Title: Road Safety

Description: In this project, students address the problem of traffic accidents in their community. Using the *Seeing Reason Tool*, they investigate cause-and-effect relationships that contribute to the problem and then develop a well-reasoned plan for making the roads safer for all.

At a Glance	
Grade Level:	3-5
Subject:	Social Studies
Topics:	Civics, Statistics, Research
Higher-Order Thinking Skills:	Cause and Effect, Evaluating Evidence, Generalizing
Key Learnings:	Social Responsibility, Data Analysis, Public Safety
Time Needed:	3 weeks, 2-3 hours per week
Background:	This unit is based on a unit developed by a teacher in Israel.

Unit Summary
In this study, students focus on a local problem: traffic accidents in their community. After the teacher sets the stage with compelling news articles about road accidents and statistics, students turn their suppositions about the causes of accidents into research questions. With help of the *Seeing Reason Tool*, they think through the complex factors that influence safety, from congested streets to driving habits to traffic patterns. They study, represent their understanding in causal maps, and ultimately write an "action plan" that makes a case for why accidents occur and how to avoid them. Students develop their action plans into public service presentations that inform the community about the problem and offer ideas for personal actions as well as public policy that will improve road safety.

Curriculum-Framing Questions
- **Essential Question**
How can I understand the world around me?
- **Unit Questions**
How can I use different kinds of data to understand issues in my community?
How can I have a voice in my local government?
- **Content Questions**
What can different kinds of data tell us?
What are the responsibilities of local government?

Assessment Processes

View how a variety of student-centered assessments are used in the Road Safety Unit Plan. These assessments help students and teachers set goals; monitor student progress; provide feedback; assess thinking, processes, performances, products; and reflect on learning throughout the learning cycle.

Instructional Procedures

Prior to Instruction
This unit makes use of the *Seeing Reason Tool*. Before you use *Seeing Reason* with your students:

    -Examine the *Seeing Reason* Web site and familiarize yourself with the tool
    -Set up a project and teams in the teacher workspace
    -Set up a test team and make practice maps to uncover potential directions student mapping might go, and to refine the investigation

Refer to Become Familiar with Seeing Reason for more information on using *Seeing Reason*.

Introduce the Project
Pose the Essential Question: *How can I understand the world around me?* Determine background knowledge by asking students how they get information about their community and what kind of information is the most reliable. Ask who is responsible for making their community safe and how they learn about safety issues in their community. Ask what kind of information is available on the topic and where do they get the information (talking to their parents and friends, observation, and the newspaper). Encourage students to think of as many different kinds of information as they can. Ask them to categorize the kinds of information (personal stories of friends and family, incidents from the news, traffic reports from the newspaper, government statistics).

Place students in small groups and ask them to describe the strengths and weaknesses of each kind of evidence. While students are in small groups make anecdotal observations about their understanding of what makes good evidence. Use this information to plan mini-lessons on evaluating evidence throughout the unit.

With the class, read a [news article from Israel](#) or a local news story about road accidents, and have students discuss their initial assumptions about the problems of road safety. Explain that they are going to be looking at complex events and thinking about their causes keeping in mind that most events have multiple causes, that events can be both effects and causes, and that just because one event happens after another, the first doesn't necessarily cause the second.

Place students in jigsaw groups to generate factors to be used in their causal maps. In the first phase of the jigsaw, each group is given one main factor (human factors, road factors, or driving condition factors). They will use Post-its* to brainstorm concrete examples contributing to their main factor. Next, they will categorize and generalize their examples into categories for their causal maps. Use the [Support for Causal Mapping](#) checklist to provide feedback and prompting to students during this activity. In the final phase of the jigsaw, representatives from each main factor group will meet with their teams to combine all three main factors into the team's causal map.

