About SMART MOVES Middle School Curriculum

SMART MOVES Middle School Curriculum invites students to become active citizens – to examine real issues in their own community and act on their knowledge and beliefs. Designed by the Office of Transportation at the City of Portland, this curriculum is intended to build a sense of hope in youth, to give them a stake in their city and the skills and desire to shape it.

The mission of the City of Portland is to encourage traffic safety, a clean environment, and livable neighborhoods. Meeting these goals requires the participation of informed citizens working together, and educators like you are crucial to this process.

Why SMART MOVES?

This curriculum helps students to:

- Identify real transportation, planning, and environmental issues in their community.
- Practice problem solving.
- Understand how a community is formed and managed.
- Learn traffic and safety rules.

- Safely explore healthy transportation options such as walking, biking, and roller-blading.
- See the connection between transportation habits and the environment.
- Develop and practice benchmark skills.
- Discover a clear vision for their community and create a plan of action.

Who is it for?

SMART MOVES was created for all middle school students. With minor adaptations, it can be used successfully with classes that contain a wide range of skill levels. In addition, these lessons can be tied to a variety of subject areas. For example, a teacher looking for language arts assignments will find topics here suitable for narrative, imaginative, expository, and persuasive writing exercises.

What's in this Curriculum?

The SMART MOVES Curriculum consists of ten lessons ranging from health and safety to environmental and planning issues. Behind each lesson is a concern for both the safety of individuals moving about the community and the safety of the environment in which they travel.

Lesson Components

Each lesson plan includes the following components:

- **Overview** lesson summary
- **Objectives** specific student outcomes
- **Time** approximate class periods
- Materials detailed list of all materials necessary to teach the lesson
- **Procedure** step-by step suggestions for teaching
- **Assessment Opportunities** within the lesson
- **Extensions** suggestions for further study
- **Benchmarks** correlated to the Oregon Standards and Benchmarks. Information includes the subject area, strand, content standard, and specific benchmarks for 8th grade. Where the content standard and benchmark are identical, only the content standard is listed.
- **Resources** local, regional, and national
- **Student Handouts** copy-ready student handouts
- Teacher Resources answers to questions on student handouts and background information

Overview of Lessons

Making Choices 1: Basic Principles

Students examine core beliefs behind American values, including the thinking of philosophers such as Locke and Rousseau. Through dialogue, students define and develop their own principles and values.

Making Choices 2: Walking the Walk

In this second lesson on values, students recognize the complexity of environmental choices, explore a process for decision making, and create an environmental action plan based on their principles.

H2O and Cars

Students discover the connection between cars and water quality. They discuss how they can help prevent water pollution, and then create illustrated fact sheets to distribute to drivers in the community.

Trees, Cars and CO2

Using simple arithmetic to figure the amount of CO2 emissions produced by their own travel, students understand why fuel-efficient cars are more environmentally friendly. As a wrap-up activity, students design a bumper sticker that expresses the information they have learned.

Form, Function, and Freeways

Students consider how transportation infrastructure affects the way we live our lives. Students study the streets located around their school and the functions that the streets serve for the school community as well as for the Portland metropolitan area. They then consider a major transportation decision that would affect their school's neighborhood and write an impact statement that explains the ramifications of the decision.

ECO Town

By playing a board game, students are introduced to the transportation issues involved in planning a livable city.

Pushing Pedal Power

In this lesson, students analyze car advertisements, discuss the bicycle as an alternative to the car, and then create their own advertisements promoting bicycling.

Safety

Students read descriptions of transportation crashes, play a game that requires them to identify transportation safety rules, and then observe and record safe and unsafe behaviors in the community.

Get Moving and Get Healthy

In this lesson, students calculate their resting heart rates and target heart rates. They complete fitness evaluations and set activity goals using various modes of transportation to improve their health.

What Do You Know Bingo

In this group bingo game, students review traffic safety, health, transportation, and planning issues using questions taken from the lessons.

Tips for Using SMART MOVES

How to integrate

This curriculum offers a flexible tool for teaching many community issues: citizenship, environmental awareness, safety, and health. Some of the lessons cover a single topic in one class period, while others focus on

complex concepts and extend over several periods. The lessons are complete and may be used as is or easily modified.

How you integrate the lessons into your curriculum depends on your goals and your students' interests and skill levels. You could choose individual lesson plans to introduce, supplement, or extend a unit you are teaching. Or you could use the whole curriculum in sequential order as a unit in itself. Any one of these lessons could be the basis for a module, class project, or service learning.

Reading, thinking, and speaking

Many of the lessons ask students to read handouts, but the process is adaptable. If reading the handouts proves too difficult for some students, consider reading those handouts aloud to your class or pairing poor readers with better ones.

Whatever you do, don't shy away from the lessons that engage higher order thinking just because your students have limited skills. Many educators are now finding that students with a range of abilities are capable of and indeed interested in tackling the complex thinking real-world issues require.

Young people are experts on their experiences. They care about their neighborhoods and want to talk about them. If you adopt the role of facilitator, you can help your students construct exciting and meaningful exchanges. You won't have all the answers. You don't have to. You are all citizens of Portland and you are deciding how you will live in this city. The

SMART MOVES Curriculum asks teachers to collaborate with their students, to share a dialogue about the common good and what it means to our daily lives.

Group work

Almost all of the lessons ask students to work in groups, a tactic that helps them learn and practice teamwork skills. Citizenship requires the ability to work and solve problems together. But you might also want to make opportunities for students to produce individual pieces as well, such as poems, drawings, songs, or models that express their unique understanding of a concept or topic.

Getting out into the community

Teachers should note that it is almost impossible to study livability issues without getting students out into the community. You may have students who have never walked around the school or their own neighborhoods. As much as possible, get students out of the classroom to look and think about the place where they live. Help them realize that the results of human decisions are all around them. Do they like what they see? What decisions would they make if they were in charge?

Some of the lessons ask students to practice a skill in the community and report back to the class. This "homework" can be a fun way to reinforce concepts if you make a point to ask students what they discovered. Encourage your students to develop the eye of an anthropologist. What's

going on out there in the community? What do they see? And why do they think it is happening?

Further study

Use the resources listed at the end of each lesson to expand and extend study of the topic covered in the lesson. Both Metro, (503) 797-1755, and Tri-Met, (503) 962-7660, have curricula that are compatible with SMART MOVES. Check out their offerings for more lessons on safety and livability issues.

Project ideas

Projects offer students the opportunity for hands-on, contextual learning and are a powerful way for students to connect academic knowledge with the world around them. Whenever possible, students should share their projects with an audience of peers or adults.

Below are a few suggestions for projects that students could complete with support and guidance from adults. Students could:

- Map the neighborhood and/or the area around the school. Have them include specific transportation facilities such as crosswalks or bike paths.
- Conduct information interviews with individuals involved in transportation and planning issues: planners, platters, members of a neighborhood association, or local bike club.
- Put on a bike or scooter safety rodeo with an obstacle course and prizes.
 Invite police officers to moderate.
- Create a guide to the best bike routes for kids in the city.

- Design a handbook on bike, bus, or pedestrian safety.
- Take on a community issue, (such as a dangerous intersection near their school), attend neighborhood or city meetings, and bring attention to the problem with informational flyers.
- Explore on the Internet what other cities in America and around the world have done to create safe and livable environments.
- Design and display a safety collage.
- Write and perform plays on safety and environmental issues for other classes.
- Create and conduct surveys. Have your students survey the community to find out what people like and dislike about their neighborhoods. Make sure students include respondents from all races and cultures in their survey. They could ask questions such as: What would you like to change about the traffic in your neighborhood? What safety rules do you wish more people would follow? Have students put this information on charts or graphs and come up with solutions to the problems that respondents identified. Students could even go back to the same respondents and ask them what they think of their solutions. This project helps students understand the challenges of creating a community for the common good.
- Develop a multi-media presentation. Students could inform other students or members of the PTA about their neighborhood. Presentations could include video-taped interviews with community members, an audio tape of neighborhood sounds set to music, or a slide show tour of a neighborhood that celebrates its unique qualities.

- Draw cities of the future, new designs for roads and bridges, and/or new vehicles.
- Estimate, predict, or forecast the future based on current statistics. For example, students could research American driving patterns and pollution numbers and forecast three futures: 1) if we increase the miles that each individual drives; 2) if we drive the same miles, adjusted for population growth; 3) if we reduce driving or reduce emissions with fuel-efficient cars. Let your class imagine and portray future scenarios. There are many good futuristic Web sites on the Internet to which students could compare their scenarios.
- Write brochures, fact sheets, or short stories based on their community.
 Students could create a myth or comic book about a safety or environmental superhero. They could write and illustrate a children's books to share with younger children.
- Study geometry in nature to discover more efficient designs for housing, commercial buildings, and roads.

Overview of Benchmarks

	Arts	Career- related Learning	English	Health Education	Mathematics	Physical Education	Science	Social Science
Making Choices 1		V	1					1
Making Choices 2		1	1		1			1
H ₂ O and Cars	1		1				1	
Trees, Cars, and CO ₂	1		1		V		1	
Form, Function, and Freeways		1	1					1
ECO Town		1		1/			1	1
Pushing Pedal Power	1		1					
Safety			1	1/				
Get Moving and Get Healthy			1	1/	V	V		
What Do You Know Bingo		1		1	V	1	1	V

Making Choices 1: Basic Principles

Children are quite willing to ask sensible, provocative questions until some cognitive and moral hunger is appeared – unless they figure out that the adults around them have no wish to hear what is on their minds."

Robert Coles

Overview: Students examine core beliefs behind American values, including the thinking of philosophers such as Locke and Rousseau. Through dialogue, students define and develop their own principles around the concept of the common good.

Objectives:

Students will be able to

- Engage in dialogue that includes explaining and relating ethical ideas.
- Compare and contrast moral philosophies and draw conclusions.
- Evaluate moral philosophies.
- Define *freedom* and *common good*.
- Examine and describe their own values in relationship to the common good.

Time: 2-3 class periods

Materials:

• Student Handout: What Do You Believe?

• Student Handout: What Is Right?

• Student Handout: Freedom and the Common Good

Before you begin:

"Making Choices 1" and "Making Choices 2" are intended to be used together. The goal of these lessons is to help students explore the connection between what they believe and how they choose to act. By defining their principles, students can judge their own actions and determine whether or not they are living the visions they hold for their lives and their community. The abilities to judge and act are at the core of good citizenship.

Both lessons ask teachers and students to engage in dialogue with a spirit of inquiry. Write the rules for scholarly discourse on the board (in step 5, below) and refer to them whenever the discussion veers from a respectful process. Depending on the level of interest your students express for the dialogues, this lesson will take two to three class periods. Consider pairing poor readers with better ones during the individual reading time, or ask small groups to read the handouts aloud while everyone in the group follows along.

Procedure:

Day One

- 1. Begin the lesson with a question for the class: What would you do if your whole class was being punished because someone in the class stole from another student and you knew who did it? Your class would get to go outside on a break right away if you told the teacher. Would you?
- 2. Encourage students to answer honestly and show no judgement in response to their reasoning (as hard as that might be).
- 3. After brief discussion, tell students that in this lesson they will be considering moral questions like this one as they define their basic principles or values that guide their lives.
- 4. Pass out the handout *What Do You Believe?* and ask students to respond to the statements quickly and to the best of their ability. Tell students that philosophers have spent lifetimes pondering these questions, but you want students to choose the answer that comes to mind first. Give them five minutes to complete the handout.
- 5. When everyone has finished the handout, tell students they will have a chance to discuss the statements on it, but first a few rules of courtesy for scholarly discussions. Write these on the board:

There are no right answers, only answers with better reasons. Explain your reasoning.

Stick to the ideas and disagree respectfully – don't attack each other personally.

Really listen to each other.

- 6. Invite students to discuss the statements on the handout. Point out that they responded to the statements quickly and that they may find themselves changing their responses once they've had a chance to discuss them. That's fine.
- 7. Use the following questions to encourage thoughtful examination of the issues behind the statements:

Why do you think that? How so? How did you get to that conclusion? What assumptions are you working from? Can you give an example?

- 8. Reinforce students who begin using the questions you have modeled: "Now you're thinking. That's just the kind of question a philosopher would ask."
- 9. After the class has discussed the statements, ask if anyone changed their viewpoint or developed a new reason for their belief. Tell students that what they have just done is participate in a philosophical dialogue. Dialogue is an excellent way to examine complex concepts.
- 10.Pass out the handout *What Is Right?*. Tell students they will now look at what some philosophers have reasoned is ethical or right behavior. Encourage students to look for ideas in the reading that are similar to those they expressed in their class discussion. Which philosophers do they agree with?
- 11. Ask students to read over the entire handout on their own and to jot a few ideas in response. Give students 15 minutes for this. For a class with poor reading and comprehension skills, you could either put students in pairs or have the whole class read and discuss the passages aloud and give time after each passage for the class to write responses.
- 12.Next, have students get into groups and discuss the questions on the sheet. They should take notes and end up with a group response to each question.

13.Lead a short class discussion to sum up the ideas students have discovered. After each question on the handout, ask if any other group came up with something different. Make sure every group shares their response to at least one of the questions.

Day Two

- 14. Write the word *freedom* on the board. Ask the students to define it as you write key phrases and words from their suggestions. They may not agree on the definition, which is fine. Ask, "What does freedom mean in our country? Are we free to steal? Are we free to pursue any job we want? Are we free to read what we want? Are we free to drive through a neighbor's yard?" Encourage students to begin to express the ideas of rights and responsibilities.
- 15. Ask students if they can recall the rules for courteous scholarly discussion. Write them on the board as students name them:

 There are no right answers, only answers with better reasons. Explain your reasoning.

Stick to the ideas and disagree respectfully – don't attack each other personally.

Really listen to each other.

- 16.Pass out the handout *Freedom and the Common Good*. Request that students read it first by themselves and jot notes. After ten minutes of reading, put students into small groups to read the handouts again, discuss, and sum up the group thinking in writing. Give the groups about 20 minutes to complete the handout.
- 17. When the groups have finished the handout, lead a class discussion.

Make time for students to respond to other groups' comments.

Discussion prompts may include:

Could you give an example?

What are you assuming?

What would follow from what you say? What would be some unintended consequences?

How are the ideas from this group alike or different from Hobbes, Locke, or Rosseau?

How do these behaviors maintain the common good?

Reinforce students who exhibit higher order thinking skills: those who integrate ideas, assess, judge, and explain.

