections between the United States and different world regions and explain their causes and consequences).
 - **II.5.MS.1** (Geographic Perspective: Describe how social and scientific changes in regions may have global consequences).
 - **IV.2.MS.4** (Economic Perspective: Examine the historical and contemporary role an industry has played and continues to play in a community).
 - **VI.1.MS.3** (Public Discourse and Decision Making: Explain how culture and experiences shape positions that people take on an issue).

Timeline: 1 class period (50 - 60 minutes) depending on the length of each presentation

Class Structure: watch a DVD and class discussion

Assessment Strategy: Pre-module Assessment Questions #1, 2, & 3
EEK! Daily Assessment

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Transportation and Energy Use: Powershift Video and Discussion

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Materials:

- Note-taking journals
- Pencils
- Erasers
- Powershift video (26 minutes)

CLASS EXERCISES:

I. Introducing the Module

This short video introduces how energy impacts our daily lives and, most importantly, discusses how our everyday actions impact not only in our local communities, but create impacts around the globe.

We have chosen this video as an introduction to the module to stress a main point of this curriculum: global interconnectedness. The decisions we make affect the world. Just as, the decisions of others around the world affect us likewise. We live within a global community.

II. Before the Video

Ask the students to answer the following questions in their note-taking journals dedicated for this module. Possible responses are in red.

1. How do you use energy (electricity, gas) in your daily life?

Lighting, refrigerator, freezer, toaster, stove, automobile (gasoline).

2. What is the primary source of energy in the United States?

Approximately 60% of all electricity in the United States is generated from burning coal.

3. Do you think the amount of energy you use can affect people living in different countries? How might this happen?

We live in a global community where our actions affect those around the world. Specific examples include: our CO₂ emissions and other pollutant emissions which contribute to acid rain, and global warming.

III. After the Video

With the time remaining during class, begin a class discussion about the video. The following questions may be helpful to stimulate conversation.

- What did you learn that you had not thought of before?
- Do you believe that many of your actions affect others around the world?
- What could you do in your own life to reduce the impact on the environment?
- How or why could these changes be difficult?
- What would help you to stand by these changes?

IV. Post-video Writing

Have the students update their responses to the questions they answered prior to watching the video and include any thoughts / conversation points from the post-video discussion.

V. Further Discussions

If the class desires to continue the conversation, create small groups and ask each group to brainstorm three questions:

1. What was the most significant they learned in the video they did not know before?
2. What could they do in their own life to reduce their impact on the environment?
3. How or why could they foresee question #2 being difficult to enact?

Lesson 2: 7th grade
Transportation: Trains, Planes, and Automobiles. . .and Bikes and Boats

Lesson Overview: Create a word map to explore ideas about transportation—past and present.

Lesson Concept: There are multiple ways to transport people and goods throughout the world. Investigate the potential connections of how transportation can affect all aspects of life.

Materials:

- Large white paper for note-taking
- Student Hand-out: Ground Rules for Conversation & Brainstorming

Standards:

- **English:**
 - **IX.11.MS.1** (Inquiry and Research: Generate questions about important issues that affect them or topics about which they are curious; narrow the questions to a clear focus; and, create a thesis or a hypothesis).
- **Science:**
 - **II.1.MS.3** (Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge: Show how common themes of science, mathematics, and technology apply in real-world contexts).
- **Social Studies:**
 - **II.5.MS.1** (Geographic Perspective: Describe how social and scientific changes in regions may have global consequences).
 - **IV.2.MS.2** (Economic Perspectives: Compare various methods for the production and distribution of goods and services).
 - **IV.2.MS.4** (Economic Perspective: Examine the historical and contemporary role an industry has played and continues to play in a community).

Timeline: 1 class period (50 - 60 minutes)

Class Structure: whole class brainstorming and discussion

Assessment Strategy: EEK! Daily Assessment
General Assessment Strategy #1
General Assessment Strategy #3

Lesson 2: 7th grade
Transportation: Trains, Planes, and Automobiles. . .and Bikes and Boats

After watching the Powershift DVD introducing a perspective on global energy issues, the following lessons will focus on gaining knowledge and sharing viewpoints surrounding transportation.

This lesson is primarily a brainstorming session devoted to exploring the students' ideas and understanding about transporting people and goods throughout the world. As always, it is important to begin teaching a lesson from where the students are—begin with their inherent knowledge and work from there. This lesson includes a series of questions as well as background material to facilitate discussions.

Lesson Overview: Class discussion to explore different thoughts and understanding about transportation—past and present.

Lesson Concept: There are multiple ways to transport people and goods throughout the world. Investigate the potential connections of how transportation can affect all aspects of life.

Materials:

- Large white paper for note-taking
- Student Hand-out: Ground Rules for Conversation & Brainstorming

CLASS EXERCISES:

I. Transportation Word Map

In this first exercise, the goal is to encourage conversation and a free-flow of ideas about transportation to begin percolating within the classroom. In order to facilitate a brainstorming session with the students, create a word-map and see what connections the students begin making about transportation and the effects it has on all living things.