Use the Seeing Reason Tool
Collect their thinking and demonstrate the *Seeing Reason Tool* by having students contribute factors to a map you build that reflects on the Unit Question: *What causes our roads to be unsafe?* As students offer ideas, show them how to organize and describe factors relating to the problem. Help students explore the complexities of the topic and guide the discussion to address human, road, and driving condition factors. These might include:

> **Human factors:** Driver inexperience, older drivers, driver distraction, impaired driving, speeding, failing to stop at signals
> **Road factors:** Surfaces, number of lanes, pedestrian and bicycle access, intersections, signage, and straightness
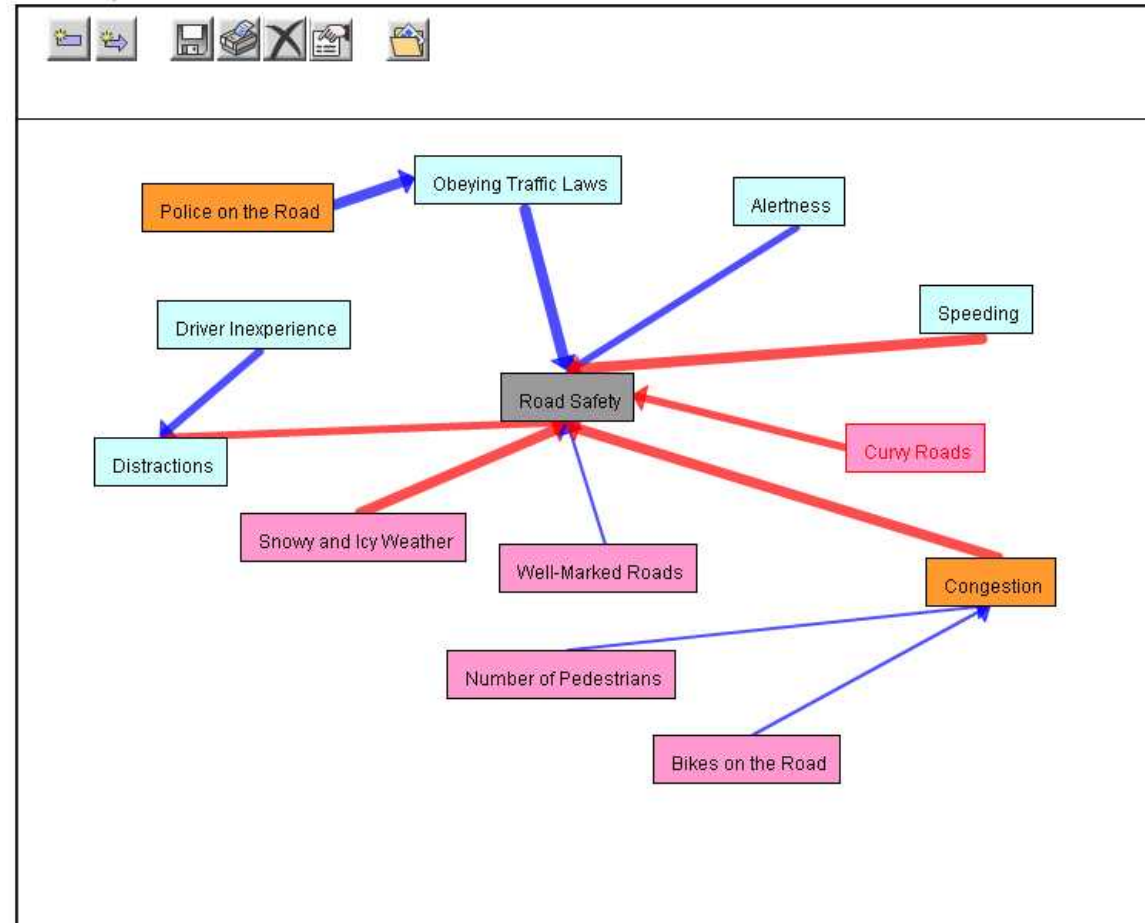> **Driving condition factors:** Time of day, congestion, weather, conditions of vehicles, types of vehicles on the roads, speed limits, and police patrols

As students are working on their maps, provide feedback on their cause-and-effect thinking: Are they seeing multiple causes and effects? Are they interpreting connecting events correctly? Provide individual and group feedback or conduct a whole-class mini-lesson, if necessary.

