



Grades 3 - 5

# Safe Routes to School Lesson Guide

*Walking/Bicycling Traffic Safety Education  
Aligned with Ohio Academic Content Standards*

5  
Ready-Made Lessons

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OHIO DEPARTMENT OF  
TRANSPORTATION



# Lesson 1

## Getting There Safely: It's Your Responsibility Too! *Grades 3 - 5*

### Safety Focus



Students take personal responsibility for being safe in how they get to and from school. This includes learning safety rules and tips to instill a stronger understanding of the many factors that contribute to Safe Routes to School.

Visit [everymove.ohio.gov](http://everymove.ohio.gov) for electronic versions of this and the other Safe Routes to School Lesson Guides published by the Ohio Department of Transportation (ODOT).



- Grades K – 2
- Grades 6 – 8



## Curricular Connections: Grades 3-5

Grade 3	Grade 4	Grade 5
Writing – Common Core State Standard	Writing – Common Core State Standard	Writing – Common Core State Standard
<b>Text Types and Purposes</b>	<b>Text Types and Purposes</b>	<b>Text Types and Purposes</b>
3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
Speaking & Listening – Common Core State Standard	Speaking & Listening – Common Core State Standard	Speaking & Listening – Common Core State Standard
<b>Presentation of Knowledge and Ideas</b>	<b>Presentation of Knowledge and Ideas</b>	<b>Presentation of Knowledge and Ideas</b>
4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.	4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

## Related Vocabulary

- **PSA (Public Service Announcement)** – A type of message featured on television, radio, print or other media that is usually aired at no charge in order to raise awareness of a social issue.

## Student Worksheets

These are designed to copy and use in class.

Attachments
A – Four Corners
B – Safety Message Tips
C – PSA Planning Page
D – PSA Storyboard
E – PSA Presentation Rubric

## Procedure

### ➔ Day 1: (40 minutes)

1. **Watch the video "Safe Out the Door"** performed by the All-Ohio Show Choir. <http://www.dot.state.oh.us/groups/EveryMove/SRTS/Pages/Safe-Out-The-Door-Video.aspx> or <http://www.youtube.com/watch?v=qPMcEBIqVWo>

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2. **Discuss the meaning of a PSA** (Public Service Announcement) with students. Have them share other PSAs that they might have seen on TV or heard on the radio. (Examples could include "Click It or Ticket" for seatbelt safety, "Arrive Alive" to promote safe driving, etc.).

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3. **Ask students:**
  - **What do PSAs have in common?** (Fun, entertaining, disturbing, informational, include attention grabbers, emotional connection to audience, fast paced)
  - **How do they try to get the message across?** (Positive messages, or messages to inform people of hazards)
  - **What is a typical length of a PSA?** (Short; like a 30 second commercial or radio ad)

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4. **Using the cards on Attachment A – Four Corners**, cut apart and place one card in each corner of the room. Have students move to the corner of the room that shows how they get to school. (Walking, biking, bus rider or car rider). Give them five minutes to talk about safety experiences they have had while on their way to/from school.

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5. **Have students divide into smaller groups of 3 to 4 students/group.** (This will be the group that they develop a PSA with, dealing specifically with how they get to school).



### Materials Needed

- Online access to watch Safety Video
- Copies of Lesson Attachments
- Optional: access to video creation software and equipment (iMovie, Windows Movie Maker, video camera) and/or online access for comic strip design

*Day 1 continued on the next page...*

## Procedure

Day 1 continued...

6. **Cut out the cards from Attachment B - Safety Message Tips**, and give each group the appropriate card. This will help focus their safety messages based on their mode of transportation to school.

7. **Explain to students that they will be creating a PSA** to give information on being safe on the way to and from school. Distribute the **PSA Planning Page (Attachment C)**. Groups need to select 2 to 3 key messages to include in the PSA that they design. They should record this on their planning page and turn it in.

### ➡ Day 2 – 3: (40 minutes each day)

8. **Distribute the Planning Pages back to the groups** and have them continue planning their PSA using the **Storyboard (Attachment D)**. During this time, they should gather more information about their message and begin to think about what to include in their PSA.

### ➡ Day 4 – 5: (40 minutes each day)

9. Students should complete the storyboard for their PSA and practice timing it. Each PSA should be no more than 30 seconds in length. During this time, encourage students to be creative and focus on safety when creating the message.

### ➡ Day 6: (40 minutes)

10. **Share your PSAs!** Have students share their PSA with their class and/or another class. They can do this "live," or if they have a recorded version, they can play it as well. The **PSA Presentation Rubric (Attachment E)** may be used as an assessment.



#### Teacher Tip

Once you collect the pre-planning page, use it to get a sense of the group's direction.

Students may want to use additional resources to research their topic before they create a PSA. Provide feedback on their planning page to help groups think about key messages.



#### Teacher Tip

If you are having students create a PSA using iMovie or other video creation tool, you will need to add time in the lesson to complete that task. It's a great way to incorporate technology and allow students to be creative!

## Extend

- Have students create videos using iMovie or a video camera. These can be broadcast for the school as well.
- Bring in a speaker from the local newspaper, TV, radio station or from your district to talk about PSAs and their role in promoting community messages.
- Students can play an interactive PowerPoint game online called the **Safe Routes to School Game Show**. It's available on the everymove website.



[www.everymove.ohio.gov](http://www.everymove.ohio.gov)

## Assessment

This lesson is designed to provide the students with an opportunity to work with a group to create and present a real world media project. Use the attached **Rubric (Attachment E)** to score the PSA presentations. If you are using video creation software, you may want to think about adding a section to the Rubric. Students should focus on getting the message across in their PSA.

## Additional Resources



### Technology Connections

Have students create a comic strip using the following URL to promote their safety message. They can add characters, dialogue, and print their comic strip.

<http://www.readwritethink.org/files/resources/interactives/comic/index.html>

## Related Careers

Invite your students to brainstorm all the potential careers related to this lesson.

- Advertising Copywriter
- Broadcast Producer
- Commercial Director
- Graphic Designer
- Law Enforcement Officer
- Lawyer
- Public Relations Specialist
- Safety Inspector
- Teacher

## Attachment A – Four Corners

Bike Rider



Walker



Car Rider



Bus Rider



## Attachment B – Safety Message Tips

Bicycling Safety Tips	Walking Safety Tips
<ul style="list-style-type: none"> <li>• Wear a helmet every time you ride a bike.</li> <li>• Tie your shoes, secure long laces and loose pant legs so that they don't get caught in wheel spokes.</li> <li>• Follow all traffic laws in your community.</li> <li>• Walk, don't ride, your bike across busy intersections.</li> <li>• Pay attention to your surroundings. Watch for other vehicles and hazards, such as potholes and parked cars that may start moving.</li> <li>• Ride out of the "door zone" of parked cars. Ride three feet or more away from parked cars to avoid doors, which might open unexpectedly.</li> </ul>	<ul style="list-style-type: none"> <li>• Use sidewalks and paths. If you have to walk in the road, walk as far from the motor vehicles as possible, facing oncoming traffic.</li> <li>• Be visible by wearing bright clothing in the daytime or reflective clothing at night.</li> <li>• Choose the route with the fewest streets to cross. Avoid crossing busy streets when possible.</li> <li>• Pay attention to traffic sights and sounds. Do not listen to loud music when walking to and from school.</li> <li>• Walk together.</li> <li>• Before crossing, always look for motor vehicles.</li> </ul>
Car Riding Tips	Bus Safety Tips
<ul style="list-style-type: none"> <li>• Whenever you ride in a car, wear your seatbelt.</li> <li>• Be sure a car is stopped before getting out.</li> <li>• Talk quietly (so the driver will not be distracted).</li> <li>• Don't put your arms, hands, head or legs out of the window.</li> <li>• Make sure the windows are clear of anything that would block a driver's view.</li> <li>• If you notice anything like bad tires, no seatbelts or broken headlights, be sure to tell the owner of the vehicle.</li> </ul>	<ul style="list-style-type: none"> <li>• When getting off the bus, make sure you walk (not run) three or more steps away from the door. This is the best place to be around a bus. Stay away from the bus wheels and watch out for moving cars!</li> <li>• While at the bus stop, wait in a safe place away from the road. Do not run and play while waiting.</li> <li>• Wait for the bus to arrive, watch for red flashing lights and the bus stop sign to be extended, and cross only when all traffic has stopped. Look left, right, and left again before crossing.</li> <li>• Talk quietly (so the driver will not be distracted).</li> </ul>



## Attachment C – PSA Planning Page

Group Members

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Three Key Messages to Include in Your PSA

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Get Creative! Brainstorm some ideas for getting your message across in your PSA! (jingle, song, rap, pictures/image)

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# Attachment D – PSA Storyboard (Part A)

Using your key messages for safety to and from school, plan out your PSA. When using a storyboard, think about your message from beginning to end. Talk with your group about what will happen first, next, and last. Once you have a good idea, record it on the storyboard.