During this first exercise, it is important to remember the Ground Rules for conversation and respect not only everyone's ideas, but also their silence.

We are suggesting creating the word map on a large piece of butcher paper that you can save and refer to later. This initial word map will serve as a crucial guide for the entire Transportation Module and will provide the following:

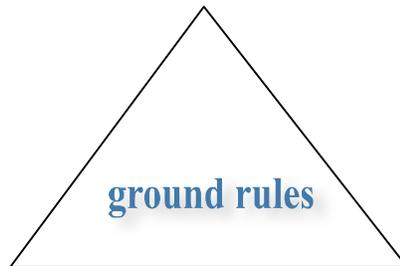
- Tool for discovering the students' prior knowledge
- Starting point for teaching and learning (may show how deeply the students have thought about the idea of transportation)
- Tool for discovering what the students view as important
- Assessment tool as the Module progresses (the initial word map can be added to or a new one created as the increase their knowledge)
- Teaching tool (use language of the students to help them 'make sense' of the lessons)

II. Ground Rules for Conversation & Brainstorming

These ground rules apply for the whole class—students, teachers, visitors—when engaged in conversations and teasing out ideas (brainstorming).

Trust

- ‡Respect each others' personal style
- ‡Don't make fun of anyone
- ‡Keep an open mind



Communication

- ‡Speak clearly
- ‡Stay focused
- ‡Answer questions directly and stay on topic
- ‡Wait your turn

Responsibility

- ‡Pay close attention
- ‡Ask informed questions
- ‡Include all group members

III. Creating the Word-Map

- Write the word transportation on the board. The word may conjure many different ideas—cars, trains, people, food, pollution, technology, auto-industry, jobs, unions, lay-offs, economy, businesses. Word maps can often become quite elaborate—encourage the students to explore as many topics as possible within the word map to make connections between:
 - humans
 - non-humans
 - industry
 - pollution
 - jobs
 - quality of life issues
- But, when first introducing word mapping as a brainstorming exercise with your students, introduce the concept step-by-step. The following diagrams will take you through the beginning steps of what a word map might look like and provide ways to introduce ideas and ask questions.
- Look around the room and ask the students, “OK, let’s begin with different modes of transportation—let’s see how many modes we can think of.”
- Write each word or phrase on the board around it. When one thought directly leads to another, follow the thought pattern with arrows. The following example is of a simple word map.

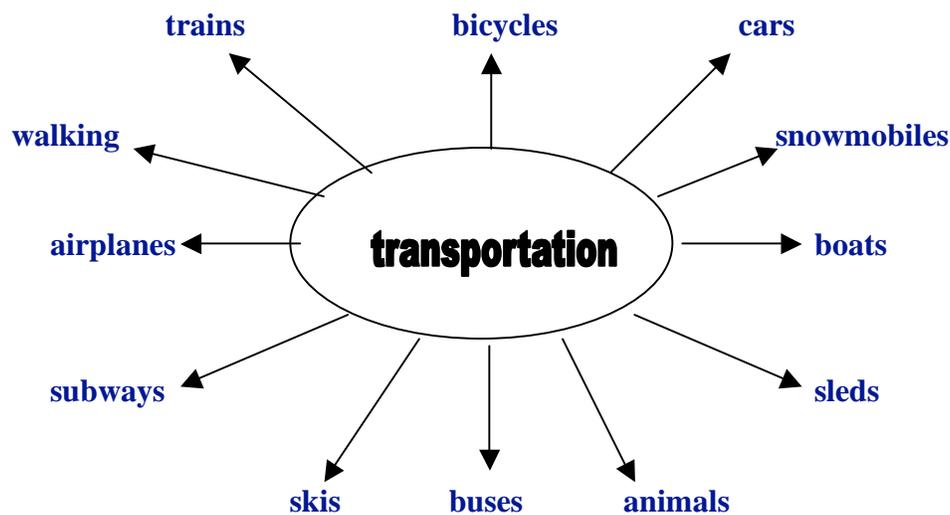
Transportation Word Map Example

Step 1: Different Modes of Transportation

- Step 1:** Hang a large piece of white butcher paper on the board or wall.
- Step 2:** Write the word 'transportation' on the middle of the paper.
- Step 3:** Ask the students to brainstorm about every different mode of transportation they can think of. Write down all of their responses.

The word map below is an example of how your word map might look:

Note: Please remember there is no 'right' or 'wrong' way to create a word map—this is a brainstorming exercise. The intent is to gather as many ideas as possible about what the students perceive as different modes of transportation.