- 18. For closure, sum up which ideas were most prevalent. Ask students if they agree that these ideas represent a good system for judging right from wrong. For example, if students identified "helping others" as an important moral behavior for maintaining the common good, ask them which behaviors would then be judged as wrong.
- 19.Tell students that in the next lesson they will have an opportunity to act on their principles.

Assessment Opportunities:

- Large and small group discussions
- Written answers to prompts on handout

Extensions:

Writing Exercises

- Students could write short stories about a society that was missing one of their principles: What if no one in this society valued honesty? What would that society be like? What kinds of problems would arise? Or what if no one worried about the future? What if people consumed all the resources and fouled the environment? What would it be like for the people who came after?
- Show a movie like *Silkwood* in which the protagonist is faced with a moral decision. Ask students to discuss whether or not they think the character made the right choice. What principles guided the protagonist and do the students value those principles?
- Give students the format for a script or play and invite them to write and act out moral dilemmas involving good citizenship.
- Ask students to write about their first memory of a moral decision. For example, did they ever steal or tell a lie when they were younger? Did they ever do the right thing in the face of difficult odds? How do they judge that early action? Did they choose badly or well?

Other Cultures

- Encourage students to explore philosophies from other cultures. Do the Chinese hold the same values as Americans? What is their definition of the common good? How are their history and thinking alike and/or different from ours?
- Students could research values in other cultures and create a chart to show the similarities and differences of values worldwide. Can students come up with a global set of principles to maintain the common good of the world?

Benchmarks

Career-Related Learning

Personal Management

Exhibit appropriate work ethic and behaviors in school, community, and workplace.

• Recognize and explain the differences between socially responsible and socially irresponsible behavior.

Problem Solving

Apply decision-making and problem-solving techniques in school, community, and workplace.

• Use information to make decisions and solve problems related to family, school, and community situations.

Teamwork

Demonstrate effective teamwork in school, community, and workplace. Use strategies to work effectively with team members (e.g., negotiation, compromise, consensus, conflict resolution).

• Examine one's own role and performance in family, school, and community team efforts, (e.g., leader, follower, team member, facilitator).

Organizations and Systems

Describe how individuals fit into organizations and systems.

• Compare and contrast simple systems and organizations, showing their common elements and relationships (e.g., families, schools, communities, and workplaces).

English

Reading

Demonstrate literal comprehension of a variety of printed material.

• Identify sequences of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections.

Demonstrate inferential comprehension of a variety of printed material.

• Examine relationships, images, patterns, or symbols to draw conclusions about their meanings in printed material.

Draw connections and explain relationships between reading selections and other texts, experiences, issues, and events.

• Extend and deepen comprehension by relating text to other texts, experiences, issues, and events.

Writing

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience, and purpose.

Communication

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas with accurate relevant supporting details, including documentation of sources, appropriate to audience and purpose.

Social Science

Civics and Government

Understand the roles, rights, and responsibilities of citizens in the United States.

• Understand citizens' roles and ways of participating responsibly in the political process.

Resources:

Going Places, Making Choices

Transportation and the Environment/Curriculum for Grades 9-12 National 4-H Council

7100 Connecticut Ave., Chevy Chase, Maryland, 20815-4999

Phone: (301) 961-2800

http://www.fourthcouncil.edu

Character Education Partnership

http://www.character.org/

Children Thinking with Matthew Lipman

http://www.terrace.qld.edu.au/academic/learnsup/gregpapr.htm

Northwest Center for Philosophy for Children

http://www.philosophyforchildren.org

The Common Good

http://www.scu.edu/SCUCenters/Ethics/practicing/decision/commongood.shtml

HANDOUT: What Do You Believe?

This survey asks you to consider some open-ended questions. You won't be judged on your choices, but you might be asked to consider why you answered the way you did. You will probably discover something new about yourself in the process.

Circle the response that best describes your beliefs.

1. Humans are born basically good. Their natural condition is one of sharing, kindness, and peace.

Agree Disagree

2. Humans are born wild and uncivilized. They need to be trained to be good.

Agree Disagree

3. Humans are neither naturally good nor bad. It is their environment that makes them do good or bad things to themselves and others.

Agree Disagree

4. There is no absolute right or wrong. Right and wrong depend on the situation.

Agree Disagree

5. There are things we can always say are definitely right or wrong.

Agree Disagree

6. People should take care of themselves and not expect other people to help out.

Agree Disagree

7. We all need to help each other.

Agree Disagree

8. All people owe it to their community to be good citizens: to make and follow the laws, to participate in solving community issues.

Agree Disagree

9. No person should have to worry about the community. People should be able to do whatever they want, whenever they want.

Agree Disagree

10. It's our duty to plan ahead for future generations: to leave the water, air, and land clean, to leave plenty of fuel and food.

Agree Disagree

11. Let each generation solve its own problems.

Agree Disagree

12. I consider myself a moral person.

Agree Disagree

HANDOUT: What Is Right?

For thousands of years philosophers have pondered what it means to be human. They have questioned the notions of freedom, truth, and goodness. They have argued over what is real, what is wrong, and what is right. Many of our social behaviors and political processes have sprung from answering these and other questions. The Declaration of Independence and the U.S. Constitution are based on some of the ideas from such eighteenth century philosophers as John Locke and Jean Jacques Rousseau.

Read over the following descriptions, first individually and then in small groups. Discuss these ideas in your group and respond to the questions. Take the time to really listen to one another and arrive at conclusions that reflect your collective thinking.

Absolutism and Consequentialism

Ethics, or moral philosophy, deals with right behavior, with what constitutes good and bad conduct for a government, a group, or an individual. Moral philosophy can be divided into two categories: Absolutism and Consequentialism.

Absolutism

Absolutism states that there are actions that are so morally wrong that they should never be done no matter what the consequences of not doing such an action might be.

Example

An absolutist who believed that killing was *always* wrong would refrain from killing in any situation, even to defend himself against a threat to his life.

Ouestions:

What are the arguments for absolutism?

What are the arguments against it?

Consequentialism

Consequentialism states that the morality of an action can be determined by the consequences of the action. The Consequentialists believe further, that there is no act that cannot be justified by its consequences. The slogan "the end justifies the means" typifies Consequentialist philosophy.

Example

An **Absolutist** might say, "Dropping a nuclear bomb is so wrong that it should never be done no matter what the circumstances." A **Consequentialist** might say "Yes, 130,000 people died in Hiroshima, but it ended World War II and saved a lot more lives by doing so."

Questions:

What are the arguments for Consequentialism?

What are the arguments against it?

Consequentialism as Utilitarianism

Utilitarianism is an ethical theory based on the idea that an *action affecting society* can be judged to be right or wrong depending on how good or bad the consequences. The English philosopher, Jeremy Bentham (1748-1832) was the founder of this theory, which is often condensed to the slogan "the greatest happiness for the greatest number."

Ouestions:

What are the arguments for using "the greatest happiness for the greatest number of people" as the basis for organizing a society?

What are the arguments against it? What examples can you think of where creating a society based on the "greatest happiness for the greatest number" might not be good, just, or right? (Hint: Consider the situation of slavery in the early history of the United States.)

HANDOUT: Freedom and the Common Good

Americans vigorously protect their personal freedoms, but they also understand that freedom requires responsibility. People are not free to harm others, rather we agree as a group to behave in a way that benefits the *common good*. What is the common good? It means we create and manage social systems, institutions, and our environment to benefit all people. We strive for good health care for our citizens, public safety and peace, fair employment and education, clean air, water, and soil.

Below are some descriptions of philosophers who have influenced our thinking about the common good. See if you can find the roots of some of your own ideas about justice in these passages and think about what you believe is right behavior for a society and its individuals.

Thomas Hobbes (1588-1679)

Thomas Hobbes, a seventeenth-century English philosopher, believed that people should surrender their natural rights to their king and never challenge their leader once they have given him authority. To Hobbes, the leader's power is absolute and no one can change that, not even the Church.

Hobbes is most famous for his book *Leviathan*, in which he describes humans' natural state as, "No arts; no letters; no society; and, which is worst of all, continual fear and danger of violent death; and the life of man solitary, poor, nasty, brutish and short." He felt that it was fear of violent death that motivated people to form "the state" and surrender themselves to the absolute authority of a sovereign power (the king).

Questions:

What are some benefits of a government based on the absolute power of a ruler?

What are some problems with Hobbes' concept of absolute rule?

John Locke (1632-1704)

John Locke, another English philosopher, viewed the natural state of mankind in a less pessimistic light than Thomas Hobbes. Locke felt that humans were born with a natural goodness and innocence. Unlike Hobbes, Locke argued that the power a leader has is "on loan" and can be revoked through rebellion if the leader violates the agreement of the social contract.

In 1690 his two most famous works were published: *Essay Concerning Human Understanding* and *Two Treatises on Civil Government*. Locke thought that all people were created equal, and should be able to pursue "life, health, liberty and possessions." Locke argued that the social contract should be founded on reason and tolerance. His ideas for a system of checks and balances was incorporated into the U.S. Constitution. Locke believed that if a governing power violated the social contract, revolution could not only be justified, but in some cases, was an obligation.

Jean Jacques Rousseau (1712-78)

A Swiss-French philosopher, Rousseau became one of the most influential thinkers of the eighteenth century, contributing his ideas to a period known as the Enlightenment, (sometimes called the Age of Reason). Building on the thinking of Hobbes and Locke, Rousseau wrote *Discourse on the Inequalities of Men* (1754) and *Social Contract* (1762), in which he stated that humans were essentially good, but were corrupted by class divisions, property and commerce. He wrote, "Man is born free, and everywhere he is in chains." In Rousseau's vision, people entered into a social contract

among themselves, creating a government and educational systems to correct the inequalities brought about by civilization.

Both Locke and Rousseau contributed to our modern idea of individual rights, a concept that serves as a foundation for the American democracy we have today. Most Americans hold strong convictions about their individual freedoms, far beyond what Rousseau would have imagined. But even here, in the "land of the free," individual rights must be balanced with the rights of the group. For example, you are not free to run a red light while driving. To do so would take away the right of other drivers and pedestrians to be safe from collisions.

Freedom is often a balance between the individual's rights and the rights of others. Considering what you have just read and your own ideas on the subject, describe what you believe is a good system for ensuring the rights of individuals and the common good. Use the following questions to guide you.

Ouestions:

Describe the society that you would like to live in. What are the qualities of this perfect place? How do people behave and what kind of benefits do people get from this society?

In your perfect society, would you limit individual freedoms for the common good? If so, under what circumstances? If you would not limit individual freedoms, what would be the consequences of no limits?

How would you make sure that people followed the rules? Give examples. (Note: If you think like Hobbes – that humans are basically nasty and brutish – you will have a different plan for ensuring order than if you think like Rousseau.)

List what you consider are the five most important behaviors for people to have in order to maintain the common good. (For example, honesty or altruism.)

Do you believe that planning for future generations is part of maintaining the common good? For example, should people give up some of their freedoms now to make the planet cleaner or safer for the children who will come later? Why or why not?

Making Choices 2: Walking the Walk

Overview: In this second lesson on principles and citizenship, students recognize the complexity of environmental choices, explore a process for decision making, and create action plans based on their principles.

Obj	ecti	ves	:		
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St	udents will be able to
	Recognize the complexity of "right/right" choices.
	Identify the parts of an environmental problem, including the science
	behind the problem as well as the human concerns.
	Explore a process for making decisions.
	Describe what they are willing to do about the problem.
	Create action plans based on their principles.

Time: 2 class periods

Materials:

☐ Student Handout: *Making Choices*

Procedure:

- 1. Review the students' principles that they wrote in the lesson "Making Choices 1" and point out that the values they have written can help them make decisions in their lives. One way people decide what to do or how to solve a problem is to let their values guide them.
- 2. Write the word *integrity* on the board and ask students if anyone knows what it means. Tell students that today they will explore integrity matching their values with responsible behavior or actions. Explain that people who have integrity act on their beliefs and do what they say they will do. Ask the students: Would you call a minister who lies a person demonstrating integrity? Why not? What about a writer who quits his job creating advertisements for a cigarette company because he doesn't believe in glamorizing the product? Does his action show integrity? Why or why not?
- 3. Point out that the great thing about having sound principles is that you always have a way to measure your behavior, you always have a way to

- judge whether or not you are living the vision you have for your life. Tell students that today they will look at a real and pressing problem facing all of us and use their principles to help them decide what to do about it.
- 4. Pass out the handout *Making Choices* to each student and tell the class that you will use the handout as a basis for class discussion. Everyone should follow along and do the exercises.
- 5. Start the discussion by telling students that they will examine real problems, problems that aren't easy to solve.
 - Here's an example of a real problem: A girl sees a friend stealing from another student at school and knows she should tell the teacher. If she does tell, her friend will get in trouble and feel betrayed by her. If she doesn't tell, her friend will harm other students by stealing from them. The girl is right to want to be loyal to her friend and right to want to protect others. She has a real problem to solve.
- 6. Have students read the introduction to the handout *Making Choices* aloud and then give them time to read and respond to the first problem-solving step. Repeat this process for each step: have students read the information, work through the exercise individually, and then discuss together in whole group.
- 7. Point out that it is easy for us to intend to do the things we believe in, but it's often difficult to carry out good intentions. In the final step of *Making Choices*, Make a Decision, preview the example in the Personal Action Plan. Some students may say that they don't think they should have to reduce the miles they are driven. Encourage those students to come up with a plan for air quality. What other ideas do they have? Let them spend time researching the topic on the Internet and have them document their sources.

Discuss with the class other actions students might take that could minimize the use of cars and encourage the use of alternative transportation; for example, encouraging the drivers of cars to respect bicyclists or teaching a friend how to take the bus.

8. Tell students that the process they are using today can be one they apply to all the problems in their lives. The hard part of this process is actually

following through – demonstrating integrity. It is one thing to make an action plan based on your beliefs; it is quite another to act.

9. Encourage students to take their plans with them and report back in a week on their progress. When students have completed their action plans, ask volunteers to share their plans. You might post a chart of the greenhouse gases that were not emitted by the class using alternative transportation.

Assessment Opportunities:

Responses to problem solving steps in handout
Class discussion
Completed action plans
Review and discussion of action plans

Extensions:

Forecasting

To demonstrate the power of individual actions, ask students to forecast the clean air savings when each person conserves. What happens when one student walks two miles to the store instead of driving? What happens when every student in the class walks two miles to the store every week for a year? How many pounds of noxious gases are not emitted when 100 people walk two miles instead of driving?

