

## Web Unit Plan

**Title:** Red Light, Green Light

**Description:** A car accident in a school neighborhood motivates students, parents, and community members to campaign for improved street safety. Students collect, represent, and analyze traffic data in the area around their school, and they think of ways to make everyone safer.

### At a Glance

**Grade Level:** 3–5

**Subject sort (for Web site index):** Social Studies

**Subjects:** Social Studies, Science, Math, Technology

**Topics:** Safety, Government, Geography

**Higher-Order Thinking Skills:** Data Analysis, Data Interpretation

**Key Learnings:** Data Collection, Organization and Analysis, Persuasive Speaking

**Time Needed:** 10–12 weeks, 1 period daily during the first week, then 2 or 3 periods each week thereafter

**Background:** Colorado, United States

### Unit Summary

After a car and pedestrian accident occurs near the local school, concerned students, parents, and neighbors launch a neighborhood safety project. Students consider potential hazards and then collect traffic and pedestrian data that might shed light on the situation. A survey is conducted to determine how children in the neighborhood travel between home and school, and students challenge their classmates to increase their use of human-powered (foot and pedal) transportation. Students use spreadsheets to enter and represent data, analyze their observations and survey data to determine the most significant problems, and study possible solutions. They develop a proposal for improving traffic safety, create slideshows and brochures, and present their ideas to the local city council.

### Curriculum-Framing Questions

- **Essential Question**  
How can we communicate so we will be heard and understood?
- **Unit Questions**  
How safe is our school neighborhood?  
How can we improve the safety of our school neighborhood?
- **Content Questions**  
What factors influence street safety?  
How do decisions get made in our community?  
What safety measures are in place in our neighborhood?

### Assessment Processes

View how a variety of student-centered [assessments](#) are used in the Red Light, Green Light Unit Plan. These assessments help students and teachers set goals; monitor student progress; provide feedback; assess thinking, processes, performances, and products; and reflect on learning throughout the learning cycle.

## Instructional Procedures

### Consider the Problem

Begin this project by introducing a scenario involving an accident that occurred near the school. Hold a discussion with the class and ask them to consider the following questions:

- *Could the accident have been avoided? If so, how?*
- *What other hazards should we be aware of?*
- *What measures are already in place to help prevent accidents and alert drivers and pedestrians?*

Record ideas and answers on a piece of chart paper. Use student contributions to determine students' prior knowledge about safety and the kinds of evidence they use to support their opinions.

After discussing solutions and recording ideas, pose the Essential Question, *How can we communicate so we will be heard and understood?* Engage students in a Think-Pair-Share to brainstorm ideas. Take observational anecdotal notes as students share their thoughts to provide ideas for areas to address during instruction.

Go for a walk in the neighborhood, and take copies of a map of the immediate area. Ask students to think about the question, *How safe is our school neighborhood?* Have students label safety measures they recognize on their maps. (Keep the maps; students will repeat this activity after instruction.)

Have students meet with members of the parent-teacher association or local school advisory committee to discuss their concerns about safety and to ask for their help when it is time to collect data in the neighborhood. If possible, invite a transportation specialist to discuss the topic. The [Federal Highway Administration](#)\* Web site can guide you as you help students plan the safety investigation.

### Pedestrian and Bicycle Safety

Students are at least partially at fault in 70 percent of accidents in school zones. Ask students to write in their journals about how they stay safe when they walk and ride their bikes around the neighborhood. Use this information to plan basic lessons students need related to street safety for pedestrians and bicyclists. Local public safety departments often provide useful lesson plan suggestions and materials.

### Citizens Respond

Discuss the ways citizens can have an impact on their community through elections, citizen advisory boards, volunteer campaigns, and public hearings. Ask students what they might do to make their neighborhood safer for pedestrians and bicyclists, and then propose the idea of a street safety study. (Note: Some cities have research packets citizens can use to monitor traffic and street safety in their neighborhood.) Before the study is designed and implemented, determine the audience for the resulting proposal. Challenge students to find out how decisions related to traffic and street safety are made. They can ask parents, make phone calls, look in a city directory, or check the government agency index in the phone book. Depending on the locale, a city council, county commissioner, city manager, or transportation administrator may be the appropriate party to contact. Another audience is the

school student body, parents, and neighbors who are also responsible for street safety.