Most recent map for: Sample
Project Name: Road Safety
Research Question: What causes roads to be unsafe?

Plan for Research
Ask the Content Question: *How do citizens have input into local government decisions?* Review local government structure and ask the Unit Question: *How can I have a voice in my local government?*

Explain that student teams are going to study different factors more deeply and then develop a plan of action for safer roads in their community. This will take the form of a short paper and associated presentation. Have students meet in teams of two or three to discuss and identify topics they would like to study. Have them determine the audience for their analysis and recommendations. If a group picks "speeding" as an important factor to study, a likely audience would be drivers. If they choose road conditions such as "congestion," their audience might be a city planning commission. (Try to get two teams to study the same problem. After initial research, they combine into one team to synthesize their research into a final report and presentation.) To set the stage for the next activity, have small groups share the problem they want to study.

Define Research Questions
Refer to the steps below to explain and discuss the process for turning problem statements into research questions. Then have teams submit a research plan for your input and approval.
1) Define a factor in measurable terms. Examples: Speeding is driving at a rate that's over the legal limit.

2) Pose a research question that can be quantified. Example: *How many accidents are attributed to speeding each year? Why do people speed?*
3) Plan to address questions in these two ways:
   a) Find reputable sources. *Which sources are likely to have this type of information?* For example, to answer, *How many accidents are attributed to speeding each year?*, students might meet with a representative from the local police department and look at department of transportation statistics on a Web site. Encourage students to get information from a variety of kinds of sources.
   b) Collect original data to answer the question. For example, to answer, *Why do people speed?*, students could survey drivers they know. To learn, how many bicycles are there on Kaplan Street, they could collect data at different times during the day.