Research Other Actions

Have students get on the Internet and discover what other students around the world are doing about air quality. What actions are young people taking? How can your students participate in this cause?

Benchmarks:

Career-Related Learning

Personal Management

Exhibit appropriate work ethic and behaviors in school, community, and workplace.

Recognize and explain the differences between socially responsible and
socially irresponsible behavior.

Problem Solving

Apply decision-making and problem-solving techniques in school, community, and workplace.
☐ Use information to make decisions and solve problems related to family, school, and community situations.
 Organizations and Systems Describe how individuals fit into organizations and systems. □ Compare and contrast simple systems and organizations, showing their common elements and relationships (e.g., families, schools, communities, and workplaces).
 English Reading Demonstrate literal comprehension of a variety of printed material. □ Identify sequences of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections.
Demonstrate inferential comprehension of a variety of printed material. ☐ Examine relationships, images, patterns, or symbols to draw conclusions about their meanings in printed material.
 Draw connections and explain relationships between reading selections and other texts, experiences, issues, and events. □ Extend and deepen comprehension by relating text to other texts, experiences, issues, and events.
 Writing Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details. Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience, and purpose.

Communication

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details. Convey clear, focused main ideas with accurate relevant supporting details, including documentation of sources, appropriate to audience and purpose.
 Mathematics Calculations and Estimations Compute with whole numbers, fractions, decimals, and integers using paper and pencil, calculators, and computers. □ Perform calculations on whole numbers, fractions, decimals, and integers using paper and pencil, calculators, and computers.
 Social Science Civics and Government Understand the roles, rights, and responsibilities of citizens in the United States. □ Understand citizens' roles and ways of participating responsibly in the political process.

Resources:

A Framework for Ethical Decision Making

http://www.scu.edu/SCU/Centers/Ethics/practicing/decision/framework.sht ml

Environmental Protection Agency

http://www.epa.gov

How Good People Make Tough Choices

http://www.globalethics.org/pub/toughchoices.html

HANDOUT: Making Choices

Most Americans agree that we should create a society based on the concept of the common good, a society that benefits all. But the disagreements start when people try to determine how we achieve this common good.

Below is one process for making ethical choices in your life – not only for public problems like pollution – but also for personal ones like figuring out who you want for friends or whether or not you should apply for a certain job.

I. Recognize a Real Problem

How do you know you are faced with a problem? Real problems are not those in which you must choose between right and wrong. Right and wrong are easy decisions: you know which one you should choose, even if you decide not to. Real problems are the ones where you must choose between **right** and **right**.

Keeping Our Air Clean Is a Real Problem

Almost everyone wants to keep the air clean, but not everyone can agree how we should do this. Some people argue that we should pass laws that make people reduce their driving since cars are a major source of air pollution. Other people argue that we should each take responsibility to conserve on our own. And there are even people who say they don't care about air quality; their right to drive cars come first.

Look at these quotes from citizens who wrote to the *Oregonian* on May 24, 2001 to express their opinions on energy and air quality issues:

"...we should use 21st century technology to reduce our reliance on costly, dirty, and nonrenewable sources such as oil and coal." Lake Oswego

"With all the concerns about energy conservation and methods to reduce air pollution, it seems that one of the easiest ways to help would be to turn off your car engine while idling. Turning off a car engine is comparable to shutting off a power mower, which is another highly recommended means to reduce air pollution and conserve energy." Tigard

"This is America! Government does not have the right to dictate the conditions of life to free Americans. If Americans want more energy, then that's what they are going to get." Lake Oswego

The first two speakers argue for ways to keep the air clean. The last speaker is not so concerned about how the air will stay clean but about making sure that Americans get the energy they want. Both viewpoints are right. It's right to want to protect the air and it's right to want gas to drive your car.

Find the right versus right issues in the following quotes from other real citizens in our community:

"Everyone – individuals, businesses, and governments – needs to take prompt action to reduce emissions of greenhouse gases."

"Why should Americans have to conserve when other countries like China aren't doing their part?"

II. Get the Facts

When you are faced with a problem, one good practice is to gather as many facts as you can about the problem. Then you will be able to base your solution on knowledge rather than guesses.

Gather Facts on the Problem of Keeping Our Air Clean

[Begin sidebar.]

"Carbon dioxide is a heat-trapping greenhouse gas. Its concentration in the atmosphere has risen about 30 percent since the late 1800's and is higher than it has been in at least the last 400,000 years. Many scientists project the rising CO2 level could reach between two and three times its late 19th-century level by 2100."

From the article "Plant Reveals Carbon Dioxide's Ties to Temperature" in the *Oregonian*, May 17, 2001

[End sidebar.]

Global warming, greenhouse gas, ozone damage. You've heard these words in the news. But what do they mean? And how bad is the problem of air pollution anyway?

A Few Definitions

Global warming is a term that means the temperature of the Earth's surface is rising. This sounds like fun to have a warmer planet, but it turns out that warmer temperatures could cause more droughts in some regions, more rain in others, increased flooding, and other serious consequences to the planet and its inhabitants. The global average temperature has risen from 14.86 degrees Celsius in 1950 to 15.40 degrees Celsius in 1995.

Greenhouse gases result from both natural causes and from human activity such as burning fuels like coal and oil. These gases are compared to the glass on a greenhouse because they let in short-wave solar radiation, but prevent long-wave radiation from escaping. They trap and bounce the radiation back to earth, making it warm. The greenhouse effect is a natural phenomenon, but human activity has created too many gases that are now overheating the Earth.

Ozone is the protective layer in the atmosphere about 15 miles above the ground that absorbs some of the sun's ultraviolet rays and helps prevent potentially harmful radiation from reaching the earth's surface. Ozone damage is what happens when certain compounds such as chloroflourocarbons destroy ozone molecules.

So What?

One of the reasons we have trouble keeping our air clean is that we often can't see that we are polluting it. For the most part, auto emissions are invisible and people don't make the connection between driving – which is a major source of air pollution – and health and environmental problems. Carbon monoxide hinders our body's ability to utilize oxygen. Nitrogen oxides can cause asthma and other lung problems, and carbon dioxide is a greenhouse gas that contributes to global warming.

Recent advances in automobile technology and design have decreased the emissions from modern cars. But just when we were making progress with

clean air, Americans increased their driving from one trillion miles per year in 1970 to approximately four trillion miles per year currently. If we keep increasing our driving, we will lose the gains we have made in clean car designs.

A Few Statistics

Take a look at these statistics from the Environmental Protection Agency and try out the math for yourself.

Greenhouse Gases and Pollution from Cars (Based on a fuel efficiency of 20mpg for cars)

Pounds of Carbon Dioxide (greenhouse gas)	Pounds of Nitrogen Oxides	Pounds of Carbon Monoxide
Cars emit carbon dioxide at a rate of approximately 0.98 pounds per mile or almost one pound per mile.	Cars emit nitrogen oxides at a rate of .0045 pounds per mile.	Cars emit carbon monoxide at a rate of .04 pounds per mile.
How many pounds of carbon monoxide does a 15-mile car trip generate?	How many pounds of nitrogen oxides does a 15-mile car trip generate?	How many pounds of carbon monoxide does a 15-mile car trip generate?
How many pounds of carbon monoxide does a 45-mile car trip generate?	How many pounds of nitrogen oxides does a 45-mile car trip generate?	How many pounds of carbon monoxide does a 45-mile car trip generate?

How many pounds of carbon monoxide would you generate driving from your home to your school?	How many pounds of nitrogen oxides would you generate driving from your home to your school?	How many pounds of carbon monoxide would you generate driving from your home to your school?
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III. Evaluate the Options for Personal Action

The problem of air pollution is as big as the sky and it may seem that there is nothing you can do about it. But the problem really begins with individual actions that add up. How could you act in a way that would contribute to your definition of the common good? What behaviors would make a difference to the problem of air pollution? What are you willing to do? Think about the principles you hold and list as many options for action as you can:

IV. Make a Decision

Sometimes it is easy to say that you will do something and very hard to follow through. This is why we respect people who demonstrate integrity when they make a decision and act on it.

What's so hard about making a decision?

You might decide that reducing the amount of miles you drive (or are driven) is important to you and the environment. But using other modes of transportation can be inconvenient at times.

Bus

Bike

Walking
Skateboard
List times when you would need to use a car: for example, to take your mother to the hospital or to haul food and supplies to a party. When does it make the most sense to drive?
When does it make the most sense to use another mode of transportation?
Bus
Bike
Walking
Skateboard

Now look over the options for personal actions that you listed above. Consider all the pros and cons of each. Using your own values, make a decision about what you can and are willing to do about air pollution. Fill out the Personal Action Plan and bring it back to class when you have completed it. What was it like to try a mix of transportation modes?

Personal Action Plan

Example : Because I value my health and the environment, during the next weeks, I will try to reduce the number of miles I am driven and explore alternative modes of transportation by doing one or more of the following:
★ Walking or riding my bike toinstead of having someone drive
me.
A place to where I usually get a ride
↑ Take the bus to Lloyd Center instead of having someone drive me there. A place to where I usually get a ride
★ Encourage to take another means of
transportation.
Someone who drives when he/she could take other transportation
♦ Other Actions: Check out the bus schedule to see if I can take the bus to my cousin's in Oregon City on Saturdays.
signature: <u>Joseph "Duke" Smith</u>
Personal Action Plan
Because I value my health and the environment, during the next weeks, I will try to reduce the number of miles I am driven and explore alternative modes of transportation by doing one or more of the following:
★ Walking or riding my bike toinstead of having
someone drive me.
A place to where I usually get a ride
* Take the bus to instead of having someone drive me there.
A place to where I usually get a ride
* Encourage to take
another means of transportation. Someone who drives when he/she could take other transportation
* Other Actions:
* Other Actions:
* Other Actions:

H₂0 and Cars

Overview: Students discover the connection between cars and water quality. They discuss how they can prevent water pollution, and then create illustrated fact sheets to distribute to drivers in the community.

Objectives:

Students will be able to

- Understand how cars impact water quality.
- Identify specific practices involving cars that increase water pollution.
- Use a drawing to illustrate a fact.
- Consider audience when presenting information.
- Design an illustrated fact sheet to inform the public about cars and water pollution.

Time: 2 class periods

Materials:

- Water in a transparent drinking glass
- Student Handout: The Water Cycle
- Student Handout: Cars and Water Fact Sheet
- Drawing paper and crayons or markers
- Teacher's Resource: *Numbers* (photocopy, cut on dotted lines, put into a container to use in Step 3)

Procedure:

- 1. Take a big swallow of water from the drinking glass. Tell the students that you just shared a drink with a dinosaur. Ask students how that could be.
- 2. Pass out the *The Water Cycle* handout and tell students to consult the handout to explain why you actually could be drinking the same water as a dinosaur. Point out that the dinosaurs' drinking water was not affected by as many pollutants as our water is. Tell the students that they will explore the connection between one source of pollution the car and the quality of their drinking water.

- 3. Ask the class what possible connections there could be between cars and water quality. Record their responses on the board.
- 4. Assign or have students choose partners. Have each team draw a number from the container, taking care not to reveal the number to the class. Distribute the *Car and Water Fact Sheet*, drawing paper, and markers. Tell the teams to match their numbers to the corresponding numbers on the *Fact Sheet* and then draw a picture that illustrates that fact.
- 5. Now have the teams take turns displaying their drawings. Have the class consult the *Fact Sheet* and identify which fact each team illustrated. For each fact, have the class discuss: 1) why the information is important, and/or 2) how they might help prevent the pollution described in the fact. If the students do not suggest it, point out that one way to reduce water pollution is to walk or ride a bicycle instead of driving a car.
- 6. Return to the list on the board that the class generated in Step 2. Ask the students to make additional connections between cars and water pollution.
- 7. Tell the students that they will now create an illustrated fact sheet to distribute to their parents and other car owners. With the class, determine which facts are the most critical and relevant to car owners.
- 8. Discuss how these facts can be conveyed clearly in a drawing. Students can use their original sketches to guide them, but students should also consider the size of the drawings for the fact sheet, the level of complexity (the simpler the better), and even the types of pens they will use. Students should realize that a public information piece requires different considerations than one they create for the class.
- 9. Working with your class, sketch on the blackboard a general layout for the fact sheet. How will it look with all the facts and illustrations together? Who will create a title for the sheet? Who will write a line that identifies the authors of the sheet? What other information should go on a public handout?

- 10. Have the students form teams to illustrate the facts they have chosen for the handout. Assign a team to collect the completed drawings and do a mock-up of the handout. If possible, have students complete the fact sheet on a computer. Let the class comment on the mock-up before you finalize its design.
- 11.Print and distribute the illustrated fact sheet to your students to take home. Ask your students to show the fact sheets to their parents and other drivers. Encourage your class to find out which facts are new information to these drivers.

Assessment Opportunities:

- Drawings and discussion generated by drawings
- Additional connections between cars and water quality
- Willingness to share their illustrated fact sheets with car owners

Extensions:

An Internet Project

Have students find out what Portland is doing to prevent water pollution, especially pollution caused by motor vehicles. Find another city that is working on water pollution. Compare and contrast the solutions of the two cities.

A School Project

Have students build terrariums to help them understand the water cycle and the fact that water is a limited resource on earth.

Another School Project

Have students create a bulletin board that illustrates the relationship between cars and water quality. Students could include colorful pictures and large, catchy text. The best location for this display would be near the main office of the school where parents might see it, or near the drinking fountain.

A Community Project

Obtain the stencils with the message "Dump No Waste, Drains to Stream," paint, and safety vests from the Environmental Education Specialist at the

City of Portland, Bureau of Environmental Services. Have teams of students stencil the message near storm drains in their neighborhood.

A Field Trip

Have the students wash a car, keeping careful count of how many gallons of water they use by filling buckets instead of using a hose. Then have them take a field trip to a car wash where they can learn about technology that limits the use of water and recycles it.

Benchmarks:

Arts

Create, Present, Perform

Apply artistic elements and technical skills to create, present, and/or perform works of art for a variety of audiences and purposes.

• Create, present, and/or perform a work of art, selecting and applying artistic elements and technical skills to achieve desired effect.

English

Reading

Locate information and clarify meaning by skimming, scanning, close reading, and other reading strategies.

• Locate information and clarify meaning by using tables of contents, glossaries, indexes, headings, graphs, charts, diagrams, and/or tables.

Demonstrate literal comprehension of a variety of printed materials.

• Identify sequence of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections

Writing

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience, and purpose.

Use correct spelling, grammar, punctuation, capitalization, paragraphing, and citations.