### Design the Study

Set small student groups to work considering the following question set:

- *What is one possible cause of unsafe streets?*
- *Given this possible cause, what should we look for?*
- *What should we count or measure?*

For example:

- *Possible cause?* Pedestrians cross streets at places other than marked crosswalks.
- *What to look for?* Pedestrians crossing streets outside of crosswalks.
- *What to count or measure?* The number of pedestrians who use crosswalks and the number of pedestrians who do not.

Groups may ask and answer the set of questions repeatedly for each safety concern they have. After ideas are generated, have teams present their ideas and discuss their reasoning. Elaborate on the best ideas, and offer ideas that were not raised. (Note: The most common problems in school zones are excessive speeding; general traffic volume; congestion at peak hours when buses, cars, bicycles, and pedestrians share space; and unsafe pedestrian and bicyclist practices.) From these ideas, make a recording tool, such as this [street safety research sheet](#) to collect information.

### Observe, Measure, and Count

Divide the questions among groups of three or four and arrange for observations in the neighborhood for several days during peak congestion periods, such as before and after school, and following sports practice or games. Help teams gather necessary items for the observations, such as data sheets, clipboards, golf counters, measuring tapes, and digital cameras. If possible, borrow a speed gun from the high school baseball team or local traffic or public safety department. Station adult volunteers with each group at crosswalks and other points where data will be collected.

In addition to studying the situation outdoors, help students create a [family survey](#) to determine how kids travel between home and school. Include a question about how far each family lives from school as well. Distribute the take-home survey to all classrooms. Ask students to use the [data rubric](#) to self-assess their data collection and record-keeping.

### Organize and Summarize Data using a Spreadsheet

Demonstrate ways research results can be more easily understood through charts and graphs. Demonstrate two [traffic charts](#) of traffic volume, and discuss their interpretation. Discuss what they show as well as what they *do not* show.

Introduce students to the spreadsheet as a tool for organizing, representing, and analyzing their traffic studies and family survey data. Using a projector, provide students with a spreadsheet tour—show them how to:

- Create a new worksheet
- Add a title
- Enter headings and data

- Create charts

Provide students with a copy of the [spreadsheet worksheet](#) to aid them in creating their own spreadsheets, charts, and graphs using data collected from their traffic studies and family surveys. When the charts and graphs are complete, have students practice interpreting their charts and graphs with one another.

### Draw Conclusions

Guide students in the next phase as they draw conclusions from the data. Some data will be interesting but not lead to conclusions about safety or, subsequently, to a proposal. Ask students to self-assess their data interpretation with the [data rubric](#). Record conclusions on posters, and include the data and charts that support the conclusions.

Introduce students to traffic-calming devices as one method for improving safety. Pass out pictures of different devices and have small groups consider the purpose of each. When they return to the large group, explain the actual names and functions of the devices.

Have the class take another walk around the school neighborhood with their maps to see what safety measures students recognize after instruction. These may include signs showing speed limits, pedestrian zones, and parking regulations; yellow paint marking no-parking zones; calming devices, such as speed bumps and street narrowing; lighting at intersections; clear crosswalk zones; and so on. Create a large-scale map with all the traffic features labeled. Based on class discussion, add suggested changes to the map in a different color.

### Plan a Proposal

Pose the Unit Question, *How can we improve the safety of our school neighborhood?* Discuss practical solutions to the safety problems the class has identified. These may include greater speed limit enforcement; reduced vehicle congestion through more walking, bicycling, and carpooling; improved signage and lighting in the neighborhood; crosswalk monitors; traffic-calming devices; rerouted traffic; car-free zones at certain hours; a new parking or drop-off plan; and staggered arrival and departure times.

Set groups to work writing a one-page paper detailing a specific aspect of the project. Each group's paper should include answers to the Essential, Unit, and Content Questions. Ask students to refer to the [data rubric](#) as they write their paper. The paper should also include the following elements:

- One research question
- Data collection methods
- Summary of the data with graphics
- Conclusions
- Proposal for improved safety

Have groups present their reports to others for discussion and feedback before they submit them as part of the greater class proposal.