Transportation Word Map Example Step 2: Mining the Ideas

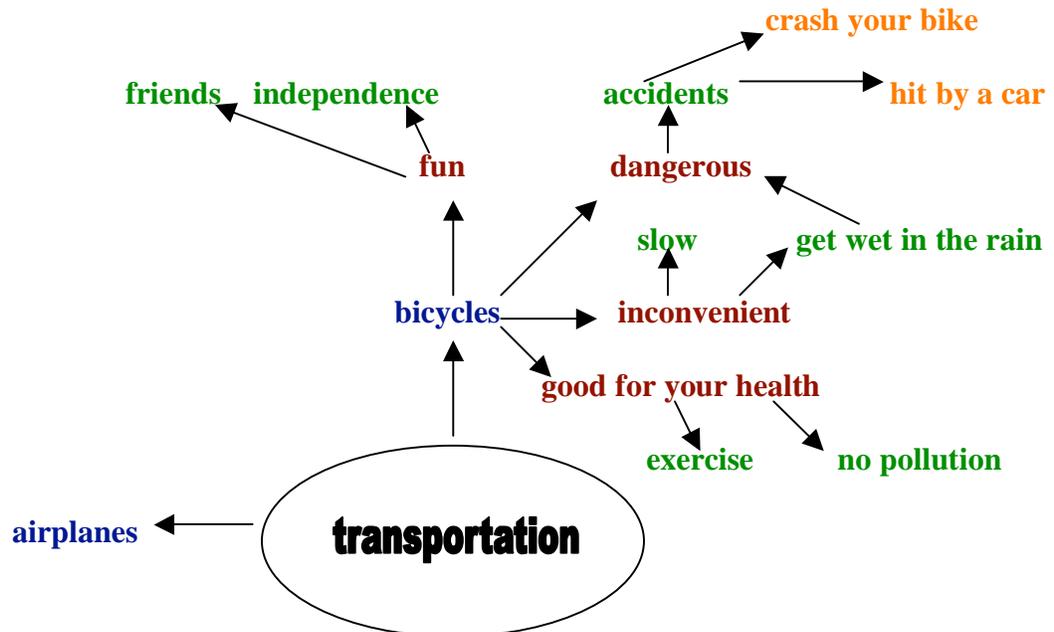
Once the class has compiled all of the different modes of transportation that they can imagine, the next step is to continue the brainstorming session by investigating each idea.

In this step, encourage the students to ‘free-associate’ ideas for each mode of transportation. It might be helpful, though, to have the students focus on one mode at a time for Step 2. Below is an example of what the word map may look like when mining ‘bicycles’.

Understanding the example word map: Tiers of Investigation

The 1st tier of investigation = a mode of transportation (bicycles, airplanes)
 The 2nd tier of investigation = first things that came to mind (inconvenient, dangerous, fun, good for your health)
 The 3rd tier of investigation = brainstorming the 2nd tier (friends, independence, accidents, slow, get wet in the rain, exercise, no pollution) **
 **But, note that there is a connection made between ‘get wet in the rain’ and ‘dangerous’
 The 4th tier of investigation = brainstorming the 3rd tier (crash your bike, hit by a car)

- Step 1:** Choose one mode of transportation at a time to ‘mine’.
Step 2: Ask the students, “What comes to mind about x mode of transportation?” Write down all of their responses.



Transportation Word Map Example Step 3: Mining the Ideas #2

The following is another example—in this example, we word map ‘cars’. This word map is becoming more complex with deeper tiers of investigation, but the investigation is just beginning to delve into the connections of how ‘cars’ may affect all aspects of life.