Use a variety of modes and written forms to express ideas.

• Write in a variety of modes (e.g. narrative, imaginative, expository, persuasive) and forms (e.g., essays, stories, letters, research papers, reports) appropriate to audience and purpose.

Social Science

Social Science Analysis

Identify and analyze characteristics, causes, and consequences of an event, issue, problem, or phenomenon.

• Examine the various characteristics, causes, and effects of an event, issue, problem, or phenomenon.

Science

Unifying Concepts and Processes

Use concepts and processes of change, constancy, and measurement.

• Identify and explain patterns of change as cycles and trends.

Use concepts and processes of systems, order, and organization.

• Identify a system's inputs and outputs. Explain the effects of changing the system's components.

Resources

For information on what Portland is doing about water pollution, contact:

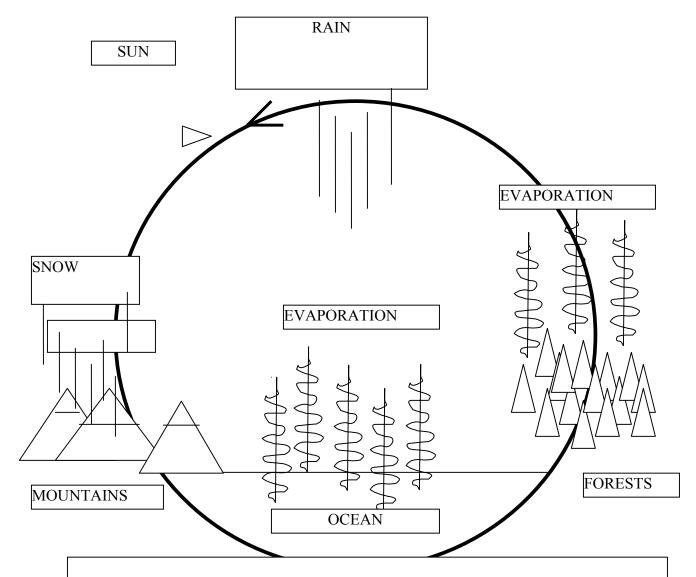
City of Portland

Bureau of Environmental Services 1120 SW Fifth, Room 400 Portland, OR 97204 503-823-5281 hrttp://www.enviro.ci.portland.or.us

For two brochures, "50 Ways to Love Your River" and "Your Guide to a Climate Friendly Ride," contact:

The Oregon Environmental Council 520 SW 6th Suite 940 Portland, OR 97204-1535 503/222-1963 http://www.orcouncil.org

HANDOUT: Water Cycle



Water continuously cycles through its different forms—liquid, solid, and gas – but the Earth has the same amount of water as it has always had. New water is not being created. Over 99% of our water is "tied up" in the salty oceans or the frozen polar caps, unavailable for human use. You can understand why it is important that we do not pollute the limited amount of water available for a growing human population.

HANDOUT: Cars and Water Fact Sheet

- 1. Last year, 180 million gallons of used motor oil were sent to a landfill or poured down the storm drains by do-it-yourself oil changers.
- **2.** One gallon of gasoline can contaminate 750,000 gallons of water.
- **3.** On calm water, one pint (two cups) of oil can spread out and cause an oil slick the size of two football fields. Think what an oil tanker of spilt oil could do!
- **4.** It takes 39,090 gallons of water to manufacture an automobile, tires included.
- **5.** Roads and parking lots generate runoff of oil, radiator fluid, brake fluids, and other chemicals that degrade our water.
- **6.** Pavement for vehicles now covers over 60,000 square miles in the USA—2% of the total surface area and 10% of all arable land.
- 7. Exhaust from diesel-fueled vehicles is the primary source of lead in surface water.
- **8.** When a car needs new brakes, metal filings (tiny pieces of metal) fall onto the street and can end up in our water supply.
- **9.** Rubber from skid marks on the street gets washed into storm drains and can find its way into our water supply.
- **10.** Hand washing a car can take up to 143 gallons of water. The suds run into the storm sewer and contaminate streams and rivers. Many commercial car washes use about 35 gallons per car and recycle the water.
- **11.** Although 75% of the Earth's surface is water, most of it is frozen or salty. About 1% is available for human use. Water is precious stuff!
- **12.** About 75% of your brain is water. You can use your "brain water" to keep your drinking water clean.

Many facts about water pollution can be found on the Internet. Many of these facts came from http://www.nps.gov/rivers, Web site for National Wild and Scenic Rivers Systems.

TEACHER'S RESOURCE: Numbers

Cut on the dotted lines and put in a box.

Trees, Cars, and CO₂

Overview: Students learn that CO2 is emitted when gasoline is burned, that too much CO2 is causing global warming, and that trees absorb CO2 and produce oxygen. Using simple arithmetic to figure the amount of CO2 emissions produced by their own travel, students discover why fuel-efficient cars are more environmentally friendly and consider alternative transportation. As a wrap-up activity, students design bumper stickers that express the information they have learned.

Objectives:

Students will be able to

- Describe the impact of cars on air quality.
- Understand the importance of trees to air quality.
- Practice basic computation skills.
- Apply math skills to understand real-life issues and problems.
- Create a slogan that expresses the relationship between cars and air quality.

Time: 2 class periods

Materials:

- Student Handout: There's a Connection
- Student Handout: Getting Warmer All the Time
- Student Handouts: Go Figure 1-3
- Teacher's Resources for Go Figure 1-3 (preview before class)
- Student Handout: *Bumper Stickers* (photocopy for students on adhesive paper if you want the students to produce actual bumper stickers)
- Art supplies: pens, scratch paper

Procedure:

Distribute the *There's a Connection* handout. Explain that one of just two words will complete each statement. Have the students, individually or as a group, read the statements and identify the words "car" and "tree" (or the plurals of these words). Briefly discuss the statements, explaining that CO2 is an odorless, colorless gas released when burning fossil fuels such as gasoline. Tell the students that they will explore the connection between cars, trees, and air quality while practicing their math skills.

2. Point out that we usually don't connect cars with trees (unless we run into one), but that cars emit carbon dioxide that we can't breathe and that trees (and other plants) absorb CO2 and produce the oxygen that we must have to live. This sounds like an ideal cycle, but if we have too much CO2 there are serious consequences.

Ask students whether they know about "global warming" or "the greenhouse effect." Distribute the handout *Getting Warmer All the Time*. Explain – or have students explain – that most scientists believe that global warming has resulted from a build-up of CO2 in the Earth's atmosphere, partially caused by the increasing number of vehicles.

Ask students why global warming is sometimes described as the "greenhouse effect." If necessary, explain the effect by comparing CO2 to glass in a greenhouse. More CO2 is the same as thicker glass. Light passes through easily and changes to heat, but heat does not pass through the thicker glass easily and it builds up. Thicker glass/CO2 doesn't stop much light, but thicker glass/CO2 does block heat from escaping.

3. Now write on the board the following equation:

Less Car Emissions + More Tree Absorption = Better Air Quality

Have the class refer back to the handout *There's a Connection* in order to explain why the equation is true and what actions could reduce CO2 and improve air quality. Confirm that fewer cars, the same number of fuel-efficient cars, and more trees would have a positive effect on air quality.

4. Distribute the handout *Go Figure*. Depending on the students' math skills, have them complete all or part of the handout individually, with a partner, or as a class. (Consult the Teacher's Resources for prompts,

calculations, answers, and additional resources.) Go over the students' calculations and answers to the problems, and then facilitate a discussion around their responses to the three *Go Figure* questions about what they might do to promote better air quality.

5. Tell the students that they now will put the information they have learned to use by creating bumper stickers. Distribute the handout *Bumper Stickers*. Discuss the example and then have the students work individually or in teams to develop additional bumper stickers using what they have learned about car emissions, tree absorption, and air quality. Have them display their bumper stickers and, if time allows, have the class decide which ones are most eye-catching and effective at getting a clean-air message to the public.

Assessment Opportunities:

- Discussion of the equation: Less Car Emissions + More Tree Absorption = Better Air Quality
- Successful completion of the math problems (this would assess skills gained prior to the session) and application of them to the problem of global warming
- Answers to the Go Figure questions on the handout
- Slogan, mottoes, or information used on the bumper stickers

Extensions:

A Research Project

Have students learn about the 1990 Clean Air Act, how it is being addressed in the Portland metropolitan area, and how increased use of public transportation can improve air quality for our city. (The Web site http://www.epa.gov/oar/oaqps contains information about the Clean Air Act.) This research project will require students to learn about other pollutants emitted by cars and the impact of these emissions on the environment.

A Community Project

Contact Friends of Trees for information about group volunteer tree planting, including plantings on school grounds.
Friends of Trees
2831 NE Martin Luther King Boulevard
Portland, OR 97212

(503) 284-8733 http://www.teleport.com/~fot fot@teleport.com

Benchmarks:

Arts

Create, Present, and Perform

Apply artistic elements and technical skills to create, present, and/or perform works of art for a variety of audiences and purposes.

• Create, present and/or perform a work of art, selecting and applying artistic elements and technical skills to achieve desired effect.

English

Reading

Locate information and clarify meaning by skimming, scanning, close reading, and other reading strategies.

• Locate information and clarify meaning by using tables of contents, glossaries, indexes, headings, graphs, charts, diagrams, and/or tables.

Demonstrate literal comprehension of a variety of printed materials.

• Identify sequence of events, main ideas, facts, supportive details, and opinions in literary, informative, and practical selections.

Demonstrate inferential comprehension of a variety of printed materials.

• Examine relationships, images, patterns, or symbols to draw conclusions about their meanings in printed materials.

Writing

Use varied sentence structures and length to enhance flow, rhythm, and meaning in writing.

Use correct spelling, grammar, punctuation, capitalization, paragraphing, and citations.

Use a variety of modes and written forms to express ideas.

• Write in a variety of modes (e.g. narrative, imaginative, expository, persuasive) and forms (e.g. essays, stories, letters, research papers, reports) appropriate to audience and purpose.

Mathematics

Computation

Compute with whole numbers, fractions, decimals, and integers using paper and paper and pencil, calculators, and/or computers.

• Perform calculations on whole numbers, fractions, decimals, and integers using paper and pencil, calculators, and/or computers.

Science

Unifying Concepts and Processes

Use concepts and processes of change, constancy, and measurement.

• Identify and explain patterns of change as cycles and trends.

Use concepts and processes of systems, order, and organization.

• Identify a system's inputs and outputs. Explain the effects of changing the system's components.

Scientific Inquiry

Analyze scientific information to develop and present conclusions.

• Analyze and summarize data including possible sources of error. Explain results and offer reasonable and accurate interpretations and implications.

Science in Personal and Social Perspectives: Understanding that science provides a basis for understanding and acting on personal and social issues.

• Describe how daily choices of individuals, taken together, affect global resource cycles, ecosystems, and natural resource supplies.

Resources:

For a list of ways to help reduce global warming from the **Environmental Defense** organization, see

http://www.environmentaldefense.org/Want2Help/b_gw20steps.html

Visit the **Environmental Protection Agency's** Web site for kids about global warming at http://www.epa.gov/globalwarming/kids/index.html.

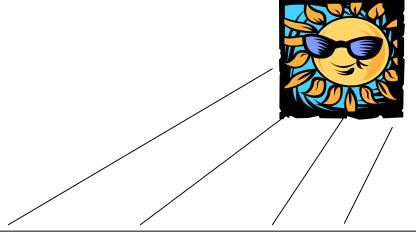
See resources after each problem in the Teacher's Resources for Go Figure.

HANDOUT: There's a Connection

One of two words will complete the statements below. What are these two words?

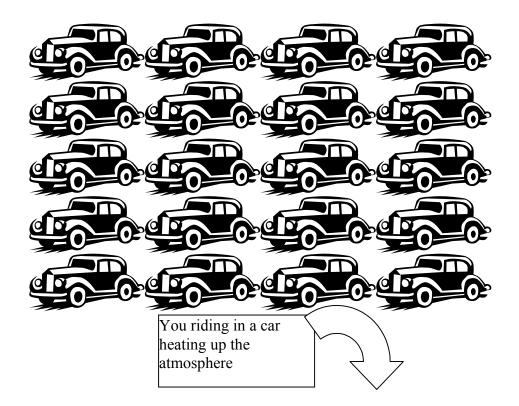
•	On the average, every gallon of gas used by a releases about 20 pounds of carbon dioxide (CO2) into the air.				
•	A single fully growncan transform 13 pounds of carbon dioxide into life-giving oxygen every year.				
•	One acre of produces enough oxygen for 18 people every day.				
•	A Chevy Cavalier is a It's a top performer in its class, but it is estimated to emit 39.4 tons of carbon dioxide over its useful life of 120,000 miles.				
•	In the year 2030, there will be double the number ofon the world's streets and highways.				

HANDOUT: Getting Warmer All the Time



CO2 from gasoline causes an increase of the Earth's temperature called global warming. Global warming can cause:

- More floods, storms, and other extreme weather events
- The spread of disease and other health problems
- Severe stress on forests, wetlands, and other natural habitats
 Dislocation of agriculture and commerce
- Expansion of the Earth's deserts
- A rise in the sea level and flooding of coastal lands due to warming oceans and melting glaciers





HANDOUT: Go Figure 1

"Every gallon of gasoline releases about 20 lbs of CO2 into the air." - US Environmental Protection Agency (EPA)

How much CO2 do YOU contribute to the atmosphere?

- Estimate the number of trips you make in a car during one week.
- Estimate how many miles you travel in a car during a week.
- Estimate how many gallons of gasoline you use per week.
- Calculate how many pounds of CO2 your car trips emit each week.

Go Figure Big Time: What could you do every week to decrease the amount of CO2 that you are responsible for putting in the air by car travel?

Check It Out:

http://globalwarming.enviroweb.org/games/yourscore/ sponsored by the Environmental Defense Fund offers an interactive page where you can total up the

amount of CO2 you are producing through fuel consumption, including operating cars.

HANDOUT: Go Figure 2

Estimated fuel efficiency of transit compared to the average commuter automobile:

"One full bus equals 6 automobiles One full light rail car equals 16.5 autos."

- Tri-Met

You wouldn't walk or take a bicycle the nine busy freeway miles from downtown Portland to the airport, not with luggage anyway. But you could think about air quality when you choose how to get there and other places. Figure out how much less CO2 you are responsible for emitting if you take the bus instead of a taxi.

1. How many pounds of CO2 would you put into the air if you were the only passenger taking a taxi from downtown Portland to the airport if that taxi gets 18 miles to the gallon?