Title of PSA		
Characters in the PSA	Setting/Location of Scenes	Objects/Props Needed

## Attachment D – PSA Storyboard (Part B)

<p>Remember to include a quick diagram or picture of what is happening in each scene plus dialogue for the characters.</p>	1	2
	4	5
3	7	8
6	10	Credits:
9		

Important Things to Remember:

## Attachment E – PSA Presentation Rubric

Use this rubric to score student presentations with 4 being the highest score in each category.

Name: \_\_\_\_\_

	4	3	2	1	Enter Score
Storyboard	Demonstrates detailed planning and preparation. Process well-thought out. Includes diagrams and script.	Demonstrates good planning and preparation. Process thought out. Includes diagrams and script.	Demonstrates some planning and preparation. Includes limited diagrams and script.	Demonstrates little planning or preparation for project. Many elements missing or hard to understand.	
Content of PSA	Students create an original and interesting PSA. Focuses on the safety message and addresses the issue.	Students create a PSA that addresses the issue.	Students create an accurate PSA, but it does not fully address safety issues.	PSA not accurate or complete.	
Production	PSA presentation is clear and loud enough to be heard. Sound effects blend with the PSA's message.	PSA presentation is clear and loud enough to be heard. Sound effects usually blend with the PSA's message.	PSA presentation is clear and loud enough to be heard. Sound effects sometimes distract from the PSA's message.	PSA presentation is unclear and/or not loud enough to be heard. Sound effects distract from the PSA's message.	

Presentation Notes:

Total Score: \_\_\_\_\_





## Lesson 2

# Designing Safe Sidewalks

Grades 3 - 5

### Safety Focus



Students help identify safety concerns and design and present solutions to improve the safety of all people who are walking and bicycling to school.

Visit [everymove.ohio.gov](http://everymove.ohio.gov) for electronic versions of this and the other Safe Routes to School Lesson Guides published by the Ohio Department of Transportation (ODOT).



- Grades K – 2
- Grades 6 – 8



## Curricular Connections: Grades 3-5

Grade 3	Grade 4	Grade 5
<p>Mathematics – Common Core State Standards</p>	<p>Mathematics – Common Core State Standard</p>	<p>Mathematics – Common Core State Standard</p>
<p><b>Measurement &amp; Data: Understand concepts of area and relate area to multiplication and to addition.</b></p> <p>6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).</p> <p>Relate area to the operations of multiplication and addition.</p> <p>a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.</p> <p>b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.</p>	<p><b>Measurement &amp; Data: Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit.</b></p> <p>3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</p>	<p><b>Measurement and Data: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.</b></p> <p>5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>b. Apply the formulas <math>V = l \times w \times h</math> and <math>V = b \times h</math> for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.</p>
<p><b>Measurement &amp; Data: Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.</b></p> <p>8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same area and different perimeters.</p>		<p><b>Note to Fifth Grade Teachers:</b></p> <p>To meet this standard, extend the activity to focus on volume. Ask students to calculate volume if the sidewalk was 3 inches thick. This problem can be posed as a real world example to determine the amount of concrete that would be needed when constructing the sidewalk.</p>

## Related Vocabulary

- ▶ **Perimeter** – The perimeter of a polygon is the distance around the outside of the polygon.
- ▶ **Area** – The amount of space inside the boundary of a flat (2-dimensional) object.

## Student Worksheets

These are designed to copy and use in class.

Attachments
A – Perimeter and Area of Sidewalk
B – School Sidewalk Solutions
C – Cost Calculations
D – Persuasive Letter
E – Sidewalk Construction Game

## Procedure

### ➔ Day 1: (30 minutes)

1. Read ***Where the Sidewalk Ends*** by Shel Silverstein and discuss the poem with students. Talk about what they know about sidewalks. Record their ideas on chart paper.
2. Distribute **Perimeter and Area of Sidewalk (Attachment A)** to students.
3. Before students begin solving the problem, **have them turn and talk with a partner about what they would do to determine perimeter and area.** Have them record their ideas on the back of **Attachment A**. You can use this as a formative assessment. As students are recording their ideas, look for whether they are confusing perimeter and area.
4. **Review the problem presented in Attachment A.** When students finish, have them share and show their solutions in a whole class discussion. Chart the different strategies to find perimeter and area shared by students and generate a class list. (The list of strategies generated by the class will help students solve the additional problems included as part of this lesson).  
  
(Answer: Students will generate several examples of how they got to the solution. Length x width = area. 60 feet x 5 feet = 300 square feet. Perimeter is the total sum of all sides around the shape. 60 + 60 + 5 + 5 = 130 feet).



### Materials Needed

- Where the Sidewalk Ends poem by Shel Silverstein
- Copies of Attachments
- Pencils
- Square Tiles (2 different colors for each pair of students) for the Sidewalk Construction Game (Attachment E)
- Optional: slates, Expo markers, chalkboard, SMARTboard, chart paper



## Procedure

### ➔ Day 2: (45 minutes)

#### 5. Pose the following scenario to the class:

Your friend who is a teacher at a school has a problem. Her students have a safe way to get to school. However, once they get to school, there is no sidewalk leading up to the school. Students have to walk through the school parking lot to get to the entrance, which is very unsafe for walkers and bicyclists.

Your friend needs to convince the school district that they must build a sidewalk. She found concrete squares that are 5 x 5 feet. She doesn't know how many to buy and she needs our help.

#### Discuss as a Class:

- **How do you think we can help solve this problem?**  
(Possible Answer: We need to help her figure out how many to buy and how much it will cost).
- **How can we figure out how many to buy?**  
(Possible Answers: She would need to measure the length of the area where the sidewalk would be placed. Maybe she could even give us a map of the school grounds and the measurements. Once we have the amount of concrete squares that we need then we can multiply to calculate the total price.)

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6. **Distribute School Sidewalk Solutions (Attachment B).** Tell students that you talked to your friend and that you have the measurements for the sidewalk. It needs to be 73 feet long from the street to the front door of the school.

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7. Have the students **solve the problem using Attachment B** and record their thinking. You can distribute square tiles or cubes as a manipulative, which would provide a visual representation of the problem. Formulas should not be introduced before students discover the meaning of area. (Answer: 14, plus they will need part of another one. So the total number of squares that need to be purchased is 15 squares).

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8. As a whole class, **have students share multiple ways** for how they determined different solutions for the number of sidewalk squares they will need.



#### Teacher Tip

*Having previous experience with area and perimeter prior to this lesson will help students solve this task. If this is an early experience, you may want to only focus on one of the concepts (area or perimeter).*

*Students should also have opportunities to show multiple ways of solving the problem and communicating their ideas. This will also support the use of the Mathematical Practices in the Common Core Standards.*

*Day 2 continued on the next page...*

## Procedure

Day 2 continued...

9. **Students should determine the area and/or perimeter** of the sidewalk and explain their thinking, using **Attachment B**.

(**Answer:** Length times width equals area.  $73 \text{ feet} \times 5 \text{ feet} = 365 \text{ square feet}$  which is the area. Perimeter is the total sum of all sides around the shape.  $73 + 73 + 5 + 5 = 156 \text{ feet}$  which is the perimeter).

10. **Distribute Cost Calculations (Attachment C)**. Ask students how much will it cost to buy all of the concrete squares needed to build the sidewalk? Have the students record the answer on their worksheet. Again, students will have multiple ways to show the solution. Have them share different solutions to solving this problem as a whole class discussion.

(**Answer:**  $15 \times \$25.00 = \$375.00$  and there will be an extra portion of the concrete square left over).

## Extend

- **Using the Persuasive Letter (Attachment D)**, have students write a persuasive letter to the school district recommending why a sidewalk should be built, how many concrete squares will be needed, and the cost. Students should use information from the lesson in their argument.
- **Play the Sidewalk Construction Game** using the directions and gameboards included in **Attachment E**.

## Assessment

This lesson uses real world data and context to involve students in solving a problem in a school zone. While students think like engineers, and work the math problems included in this lesson, look for whether they are confusing perimeter and area. If this is an early experience, choose one concept to focus on. You can also assess how students connect and apply multiplication and area through some of the activities, including the **Sidewalk Construction Game (Attachment E)**. A **Persuasive Letter (Attachment D)** can be used as an assessment to evaluate the students' ability to explain the problem and proposed solution clearly, and why this is an important problem to solve.