Conduct a lesson on collecting reliable data, addressing topics such as the importance of accuracy in measurements, keeping careful records, the identification of variables, and the uniform use of tools by different group members.
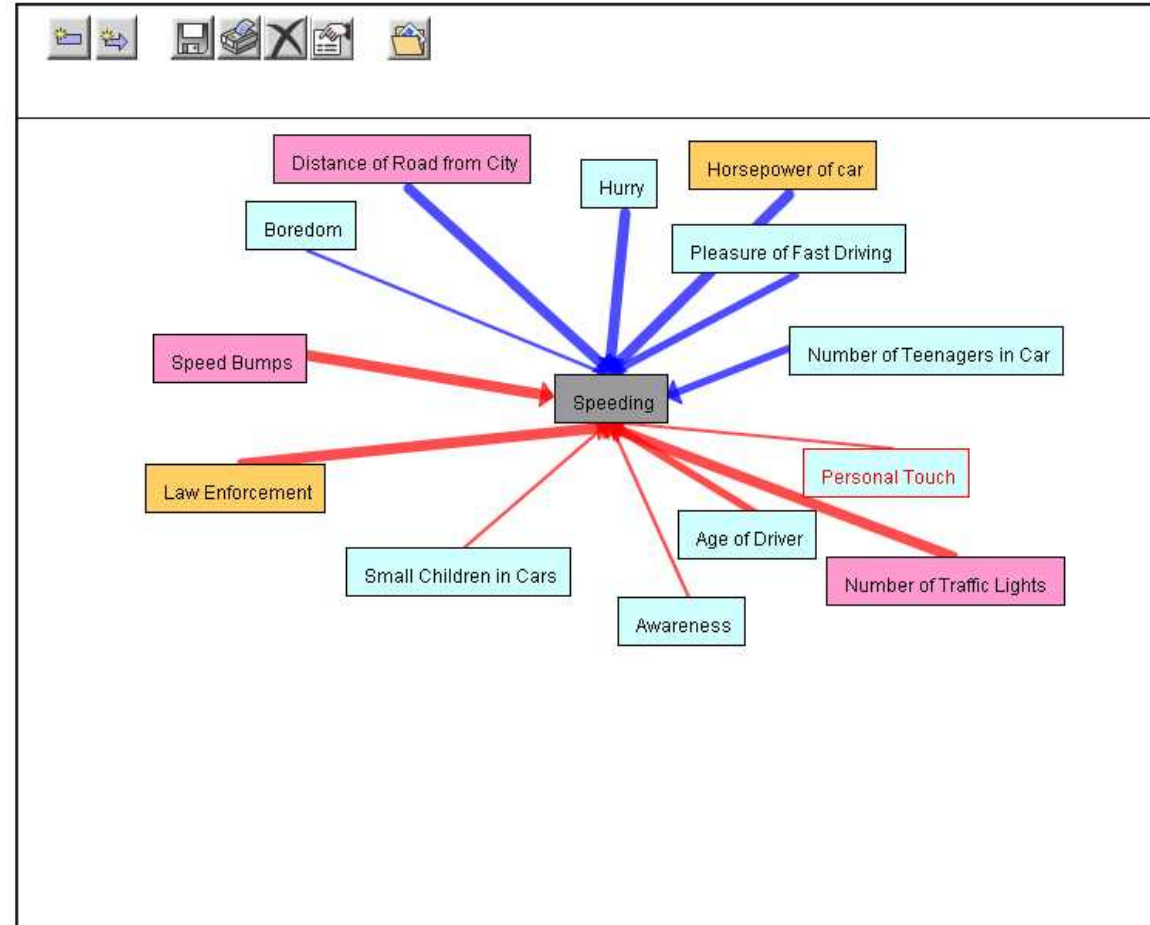
Dig Into Research
After you have approved students' research plans, have them study their questions using human and print resources, systematic field observations, and a set of online information resources. Have students record their data in a spreadsheet, separating statistical data from anecdotal data.

As they discuss, read, interview, and conduct field observations, students will start to make sense of the complex factors that influence (increase and decrease) road accidents by identifying patterns within their data. Have them organize their growing understanding in a team causal map. Recommend that they explain and justify their reasoning by supplying quotations, numerical data, and source citations in the factor and relationship description fields. Encourage students to add to and modify their maps as understanding grows and their thinking changes. View the changing maps to gauge research progress. Student work should show both clear understanding of the problem and reasonable solutions. Guide students as they study and map, and use the "comments" feature of the tool to review and comment on their work during off hours. See one team's map on speeding and road safety here.

Most recent map for: Sample 2
Project Name: Speeding
Research Question: What causes roads to be unsafe?

Team Plan of Action
After completing their research, teams that studied the same topic combine into one team to share their research, draw conclusions, and develop a plan of action. Pose the Unit Question: *How can I have a voice in my local government?* Have students generate some possible audiences for their plan of action. Ask each group to choose a specific audience for their presentation.

Ask the Content Question: *What can statistical and anecdotal data tell us?* Conduct a lesson on analyzing statistical and anecdotal data, comparing means and medians, finding commonalities, looking for trends, and identifying outliers. Model drawing reasonable conclusions from data.

Use this example of one team's plan of action and this list of elements to establish requirements for the paper.
- Statement of the problem
- Research and data collection methods and representation of the data
- Representation of the data in graphs or causal maps
- Reasoned analysis of the problem that reflects the research
- Recommendation
- Justification for one recommendation over others
- Practical steps for carrying out their plan

Presentation
Set aside several days for students to plan a culminating public service event, where students present their proposals to classmates and interested members of the community. Give students the project rubric to refer to as they prepare their presentations and papers. Show students an example presentation to model expectations. Have students use plans of action, maps, and other products of their research effort (photos, graphs, taped interviews) to support their recommended course of action. While students are working on their plans, conduct group conferences to determine progress and understanding of cause-and-effect thinking and data analysis. Provide additional instruction and support when needed.