• How many pounds of CO2 would you be responsible for emitting if you took a bus that got 8 miles per gallon and released 22 pounds of CO2 per gallon of gas but was carrying 20 passengers?

Go Figure Big Time: Why is taking the bus usually better for the environment than taking a car?

Check it Out:

http://www.tri-met.org/envfacts.htm, the Web site with environmental information for Tri-Met, the agency providing public transit service for the Portland metropolitan area.

HANDOUT: Go Figure 3

Different makes and models of cars get different gas mileage and emit different amounts of CO2. When you choose a car, what will you consider besides the price and the color?

- A four-wheel-drive Jeep Cherokee gets about 15 miles per gallon during city driving and is estimated to emit 11.3 tons of CO2 per year. If a single tree can absorb 30 pounds of CO2 per year, how many trees would it take to absorb the Cherokee's emissions for one year?
- A Toyota Camry gets 24 miles per gallon in the city and is estimated to emit 7 tons of CO2 per year. How many trees would it take to absorb the Camry's emissions?
- If each tree takes a 20 foot by 20 foot area and there are 43,560 square feet in an acre, how many acres of forest are required for each Cherokee every year? How many acres for each Camry?
- Go Figure Big Time: Forest Park in Portland contains nearly 5000 forested acres. It provides a place for people to get away from the stress of city living as well as a habitat for wildlife. What are other reasons that Forest Park and other parks are important to you and the other citizens of Portland?

Check It Out

http://www.fueleconomy.gov/feg/findacar.htm, sponsored by the Federal Environmental Protection Agency, allows users to identify the annual fuel cost and emissions in tons per year of specific models of cars.

TEACHER'S RESOURCE: Go Figure 1

How much CO2 do YOU contribute to the atmosphere?

- 1. Estimate the number of trips you make in a car during one week.

 Prompt students about trips to school, shopping, to sports events, visiting friends, going to religious services, etc.
- 2. Estimate how many miles you travel in a car during a week.

 To facilitate estimating, have on hand the mileage from the school or a central location to malls, movie houses, and other places to which students are likely to ride in cars.
- 3. Estimate how many gallons of gasoline you use per week.

 Point out that miles per gallon depends upon the type of vehicle and can vary widely. You might offer these examples as typical for city driving: compact: 30 miles per gallon: mid-sized: 20mpg, SUV: 15mpg; pick-up 18mpg.
- 4. Calculate how many pounds of CO2 your car trips emit each week. Point out that the amount of CO2 emitted varies depending upon the year, make, model and condition of the car engine. Twenty pounds of CO2 per gallon of gas burned is an average students can use.

(Miles traveled /miles per gallon) x 20 lbs. per gallon = 1 lbs. of CO2 per week.

Go Figure Big Time: What could you do every week to decrease the amount of CO2 that you are responsible for putting in the air by car travel?

Actions could include:

- Reducing the number of trips by car
- Taking alternative transportation
- Taking the most fuel-efficient cars, especially if your family owns more than one vehicle
- Helping parents and older brothers and sisters to remember to have their cars tuned and serviced

Additional Resources for Go Figure 1

http://globalwarming.enviroweb.org/games/yourscore/, sponsored by the Environmental Defense Fund, offers an interactive page where you can total up the amount of CO2 you are producing through fuel consumption, including operating cars.

TEACHER'S RESOURCE for Go Figure 2

Estimated fuel efficiency of transit compared to the average commuter automobile:

"One full bus equals 6 automobiles One full light rail car equals 16.5 autos."

- Tri-Met

You wouldn't walk or take a bicycle the nine busy freeway miles from downtown Portland to the airport, not with luggage anyway. But you could think about air quality when you choose how to get there and other places. Figure out how much less CO2 YOU are responsible for emitting if you take the bus instead of a taxi.

1. How many pounds of CO2 would you put into the air if you were the only passenger taking a taxi from downtown Portland to the airport and if that taxi got 18 miles to the gallon?

9 miles x 20 lbs of CO2 = 10 lbs (you emitted on the way to PDX) 18 mpg

2. How many pounds of CO2 would you be responsible for emitting if you took a bus that got 8 miles per gallon and released 22 lbs of CO2 per gallon of gas but was carrying 20 passengers?

- = 1.24 lbs. (your share of emissions to PDX)
- **Go Figure Big Time:** Why is taking the bus usually better for the environment than taking a car?

Buses carry more people so there is less emission per person. A single bus replaces many cars.

Additional Resources for Go Figure 2

http://www.tri-met.org/envfacts.him provides environmental information from Tri-Met, the agency providing public transit service for the Portland metropolitan area.

TEACHER'S RESOURCE for Go Figure 3

Different makes and models of cars get different gas mileage and emit different amounts of CO2. When you choose a car, what will you consider besides the price and the color?

1. A four-wheel-drive Jeep Cherokee gets about 15 miles per gallon during city driving and is estimated to emit 11.3 tons of CO2 per year. If a single tree can absorb 30 pounds of CO2 per year, how many trees would it take to absorb the Cherokee's emissions for one year?

Remind students that 1 ton equals 2000 pounds.

11.3 tons x 2000 lbs = 753 trees to absorb the Cherokee's CO2 30 lbs. of absorption per tree

2. A Toyota Camry gets 24 miles per gallon in the city and is estimated to emit 7 tons of CO2 per year. How many trees would it take to absorb the Camry's emissions?

 $\frac{7 \text{ tons } \times 2000 \text{ lbs}}{30 \text{ lbs of absorption per tree}} = 466 \text{ trees to absorb the Camry's CO2}$

3. If each tree takes a 20 foot by 20 foot area and there are 43,560 square feet in an acre, how many acres of forest are required for each Cherokee every year? How many acres for each Camry?

 $\frac{43,560 \text{ sq. ft. / acre}}{20 \text{ ft x 20 ft per tree}} = 109 \text{ trees per acre}$

<u>753 trees per Cherokee</u> = 7 acres of trees needed per Cherokee 109 trees per acre

<u>466 trees per Camry</u> = 4.28 acres of trees needed per Camry 109 trees per acre

← Go Figure Big Time:

Forest Park in Portland contains 5000 forested acres. It provides a place for people to get away from the stress of city living as well as a

habitat for wildlife. What are other reasons that Forest Park and other parks are important to you and the other citizens of Portland?

The trees and other vegetation in parks absorb CO2 and produce oxygen, which improves the air quality for the city.

Additional Resources for Go Figure 3

http://www.fueleconomy.gov/feg/findacar.htm, sponsored by the Federal Environmental Protection Agency, allows users to identify the annual fuel costs and emissions in tons per year by make, model, and year of car.

HANDOUT: Bumper Stickers

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Form, Function, and Freeways

Overview: Students think critically about how transportation infrastructure affects the way we live our lives. They observe the transportation facilities near their school and then analyze a transportation proposal that would affect their school's neighborhood. They write an impact statement for the proposal and examine other ways that transportation needs could be met.

Objectives:

Students will be able to

- Read a map, locating streets and waterways on it.
- Work cooperatively in groups.
- Understand that most people are, at different times, a pedestrian, passenger, and driver.
- Explain how the different modes of transportation and the facilities that support them are often in conflict.
- Analyze the physical and social impacts of highway development in a neighborhood.
- Use observation to collect data, generate ideas, and write about transportation issues.
- Describe how land use decisions affect livability.
- Describe how natural causes, economic patterns, and ways of life affect transportation development.
- Understand the citizen's role in land use and transportation decisions.
- List solutions to meet the needs of commuters.

Time: 4-6 class periods

Materials:

- Student Handout: map of Portland (Photocopy one for each student.)
- Student Handout: *Traveling History*
- Student Handout: Data Collection
- Student Handout: What Are the Impacts?
- Overhead transparency of the Portland map
- Highlighters and fine-tipped magic marker pens

Before you begin:

This lesson takes students into the community to gather data on transportation facilities near their school. Before teaching this lesson, you should take a few moments to walk around the school and identify a location you would like your students to observe. In addition, familiarize yourself with the kinds and numbers of transportation facilities that student will see.

Some issues that might arise in class discussion include the following points:

- For the last 75 years communities have been designed to keep different parts of our lives separate houses in one section of town, shopping in another, and offices, factories, and schools someplace else. This means to get from one place to another, we must rely on cars.
- We are now living with the consequences of these early decisions to promote and encourage the use of the automobile: huge parking lots, wide streets, freeways and other facilities that take up a lot of urban land, bumper to bumper traffic, air pollution, and more deaths per year than all the soldiers who died in Viet Nam.
- Cars have become virtually essential in our society; our economy could not function without them. Elimination of the automobile is not the goal, rather this lesson attempts to educate youth about the impact of automobiles on neighborhoods and the choices we have in creating a balanced mix of transportation options.

Procedure:

Day One (2 class periods)

1. Begin a class discussion with the following questions: How do you get around town? Where do you go and why? Where did you/your family go yesterday?

Where do you go and why? Where did you/your family go yesterday? Last weekend?

As students respond, point out that they have identified themselves as one of the following: a pedestrian: a person on foot; a passenger: a person who is riding in a vehicle; and as driver: a person who is operating a vehicle such as a bike or car. Reflect their comments back to them and emphasize the reasons that they go places. For example, "Your family drives to (a restaurant) so that you can get food." Or "You ride your bike to the park to hang out." "Your mom walks to Kinko's to make copies for her job."

2. Ask students if they know how to get from home to downtown, from

school to Eastern Oregon, and other routes that are explored in the *Traveling History* handout. Encourage answers that identify modes of transportation as well as descriptions of the routes and names of highways.

3. Place students into groups of three. Students may generate ideas together, but will complete their own maps. Pass out *Traveling History* and a Portland map to each student. Pass out the highlighters and fine-tipped markers. Read over the instructions on the handout together. The instructions direct students to highlight the highways and waterways that appear in bold type on the handout and to write with markers, along the route of the highway or pathway, the purposes for which the pathways were used.

The highways and waterways that will be highlighted and labeled include:

- --I-84/Banfield Freeway
- --Sandy Boulevard
- --Highway 26/Sunset Highway
- --Columbia River
- --Willamette River
- 4. Ask the class how the highways came to be and create a list of categories on the board. Give prompts such as: "Native Americans are mentioned in one of the facts. Why did they travel along what is now the section of I-84 known as the Banfield?" "Why did people struggle across the Tualatin Mountains?" Categories might include: fishing, economic/trade routes, and leisure.
- 5. Ask students if they see any similarities in the categories they listed at the beginning of the class and those they have listed for the handout. Students should be able to see that we use the highways to get to work (economic), bring our groceries home (way of life), to go to the beach or soccer practice (leisure), etc.
- 6. Have students label the school, their homes, and the major streets identified in the discussion on their maps. Label the purposes as well. (You may need to help students find the symbol for *school* on the map.)

Day Two (2 class periods)

7. Write this definition on the board: *Platting -- the act of designing streets* and land uses so that the needs of pedestrians, passengers, and drivers are met and different modes of transportation are supported. Tell students that today they are going to think like platters.

Ask students, "If you were a platter who had been given a job to redesign a street, what is the first thing that you would do?" Encourage students to include suggestions such as: "Study what the street is like now. Look at the street. Observe the street."

Tell the class that you will be taking a walk around the school premises to study a busy street that can be observed from or near school property. Explain that students will study how the transportation facilities for pedestrians, buses, and cars interact.

8. Pass out the *Data Collection* handout. Read the directions together. Ask students to name a few of the transportation facilities that they are sure to see. Using two of these, model what they might write about when describing the interactions among the facilities and modes of transportation. For example, students might describe the interaction between a pedestrian who is crossing the street and a car that is driving by on the street.

Possible entries for transportation facilities include:

crosswalks

bus stops

bus shelters

street lights

trash cans

sidewalks

bike paths

bike stands

speed bumps

streetlights

benches

medians

planters

curb extensions

refuge islands beacons

- 9. Discuss safety rules with your class and then begin the walk. Have a busy street in mind. Take the long way to it and as you walk ask leading questions such as: "Where does this street lead to?" "How many lanes is it?" "Is it busy?" "Do you travel this street? Why or why not?" Point to transportation facilities and ask, "What is that used for?"
- 10. When you get to the destination street, have students sit down and record their observations on the *Data Collection* handout.
- 11.Return to the classroom and share observations. Use the students' observations to emphasize the challenge of meeting the needs of various modes of transportation. If the observations don't point to conflicts between the modes of transportation, mention that the platters have done a good job. Ask students to explain why the modes of transportation worked well together. For example, a new crossing signal may ensure safe movement for pedestrians.
- 12.Next, ask students to pull out their city maps and connect the streets around the school with the highways that students identified on the map. Have them highlight routes for getting from school to the highways. Ask students, "Where do your parents or relatives work?" Discuss how the highways lead to major employment centers such as Beaverton, the industrial waterfront, OHSU, and downtown. You could point to the areas on the overhead transparency or give clues such as, "Beaverton is southwest of Washington Park. So what highway do drivers use to get there?"
- 13. Now tell students they will be solving a hypothetical, but very common, problem. Explain that the city has received many complaints from citizens, like their parents, who use one of the streets near the school to get on the freeway to go to work. The city is proposing to widen this street to make it easier for commuters to get to (name of highway). Use a street that includes transportation facilities that are important to the school population. Explain that citizens have the right and responsibility to give input on transportation decisions in their community.

- 14. Pass out the *What Are the Impacts?* handout. Review the handout together. Direct students to write an impact statement that describes the effects of the street widening on the school property and community. Put students into small groups and give them plenty of time to develop their impact statements. Tell them to use the data and observations that they collected during the *Data Collection* observation to create their statements. For example, they might have identified facilities such as sidewalks and planters that would have to be removed if the proposal was implemented.
- 15. Have students share their recommendations and solutions in class. Each group could choose a representative to present their findings.

Assessment Opportunities:

- Class discussions
- Completed maps
- Observations from Data Collection handout
- Impact statements

Extensions:

Land Use

- Students could track coverage of a land use issue in local newspapers such as the proposal to build a tram to OHSU. They could analyze the different points of view that are expressed in the quotes in the articles as well as the environmental and social impacts.
- Help students find and attend a community meeting where a land use issue is being discussed or invite a civic leader who is involved with the issue to visit the classroom. Have students study the issue in advance of the visit.
- Have students make a list of the characteristics of a good neighborhood, including not only what it looks like, but how people in the neighborhood interact with each other. Then ask students to design a neighborhood that promotes those characteristics. Students could create a cardboard model of an ideal neighborhood or simply sketch one. Have them consider the following elements in their design:

- Houses Do they have front porches? Where are the garages located in relation to the houses?
- Streets Are they wide or narrow? Do they include bike paths and place for pedestrians to cross?
- Stores and other commercial buildings Are they within walking distance of the houses? How do the streets connect to the stores?
- Transportation facilities Are there transit stops? Big or small parking areas?
- People places Are there places for people to play, talk, and sit? Or is the design of the neighborhood aimed at cars only?