## Additional Resources



### *Literature Connections*

*Spaghetti and Meatballs for All!*, Marilyn Burns

*Stacks of Trouble*, Martha Brenner

*The Best of Times*, Greg Tang

## Related Careers

Invite your students to brainstorm all the potential careers related to this lesson.

- Project Engineer
- Civil Engineer
- Construction Manager

# Attachment A – Perimeter and Area of Sidewalk

Name: \_\_\_\_\_

The sidewalk in front of my house looks like this:



I measured each square and the sides are 5 feet long. What is the perimeter and area of my sidewalk?

Record your answer using pictures, numbers or words.

## Attachment B – School Sidewalk Solutions

Name: \_\_\_\_\_

It is 73 feet from the street to the school doors. How many 5 feet squares will be needed to put a sidewalk in for students?

Record your answer using pictures, numbers or words.



Using your information above, what is the perimeter of your sidewalk? Explain your thinking below.

## Attachment C – Cost Calculations

Name: \_\_\_\_\_

If each concrete square costs \$25.00, how much will it cost the school to buy the squares to build the sidewalk?

Record your answer using pictures, numbers or words.

## Attachment D – Persuasive Letter

Name: \_\_\_\_\_

Write a persuasive letter recommending why a sidewalk should be built, how many sidewalk pieces will be needed and the cost of the project. Be sure to include information from your Sidewalk Solutions Problems to help the reader understand your argument.

## Attachment E – Sidewalk Construction Game (Part A)

In this game, students have five different gameboards, each having an area of 36. Students will explore the area of a rectangle with whole-number side lengths by tiling it. This will help students connect the concept that area is the same as multiplying the side lengths. The concept of multiplication can be related using arrays.

### Directions for Playing the Game

Students will work and play the game in pairs.

Each pair needs to select one gameboard to use. Switching gameboards to play several times is suggested.

Each Player chooses a different color of tiles, takes his or her tiles, and a die. The first Player rolls the die and places the number of tiles on the gameboard based on the number rolled. For example, if a Player rolls a 3, she takes 3 tiles of the same color and places them anywhere on the gameboard. Then Player 2 rolls using his or her colored tiles and so on.

Play continues until a Player places the last tile on a board.

**Special Rule:** If there are 2 spaces open on a board, the Player must roll a 1 or a 2 to cover the board. If they roll a 3, the play continues. Tiles cannot be left over.

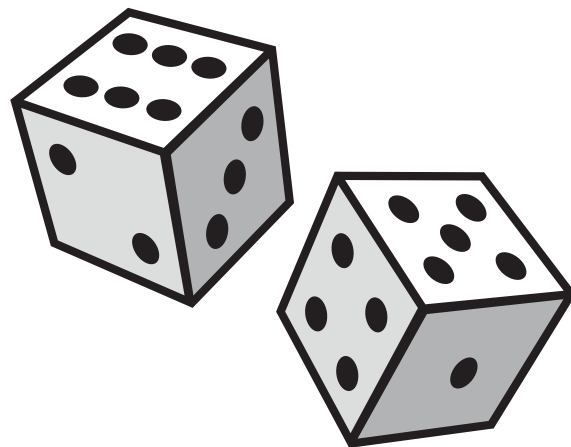
**Object of the game:** Have the most tiles covering the board.

You can also extend the game by creating gameboards with different areas. The five boards included in this lesson have an area of 36. Adjusting the area and the number of boards are great ways to extend student thinking.



### Each Team Needs

- ✓ All Five Gameboards (two boards will need assembled before playing)
- ✓ 1-inch Square Color Tiles (you will need to create these out of two different colors of construction paper)
- ✓ Dice





# Attachment E – Sidewalk Construction Game (Part B)

Gameboard 1 (6x6)


# Attachment E – Sidewalk Construction Game (Part C)

Gameboard 2 (9x4). To make this board, cut the strips below and tape them together to make a 9x4 array.



# Attachment E – Sidewalk Construction Game (Part D)

Gameboard 3 (3x12). To make this board, cut the strips below and tape them together to make a 3x12 array.



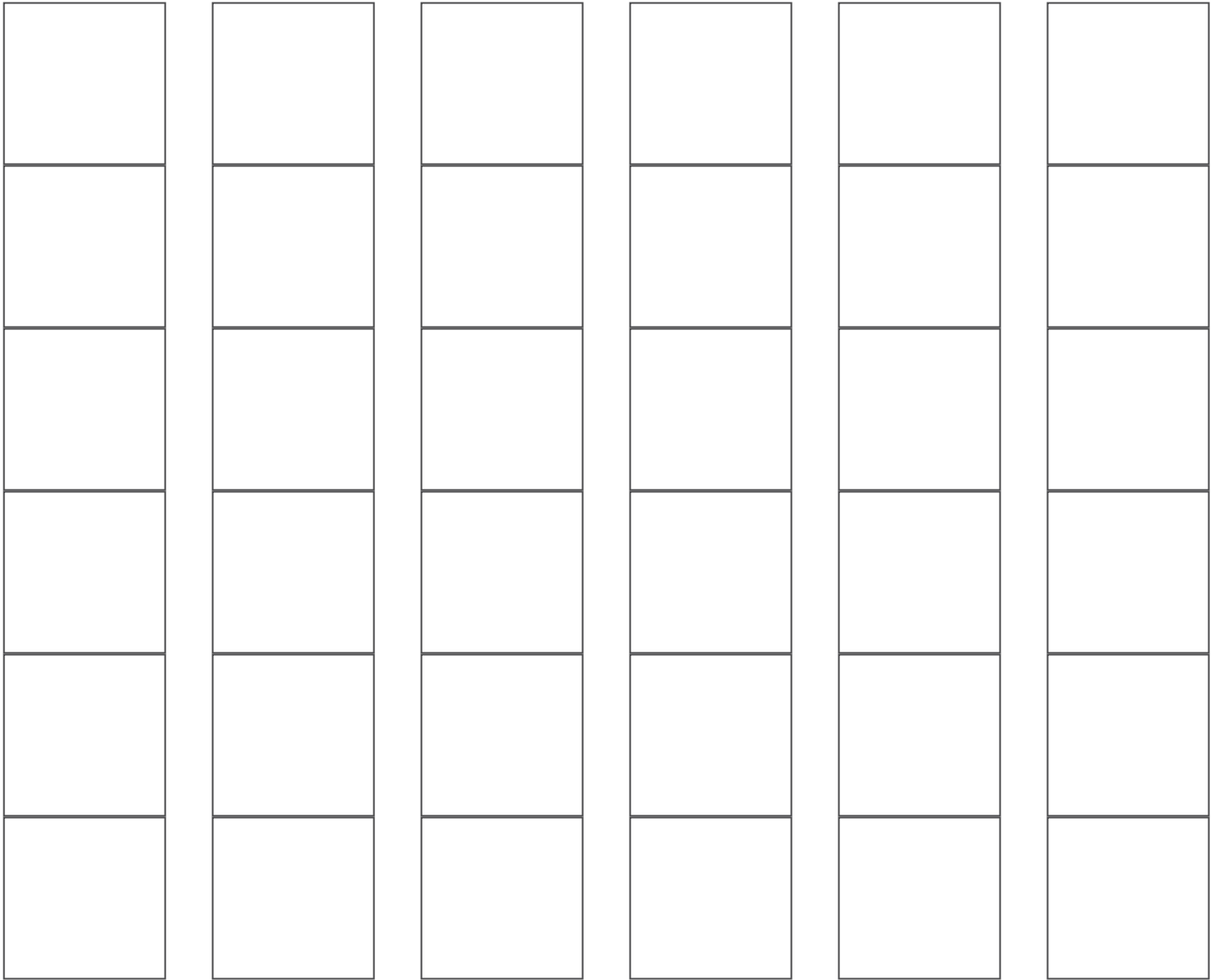
# Attachment E – Sidewalk Construction Game (Part E)

Gameboard 4 (2x18). To make this board, cut the strips below and tape them together to make a 2x18 array.




## Attachment E – Sidewalk Construction Game (Part F)

Gameboard 5 (1x36). To make this board, cut out each strip below and tape them together to make a 1x36 array.





# Lesson 3

## Slippery Sidewalks and Roads

Grades 3 - 5

### Safety Focus



Students develop stronger awareness for slippery surfaces and how they can make safe choices, which will help when they encounter them.

Visit [everymove.ohio.gov](http://everymove.ohio.gov) for electronic versions of this and the other Safe Routes to School Lesson Guides published by the Ohio Department of Transportation (ODOT).