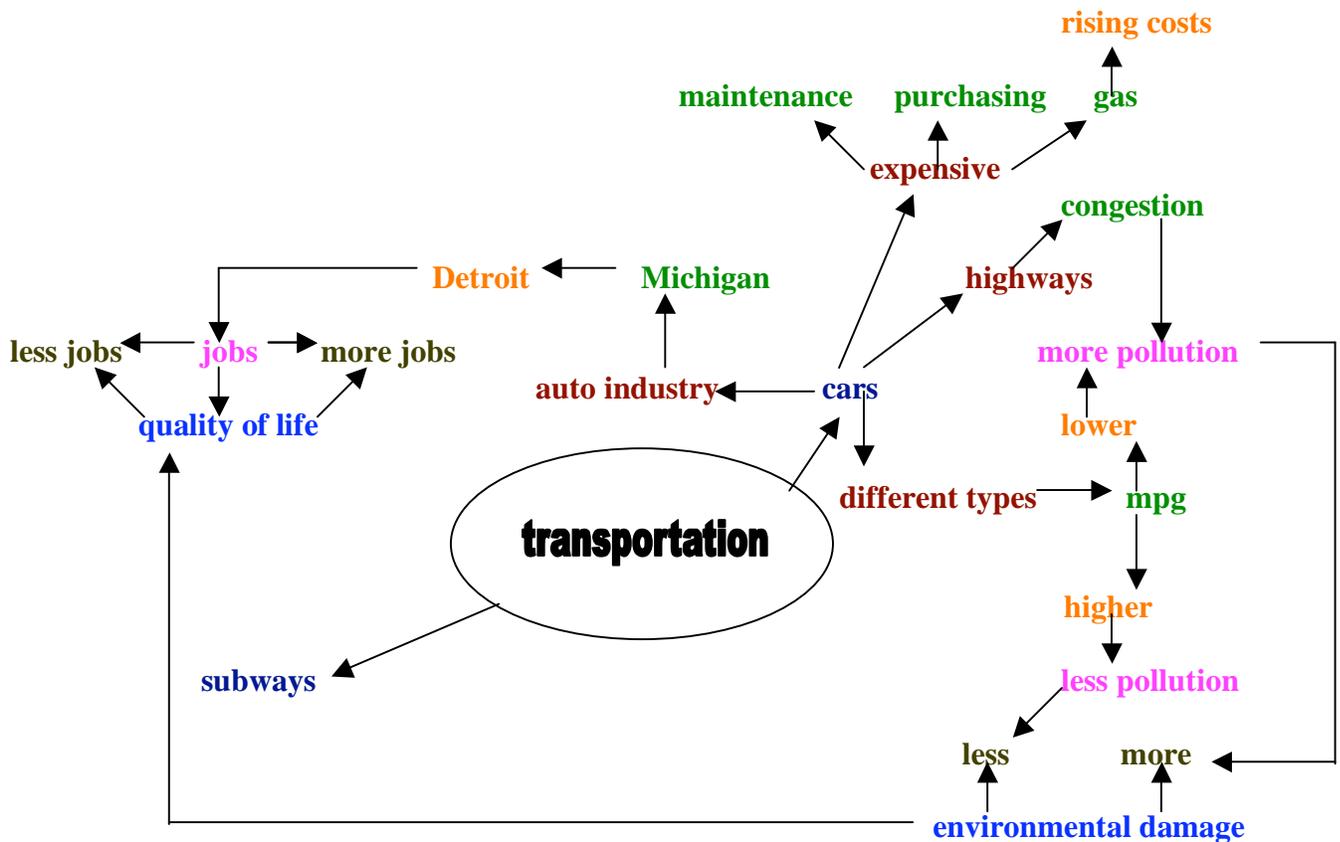
Additional Tiers of Investigation:

The 5th tier of investigation = brainstorming the 4th tier (more pollution, jobs)

The 6th tier of investigation = brainstorming the 5th tier (environmental damage, quality of life)**

It is essentially within the 6th tier that making deeper connections across different headings takes place. For example, the state of the environment also directly relates to quality of life issues.

7th tier of investigation = brainstorming the 6th tier (less jobs, more jobs, less, more (environmental damage)).



Teacher's Notes:

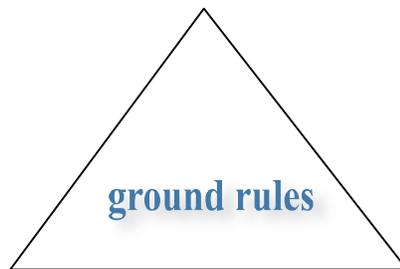
Additional Assessment Strategy

If you need to establish pre and post student knowledge of content material for this unit, these initial word maps can act as a descriptive pre-test material to gauge the students' prior knowledge.

Student Hand-out: Ground Rules for Conversation & Brainstorming

Trust

- ‡Respect each others' personal style
- ‡Don't make fun of anyone
- ‡Keep an open mind



Communication

- ‡Speak clearly
- ‡Stay focused
- ‡Answer questions directly and stay on topic
- ‡Wait your turn

Responsibility

- ‡Pay close attention
- ‡Ask informed questions
- ‡Include all group members

Lesson 3: 7th grade

Transportation through Time: Creating A Transportation Timeline

Lesson Overview: Exploring how transportation has changed over time.

Lesson Concept: People have been transporting materials for many years in many different ways around the world.

Materials:

- 18 x 24 white construction paper (to create the class composite timeline)
- tape
- Student Hand-out #1: Transportation Timeline (optional at the end of the lesson)
- Student Hand-out #2: Ground Rules for Conversation & Brainstorming
- 2-minute Modern Modes of Transportation slideshow

Standards:

- **English:**
 - **IX.11.MS.1** (Inquiry and Research: Define and investigate important issues and problems using a variety of resources).
- **Science:**
 - **I.1.MS.1** (Construct new Scientific and personal Knowledge: Generate scientific questions about the world based on observation).
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- **Social Studies:**
 - **IV.2.MS.4** (Economic Perspective: Examine the historical and contemporary role an industry has played and continues to play in a community).
 - **VI.1.MS.3** (Public Discourse and Decision Making: Explain how culture and experiences shape positions that people take on an issue).