Transportation

- Have students study Portland bus routes and MAX lines. This can be done online or by bringing Tri-Met maps to class. Direct students to highlight specific bus routes and the MAX lines on their maps. Have students explain how people who live and work in different parts of the Portland metropolitan area can get to their destinations. Students could create scenarios of people with different transportation needs and develop recommendations for these people. For example, Pam works near Pioneer Courthouse Square downtown and lives at 104th and SE Division. Every morning she drops her 3-year-old son off at a daycare center that is located at 45th and SE Powell. How can she use public transportation to meet her commuting needs? How long will the commute take her?
- Discuss the requirements and reasons for street sizes with your students. The City of Portland used to require all new residential streets to be 32 feet in width. Today, engineers recognize that narrower streets can improve the look and feel of a neighborhood, save money in construction and maintenance, reduce traffic speeds, preserve land for houses or landscaping, and reduce paved surfaces that contribute to storm water pollution. Today, the city allows some new streets to be as narrow as 20 feet. Challenge students to play an on-going game of I Spy by bringing in the names of all the narrow streets they can find. How many did they discover? And where were they located?
- Discuss the concept of watershed in regards to the map. Locate watershed maps and compare them to the maps that students completed in class.

Benchmarks:

Career-Related Learning

Problem Solving

Apply decision-making and problem-solving techniques in school, community, and workplace.

• Use information to make decisions and solve problems related to family, school, and community situations.

Teamwork

Demonstrate effective teamwork in school, community, and workplace.

• Use strategies to work effectively with team members (e.g., negotiation, compromise, consensus, conflict resolution).

English

Reading

Demonstrate literal comprehension of a variety of printed material.

• Identify sequences of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections.

Demonstrate inferential comprehension of a variety of printed material.

• Examine relationships, images, patterns, or symbols to draw conclusions about their meanings in printed material.

Draw connections and explain relationships between reading selections and other texts, experiences, issues, and events.

• Extend and deepen comprehension by relating text to other texts, experiences, issues, and events.

Writing

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience, and purpose.

Communication

Communicate knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas with accurate relevant supporting details, including documentation of sources, appropriate to audience and purpose.

Social Science

History

Understand and interpret relationships in history, including chronology, cause and effect, change, and continuity over time.

• Represent and interpret data and chronological relationships from history, using timelines and narratives.

Civics and Government

Understand the roles, rights, and responsibilities of citizens in the United States.

• Understand citizens' roles and ways of participating responsibly in the political process.

Geography

Locate places and explain geographic information or relationships by reading, interpreting, and preparing maps and other geographic representations.

• Read, interpret and prepare maps, charts, graphs, and other visual representations to understand geographic relationships.

Understand the distribution and movement of people, ideas, products.

• Identify patterns of population distribution, migration, and cultural interaction in the United States.

Explain how humans and the physical environment impact and influence each other.

• Explain how human modification of the physical environment in a place affects both that place and other places.

Social Science Analysis

Identify, research, and clarify an event, issue, problem, or phenomenom of significance to society.

• Clarify key aspects of an event, issue, or problem through inquiry and research.

Identify and analyze characteristics, causes, and consequences of an event, issue, problem or phenomenom.

• Examine the various characteristics, causes, and effects of an event, issue or problem.

English

Writing

• Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience and purpose.

Resources:

To access maps of bus routes and bike routes as well other information about meetings and events related to transportation issues, see:

Tri-Met Web site

http://www.tri-met.org

For information and photos that show Portland's streets from decades past, contact:

Oregon Historical Society

1200 SW Park Avenue Portland, OR 97205-2483 (503) 222-1741

OHS Information Line: 503-306-5198

To schedule a speaker on Portland transportation for your class, or to receive a brochure called *Skinny Streets*, contact:

Portland Office of Transportation

City of Portland 1120 SW Fifth, Room 800 Portland, OR 97204 (503) 823-6828

HANDOUT: Traveling History

Directions:

- 1. Read this fact sheet.
- 2. On your map of Portland, highlight all of the highways and waterways that appear in **bold** type below. Write the name of the highway or waterway with a marker.
- 3. What was the highway or waterway used for in the past? Summarize the purposes in short labels or phrases along the course of the highway or waterway.

A Few Facts About Portland Roads

1. Did you know that the path of the Banfield Freeway dates back to the Ice Age?

More than 10,000 years ago, when a third of the Earth's surface was covered with ice, a dam of ice somewhere to the northeast of what is now Oregon held back a massive water reservoir. When that dam broke, much of the water flowed along the **Columbia River**. But the river bed wasn't wide enough to contain the volume of water, and new rivers sprang up as a result of the overflow.

When white settlers arrived in the Willamette valley, they found a dry river bed running east to west. They named the valley carved by the river "Sullivan's Gulch." This area became a logical spot for railroad tracks and later, for the stretch of **I-84** called the Banfield Freeway.

Hint: The Columbia appears on the map in the northeast corner, north of NE Marine Drive.

2. Did you know that Sandy Boulevard is older than the City of Portland?

Before the arrival of European settlers, when Native Americans were the

human custodians of the Northwest, Willamette Valley tribes regularly moved between their homes and fishing sites along the Willamette River to fishing spots on the Columbia. They used the diagonal route that now is roughly outlined by **Sandy Boulevard**.

3. Did you know that Highway 26 started out as a plank road?

In the 1940s, farmers from the fertile Tualatin Valley west of Portland began bringing produce to Portland. In fact, one of the reasons Portland grew to become the largest city on the Willamette River was because of its access to this very productive agricultural region west of the "Tualatin Mountains" (what we think of as the West Hills).

Early in this period, workers placed planks along the main trade route to smooth the way for wagons carrying agricultural produce. The Great Plank Road became Canyon Road, portions of which have been replaced by **Highway 26**, the **Sunset Highway**.

During recent excavation for the West Side Light Rail Line, workers found equipment that was used to help pull wagons over the peaks of the hills as they approached Portland.

4. Did you know that the river first determined the direction of Portland streets?

When Asa Lovejoy and Francis Pettygrove (you know, the guys who flipped the coin to choose between the names Portland and New Boston) laid out Portland streets, they decided that streets should run parallel and perpendicular to the **Willamette River**. Because the river was the principal method of inter-city travel and trade, the river was the most important transportation feature in Portland.

That method of platting worked well for a while, but of course the Willamette River doesn't run in a straight line. So, planners decided that streets should run north/south and east/west, rather than along the path of the river. This caused some interesting and unusual intersections where streets met at odd angles. Do you notice both the grid-like patterns and odd angles on your map?

Data Collection

Your Name: Date:
A. List Transportation Facilities . Make a list of all of the transportation facilities that you see that support these modes of transportation:
Walking/Skateboarding
<u>Car</u>
Bus
Other Modes

B. Observe How Transportation Facilities Work

Sit quietly and observe how the transportation facilities affect the neighborhood. Answer the questions below, using another sheet of paper if you need more room to write.

1. How wide is the street? How much parking is there? What is the speed limit? Do cars seem to be moving safely and well? Or are there dangerous or problem areas?

2. Are the buildings too far or too close from the curb? When cars pull out of a driveway or side street, how easy is it to see pedestrians or traffic?

3. How do pedestrians and the various vehicles interact? How do pedestrians get across streets? How do cars deal with bicyclists? Observe a pedestrian, bus, or bicyclist. Watch what they do and record it.

4. For which mode of transportation are the facilities most functional, convenient, and accommodating? Why do you think this is?

5. How does a street that serves only cars affect a neighborhood? Why might people want a mix of transportation facilities on a major street?

6. Do the transportation facilities work well together on this street? Are there some problems? What would you improve?

HANDOUT: What are the Impacts?

An impact statement is a document that describes all of the consequences of implementing a proposal. Respond to the following questions to develop your impact statement.

questions to develop your impact statement.		
1. What would have to be removed in order for the highway to be widened?		
2. What else would be changed near the school? Consider factors such as noise, pollution, school events, safety, etc. How would this impact how people meet and congregate around the school?		
3. How do you feel about the proposal? Do you think it is a good idea? Why or why not?		

4. What are your recommendations? Think of ways to make commuting better for a mix of transportation modes. Suggest a way to solve the

problem of moving people about without having to widen neighborhood streets.

Pushing Pedal Power

Overview: In this lesson, students analyze car advertisements, discuss the bicycle as an alternative to the car, create advertisements promoting bicycling, and then evaluate the potential effectiveness of their ads.

Objectives:

Students will be able to

- Identify persuasive language and imagery in car advertisements.
- Compare and contrast the messages presented in car advertisements with the realities of driving a car.
- Describe the benefits and/or convenience of bicycling as an alternative to the car.
- Communicate the benefits of bicycling to a target audience, using persuasive language and imagery.
- Evaluate their messages for effective presentation.

Time: 2 class periods

Materials:

- Magazine advertisements for cars, trucks, or SUVs (one advertisement per team of three or four students)
- Student Handout: *Car Ad: Who's the Target?* (Prepare an example to model the activity by choosing an ad and completing the handout yourself.)
- Student Handout: Pushing Pedal Power
- Student Handout: *Evaluation of Ads* (Depending upon the number of "ad agencies," reproduce the correct number of pages for the handout.)
- Student Handout: Portland Bike Facts

Procedure:

Day One

1. Have the class form teams of three or four students. Give each team one of the magazine advertisements for cars along with the handout *Car Ad: Who's the Target?*. Explain how to complete the customer profile on the handout using the example you have prepared.

Now ask the teams to study their ads and complete their customer profile handouts. When they have finished, have each team display its ad and describe to the group the type of customer the advertisement is aimed at.

- 2. Ask the class to discuss whether the ads that they have analyzed—and those on television—give a realistic picture of most driving situations. Ask them to recall the very last time they were in a car. Ask whether:
 - --the number of people in the car was the same as the number of people in the ads
 - --the scenery was like that in the ads
 - --the driver was as beautiful or handsome as the driver in the ads
 - --the trip was as exciting, romantic or speedy

In addition, have students describe a freeway (I-84, I-5, etc.) or main thoroughfare (Burnside, 82nd, etc.) at 5:30 p.m.; the streets adjacent to a gym, coliseum or stadium after a sporting event; or the parking lot at a mall during the Christmas season. Have them contrast these scenarios with those portrayed in the car ads. Ask whether they believe that car advertising is truthful about the realities of everyday driving. Why or why not?

- 3. Referring to their description of the traffic scenarios above and what they know about the bicycle and bike commuting, have the students suggest reasons why using a bicycle could sometimes be a better transportation option than using a car. Record their reasons for using a bicycle on the board. These could include:
 - --More maneuverable, can avoid traffic jams
 - --Easier to park
 - --Often less stressful than driving
 - --Requires fewer roads and parking lots
 - --Emits no pollution, safer for the environment
 - -- Less expensive to buy and operate
 - --Provides exercise
 - -- Can be operated by people their own age

- 4. Now tell the class that they are going to consider all the positive reasons for using bicycles and develop an advertisement that would effectively, and truthfully, market the bike as a means of transportation. Have the students form "ad agencies" of three to six (or retain the teams from step 1) and give them a minute or two to decide upon the name for their agency. Have them share their agency name with the class.
- 5. Distribute the handouts *Pushing Pedal Power* and *Portland Bike Facts*. Read them aloud and discuss the assignment described on the first page of *Pushing Pedal Power*. If time allows, have the teams begin work on their ads.

Schedule a time for the next session when the agencies will bring their completed handouts and advertisements to class.

Day Two

6. Begin by briefly reviewing the handout *Pushing Pedal Power*. Tell the students that as the various agencies explain their plans and display their advertisements, the class will assess the effectiveness of the ads. Distribute the handout *Ad Evaluation Form*.

Give each agency five minutes to display its ad. Before the agency discusses how the ad was developed, have the class try to identify the target population. After each presentation, have students take a moment to record their observations about the ad on the handout *Ad Evaluation Form*.

- 7. When all the teams have presented their ads, lead a class discussion on the truthfulness and merits of the advertisements, using the students' completed *Ad Evaluation Forms* as a guideline.
- 8. For closure, ask the students:
 - --What was the most interesting information you discovered when developing your ads?
 - --What do you know now that might convince you to ride a bike instead of riding in a car?

Assessment Opportunities:

- Class discussions: identifying persuasive elements of car advertisements and describing the benefits of riding a bicycle
- Advertisements for biking
- Evaluations of advertisements
- Wrap up: articulating what was learned in the lesson and how it might apply personally

Extensions:

Related Activities

- Health: Have students research the health benefits of bicycling and then
 present a demonstration of how cycling can strengthen leg and back
 muscles, provide aerobic exercise, and supply cross-training for other
 sports.
- Economics: Have students research the true cost of driving a car and compare it with the cost of using a bicycle for transportation. Have them present their findings to the class using graphs and other visual organizers.
- Science: Have students research the evolution of the bicycle from the Draisienne to the recumbent, identifying materials and engineering advances.
- Geography: Students could plan a 500-mile bicycle tour of the state of Oregon, starting at the school and using maps, interviews with knowledgeable cyclists, and resources from the Portland Department of Transportation, Metro, and the Oregon Department of Transportation. Ask them to consider safety, scenery, and ease of cycling in order to create a comfortable, fun, and healthy vacation itinerary.
- More Geography: Have students research how bicycles are used in other countries and then compare their findings with the use of bicycles in the United States. Instruct students to include information on the types of roads, storage spaces, and laws that other countries have in order to protect, promote, or control bike riding. Have students present this

information to the class using props, such as flags, from the country they researched.

Additional Classroom Lessons

Find related lessons in Metro's curriculum *Planning for a Livable Future*: "Bikepeople" and "Mapping Bike and Pedestrian Routes in Your Community"

600 NE Grand Avenue

Portland, OR 97232

Metro Transportation Department: (503) 797-1755

A Field Trip

The Oregon History Center has photographs and other materials about the history of bicycling in Oregon. Call ahead so the curator can assemble relevant materials.