Individual Essay
After students have presented and learned from each other's presentations, assess individuals for general understanding by assigning a one-page essay. Have students write in response to the Essential and Unit Questions: *How can I understand the world around me?* and *How can I use different kinds of data to understand issues in my community?*

Prerequisite Skills
- Proficiency with conducting simple mathematical operations in spreadsheets
- Creating charts and graphs from data

Differentiated Instruction
Resource Student
- Give students with special needs additional assistance and task modifications as needed.
- Allow the students to use compensatory skills to complete assignments, such as oral interview instead of final essay.
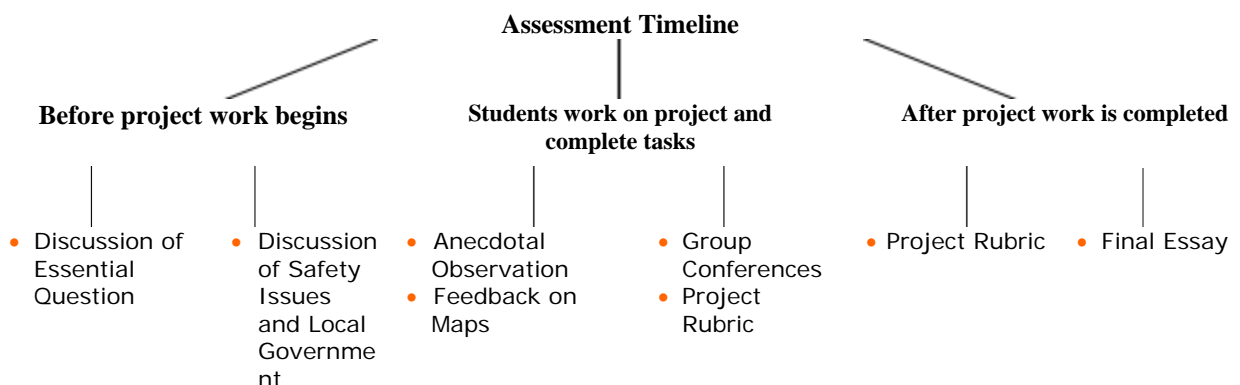
Gifted Student
- Consider extensions to the unit, such as comparing statistics from similar locations, writing an opinion piece for the local paper, building a model of an improved road system, or producing a video or audio public service announcement.

English Language Learner (ELL)
- Prepare all students to interact positively with English Language Learners in small groups by encouraging them to participate with whatever English they have.
- Ask the ELL teacher to support instruction by translating topical terms into an English/native language glossary, explaining difficult concepts, and helping students complete assignments and conduct research.
- Allow students to do research in their native language.

Things You Need (highlight box)

Assessment Plan

Assessment Timeline

Before project work begins	Students work on project and complete tasks	After project work is completed
• Discussion of Essential Question • Discussion of Safety Issues and Local Government	• Anecdotal Observation • Feedback on Maps • Group Conferences • Project Rubric	• Project Rubric • Final Essay

Discussions are used frequently during the unit to gauge students' background knowledge and understanding of the concepts in the unit. While students are working on their maps, teachers use the Generalizing Checklist to help students categorize and generalize their ideas. Teachers collect observational evidence of students' understanding of quality evidence and use this information to plan mini-lessons addressing student needs during the research phase of the project. Student groups meet with the teacher for feedback while they are developing their action plans, papers, and presentations. A project rubric helps students create their final presentations and papers and is used to assess the final product.