Timeline: 1 – 2 class periods (50 - 60 minutes each)

Class Structure: small group brainstorming and discussion

Assessment Strategy: EEK! Daily Assessment
General Assessment Strategy #1
General Assessment Strategy #3

Lesson 3: 7th grade

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- Student Hand-out #1: Transportation Timeline (optional at the end of the lesson)
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- 2-minute Modern Modes of Transportation slideshow

CLASS EXERCISES:

I. Modern Modes of Transportation Slideshow

Begin the lesson by showing the 2-minute slideshow of different forms of transportation—to move people and goods—throughout the world today.

II. Creating the Transportation Timeline: Small Group Brainstorming Session

The goal of this exercise is to have the students create a group timeline roughly plotting the dates and times of a History of Transportation. At this point, all information should be exclusively the students' prior knowledge (no research allowed).

The Ground Rules for the Transportation Timeline

Ask the students: “When might these things have happened in the past?”

- The year when humans first began transporting goods
- Name a present-day mode of transportation
- The years and events of at least 8 modes of transportation in between
- The goal is to write 10 things with dates on their timeline.
- Share with the class. This is a brainstorming exercise!

III. Compiling the Ideas

After the small groups have completed their Timeline drafts, facilitate a whole class discussion. Then, create a class Timeline on the construction paper. Write one event per piece of paper and then hang, in sequence, around the room to create a class rough-draft timeline.

Below are few starter questions to jumpstart the whole class conversation:

- What do you believe was the first mode of transportation?
- What do you believe might be the first object that was transported?
- Approximately when did this (the above ideas) take place?

Teacher’s Note: Continue in this mode, beginning your questions with phrases such as, “What might have happened. . .” or “What do you believe could have taken place. . .” This type of language can help facilitate a safe environment for brainstorming sessions. The goal of this exercise is not necessarily to discover the “correct” answers, but to encourage trusting dialogue between the students. Once this atmosphere occurs within the lesson, the student will be better able to use the sum of their collective knowledge to tease out the rough dates of the Timeline.

IV. Sharing the Compilation Timeline

In order to facilitate “filling in the gaps”—if they exist—within the Transportation Timeline, please refer to the cursory compilation provided. Also, it is best to offer this Timeline to the students **AFTER** they create their own Transportation Timelines to help assess the students’ prior knowledge and brainstorming abilities.

Background Information: Transportation Timeline Note*

This timeline has been compiled from a variety of sources and is cursory at best. There is much debate over the invention of some modes of transportation—such as what is technically considered the first bicycle—but, we have attempted to provide a brief account of the generally accepted inventors and dates for the following history of transportation invention highlights.

For further detailed information, please refer to the *Visual Timeline of Transportation by Anthony Wilson, 1995, Dorling Kindersley.*

A Brief Glance at the History of Transportation*

- | | |
|----------------|--|
| 8000 BC | Archeologists believe logs were used as rollers to move large sledges (boxes) in Asia. |
| 3500 BC | Archeologists believe the first wheels were used by Mesopotamian potters as pottery wheels not for transportation. |
| 3200 BC | The oldest wheel used for transportation discovered by archeologists was found in Mesopotamia. It is believed that the first wheels used for transportation pulled Mesopotamian chariots. |
| 3000 BC | Egyptians and Mesopotamians use boats extensively for travel. |
| 181-234 | The wheelbarrow is invented and used in China. Chuko Liang is generally considered the inventor of the first wheelbarrow that was used for a large-scale application. He was an advisor to the Shu-Han Dynasty and developed the wheelbarrow for military transport. |
| 1492 | Leonardo da Vinci (1452- 1519) creates over 100 drawings detailing ideas, theories about flight and constructing flying machines. (Sketches for bicycles have also been found among da Vinci’s sketch books). |

- 1783** First manned hot air balloon takes flight in Paris—invented by the Montgolfier brothers.
- 1787** Passenger carrying steamboat invented by John Fitch.
- 1814** Steam powered railroad locomotive invented by George Stephenson in England.
- 1834** Thomas Davenport invents the first battery powered electric car.
- 1839** Modern bicycles invented (with pedals and steering) by Kirkpatrick Macmillan in Scotland.
- 1860** Gasoline internal combustion engine created and produced en masse by Jean Lenoire (Belgium).
- 1863** The World's first subway system opens in London.
- 1876** Four-stroke internal combustion engine invented by Nicolaus Otto of Germany.
- 1877** The first San Francisco cable cars go into service.
- 1885** Gas powered motorcycle invented by Gottlieb Daimler in Germany. (Daimler was an employee of Otto's when he built the 4-stroke internal combustion engine).
- 1885** Three-wheeled automobile with an internal combustion engine built by Karl Benz of Germany.
- 1898** Dr. Ferdinand Porsche of Germany builds a hybrid car using an internal combustion engine to spin a generator that provided power to electric motors located in the wheel hubs.
- 1903** The Wright brothers pilot the first powered, sustained airplane flight at Kitty Hawk in North Carolina.
- 1908** Henry Ford streamlines automobile assembly line manufacturing and begins mass-producing the Model T.
- 1935** The first manned and un-tethered helicopter flight successfully completed by Frenchmen Louis Bergreut and Rene Dorand.
- 1947** First supersonic jet flights (non-passenger).
- 1964** The first Bullet Train begins passenger service in Japan.
- 1969** First manned space flight to land on the Moon (the Apollo 11 flight).
- 1970** First passenger jumbo jet (Boeing 747) flight.
- 1997** Toyota Prius hybrid cars for sale to the public in Japan.
- 1999** Honda releases the first mass marketed hybrid car in the United States, the four-door Honda Insight.