Oregon History Center 1200 SW Park Ave Portland, OR 97205-2483 (503) 222-1741

A Community Project

Have the students identify and interview (perhaps on video) people who commute to work by bicycle. Students might ask people why they commute by bike, how long they have been doing it, what equipment they need, how they maintain their bikes, what routes they take, whether they have had collisions, and what general advice they could offer potential bicycle commuters.

Benchmarks:

Arts

Aesthetic and Art Criticism

Explain and analyze works of art, applying knowledge of technical, organizational, and aesthetic elements.

• Recognize and describe how technical, organizational, and aesthetic elements contribute to the ideas, emotions and overall impact communicated by works of art.

Respond to works of art, giving reasons for preference.

• State preferences for works of art and reasons for preferences, based on key artistic elements and principles used in producing the art.

Create, Present, Perform

Apply artistic elements and technical skills to create, present, and/or perform works of art for a variety of audiences and purposes.

• Create, present and/or perform a work of art, selecting and applying artistic elements and technical skills to achieve desired effect.

Communicate, verbally and in writing, about one's own artwork.

English

Reading

Demonstrate literal comprehension of a variety of printed materials.

• Identify sequence of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections

Writing

Convey knowledge of the topic, including relevant examples, facts, anecdotes, and details.

• Convey clear, focused main ideas supported by details and examples in ways appropriate to topic, audience, and purpose.

Use varied sentence structures and lengths to enhance flow and rhythm.

Use correct spelling, grammar, punctuation, capitalization, paragraph structure, sentence construction, and other writing conventions.

• Use correct spelling, grammar, punctuation, capitalization, paragraphing, and citations.

Write in a variety of modes and forms appropriate to audience and purpose.

• Write in a variety of modes (e.g., narrative, imaginative, expository, persuasive) and forms (e.g., essays, stories, letters, research papers, reports) appropriate to audience and purpose.

Resources:

Bicycle Transportation Alliance

PO Box 9027 Portland, OR 97202 (503) 226-0676 http://www.teleport.com/~bta4bike

City of Portland Bicycle Program

1120 SW Fifth, Room 730 Portland, OR 97204

Phone: (503) 823-7083

http://www.trans.ci.portland.or.us/Traffic Management/Bicycle Program

Oregon Department of Transportation

Bicycle and Pedestrian Program

Phone: (503) 986-3555

http://www.odot.state.or.us/techserv/bikewalk

Portland Wheelmen Touring Club

(503) 257-7982

(schedules group rides)

HANDOUT: Car Ad: Who's the Target?

Study the photograph, graphics, and text of the car ad and then decide what type of person the car company is trying to attract to the ad. Use the list below to help develop a profile of the targeted customer.

This advertisement is aimed at someone with the following characteristics:

- Age: • Income: • Culture: • Interests: • Personal values: • How the person likes to see him/herself:
- Other characteristics of the customer that the advertisement tries to use in order to sell the vehicle:

HANDOUT: Pushing Pedal Power

Agency Name:

Agency Team Members:

Assignment: Create an advertisement, aimed at a specific group of people, that markets bicycling as an alternative to riding in a car.

Step 1

Identify your target audience. Some examples: health conscious students, 6th grade females interested in sports, 8th grade males interested in technology, social students, shy students, students who care about the environment; the principal, staff members, or teachers.

Step 2

Profile your target audience. What are their likes/dislikes? How do they like to see themselves? What might convince them to ride a bike instead of riding in a car? Other characteristics your agency should consider when developing its bike advertisement?

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HANDOUT:

Pushing Pedal Power

(page2)

Step 3

Develop a catchy slogan for choosing to ride a bike.

Step 4

Find a fact or statistic that would help convince your target audience to bicycle.

Step 5

Develop an ad that will appeal to your target audience. Try to use the fact/statistic that you found in Step 4.

Step 6

Decide where your agency would place the ad in order to reach you target audience.

HANDOUT: Portland Bike Facts

Portland, Oregon is known as a bicycle-friendly city. In fact, for the last five years, *Cycling Magazine* has recognized Portland as the best bicycling city in the country. Why?

Because the city of Portland has:

- 234 miles of bikeways
- 2000 bicycle racks
- 190 bicycle lockers (11 sites downtown, 6 in east side, 16 west side, and 4 in Gresham)

But wait there's more:

- 2,400 bicyclists use the Hawthorne Bridge daily.
- Every year, close to 80,000 bikes are taken on MAX and city buses.
- Tri-Met sells over 6,300 bike permits each year.

And plus:

- Portland has a program called Bike Central, which provides lockers, secure bike parking, and showers at an inexpensive rate for those who want to commute to work by bicycle. The Bike Central locations include Riverplace Athletic Club, Princeton Athletic Club, Commonwealth Fitness Club, and Lloyd Athletic Club.
- In downtown, public transit is free. Buses are equipped with bike racks, so people can ride their bicycles to the bus stop and then take the bus into the city. Portland has other innovative methods of making transit fast and attractive such as TV monitors with current bus schedules, wheelchair lifts, and low-floor cars so riders don't have to climb the stairs. There are ticket vending machines on the platforms and shelters at all MAX stops.
- Portland also has strong bicycle advocacy groups like the Bicycle
 Transportation Alliance and the Community Cycling Center, which
 support the bicycle as a commuting option. For more information and
 maps, visit the Portland Transportation Bicycling Web site at

http://www.trans.ci.portland.or.us/Traffic_Management/Bicycle_Program /.

References:

http://www.trans.ci.portland.or.us

http://www.wri.org/enved/suscom-portland.html

http://www.trans.ci.portland.or.us/Office_of_the_Director/Planning/ TRP_FAQ.htm

HANDOUT: Evaluation of Ads

Carefully examine the bicycling ads created by each agency and then fill out the following forms. Offer your constructive feedback during the discussion.

Ag	gency Name:			
	Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation? O Excellent O Good O Okay O Needs Work Why did you give it that rating?			
Ag	gency Name:			
	Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation? O Excellent O Good O Okay O Needs Work Why did you give it that rating?			
Agency Name:				
	Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation?			
Ag	Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not?			

O Excellent O Good O Okay O Needs Work
Why did you give it that rating?

HANDOUT: Evaluation of Ads (additional page)

Agency Name:
Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation? O Excellent O Good O Okay O Needs Work Why did you give it that rating?
Agency Name:
Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation? O Excellent O Good O Okay O Needs Work Why did you give it that rating?
Agency Name:
Slogan is catchy and appealing? O Yes O No Why/why not? Fact or statistic is convincing? O Yes O No Why/why not? Visual presentation?

O Excellent O Good O Okay O Needs Work
Why did you give it that rating?

Safety 06/30/01

Safety

Overview: Students read descriptions of transportation crashes, play a game that requires them to identify transportation safety rules, and then observe and record safe and unsafe behaviors in the community.

Objectives:

Students will be able to

- Identify unsafe behaviors around transportation.
- Understand that unsafe behaviors can result in serious injury.
- Define safe behavior for pedestrians, drivers, and passengers.
- Apply their knowledge of safety rules to observations in the community.

Time: 2 class periods

Materials:

- Student Handout: That Hurts!
- Teacher's Resource for *That Hurts!*
- An appropriate number of 5" x 8" cards or blank sheets of paper
- Teacher's Resource: Safety Questions
- Small Band-Aids (enough for each team to have an ample supply)
- Student Handout: Safety Surveillance

Procedure:

Safety 06/30/01 2

1. Write on the board the words *bicycle*, *bus*, *car*, *skateboard/in-line skates*, *train*, and *feet*. Ask the students whether anyone has been in an accident involving these types of transportation. If so, have them describe the accident and suggest what could have been done to prevent it. Tell the students that many transportation mishaps commonly called "accidents" could have been prevented. Suggest that because "accidents" are unforeseen events for which no one is to blame, the words "crash" or "collision" more appropriately describe many of the "accidents" on our streets and highways. Tell the students that they are going to talk about the blood, guts, pain, and sorrow of transportation collisions and how this misery can be prevented.

2. Distribute the handout *That Hurts!*. Have students read aloud the descriptions, identify what modes of transportation were being used, and discuss how the collisions could have been prevented. (The Teachers' Resource for *That Hurts!* offers ideas for preventing each crash.)

(Optional: Of the five modes of transportation discussed, determine by a show of hands which types students are most likely to use. During the following steps, use those pages of the Teachers' Resource *Safety Questions* that reflect how most students get about.)

Tell the students that they will play a game that requires them to think more about transportation safety.

3. Divide the group into teams of four to six.

Tell each group to choose: 1) a secretary, 2) an EMT (emergency medical technician) and, 3) a crash victim. Give each team a stack of 5" x 8" cards or sheets of blank paper and an ample supply of Band-Aids.

- 4. Explain the following game rules:
 - --You (or a student moderator) will ask a series of transportation safety questions.
 - --As a team, students will decide upon the right answer, whereupon the team secretary will print the answer on a card. When you give the signal, the secretaries will display the answers simultaneously to the whole

group.

--For every <u>incorrect</u> answer, each team's EMT will affix a Band-Aid to the crash victim's forehead. At the end of the game, the team whose crash victim has the fewest Band-Aids will be declared winner.

- 5. Read the questions from the Teacher's Resource *Safety Questions*, and after the teams present their responses, supply the correct answer. Briefly discuss the questions and answers, connecting them to the crash descriptions on the handout *That Hurts!* or to the crashes they have described during the lesson's Introduction. Have the ETMs from teams with incorrect answers affix Band-Aids to the crash victims.
- 6. Once all the questions have been read, teams can remove Band-Aids one-by-one from their crash victims (and improve their chance of winning) by recalling and explaining the correct response to each question to which they gave an incorrect answer. Count the Band-Aids remaining on the crash victims and declare a winner
- 7. Tell the students that they will now practice outside of class what they have learned by being alert for safe and unsafe behaviors, recording them, and then sharing their observations. Distribute the handout *Safety Surveillance*. Preview the examples. Ask students to focus on recording times when they might have been tempted to behave in an unsafe way but then remembered to be cautious. Request that students fill in at least three boxes. Set a time for students to bring the completed handouts back to class and explain the safety observations they recorded and any improvement in their own behavior.

Assessment Opportunities:

- Explanations of safety rules from *That Hurts!*
- Answers to the safety game
- Descriptions of behavior on the handout Safety Surveillance

Extensions:

A Visual Organizer

Students can interpret and present the information that they recorded on the handout *Safety Surveillance* in a graph, table, or chart. If possible,

encourage the class to use computer software for this. Students might produce a bar chart showing the approximate age of people that they observed engaging in unsafe behavior or identify situations and places where people are most likely to jaywalk.

A Safety Campaign

- Have students develop safety slogans or a safety program using the information they learned in class.
- Reproduce the Teacher's Resource *Safety Questions* and distribute it to the students. You might photocopy and post the "What Do You Know Bingo" questions found in this manual as well. Invite students to use the rules from these handouts to design their own safety games to be used by them and students in other classrooms. These games could be board games, puzzles, or charades.

Benchmarks:

English

Reading

Demonstrate literal comprehension of a variety of printed materials.

• Identify sequence of events, main ideas, facts, supportive details, and opinions in literary, informative, and practical selections.

Demonstrate inferential comprehension of a variety of printed materials.

• Examine relationships, images, patterns, or symbols to draw conclusions about their meanings in printed materials.

Health

Controllable Health Risks

Predict short- and long-term consequences of safe, risky, and harmful behaviors.

Safe and Healthy Environment

Explain safe physical, social, and emotional environments for individuals, families, schools, and communities.

Apply injury prevention, first aid and emergency skills.

Resources:

The National Center for Injury Prevention and Control provides information on preventing crashes at its Web site http://www.cdc.gov/ncipc.

The Oregon Bicycling Manual, which includes many safety tips, can be downloaded from http://www.odot.state.or.us/techserv/bikewalk/manual.

The Riley Hospital for Children in Indianapolis, Indiana has an excellent online resource manual for teaching children about safety, including a Skateboard Safety Fact Sheet, at http://www.rileyforkids.org/safetysmart/professional/skateboard.

Information about bus/train safety and environmental issues is available from **Tri-Met** on its Web site, http://www.tri-met.org, or by calling outreach at (503) 962-6438.

HANDOUT: That Hurts!

Bicycle, Bus, Car, Skateboard/In-line Skates, Train, Feet

Identify which types of transportation the young people in the stories below were using when they had the collisions. Then suggest how each collision might have been prevented.

Preventable Collision 1

Some middle school students were horsing around on their way home from school. Waiting for the light to change at an intersection, one of them stepped backward into the street to keep from being whacked on the head with a biology book. Just then a car made a right-hand turn and hit the young man with its bumper. The blow threw him into the air and back onto the curb. A dental surgeon repaired and implanted his front teeth. An orthopedic surgeon repaired his leg and pelvic bones.

Preventable Collision 2

They were only three blocks from home. The young man had finished arguing with his brother about whether to tune into KNRK or KISN and was just fastening his seat belt when his brother swerved into the other lane to avoid a squirrel. They hit an oncoming vehicle. There were three crashes within less than two seconds: the two vehicles slamming together, the young man's head slamming against the windshield and his internal organs slamming against his skeletal structure. For the most part, the scars on his skull and forehead don't show, but even after three months, he's wearing a neck brace and still in serious pain.

Preventable Collision 3

The front wheel of the young man's vehicle slipped into the pavement expansion joint on the Morrison Bridge just past the entrance to the I-5 freeway. He was thrown off, but luckily not into traffic. Unfortunately his head bounced against the pavement. Because of his bruises and facial swelling, his parents didn't recognize him at the emergency room.

Preventable Collision 4

The young woman spotted her friend waiting at the station on the opposition side of the street. She darted across the tracks. The operator of this quiet mode of transportation did not have time to warn her or apply the brakes. You don't want to know the details.

Preventable Collision 5

The young woman thought that jumping the curb wasn't a big deal until a nurse had to pick the gravel out of her kneecap and shin. And then over the next few weeks the wound stuck to the inside of her jeans, the shower water stung like an acid burn, and the whole wound cracked open and started to seep when she bent down to put her clothes in the dryer.

TEACHER'S RESOURCE for That Hurts! Page 1

Bicycle, Bus, Car, Skateboard/In-line Skates, Train, Feet Identify which types of transportation these young people were using when they had the collisions and then suggest how each collision might have been prevented.

Preventable Collision 1

Some middle school students were horsing around on their way home from school. Waiting for the light to change at an intersection, one of them stepped backward into the street to keep from being whacked on the head with a biology book. Just then a car made a right-hand turn and hit the young man with its bumper. The blow threw him into the air and back onto the curb. A dental surgeon repaired and implanted his front teeth. An orthopedic surgeon repaired his leg and pelvic bones.