- Grades K – 2
- Grades 6 – 8



## Curricular Connections: Grades 3-5

Grades 3 – 4	Grade 5
Science Standard	Science Standard
<p><b>Science Inquiry and Application</b></p> <ul style="list-style-type: none"> <li>• Plan and conduct simple investigations</li> <li>• Employ simple equipment and tools to gather data and extend the senses</li> <li>• Use appropriate mathematics with data to construct reasonable explanations</li> <li>• Communicate about observations, investigations and explanations</li> <li>• Review and ask questions about the observations and explanations of others</li> </ul>	<p><b>Science Inquiry and Application</b></p> <ul style="list-style-type: none"> <li>• Design and conduct a scientific investigation</li> <li>• Use appropriate mathematics, tools and techniques to gather data and information</li> <li>• Analyze and interpret data</li> <li>• Develop descriptions, models, explanations and predictions</li> <li>• Think critically and logically to connect evidence and explanations</li> <li>• Recognize and analyze alternative explanations and predictions</li> <li>• Communicate scientific procedures and explanations</li> </ul>

## Related Vocabulary

- ▶ **Force** – A push or pull.
- ▶ **Friction** – A force between two surfaces rubbing against each other.
- ▶ **Contact Force** – A force that acts on an object by touching the object (e.g., collision, magnets and gravity).
- ▶ **Speed** – To move faster over time.
- ▶ **Motion** – A change of position.
- ▶ **Slippery** – Causing or tending to cause something to slide or fall.
- ▶ **Slick** – Smooth or slippery such as on a surface or area.
- ▶ **Traction** – The concept of having grip, without slipping.

## Student Worksheets

These are designed to copy and use in class.

### Attachments

A – Letter from Company

B – Project Design Planning Sheet

## Procedure

### ➔ Day 1: (45 minutes)

1. **Optional – Show a YouTube clip** of people falling/slipping on ice. This clip can help catch students' attention and generate discussion. Included below are links to a few video examples that would be good to show and use to connect classroom discussions and design ideas during the lesson.

#### Montage of People Slipping on Ice

[http://www.youtube.com/watch?v=Fbb3631ew\\_4](http://www.youtube.com/watch?v=Fbb3631ew_4)

#### Polar Bears Sliding on Ice:

<http://www.youtube.com/watch?v=3LMmu-DKaQ0>

#### Ducks on Ice

<http://www.youtube.com/watch?v=znPCuLMJuAI>

#### Dog Sliding on Ice

<http://www.youtube.com/watch?v=VmSQRp7LBUw>

2. **You can use the videos above OR read the books** *Shoes, Shoes, Shoes* by Ann Morris, or *So Many Kinds of Shoes* by Max Grover. Have a discussion about types of shoes and what we use shoes for. Create a chart of types of shoes, how they help the people wearing them, and some of the design features.
3. **With the class, display and read the letter from the fictitious company** *Shoes and More, Inc.* (see Attachment A). This letter will set the stage for the activity and engage the class in the design challenge.



### Teacher Tip

Many of the materials are optional for the design activity. Students need a variety of supplies to use, and could also generate a supply list based on their design.



### Materials Needed

#### For Lesson

- Shoes, Shoes, Shoes*, by Ann Morris
- So Many Kinds of Shoes* by Max Grover
- Falling on Ice YouTube clips. Suggestions are listed in Step 1 of this lesson.

*continued on next page...*

*Day 1 continued on the next page...*



## Procedure

Day 1 continued...

4. **Discuss the definition and importance of team work.** (The definition of teamwork is...working with others in a group [team] to accomplish something). Introduce and explain that today, the students are going to become teams of scientists who are working together to design and create a shoe covering that will increase traction on slippery sidewalks and roads.

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5. **Introduce and display the Design Process Steps** with students. Students will follow this process as they design a shoe covering for Shoes and More, Inc. (You may want to make a chart to post on the board or wall). Note: There are several versions of the design process, feel free to use one that you already have. The steps below are just a suggestion.
  - a. **Identify a Problem** – Describe the problem and the constraints
  - b. **Explore** – Available materials
  - c. **Design** – Come up with many ideas and then choose one to draw
  - d. **Create** – Make your solution
  - e. **Try it out** – Test your solution
  - f. **Make it Better** – Evaluate results and think how to improve the design

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6. **Highlight the design constraints** referenced by the company to students. You can also post these for students to refer to while working.
  - a. The shoe covering has to be removable.
  - b. The shoe covering can use only the materials that are available or that have been approved by the teacher as part of the design plan.

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7. **Give students time to explore materials** prior to designing their individual ideas. They won't actually use the materials in this part, but allowing them to see and think about the available materials is helpful.

---

8. Divide the students into teams of four. **Distribute Project Design Planning Sheet (Attachment B)** and review with the class. Students need to complete numbers 1 to 3 individually (20 minutes).



### Materials Needed

...continued

#### Design Materials

- Ruler/Measuring Tape
- Rubber Bands
- String/Rope
- Velcro
- Thumb Tacks
- Bolts, Washers
- Elastic
- Washers
- Glue
- Pipe Cleaners
- Wooden Craft Sticks
- Gravel
- Duct Tape
- Toothpicks
- Aluminum Foil
- Plastic Wrap
- Pencil
- Ruler
- Scissors
- Sandpaper
- Baking Sheets or Trays (serving trays/lunch trays)
- Ice
- Cooking Spray
- Old Shoes (optional if you don't want students to use their own shoes)

#### Teacher Prep

*Starting with Days Two and Three, students will need to test their designs. You can fill cooking pans or plastic containers with water and freeze them overnight to simulate an icy surface, or use cooking spray. Step 11 gives additional ideas.*

## Procedure

### ➤ Day 2 – 3: (45 minutes each day)

9. Once students have generated their individual ideas, have them **work with their group**. They need to take turns sharing their designs and thoughts. Once everyone has shared, groups need to decide on a design or a combination of the designs to actually create as a group. They will record this information for their response to number 4 on the shoe covering worksheet. Complete number 5 as a group.

---
10. Have students **create the physical model** based on the group's final design. Complete number 6 as a group.

---
11. **Test the designs** (solutions) on pans of ice, pans with cooking spray, aluminum foil, plastic wrap or on the floor. (Pans may need to be on an incline). Students should release the shoe and see what happens and compare this to releasing the shoe without the covering. Be sure students are recording their observations and collecting data. Complete number 7 as a group.

### ➤ Day 4: (40 minutes)

12. Once all of the students have created and tested their models, **have the groups share their shoe cover and their design process with other groups**. They should include what worked and what didn't work. Allow groups to share feedback and exchange any ideas they have to improve each other's designs.

---
13. Complete number 8 individually.

---
14. Now that each student has heard from his or her peers, and had a chance to reflect individually about the design, have **each student individually share how he or she would decide to improve the design if provided the opportunity to rebuild it**. Ask each student which test he or she prefers, and how important is it to have good traction on slippery sidewalks and roads? Allow students to share any personal slippery experiences, if time permits.

## Extend

- Have students write a letter back to [Shoes and More Inc](#) to inform the company of their designs and findings.
- Associate a cost with each item, so that students have to evaluate the cost as they design and construct their shoe cover model.
- Have students redesign their shoe coverings based on the results of the class to test whether the improvement to the design worked.
- Have students propose ideas for modifications to bikes for use in bad weather.

## Assessment

Technological design is a problem or project-based way of applying creativity, science, engineering, and mathematics to meet a human need or want. Use this lesson to assess student understanding of design and working collaboratively. Also, content connections can be made to force and motion.

## Additional Resources



### *Literature Connections*

*Shoes, Shoes, Shoes*, Ann Morris

*So Many Kinds of Shoes*, Max Grover

*Why Do Moving Objects Slow Down?*

*A Look at Friction*, Jennifer Boothroyd

*Forces Make Things Move (Let's-Read-and-Find... Science 2)*, Kimberly Brubaker Bradley and Paul Meisel

*Friction and Gravity: Snowboarding Science*, Marcus Figorito

## Related Careers

Invite your students to brainstorm all the potential careers related to this lesson.

- Business Executive
- Construction Engineer
- Inventor
- Manufacturer
- Scientist
- Shoe Designer

## Attachment A – Letter from Company

Dear Students:

It has come to our attention that students are falling as they walk to school. Students are slipping on icy, snowy sidewalks and losing traction on wet, slick roads. Homeowners generally clear the sidewalks but sometimes they can't get the sidewalks clear before students in your area walk home. We here at **Shoes and More, Inc.** want to reduce the amount of falls in your area.

To do this we are looking for a new shoe cover that will help shoes grip sidewalks and roads. Your challenge is to design and create a removable shoe cover that will help shoes have more traction (more friction) as they are used on different surfaces.

There are two specific design features that we will be looking for in potential new designs for our company. Any design or model submitted to our company **must** include the following:

- The shoe covering has to be removable.
- The shoe covering can use only the materials that are provided by your teacher or that have been approved as part of your design plan.