### Persuade Your Audience

Pose the Essential Question again, *How can we communicate so we will be heard and understood?* Ask students to consider whether they have answered this question and how they will address it in a slideshow presentation. Have student groups summarize

their efforts in several multimedia slides using information from their reports and the [presentation checklist](#) to guide their work. Combine each set of slides into a larger presentation for students and parents, or for the city council or other responsible governmental body. View an example of [one team's work](#).

### Let Others Know

To enhance awareness of traffic safety for the school community and neighborhood, have students create brochures alerting people to potential hazards and reminding them of the safety rules for vehicles and pedestrians. The brochure might present a school-wide challenge where students track their human-powered mileage between home and school, and try for month-to-month improvement. A [brochure checklist](#) may be used as a student guide. Send the [brochures](#) home to share with parents. Distribute them to local businesses, and at community and school meetings.

### Show What You Know

Use the rubrics in the assessment section to assess student products and participation. Additionally, you may want to assess student learning by asking them to write about the unique question, *What steps could you take if graffiti was a problem at the park near your house?* Encourage students to reflect on what they learned in the unit by analyzing their conclusions to the following Unit and Content Questions:

- *How safe is our school neighborhood?*
- *How can we improve the safety of our school neighborhood?*
- *How do decisions get made in our community?*
- *What safety measures are in place in our neighborhood?*

Finally, have students respond in their journals to the Essential Question, *How can we communicate so we will be heard and understood?* in relation to this new situational question.

### Prerequisite Skills

- Students may need mini-lessons on spreadsheet and multimedia use.
- Prior experience with word processing, file management, and Internet researching is helpful.

### Differentiated Instruction

#### Resource Student

- Provide additional adult assistance
- Allow extra work time
- Make task modifications as needed

#### Gifted Student

- Have the student serve as an expert in areas such as reading, writing, and technology use
- Encourage the student to create a class Web site to highlight key learnings, student work, observations, charts, solutions, interviews, and other relevant information

#### English Language Learner (ELL)

- Ask the ELL teacher to support instruction

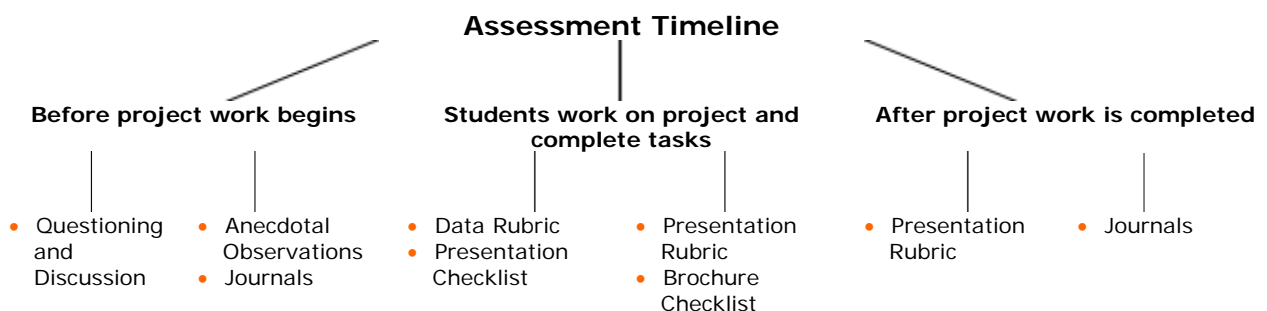
- Ask the ELL teacher to help students translate basic terms into an English/first language glossary, explain difficult concepts, and help the student complete assignments and conduct research
- Pair the student with other common first language speakers who have greater English proficiency for tasks that require reading and writing
- Adapt assignments
- Allow more time as necessary

### Credits

A teacher participating in the Intel® Teach Program developed this idea for a classroom project. A team of teachers expanded the plan into the example you see here.

### THINGS YOU NEED (highlight box)

#### Assessment Plan



Conduct a whole-class discussion on safety around the school to determine students' prior knowledge on the subject and also to ascertain how students use data to form their opinions. Take anecdotal observations while students share their ideas about the Essential Question with a partner to determine areas to address in future instruction. Collect data about individual students' thoughts about bicycle and pedestrian safety from a journal entry completed during the beginning phase of the unit.