- 2000** The first four-door, sedan-style, hybrid vehicle available in the United States—the Toyota Prius.
- 2004** The Toyota Prius II won the 2004 Car of the Year Award from Motor Trend magazine and the North American Auto Show. Toyota increases the production of Prius for the U.S. market to 47,000. Interested buyers wait up to six months to purchase a Prius.
- 2004** Ford releases the Ford Escape—the first American hybrid vehicle and the first hybrid SUV.

Student Hand-out #1: Timeline

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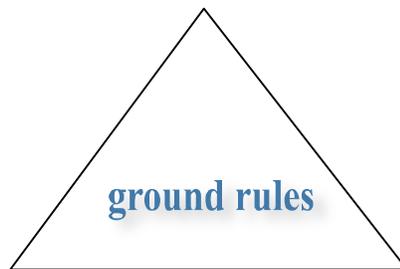
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Student Hand-out #2: Ground Rules for Conversation & Brainstorming

Trust

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- ‡Keep an open mind



Communication

- ‡Speak clearly
- ‡Stay focused
- ‡Answer questions directly and stay on topic
- ‡Wait your turn

Responsibility

- ‡Pay close attention
- ‡Ask informed questions
- ‡Include all group members

Additional Resource: Transportation Slideshow

As part of this curriculum, we have compiled a 2-minute transportation slideshow showing a variety of modern-day modes of transportation. You can find this slideshow on the CD under 'Transportation Slideshow'. This slideshow was created on a Mac, system 10.4 Tiger, in the program IPhoto.

The credits for the slideshow are below.

2-Minute Slide Show Credits

1. Eurostar at Ashford, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=25-06-7
2. Bike riding, London, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-02-32&k=Cycleing
3. Traffic Congestion with trucks, A1 Gateshead Western Bypass, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-292&k=Rush+hour+on+the+A1+Gateshead+Western+Bypass
4. Airplane, Boeing 747, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2051-14-8&k=Boeing+747
5. Scooter Riding, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-12-53&k=Motorbike
6. Barge Piz Boval, Rhine River, Switzerland, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2026-35-8&k=Barge+Piz+Boval%2C+River+Rhine%2C+Basel%2C+Switzerland
7. The Trik, Oslo Norway, Photographer D Jones, SFG
sustainablefutures@hotmail.com
8. Scooters, Kaohsiung Tawain, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
9. Bike Park, London, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-02-36&k=Bicycles
10. Fishing Boats, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2026-31-3
11. Bike Delivery, Norths Bakery, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-02-12&k=Bicycles
12. Coach USA Bus, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2030-01-5&k=Coach+USA+Bus
13. P&O Pride of Le Harve Ferry, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2026-05-6&k=P%26O+Pride+of+Le+Harve+Ferry

14. SMART Car Showroom, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
15. The World Expo in Aichi, Japan, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
16. Yellow School Bus, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2030-02-4&k=Yellow+School+Bus
17. Family hiking in the Eastern Sierra mountains, CA, Photographer D Jones, SFG
sustainablefutures@hotmail.com
18. NY Taxis, Photographer, Ian Britton
www.freefoto.com/preview.jsp?id=21-41-12&k=New+York+City+Taxi+Cabs
19. Sailing River Solent, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2026-22-57&k=Sailing%2C+River+Solent
20. Scooters in Kaohsiung, Taiwan, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
21. Bike Riding, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=21-83-96&k=Cycling
22. Manchester Airport, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=2052-01-1
23. SMART cars on the road in Taiwan, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
24. Tall Ship 2005 Race Newcastle Gateshead, Photographer Ian Britton,
www.freefoto.com/preview.jsp?id=2026-51-34&k=Tall+Ships+2005+Newcastle+Gateshead
25. Scooter riding in Taiwan, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
26. Cycleways in the Netherlands, Hanseroute and Maasroute, Photographer bzh
www.virtualtourist.com/travel/Europe/Netherlands/Provincie_Noord_Holland/Amsterdam-463377/Transportation-Amsterdam-TG-C-1.html
27. Punting The Backs, Cambridge, London, Photographer Ian Britton,
www.freefoto.com/preview.jsp?id=2026-10-52&k=Punting%2C+The+Backs%2C+Cambridge
28. Taiwanese neighborhood, Photographer Harold Glasser, SFG
sustainablefutures@hotmail.com
29. Starlight Amtrak Train Service
www.trainweb.org/amtrakphotos/
30. Airbus 320, Photographer Ian Britton
www.freefoto.com/preview.jsp?id=20-01-1

Lesson 4: 7th grade
Investigating Transportation: A Small Group Research Project
Step 1: Effective Small Group Projects

Lesson Overview: Exploring how transportation has changed over time.