Be sure to record your observations and results as you test your shoe cover using the planning sheet.

We are looking forward to seeing your designs and submissions. Thank you in advance for your hard work and creative thinking.

Sincerely,

**The Staff at Shoes and More, Inc.**

## Attachment B – Project Design Planning Sheet *(Part A)*

Names of Team Members: \_\_\_\_\_

Complete steps 1-3 on your own. Then share your designs with your group.  
Complete steps 4-7 with your group. Next, complete step 8 on your own then discuss with your group.

1. Identify the problem. (Individual)

2. What materials might you use in your design and how would you use them? (Individual)

3. Illustrate a design of what your shoe cover will look like. (Individual)

4. Work with your Design Team to compare designs. Select a final group design to create. Illustrate the final design below and label your diagram. (Group) If there are materials you will need that are not provided, be sure to ask your teacher before including them in your design.

## Attachment B – Project Design Planning Sheet *(Part B)*

5. When you test the group design, how will you measure its effectiveness? What data can you collect? How will your data provide evidence to support your explanation? (Group)

6. Create the shoe covering as a group AND create a name for your shoe cover design. BE CREATIVE! (Group)

7. Using the slippery sidewalk ice model, try the shoe covering and document your observations and results below. (Group) Be sure to record specific measurements to support the explanation that your design is effective.

8. Based on your design and results, would you change anything to make the shoe covering better? Explain what you would change and why. (Individual)





# Lesson 4

## Being Aware of How Weather Affects Your Surroundings

*Grades 3 - 5*

### Safety Focus



Students build awareness of the physical environment on their way to school and explore how weather can have an impact on their safe route to school.

Visit [everymove.ohio.gov](http://everymove.ohio.gov) for electronic versions of this and the other Safe Routes to School Lesson Guides published by the Ohio Department of Transportation (ODOT).



- Grades K – 2
- Grades 6 – 8





## Curricular Connections: Grades 3-5

Grade 3 Science Standard	Grade 4 Earth Science Standard	Grade 5 Science Standard
<p><b>Science Inquiry and Application</b></p> <ul style="list-style-type: none"> <li>• Observe and ask questions about the natural environment</li> <li>• Plan and conduct simple investigations</li> <li>• Employ simple equipment and tools to gather data and extend the senses</li> <li>• Communicate about observations, investigations and explanations</li> <li>• Review and ask questions about the observations and explanations of others</li> </ul>	<p><b>Earth's Surface: The surface of Earth changes due to weathering.</b></p> <ul style="list-style-type: none"> <li>• Rocks change shape, size and/or form due to water or ice movement, freeze and thaw, wind, plant growth, gases in the air, pollution and catastrophic events such as earthquakes, mass wasting, flooding and volcanic activity</li> </ul>	<p><b>Science Inquiry and Application</b></p> <ul style="list-style-type: none"> <li>• Identify questions that can be answered through scientific investigation</li> <li>• Design and conduct a scientific investigation</li> <li>• Analyze and interpret data</li> <li>• Develop descriptions, models, explanations and predictions</li> <li>• Think critically and logically to connect evidence and explanations</li> <li>• Recognize and analyze alternative explanations and predictions</li> <li>• Communicate scientific procedures and explanations</li> </ul>

## Related Vocabulary

- ▶ **Pressure** – Force applied to a surface by an object or liquid in contact with it.
- ▶ **Cycle** – A series of events that repeat themselves.
- ▶ **Weathering** – The breaking down of material into smaller pieces.
- ▶ **Erosion** – The movement of pieces from one place to another.
- ▶ **Rapid** – Quick; with great speed.
- ▶ **Slope** – An incline; to have a surface that is slanted.
- ▶ **Landslide** – The downward falling or sliding of a mass of soil or rock, on or from a steep slope.
- ▶ **Mechanical Weathering** – Processes that change a rock physically, but do not affect its chemical composition.
- ▶ **Thawing** – To change from a frozen solid to a liquid by gradual warming.

## Student Worksheets

These are designed to copy and use in class.

Attachments
A – Picture of Tom
B – Pre-Assessment Form
C – Pictures (cracked and uneven sidewalks, potholes, streets)
D – Weathering Investigation
E – Post-Assessment Form
F – I Have...Who Has? Game

## Procedure

### ➔ Day 1: (45 minutes)

1. Begin the class by telling the students that the world around them is constantly changing. One of the important things to remember about being safe while going to and from home and school, whether you are walking, riding a bike, or are in a car or bus, is to be aware of your surroundings. Often there may be unexpected hazards along your route that can cause you harm. **Pass out the Pre-Assessment Form (Attachment B) and have the students complete number 1.**

2. **Show the students the picture of Tom (Attachment A).** Explain that Tom arrived late to class today at his school. When he entered the classroom, he was limping. His classmates asked him what had happened, but he didn't want to talk about it. Although wearing a helmet shows that Tom is a safe rider, the helmet is not going to completely protect him in all crashes.

**Ask students:**

- **What do you think happened to Tom?**
- **What may have caused him to injure himself?**
- **Have students finish all the questions on the Pre-Assessment Form (Attachment B) as best as they can.**

*Day 1 continued on the next page...*

### Materials Needed

#### Per Group

- 3 Disposable 3 oz Paper Cups
- 4 Pinto Beans
- 6 Tablespoons of Plaster of Paris (2 tbsp/cup)
- 3 Craft Sticks
- Access to Water and Paper Towels
- Measuring Spoons
- Camera, if possible

## Procedure

Day 1 continued...

3. **Collect the Pre-Assessment Form (Attachment B).** Discuss the different things that students should be aware of in their surroundings while traveling to and from school. Have students brainstorm some hazards that might be along the routes that students take to and from school when they walk or ride a bike. Create a class chart or table recording their ideas.

This would also be a good time to incorporate literature into the lesson by reading *Berlioz the Bear* by Jan Brett. Berlioz and his bear orchestra are due at the gala ball, but on the way, their wagon gets stuck in a pothole. You can also view this as a musical video at: <http://vimeo.com/album/97049/video/4900370>

4. Using the list generated by the class, **take the students on a walk around the school grounds.** Have them look for items they generated in their list and other hazards they might find that are not on the list. Use a camera to take pictures of any possible safety hazards that can be displayed in the classroom or added to the list.

### ➡ Day 2: (45 minutes)

5. Using the pictures and/or list from Day 1, **have students try to explain how the hazards may have gotten that way.** Show students the pictures in **Attachment C.** Tell them that they are going to investigate what causes these changes around the school grounds to happen.

6. Pass out the directions for the **Weathering Investigation (Attachment D).** Have students work in partners or small groups for the investigation.

### ➡ Day 3 – 5: (10-15 minutes each day)

7. Have the students **observe each model** and discuss what they see, recording their findings and observations. The freeze and thaw demonstration can be repeated, especially if it does not show any changes initially. Just fill the cracks with new water and place in the freezer each day.

8. On the last day, **discuss the results of the models and how they relate to what happened to the sidewalk and road in the pictures in Attachment C.** Provide students with the **PDF of How Potholes are Formed**, or display for students on projector. (See Technology Connections, pg. 44)



### Teacher Tip

*In the Weathering Investigation experiment in Attachment D, the plaster in Cup B does not crack, showing students that it is the growth of the bean plant that causes the plaster in Cup A to crack. As the beans grow inside the plaster, they expand, which applies pressure to the plaster. This pressure causes the plaster to crack.*

*The same process can occur in a sidewalk. The growing seed and its roots push against the concrete, forcing the crack to widen and deepen. Eventually the sidewalk can break apart.*

*In Cup C, water that seeps into cracks in sidewalks and freezes can also cause the sidewalks to split. This occurs because water expands as it freezes. The expanded ice acts as a wedge, widening the crack in the sidewalk.*

*The breaking down of concrete into smaller pieces by natural processes is called weathering. If the concrete weathers but there is no change in the chemical composition of the rock, the process is called physical weathering.*

Day 3 – 5 continued on the next page...

## Procedure

Day 3 – 5 continued...

<http://www.emcol.com/Articles/Features/How%20Potholes%20Are%20Formed.pdf>

Remind students to be cautious of their surroundings while traveling along their route to and from school. They don't want to end up like Tom who injured himself when he wasn't paying attention to the surface of the sidewalk or road. Mention that drivers also need to be cautious of the road surface as potholes can cause damage to cars and cause accidents if drivers lose control of their vehicles when they hit one. As a passenger, you can help watch for these hazards and alert the driver.