While students plan, carry out their data collection, and interpret their results, have them use the [data rubric](#) to self-assess their processes. As students create their presentations, ask them to use the [presentation checklist](#) to manage their time and make sure they have met all the requirements. Have students use the [presentation rubric](#) to ensure that their work meets the expected quality standards. When students create brochures to inform the community about safety issues, they use the [brochure checklist](#) to monitor their work.

When the presentation is in its final form, use the [presentation rubric](#) to assess the quality of the project. Finally, ask students to summarize their learning in their journals to determine what important topics need to be dealt with in future units.

### Targeted Content Standards and Benchmarks

Targeted Oregon Content Standards and Benchmarks

**Social Sciences: Geography (Benchmark 2, Grade 5)**

- Define basic geography vocabulary such as concepts of location, direction, distance, scale, movement, and region using appropriate words and diagrams
- Know and use basic map elements to answer geographic questions or display geographic information
- Examine and understand how to prepare maps, charts, and other visual representations to locate places and interpret geographic information
- Understand how physical environments are affected by human activities

**Social Sciences: Civics and Government (Benchmark 2, Grade 5)**

- Understand how citizens can learn about public issues
- Identify and give examples of how individuals can influence the actions of government

**Social Sciences: Analysis (Benchmark 2, Grade 5)**

- Examine an event, issue, or problem through inquiry and research
- Gather, use, and document information from multiple sources (such as print, electronic, human, primary, secondary)

**Math: Statistics and Probability (Benchmark 2, Grade 5)**

- Collect, organize, display, and analyze data using number lines, bar graphs, line graphs, circle graphs, stem and leaf plots, and histograms
- Formulate and carry out simple experiments and simulations. Collect and analyze data using measures of central tendency
- Make predictions using experimental probability
- Express probabilities using fractions, ratios, and decimals
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**National Educational Technology Standards (NETS)**

Performance Indicators for Technology Literate Students (Grades 3-5)

Prior to completion of grade 5, students will:

- Use technology tools (such as 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
- Determine which technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems
- Use technology resources (such as calculators, data collection probes, videos, educational software) for problem solving, self-directed learning, and extended learning activities

**Student Objectives**

Students will be able to:

- Learn how communities make decisions
- Gather data to identify traffic issues and problems in the neighborhood
- Explore cause and effect
- Formulate questions
- Collect and organize information from multiple sources
- Classify information, analyze data, and evaluate when data is relevant to a problem
- Summarize findings, reach conclusions, and make decisions based on visual displays of data
- Propose a solution to the problem and present the proposal in an effective way

## Materials and Resources

### Supplies

- Basic art supplies

### Internet Resources

- About.com: Cities, Urban Geography, and Transportation Geography  
<http://geography.about.com/cs/citiestransport/index.htm?once=true>\*  
Studies urban and transportation geography where you live
- National Geographic Map Machine  
<http://plasma.nationalgeographic.com/mapmachine>\*  
National Geographic's offering of an online atlas
- Portland Transportation Traffic Calming Site  
[www.trans.ci.portland.or.us/trafficcalming/default.htm](http://www.trans.ci.portland.or.us/trafficcalming/default.htm)\*  
City of Portland's description of its Traffic Calming Programs along with descriptions of other safety devices
- Federal Highway Administration  
[www.ite.org/traffic/tcresources.htm](http://www.ite.org/traffic/tcresources.htm)\*  
Links to traffic programs in several cities and counties

### Technology—Hardware

- Computer(s) for conducting research and creating projects and presentations
- Digital camera for taking pictures of neighborhoods for presentations and brochures
- Internet connection for conducting research and creating presentations
- Printer for printing documents
- Projection system for lessons
- Scanner to scan images for student presentations
- Stopwatches for traffic observations

### Technology—Software

- Database or spreadsheet for collecting and charting data gathered from traffic observations
- Desktop publishing for creating documents and presentations about traffic safety
- E-mail for gathering information from city council members and other officials regarding how decisions are made in the community
- Encyclopedia on CD-ROM for instructional lessons and basic knowledge definitions
- Image processing for processing digital pictures for presentations and downloading Web sites
- Internet Web browser for accessing the Internet for researching and instructional lessons
- Multimedia for presentations about safety issues
- Word processing for creating informational documents for presentations and daily assignments