Lesson Concept: People have been transporting materials for many years in many different ways around the world.

Materials:

- Word map from Lesson 1
- Transportation Timeline from Lesson 2
- Student Hand-out #1: 5 Goals
- Student Hand-out #2: Ground Rules for Effective Small Group Projects
- Note-taking journals

Standards

- **English:**
 - **IX.11.MS.1** (Inquiry and Research: Define and investigate important issues and problems using a variety of resources).
- **Science:**
 - **I.1.MS.1** (Construct new Scientific and personal Knowledge: Generate scientific questions about the world based on observation).
 - **II.1.MS.3** (Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge: Show how common themes of science, mathematics, and technology apply in real-world contexts).
- **Social Studies:**
 - **II.5.MS.1** (Geographic Perspective: Describe how social and scientific changes in regions may have global consequences).
 - **IV.2.MS.4** (Economic Perspective: Examine the historical and contemporary role an industry has played and continues to play in a community).
 - **VI.1.MS.3** (Public Discourse and Decision Making: Explain how culture and experiences shape positions that people take on an issue).

Timeline: 2 – 5 class periods (50 - 60 minutes each) depending on available resources within the classroom / school and the students' access to out-of-class research resources

Class Structure: small group project

Assessment Strategy: EEK! Daily Assessment
General Assessment Strategy #1
General Assessment Strategy #3

Lesson 4: 7th grade
Investigating Transportation: A Small Group Research Project
Step 1: Effective Small Group Projects

Lesson Overview: Exploring how transportation has changed over time.

Lesson Concept: People have been transporting materials for many years in many different ways around the world.

Materials:

- Word map from Lesson 1
- Transportation Timeline from Lesson 2
- Student Hand-out #1: 5 Goals
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- Note-taking journals

CLASS EXERCISES:

I. Choosing the Topic

For their research topic, have each small group choose:

- 1 mode of transportation from the word map
and
- 1 time period from the timeline

for example: Bicycles from 1839 to 1979

II. Focusing the Topic

Below are three suggested questions for the small groups to answer and include as a minimum within their research project:

1. How did the mode of transportation change over your selected time period (expanded, decreased, became more efficient or less efficient, became more expensive or less expensive, became more popular or outdated, etc.).
2. How is your chosen mode of transportation being used today or is it obsolete? In what parts of the world is the transportation being used?
3. How do you feel about the mode of transportation? Do you believe it should be increased, decreased, changed, re-designed, etc. in the world today? (Please be persuasive in your answer.)
4. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the beginning of your time period.
5. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the end of your time period.

Effective Small Group Research Projects

Teacher's Note: You may already have effective ground rules established within your classroom for facilitating small group projects. In an attempt to strengthen the students' relationships and to assist teachers in teaching small group skills, we have compiled a few suggestions below to assist your students in successfully navigating working together successfully and respectfully.

I. A Few Goals

One goal of small group projects is to encourage and promote self-regulating behavior in the students and vis-à-vis in the class as a whole. In the best-case scenario, small group work will aid students in improving the following skills:

- How to identify, clarify, explore, and solve problems
- Promote critical thinking skills and maximize learning for all
- Build trusting relationships
- Enable positive teamwork

II. Basic Ground Rules

The following chart has been based on James Bellanca and Robin Fogarty's work on the different phases of social skills. (*Blueprints for Critical Thinking in the Cooperative Classroom*, Skylight Publishing, Inc., 1991, 2nd ed.)

Communication

Listen to your group members
Use a 6" voice
Let all participate
Encourage others

Trust

Respect each others' opinions
Stay with the group
Believe in each others' skills
Keep an open mind

Responsibility

Do your part
Help each other
Include all group members
Stay on task

III. The Research Project

Below are examples of the first steps you might want to take to begin the small group research project. We also suggest specifying the amount of time for each step, or at least checking-in with the groups after a designated amount of time. Providing a designated amount of time can help keep the students focused and 'on track'.

Step 1: Organize the small groups in to 2 – 4 individuals per group

Step 2: Pass out note-taking journals designated for this project (project journals).