### 9. Administer the Post-Assessment Form (Attachment E).

## Extend

- Use the ***I Have...Who Has? Cards in Attachment F*** to play a game. The student with the START card reads the first clue, and asks the question. The next student, who has the answer, reads his card, and so on.
- As a possible homework assignment, have students find at least two examples of weathering on their route home from school or in their neighborhood. Have them draw a picture or take a photo of each, labeling them and writing a few sentences explaining them.
- When students are not observing their models, they can be completing a variety of items, including reading an assortment of books on weathering, researching different land features of the area and how they were formed, creating a poster illustrating how freezing, thawing, and plant growth has affected areas in their community, and sharing their homework findings of weathering examples.
- Students could design different investigations that would test different things. Examples could be different types of beans, different sizes of rock, more or less plaster, the amount of water that is used on the paper towel, or the substance used for the rock could be changed to clay.

## Assessment

This lesson builds students' awareness and deeper understanding of a real world problem. Use the **Pre- and Post-Assessment Forms (Attachments B & E)** as tools to evaluate students' growth and understanding of weathering. The Weathering Investigation Activity can be used as another tool to assess students' ability to meet the science standards listed in the Curricular Connections section.

## Additional Resources



### *Literature Connections*

*Berlioz the Bear*, Jan Brett

*Weathering and Erosion and the Rock Cycle*, Joanne Mattern

*Erosion and the Grand Canyon: A Trail Through Time*, Linda Vieira

*Erosion: The Weather Report Series*, Virginia Castleman



### *Technology Connections*

Berlioz The Bear: "Musical Story" version with the St. Louis Symphony

<http://vimeo.com/album/97049/video/4900370>

Freezing/Thawing clip

[http://www.bbc.co.uk/schools/ks3bitesize/science/environment\\_earth\\_universe/rock\\_cycle/revise6.shtml](http://www.bbc.co.uk/schools/ks3bitesize/science/environment_earth_universe/rock_cycle/revise6.shtml)

Weathering and Erosion

<http://brambarker.com/scirave/scirave.html>

How Potholes Form

<http://www.virginiadot.org/info/resources/potholes.pdf>

How Potholes Are Formed - PDF

<http://www.emcol.com/Articles/Features/How%20Potholes%20Are%20Formed.pdf>

*Additional Resources continued on the next page...*

## *Additional Resources Continued*

### *Additional Resources continued...*

Concrete Freeze Thaw Damage: Potholes – YouTube

<http://www.youtube.com/watch?v=QYFvUfSaNDQ>

Erosion and Weathering Pictures - PDF

[http://www.doe.virginia.gov/instruction/gifted\\_ed/project\\_promise/science\\_curriculum/grade\\_two/handouts/earth\\_science/weathering\\_erosion\\_pictures.pdf](http://www.doe.virginia.gov/instruction/gifted_ed/project_promise/science_curriculum/grade_two/handouts/earth_science/weathering_erosion_pictures.pdf)

## *Related Careers*

Invite your students to brainstorm all the potential careers related to this lesson.

- Ecologist
- Environmental Scientist
- Geologist
- Meteorologist
- Road Construction Engineer

## *Attachment A – Picture of Tom*



# Attachment B – Pre-Assessment Form

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Safe Routes to School Being Aware of Your Surroundings Pre-Assessment



1. As you travel on your route to and from school, what are some of the things in your surroundings that you should be aware of to help keep you safe?

2. What may have happened to Tom on his way to school?

3. Mark each statement either True or False.

\_\_\_\_\_ Plant growth can break rock.

\_\_\_\_\_ Water can break rock.

\_\_\_\_\_ Plants are strong enough to shape the Earth in different ways.

\_\_\_\_\_ Cracks in sidewalks and roads happen only because people walk and drive on them.

4. Describe how freezing and thawing can cause the weathering of rock.

5. Describe how plant growth can cause the weathering of rock.

6. Describe how the weathering of rock can reshape the land surface.

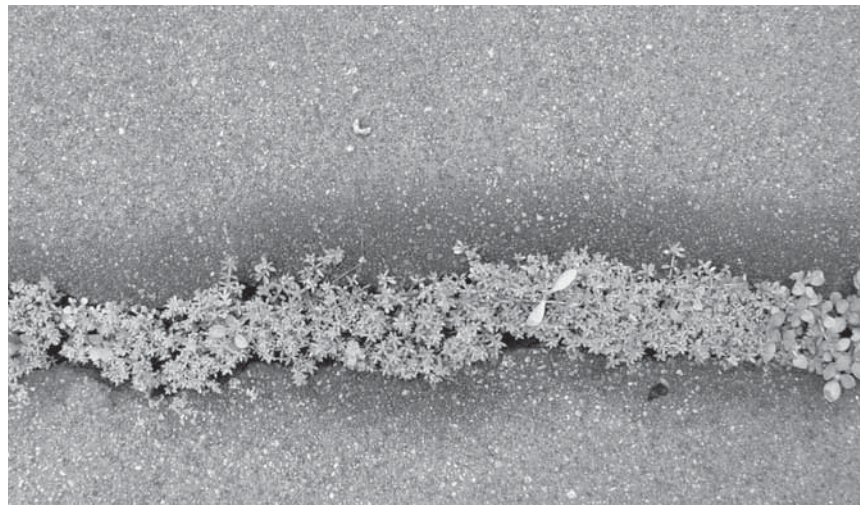




# Attachment C – Pictures *(cracked and uneven sidewalks, potholes, streets) (Part A)*



## Attachment C – Pictures *(cracked and uneven sidewalks, potholes, streets) (Part B)*



## Attachment D – Weathering Investigation (Part A)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Weathering – Nature’s Effects on the Environment

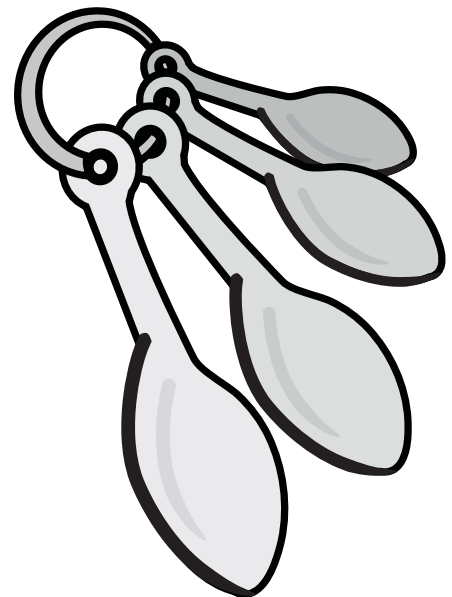
There are many things in the environment that affect rocks. Weathering is the process that breaks down rocks and other substances at the Earth’s surface. The temperature, weather, ice, air, and plants are some of the things that contribute to weathering.

#### Steps

1. Place 2 tbsp of plaster in each cup. Add one tbsp of water to each and stir with the craft stick. Throw the craft stick away when finished.
2. In one of the cups, place the four pinto beans standing up as far away as possible from each other. Gently push them about 3/4 of the way into the plaster. Mark this cup, Cup A.
3. Mark a second cup, Cup B. This will be your control. You will do nothing to the plaster in this cup.
4. Allow the third cup to sit for about 20 minutes. When the plaster is stiff but not hard, push on the bottom of the cup to create cracks in the surface of the plaster.
5. Record the appearance of the surface of the plaster in each cup.
6. Fold two paper towels so they are about the size of the area of the plaster’s surface. Wet them so that they are damp, but not dripping. Place one paper towel on the surface of Cup A and one on Cup B.
7. Once the plaster is completely hardened in Cup C, fill the crack with water and place it in the freezer overnight. Take it out the following day and allow it to thaw.
8. Observe the three cups for the next few days, observing and recording your findings. Include illustrations to show how things are or aren’t changing.

#### Materials Needed

- 3 Paper Cups
- Water
- Craft Stick
- Plaster of Paris
- 4 Pinto Beans
- 2 Paper Towels
- Measuring Spoons



## Attachment D – Weathering Investigation (Part B)

Cup	Observations	Illustrations
A	Day 1:  Day 2:  Day 3:  Day 4:  Day 5:	
B	Day 1:  Day 2:  Day 3:  Day 4:  Day 5:	
C	Day 1:  Day 2:  Day 3:  Day 4:  Day 5:	

## *Attachment D – Weathering Investigation (Part C)*

Summarize the results of your investigation below. What is the effect of plant growth and freezing and thawing on rocks? How does it happen?

## Attachment E – Post-Assessment Form

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Safe Routes to School Being Aware of Your Surroundings Post-Assessment

1. As you travel on your route to and from school, what are some of the things in your surroundings that you should be aware of to help keep you safe?

2. What may have happened to Tom on his way to school?

3. Mark each statement either True or False.

\_\_\_\_\_ Plant growth can break rock.

\_\_\_\_\_ Water can break rock.