Student Objectives/Learning Outcomes:
Students will:
- Investigate and represent complex systems of cause and effect
- Collect, organize, display, and evaluate data to identify local problems
- Collect and organize information from multiple sources
- Synthesize research findings to devise credible solutions
- Classify information, analyze data, and evaluate what data are relevant to the problem
- Summarize findings, reach conclusions, and make decisions based on visual displays of data
- Persuade others of the validity of their position

Targeted Oregon Content Standards/Benchmarks:
Social Sciences
- Identify public safety, transportation, education, and recreation as responsibilities of local governments
- Understand how citizens can learn about public issues.
- Identify and give examples of how individuals can influence the actions of government.
Mathematics
- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
English/Language Arts
- Write research reports about ideas, issues, or events
National Educational Technology Standards (NETS)
  Performance Indicators for Technology-Literate Students
- Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum.
- Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom.

Materials and Resources

Internet Resources
Israel sites
- Sites for Memorial Stories, Road Accident Statistics, and Recommendations for Prevention Anashim Be'adom for Safe Roads in Israel
http://www.anashimbeadom.org.il/aba/Section.aspx?Name=Personal+Stories*
First-hand accounts from the war on road crashes by a volunteer traffic policewoman
- Betts Injury Prevention Project, Hebrew University-Hadassah School of Public Health and Community Medicine, Jerusalem, Israel
www.md.huji.ac.il/depts/occenvmed/2000before.html*
A proposal that lists several methods for reducing accidents and predicts the lives that will be saved by their implementation

- Israel Central Bureau of Statistics (search)
http://www.cbs.gov.il/lmsrce.cgi?p=!srch&r=0&f=3&o=0http://www.cbs.gov.il/lmsrce.cgi?p=!srch&r=0&f=3&o=0www.cbs.gov.il/lmsrce.cgi?p=!srch&r=0&f=3&o=0*
A searchable database of statistical information, including data related to traffic accidents
- Traffic Department, State of Israel: Accident Statistics
http://www.police.gov.il/english/AboutUs/Structure/04_en_traffic.asphttp://www.police.gov.il/english/AboutUs/Structure/04_en_traffic.asp*
http://www.police.gov.il/english/Traffic/Facts_Figures/01_en_tr_4_accidents.asphttp://www.police.gov.il/english/Traffic/Facts_Figures/01_en_tr_4_accidents.asp*
An informational site produced by the Israel police with statistics about road safety

United States sites
- Car-Accidents.com
www.car-accidents.com/pages/stats.htmlwww.car-accidents.com/pages/stats.html*
Sites with statistics on accidents, injuries, restraint and airbag use
- International Injury and Fatality Statistics
www.safecarguide.com/exp/statistics/statistics.htm*
Compare problems different countries have to put our own in perspective
- National Highway Safety Administration's Safety City
www.nhtsa.dot.gov/kids/ *
Vince and Larry, NHTSA's crash test dummies, are tour guides for Safety City, Cyberstudio, a Challenge Quiz, and more
- Traffic Calming for Communities: US Department of Transportation: Federal Highway Administration
www.ite.org/traffic/tcresources.htm*
Neighborhood traffic management programs around the U.S.
- US Department of Transportation: Federal Highway Administration
http://safety.fhwa.dot.gov/*
Many national statistics about accidents, can search by locale
- US Department of Transportation: Federal Highway Administration
www.fhwa.dot.gov/webstate.htm*
List of links to state departments of transportation

Other Resources

Technology – Hardware

- Computer(s) for conducting research and creating papers and presentations
- Printer for revising and disseminating products
- Projector for sharing *Seeing Reason Tool*

Technology – Software

- Database/spreadsheet for collecting and analyzing data
- Encyclopedia on CD-ROM for conducting research
- Internet Web browser for conducting research
- Multimedia presentation software for creating presentations
- Word Processing for writing papers

Credits: Two teachers in Israel and Oregon worked together to develop this unit plan. This classroom project was featured in An Innovation Odyssey, a collection of stories of technology in the classroom, Story 275: Mapping the Road to Safety.