- Step 3:** Establish the behavior guidelines—the ground rules. You may want to provide each student with their own copy of the ground rules (student hand-out #2) to secure in their project journal.
- Step 4:** Groups determine their project—1 mode of transportation + 1 time period. (10 minutes)
- Step 5:** Each individual in the group creates their own word map for the chosen topic. (5 minutes)
- Step 6:** The group members share their word maps within their group and create one word map. This will serve as either the outline for their process or as the basis for their outline. (Some students feel more comfortable with a more traditional style of outline). (10 minutes)
- Step 7:** Groups now analyze the collective word map and decide what are the most interesting aspects to everyone for the research project.
- Step 8:** Provide the five Focusing the Topic questions
1. How did the mode of transportation change over your selected time period (expanded, decreased, became more efficient or less efficient, became more expensive or less expensive, became more popular or outdated, etc.).
 2. How is your chosen mode of transportation being used today or is it obsolete? In what parts of the world is the transportation being used?
 3. How do you feel about the mode of transportation? Do you believe it should be increased, decreased, changed, re-designed, etc. in the world today? (Please be persuasive in your answer.)
 4. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the beginning of your time period.
 5. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the end of your time period.
- Step 9:** Groups develop Research Plan
- What—what kinds of research materials do they believe will be necessary & what type of resources are available to the group (books, internet, magazines, encyclopedias, etc.)?
 - Where—where will they find the research materials?
 - Who—who is interested in what part of the chosen topic?
- (10 minutes)
- Step 10:** Groups develop Interaction Plan
- Who will be responsible for what part of the chosen topic?
 - Will some of the parts be researched together?
 - Create a timeline with specific goals at each aspect of the timeline (schedule)
- (10 minutes)

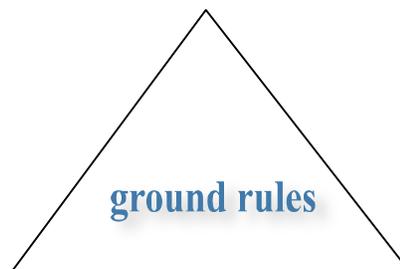
Student Hand-out #1: 5 Goals

1. How did the mode of transportation change over your selected time period (expanded, decreased, became more efficient or less efficient, became more expensive or less expensive, became more popular or outdated, etc.).
2. How is your chosen mode of transportation being used today or is it obsolete? In what parts of the world is the transportation being used?
3. How do you feel about the mode of transportation? Do you believe it should be increased, decreased, changed, re-designed, etc. in the world today? (Please be persuasive in your answer.)
4. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the beginning of your time period.
5. Provide one visual—a drawing, photo, or sculpture—of your chosen mode of transportation at the end of your time period.

Student Hand-out #2: Ground Rules for Effective Small Group Projects

Trust

- ‡Respect each others' opinions
- ‡Stay with the group
- ‡Believe in each others' skills
- ‡Keep an open mind



Communication

- ‡Listen to your group members
- ‡Use a 6" voice
- ‡Let all participate
- ‡Encourage others

Responsibility

- ‡Do your part
- ‡Help each other
- ‡Include all group members
- ‡Stay on task

Lesson 5: 7th grade
Investigating Transportation
Step #2: Small Group Research Project Q & A

Lesson Overview: Exploring how transportation has changed over time.

Lesson Concept: People have been transporting materials for many years in many different ways around the world.

Materials:

- Note-taking journals

Standards

- **Science:**
 - **I.1.MS.1** (Construct new Scientific and personal Knowledge: Generate scientific questions about the world based on observation).
- **Social Studies:**
 - **IV.2.MS.4** (Economic Perspective: Examine the historical and contemporary role an industry has played and continues to play in a community).
 - **VI.1.MS.3** (Public Discourse and Decision Making: Explain how culture and experiences shape positions that people take on an issue).

Timeline: 1 class periods (50 – 60 minutes)

Class Structure: whole class question & answer, and brainstorming session

Assessment Strategy: EEK! Daily Assessment
General Assessment Strategy #1
General Assessment Strategy #3

Lesson 5: 7th grade
Investigating Transportation
Step #2: Small Group Research Project Q & A

Lesson Overview: Exploring how transportation has changed over time.

Lesson Concept: People have been transporting materials for many years in many different ways around the world.

Materials:

- Note-taking journals

CLASS EXERCISES:

I. Discussing Problems

In order to help the students develop and create the most effective and interesting research projects, it is crucial to devote one full class period at some point during the middle of the research project schedule to field questions, challenges, and frustrations. This will help provide a check-in for you and the students, and provide the groups assistance.

The teacher's role within this full class discussion is to act as facilitator, not necessarily as the "one with the answers". This is an opportunity for the groups to ask questions to other groups and begin searching out their classmates to assist in solving problems rather than the teacher.

These problems or questions, though, should be relegated to issues around research questions and not stray into a personal session if group members are having difficulty between one another. Those issues might better be addressed personally with you in a non-public format.

The following are a few examples of questions you might want to ask the groups:

- How is the research going in general?
- Are you having any specific problems—not finding information, etc?
- Are you on schedule?
- Are any groups researching similar topics?
- How may I (the teacher) or others help you?