\_\_\_\_\_ Plants are strong enough to shape the Earth in different ways.

\_\_\_\_\_ Cracks in sidewalks and roads happen only because people walk and drive on them.

4. Describe how freezing and thawing can cause the weathering of rock.

5. Describe how plant growth can cause the weathering of rock.

6. Describe how the weathering of rock can reshape the land surface.

## Attachment F – I Have...Who Has? Game (Part A)

**I Have...Who Has?** Cut cards apart. Each student gets one card. Begin with the start card. As clues are read, the student who has the correct answer reads his or her card which asks the next question, and so on. Teachers pay close attention that students are giving correct answers to all the questions.

<p><b>START</b> Who has a series of events that repeat themselves?</p>	<p>I have <b>CYCLES</b>. Who has a geographic feature on earth?</p>
<p>I have <b>LANDFORM</b>. Who has a downward falling or sliding mass of soil or rock?</p>	<p>I have <b>LANDSLIDE</b>. Who has a process that changes a rock physically, but does not affect its chemical composition?</p>
<p>I have <b>MECHANICAL WEATHERING</b>. Who has the breaking down of rock into smaller pieces?</p>	<p>I have <b>WEATHERING</b>. Who has water that flows over the surface of earth into rivers and lakes?</p>

## Attachment F – I Have...Who Has? Game (Part B)

<p>I have <b>RUNOFF</b>. Who has the process of transporting weathered material by natural agents?</p>	<p>I have <b>EROSION</b>. Who has an example of a quick process?</p>
<p>I have <b>EARTHQUAKE</b>. Who has an example of a slow process?</p>	<p>I have <b>FREEZE/THAW</b>. Who has an example of a walking safety tip?</p>
<p>I have <b>WEAR BRIGHT CLOTHING</b>. Who has an example of a bicycle safety tip?</p>	<p>I have <b>WEAR A HELMET</b>. Who has an example of weathering on sidewalks?</p>



## Attachment F – I Have...Who Has? Game (Part C)

<p>I have <b>PLANT GROWTH</b>. Who has an example of weathering by freeze/thaw that occurs in the street?</p>	<p>I have <b>POTHOLES</b>. Who has a way to identify safety issues around school zones?</p>
<p>I have <b>CONDUCT A WALK AUDIT/SURVEY</b>. Who has a way to be safe while going to and from home and school?</p>	<p>I have <b>BE AWARE OF YOUR SURROUNDINGS</b>. Who has how potholes get larger?</p>
<p>I have <b>TRAFFIC KEEPS REMOVING PIECES</b>. Who has when water expands when it freezes and rocks break apart?</p>	<p>I have <b>FROST ACTION</b>. Who has how rock can be eroded?</p>

## Attachment F – I Have...Who Has? Game (Part D)

<p>I have <b>WIND</b> and <b>WATER EROSION</b>. Who has a part of the street into which car doors open?</p>	<p>I have <b>DOOR ZONE</b>. Who has the speed limit in a school zone?</p>
<p>I have <b>20 MILES PER HOUR</b> (mph). Who has which side of the street you should walk on when there is <b>NOT</b> a sidewalk?</p>	<p>I have <b>FACING ONCOMING CARS</b>. Who has why it is important to tie pants legs or shoelaces while riding a bike?</p>
<p>I have <b>SO THEY WON'T GET CAUGHT IN THE BIKE</b>. Who has the distance you should be away from parked cars when riding your bike?</p>	<p>I have <b>3 FEET</b>. Who has the safest place to cross a street?</p>

## Attachment F – I Have...Who Has? Game (Part E)

<p>I have <b>CROSSWALK</b>. Who has a benefit of walking/bicycling to school?</p>	<p>I have <b>STAYING HEALTHY</b>. Who has why you shouldn't listen to loud music when walking or riding a bike?</p>
<p>I have <b>IT CAN DISTRACT YOU FROM HEARING TRAFFIC</b>. Who has a red hexagon that is important for everyone?</p>	<p>I have <b>STOP SIGN</b>.</p>



# Lesson 5

## School Zone Safety Project

Grades 3 - 5

### Safety Focus



Students take action to assess their routes to school, become problem solvers in developing solutions, and present information in order to communicate their safety solutions.

Visit [everymove.ohio.gov](http://everymove.ohio.gov) for electronic versions of this and the other Safe Routes to School Lesson Guides published by the Ohio Department of Transportation (ODOT).



- Grades K – 2
- Grades 6 – 8



## Curricular Connections: Grades 3-5

Grade 3	Grade 4	Grade 5
Writing – Common Core State Standards	Writing – Common Core State Standards	Writing – Common Core State Standards
<b>Text Types and Purposes</b>	<b>Text Types and Purposes</b>	<b>Text Types and Purposes</b>
2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
<b>Research to Build and Present Knowledge</b>	<b>Research to Build and Present Knowledge</b>	<b>Research to Build and Present Knowledge</b>
7. Conduct short research projects that build knowledge about a topic.	7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.	7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

## Related Vocabulary

- ▶ **Zoning** – Dividing a town or stretch of land into areas subject to planning restrictions.
- ▶ **Hazard** – A source of danger.

## Student Worksheets

These are designed to copy and use in class.

Attachments
A – School Area Signs
B – ODOT Student Safety Tip Card
C – School Zone Hazard Identification Chart
D – Hazards: Things to Consider
E – School Safety Zone Planning Sheet
F – Presentation Rubric

## Procedure

### ➔ Day 1: (45 minutes)

1. **Create a class T-chart titled: "School Zone Planning."** Label the first column "environment" (roads, crosswalks, sidewalks, etc.) and the second column "people" (other students, cars, etc.).

2. **Ask students:**

- **Have you ever had any problems walking or riding your bike to school because of the route you take?**
- **What were some of the problems?**
- **What are some safety features that you notice?**

As students brainstorm, record their responses into the T-chart in the appropriate columns.

3. **Ask students:**

- **What is safety?** (to remain free from harm, injury or risk)
- **What is a hazard?** (anything that could cause harm or injury)
- **What is a zone?** (an area that is used for a specific purpose)

4. **Using Attachment A, School Area Signs, show students examples of signs** around schools and identify the meanings. Discuss which signs they have seen and explain that in a school zone, it is imperative that the zone be free from hazards and that safety is a priority.

5. **Distribute the ODOT Student Safety Tip Card (Attachment B) and the School Zone Hazard Identification Chart (Attachment C).** Students can use these pages to help focus their search for hazards. Explain that each student is going to be a School Zone Safety Inspector looking for areas that are managed well and have no hazards, and areas that need improvement. Students will need a clipboard or hard book to help with taking notes on their walk.



#### Teacher Tip

*Typically each daily plan uses a 40-45 minute block of time. The School Zone Safety Project could be completed in a different time frame depending on schedules.*



#### Materials Needed

- Copies of Attachments
- Clipboard/Hard Surface to write on
- Pencils
- Optional: Camera and/or Video Software and Equipment.

*Day 1 continued on the next page...*

## Procedure

Day 1 continued...

- 6. Take students on a walk outside of the school building.** During this time, have them take notes on the **School Zone Hazard Identification Chart (Attachment C)**. They should list any potential safety hazards along roads, crosswalks, sidewalks, etc. that could impact students who walk or ride bikes to school. They should indicate the hazard and the location on their form. (Students do not need to fill in the solution column at this time).
- 7. Return to the room when students have completed the walk and recorded hazards on their chart.** Have students share what they identified as potential safety hazards in the area and create a class hazard list.



### Teacher Tip

*Students will use the hazard chart list to identify an area that could be improved to ensure safe routes for students who walk or bike to school.*

*Students will create a presentation that will offer solutions to help make the school zone a safer place.*

## ➡ Day 2 – 3: (45 minutes each day)

- 8. Divide students** into groups of 2 to 3 and have them discuss their lists of hazards. After discussing, the group needs to select one hazard to focus on improving. **The ODOT Student Safety Tip Card (Attachment B)** can again help focus their discussions or generate additional ideas, if needed.
- 9.** After each group has decided on the “hazard” they would like to improve, **distribute Attachment D, Hazards: Things to Consider and Attachment E, School Safety Zone Planning Sheet**. Students may use these to guide their conversations as they begin completing the School Safety Zone Planning Sheet together as a group.
- 10.** Students should **create questions they need to ask to gain more information about the hazard and decide how they will record this data** (chart, table, etc.). Example questions include: How many times a day do kids walk off the sidewalk? Have you ever tripped on any broken concrete? If students decide not to collect data, they could cite an observation or accident report to substantiate the need for improvement.
- 11.** Have students collect data, information, interviews, visuals, observations or reports, as needed, based on their group plan. Students may want to interview or ask other people questions about a safety hazard.

## Procedure

### ➤ Day 4 – 5: (45 minutes each day)

12. **Have students create a 5 minute presentation.** Show students the **Presentation Rubric (Attachment F)** that identifies the following expectations for the presentation.
- The hazard identified by the group
  - Map showing the current problem
  - Map showing the suggested solution
  - Data, information, reports, interviews or observations collected and presented
  - Outline of presentation completed
  - Neat and colorful presentation, clear visual aids/pictures
  - Each student must have a part in the presentation, and speak clearly
- 
13. **Provide time for teams** to put the finishing touches on presentations and to practice the presentations.

### ➤ Day 6: (45 minutes)

14. **Teams will present their findings to the class.** Use the **Presentation Rubric (Attachment F)** to score the students' presentations.
- 
15. **Each presentation should last approximately 5 minutes** with proper use of visual aids and a presentation outline.

## Extend

- **Have a team or two present to the administrative staff** of the school building or district, parent and community groups, school board, city council, etc.
- Students can play an interactive PowerPoint game online called the **Safe Routes to School Game Show**. It's available on the everymove website.



[www.everymove.ohio.gov](http://www.everymove.ohio.gov)



## Assessment

This lesson enables the students to learn and focus on a real world problem in their community and to develop solutions to help solve it. This lesson can be extended so the students involve the community. The learning focuses on researching, building knowledge about a topic, working with a group, and presenting the information clearly. Use both the planning sheet and the rubric to score student understanding.

## Additional Resources



### Technology Connections

Using **Powerpoint** and **Smart Notebook** are great ways to incorporate technology for student presentations.

Additionally, there are several online tools that will engage students and provide them with opportunities to learn strategies for presenting information.

**Prezi** – Easy to learn with features that allow students to zoom in and out, and transition to new topics in innovative ways.

[www.prezi.com](http://www.prezi.com)

**Glogster** – Allows students to create animated presentations that incorporate images, video, text, animations, and more!

[www.glogster.com](http://www.glogster.com)

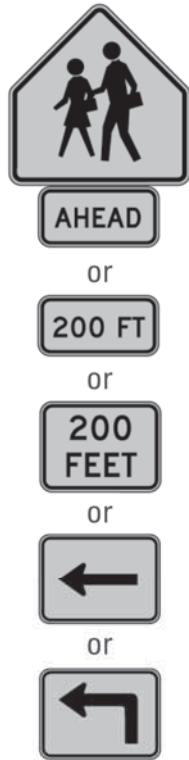
## Related Careers

Invite your students to brainstorm all the potential careers related to this lesson.

- Civil Engineer
- Committee Leader
- Data Analyst
- Law Enforcement Officer
- Public Relations Specialist
- Public Speaker
- Reporter, Journalist
- Safety Inspector
- School Administrator
- Teacher

# Attachment A – School Area Signs

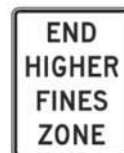
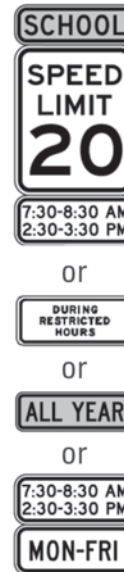
School Zone Ahead and School Crossing Ahead



School Crossing



School Speed Limit



## Attachment B – ODOT Student Safety Tip Card (Side A)

OHIO DEPARTMENT OF TRANSPORTATION

EVERY  
*move*  
YOU MAKE  
KEEP IT SAFE

*Stay safe  
and fit on your  
way to school!*

- 1 Know the traffic laws
- 2 Walk or bike in groups
- 3 Stay on sidewalks
- 4 Use crosswalks
- 5 Wear bright colors
- 6 Watch for cars before crossing
- 7 Leave your phone alone
- 8 Plan your route and follow it
- 9 Be aware of traffic sights and sounds
- 10 Look left, right, behind and in front while crossing
- 11 Make sure your parents always know where you are

*Watch our video!*

Go to [everymove.ohio.gov](http://everymove.ohio.gov) for activities and more!

# Attachment B – ODOT Student Safety Tip Card (Side B)

## Walk Safe

1. Use pedestrian signals and crosswalks
2. Walk directly across streets
3. Walk facing traffic so you can see drivers
4. Always cross at the safest place
5. Watch for parked cars that might move unexpectedly
6. Keep in mind, it's hard for big vehicles to see you

## Bike Safe

1. Use proper hand signals
2. Wear proper gear: a bike helmet and bright clothing
3. Ride in the same direction as traffic
4. Check for traffic before you change lanes or cross the street
5. Ride 3 feet away from parked cars since doors might open
6. Use headlights, taillights and reflectors when it's dark
7. Ride in a straight line with both hands on handlebars, use a backpack or basket to carry books and lunches

## Test Your Safe Routes to School IQ

1. When your mom drives you to and from school it creates enough carbon dioxide on average to fill \_\_\_\_ balloons.  
a. 1    b. 10    c. 60
2. How many gallons of gas would your parents use if they drove you to school in a medium-size car 1 mile a day for a year?  
a. 67    b. 25    c. 32
3. Walking a mile to school keeps you healthy by burning \_\_\_\_\_ calories a year.  
a. 3,725    b. 250    c. 16,000
4. Walking or riding bikes to school makes you smart.  
a. True    b. False
5. You can learn to be self-reliant and independent when you practice traffic safety and walk or ride bikes to school.  
a. True    b. False

## HONDA



U.S. Department of Transportation  
Federal Highway Administration

### Answers

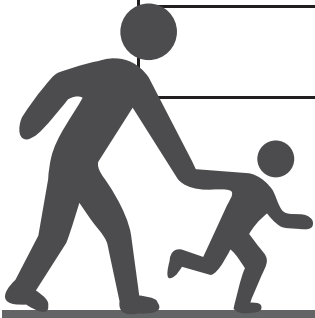
1. c. 60 balloons – which is a lot of air pollution.
2. a. 67 gallons a year which costs \$201 if gas is \$3 a gallon.
3. c. 16,000 calories – the same amount gained from eating 64 fast food hamburgers or drinking 107 sodas.
4. a. True – Research shows physically fit kids do better on reading, math, science and social studies standardized tests.
5. a. True – Plus, walking and bicycling to school is a fun way to spend more time with your friends.

*IQ Test Sources:* <http://caloriecount.about.com/>, [www.walktoschool.co.uk](http://www.walktoschool.co.uk), [feetnotfuel.com](http://feetnotfuel.com), [www.sciencedaily.com](http://www.sciencedaily.com), <http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm>

## Attachment C – School Zone Hazard Identification Chart

Student Safety Inspector: \_\_\_\_\_

Hazard	Location	Possible Solution
What is the hazard or problem that could cause someone to become injured?	Be specific. What is the hazard close to? (Take a picture or video if possible).	How could this be fixed?



## Attachment D – Hazards: Things to Consider

Student Safety Inspector: \_\_\_\_\_

Ask Yourself These Questions

Is there a sidewalk or path?

Is there room to walk on the sidewalk or path?

Are the sidewalks broken, cracked or uneven?

Were you able to cross the street?

Was it easy? Why or why not?

Were you able to cross at traffic lights?

Were there cars parked in a way that made it hard to check for traffic?

How did the drivers drive in the school zone?

Were areas clearly marked with visible signs?



# Attachment E – School Safety Zone Planning Sheet

Student Safety Inspector: \_\_\_\_\_ Hazard: \_\_\_\_\_

How could someone be hurt if this hazard was not fixed or removed?	
Identify 3 possible solutions:	
1.	
2.	
3.	
Which solution(s) will you choose to focus on in your presentation?	
How will this help?	Who will this help?
Who do we need to involve?	What information will we need?
What materials will we need?	What observations, visuals, information, reports or interviews can we collect and how will we present the information?

# Attachment F – Presentation Rubric

Student Safety Inspector: \_\_\_\_\_ Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

Hazard	Excellent	Satisfactory	Needs Improvement	Not Included
Potential hazard was shared	3	2	1	0
Possible solutions were explained	3	2	1	0
<b>Information Collected</b>				
Data, information, reports, interviews or observations were identified	3	2	1	0
Information was presented in a clear manner	3	2	1	0
<b>Overall Presentation</b>				
Map showing the problem is included, neat and colorful	3	2	1	0
Map showing the solution is included, neat and colorful	3	2	1	0
Visual aids were easy to see, understand	3	2	1	0
Each student spoke, easy to understand	3	2	1	0
<b>Outline</b>				
Presentation outline was clear	3	2	1	0
Presentation outline was complete	3	2	1	0

Overall Comments:

Total Score: \_\_\_\_\_



## Teacher Notes

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