Transportation: Feet

The collision could have been prevented by:

- Not horsing around on a busy street
- Staying focused on traffic
- Anticipating what drivers might do

Preventable Collision 2

They were only three blocks from home. The young man had finished arguing with his brother about whether to tune in KNRK or KISN and was just fastening his seat belt when his brother swerved into the other lane to avoid a squirrel. They hit an oncoming vehicle. There were three crashes within less than two seconds: the two vehicles slamming together, the young man's head slamming against the windshield and his internal organs slamming against his skeletal structure. For the most part, the scars on his skull and forehead don't show, but even after three months, he's wearing a neck brace and still in serious pain.

Transportation: Car

The collision could have been prevented by:

- Fastening seat beats before driving
- Not distracting the driver

Preventable Collision 3

The front wheel of the young man's vehicle slipped into the pavement expansion joint on the Morrison Bridge just past the entrance to the I-5 freeway. He was thrown off, but

luckily not into traffic. Unfortunately his head bounced against the pavement. Because of his bruises and facial swelling, his parents didn't recognize him at the emergency room.

Transportation: Bicycle

The collision could have been prevented by:

- Using bike lanes whenever possible
- Crossing pavement joints, rails, etc. at a 90 degree angle

TEACHER'S RESOURCE for That Hurts! Page 2

Preventable Collision 4

The young woman spotted her friend waiting at the station on the opposition side of the street. She darted across the tracks. The operator of this quiet mode of transportation did not have time to warn her or apply the brakes. You don't want to know the details.

Transportation: Train

The collision could have been prevented by:

- Looking and listening before crossing tracks
- Taking NO chances, including never trying to beat at train

Preventable Collision 5

The young woman thought that jumping the curb wasn't a big deal until a nurse had to pick the gravel out of her kneecap and shin. And then over the next few weeks the wound stuck to the inside of her jeans, the shower water stung like an acid burn and the whole wound cracked open and started to seep when she bent down to put her clothes in the dryer.

Transportation: Skateboard, Roller Blades, or Scooter The collision could have been prevented by:

- Wearing knee pads and shin protection
- Not doing tricks on the sidewalks

TEACHER'S RESOURCE: Safety Questions Page 1

Bicycles:

1. Bicycles are vehicles and must follow the same rules as other vehicles.

Yes or no?

Answer: Yes

Discussion: This includes coming to a full stop at stop lights and stop signs and signaling for turns. Cyclists can be ticketed and fined for failing to follow the rules.

2. By law, bicyclists must ride on which side of the street?

Answer: Right side

Discussion: Remember bicycles must follow the same rules as motor

vehicles.

3. What piece of biking equipment is designed to cushion the head during a fall?

Answer: Bike helmet

Discussion: Head injuries are very dangerous. A helmet is a must, and football or hockey helmets do not work as bike helmets. Buy a helmet that is certified by the American Society for Testing and Materials (ASTM) or the Snell Memorial Foundation. There will be a sticker label on the inside of the helmet or on the outside of the box.

4. Of the 800 people per year in the United States who die from bike crashes, what type of injury do most sustain?

Answer: A head injury

Discussion: Hospital emergency room studies show that a helmet can prevent about 85% of head injuries.

5. How do bicyclists communicate with other drivers?

Answer: Hand signals

Discussion: Demonstrate, or ask students to demonstrate, the hand signals.

6. What type of clothing should cyclists wear to be seen by drivers?

Answer: Bright clothing

Discussion: Neon or florescent colors are good choices.

TEACHER'S RESOURCE: Safety Questions Page 2

Bus or Train:

1. All bus and train operators have what means of communication to call for help in case of a problem?

Answer: A telephone

Discussion: Buses and trains are fairly safe places to be because the driver monitors behavior and can call for immediate help in case of problems. In fact, if you are being threatened on the street or need help, you can flag down a bus driver who can call for assistance.

2. What is a major safety issue with the MAX trains?

Answer: People don't hear them coming. (Also, people don't understand how fast the trains go.)

Discussion: When crossing a track, be very alert because, unlike car or bus engines, there is little noise from an electric motor to warn you that a train—or an electric car, for that matter--is coming.

3. Yes or no? Buses only stop at designated bus stops.

Answer: No

Discussion: If you are riding the bus at night by yourself, the driver will let you off anywhere on the route that is safe. It doesn't have to be a regular bus stop.

4. A MAX train going 45 miles an hour needs what distance to stop? Ten yards? At least a block? Five blocks?

Answer: Five blocks

Discussion: Trains – and buses – can not stop quickly. Don't step out in front of them or cross in front of a moving train or bus.

5. If you feel threatened by someone at a bus stop who's getting on the same bus, where should you sit once you board?

Answer: Near the driver

Discussion: Bus and rail operators, road supervisors, fare inspectors, and transit police are all there to assist passengers. If you are in trouble, ask for their assistance.

TEACHER'S RESOURCE: Safety Questions Page 3

Cars:

1. One out of how many people will be seriously injured in a car crash sometime during their life? One out of 100? One out of 10? One out of 3?

Answer: One out of 3

Discussion: Have the students figure how many people in the class will be injured according to statistics. If the class has 30 students, for example, 10 of them are likely to be seriously injured in a car crash.

2. What is the first thing you should do when you get into a car?

Answer: Buckle your seat belt.

Discussion: It's essential for safety and it's the law.

3. What's the average time it takes to "buckle up"?

Answer: Three seconds

Discussion: It's a tiny amount of time that could save your life.

4. Within how many miles of home do most car crashes occur? Within 100 miles? 50 miles? 25 miles?

Answer: Within 25 miles of home

Discussion: It's important to fasten your safety belt even for short trips.

5. What is the safety device housed in the dashboard that deploys during a frontal crash?

Answer: The air bag

Discussion: Air bags reduce injuries during crashes; however, young children and very short people should not sit in the front seat where a deployed air bag might injure or smother them. The safest place for a child is in the middle of the back seat.

6. True or false? You have a greater chance of being killed or injured if you are thrown from a vehicle than if you are contained inside.

Answer: True

Discussion: Your chances of being killed or injured are 25% higher if you are thrown from the vehicle. Some people use the example of fire or being submerged in water during a crash as an excuse not to use seat belts, but only one half of 1% of all traffic crashes involve fire or submersion.

7. Four hundred and fourteen Oregonians were killed in traffic accidents in 1999. (That's like wiping out Hosford Middle School!) How many of these people died as a result of speeding? Less than half? More than half? Answer: More than half – about 230 people

Discussion: Tell the students that Oregon has a significantly higher rate of fatal crashes involving speeding than other states. (56% in Oregon versus 30% nationally.) Ask them what they could do to lower the fatality rate from speeding in our state. Suggestions might include being ready on time for trips so the driver isn't tempted to speed, reminding the driver not to speed, or refusing to ride with friends old enough to drive who are likely to speed and take chances.

TEACHER'S RESOURCE: Safety Questions Page 4

Skateboarding or In-line Skating:

1. Which one is the most common cause of skating injuries: 1) showing off;

2) irregularities in the riding surface; or 3) traveling at high speeds?

Answer: 2) irregularities in the riding surface

Discussion: Skateboards have much smaller and less compressible wheels than, for example, bicycles. As a result they are more easily affected by the interruptions in the riding surface, such as rocks, sticks and cracks. Skateboarders should know the areas where they will be riding and check for holes, bumps, and rocks.

2. What percentage of injured skateboarders are male? 50%, 75% or 90%? Answer: 90%

Discussion: Ask the students why they think this is true. You might suggest that more skateboarders are male or that males take more risks than females.

3. The most common skateboard injury is to the 1) head, 2) elbows, or 3) wrist.

Answer: 3) Wrist

Discussion: Skateboarders often try to break their fall by extending their arms. Rolling, trying to land on the fleshy parts of the body and relaxing instead of keeping stiff can help prevent injuries during a fall.

4. One reason kids below the age of five should not ride skateboards is because they have big heads. True or false.

Answer: True

Discussion: Young children have disproportionately large and heavy heads, so when they lose their balance, they tend to lead with, and land on, their heads. Also their muscle coordination is not developed and they don't have the strength to break their fall with their arms.

TEACHER'S RESOURCE: Safety Questions Page 5

Feet:

1. Are more males or more females killed in pedestrian accidents?

Answer: Males

Discussion: In 1999, more than two thirds of the pedestrian fatalities were male. Statistics don't show why this is true, but ask the students to consider whether they think males take more risks.

2. If there is no sidewalk, should a pedestrian walk facing or not facing the traffic?

Answer: Facing the traffic

Discussion: This way, you can see cars coming and jump out of the way if a car is swerving toward you.

3. If you are crossing an intersection on foot, what is the best way to make certain a driver making a right-hand turn sees you?

Answer: Make eye contact

Discussion: Drivers are often focused on the traffic. They can overlook or look past pedestrians who might be trying to cross the street.

4. What should you do if the Don't Walk signal begins to flash once you have started to cross the street—return to the curb or keep walking?

Answer: Keep walking

Discussion: The signals are set to allow enough time for you to cross safely. If you hesitate, change your mind or turn back, you might confuse the drivers.

5. What is the word for crossing the street at any point other than a marked crosswalk or corner?

Answer: Jaywalking

Discussion: Not only is jaywalking dangerous, it is illegal. You could be fined for jaywalking.

HANDOUT: Safety Surveillance

Example: BUS/TRAIN SAFETY

Unsafe Behavior Observed

Where: downtown bus mall

When: around noon on Saturday

Who: older woman

Description: She kept talking with the

driver while driver was trying

to drive.

Safe Behavior Observed

Where: NE Broadway/24th

When: **8:15pm**

Who: Group of Grant HS students

Description: Waited on the curb until bus

came to a full stop.

MY SAFE BEHAVIOR

Where: Lloyd Center MAX Station When: after movie/Friday night

Description: Started to step on track/

remembered it takes a train 5

blocks to stop.

BUS/TRAIN SAFETY

Unsafe Safe Behavior Observed Safe Behavior Observed MY SAFE BEHAVIOR

Where: Where: When: When: When:

Who: Who: Description:

Description: Description:

CAR SAFETY

Unsafe Safe Behavior Observed Safe Behavior Observed MY SAFE BEHAVIOR

Where: Where: Where: When: When: Who: Description

Who: Who: Description: Description:

HANDOUT: Safety Surveillance Page 2

PEDESTRIAN SAFETY

Unsafe Safe Behavior Observed	Safe Behavior Observed	MY SAFE BEHAVIOR
Where: When: Who: Description:	Where: When: Who: Description:	Where: When: Description:

SKATEBOARD SAFETY

Unsafe Safe Behavior Observed	Safe Behavior Observed	MY SAFE BEHAVIOR
Where: When: Who: Description:	Where: When: Who: Description:	Where: When: Description:

Get Moving and Get Healthy

Overview: In this activity students calculate their resting heart rates and target heart rates. They complete fitness evaluations and set activity goals using various modes of transportation to improve their health.

Objectives:

Students will be able to

- Examine personal habits.
- Identify modes of transportation that are also modes of exercise.
- Study the health benefits of walking, biking, and roller blading.
- Calculate resting heart rate (RHR) and target heart rate (THR).
- Make a health goal.
- Explain that exercise is one of the necessary elements of a healthy lifestyle.

Time: 1-2 class periods

Materials:

- Student handout: Fitness Evaluation
- Student handout: My Health and Goals
- Large wall clock with second hand
- Dictionaries

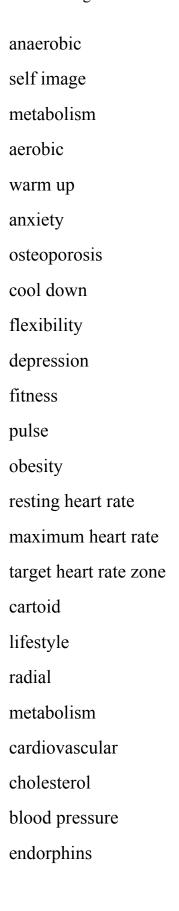
Before you begin:

You will probably need to demonstrate to your students how to take a pulse rate. If you can, take your students outside or to the gym to exercise so that they can observe their pulse rate increasing during physical activity. Since students will not be able to take a true resting pulse rate until the following morning, allow them to start with a rate taken in class.

You may want students to create a glossary of health terms and their definitions.

The glossary could include the following:

bone density



Procedure:

- 1. Ask your students if they think they are healthy. What does it mean to be healthy?
- 2. Explain that they are going to complete a fitness evaluation to find out how healthy they are. Pass out the *Fitness Evaluation* and *My Health and Goals* handouts. Review the steps together. Point out the places where students should transfer their calculations and answers onto the *My Health and Goals* handout. Encourage students to look up unfamiliar words in the dictionary.
- 3. Guide students through the processes of calculating RHR and THR. You may want to model them yourself first.
- 4. Move around the room to answer questions and help students do the calculations. Students may bring up the fact that they do other activities, not listed on the evaluation, that contribute to personal fitness. Explain that those are great, and that the list focuses on activities that also happen to be modes of transportation.
- 5. Before the students write their health goals on their handouts *My Health* and Goals, pass out the *Health Facts* handout. Read the handout together as a class.
- 6. Ask students which facts were the most and least surprising. Ask students if they have participated in some of the activities discussed on the handout. Has anyone experienced the psychological benefits mentioned? Encourage students to share anecdotes from their experiences. What are some benefits that are not noted? This is a good place to emphasize the extra benefits of transportation as exercise: its good for the environment and good for the person doing it.
- 7. Give students time to write their goals and to complete the *My Health and Goals* handout. Ask volunteers to share their goal statements out loud.
- 8. Check in with students weekly to see how their health goals are coming along. Remind students that getting healthy is a long-term process. You might want to keep a fitness graph or chart to track the class's progress.

Assessment Opportunities:

- Participation in class discussions
- Completion of the *My Health and Goals* handout
- Glossary of health terms (optional)

Extensions:

Research Projects

- Students could research teen health risks such as anorexia, bulimia, obesity, over- and under-exercising, and steroid usage. Have them present their information to the class.
- Students could research the health benefits of alternative modes of transportation. They could create fact sheets about heart disease, the medical costs of poor fitness, rates of car pollution, costs to maintain roads, etc.

Media Analysis

Challenge students to develop a thesis about the images of teens and transportation in the media. What is the message portrayed on television and in the movies? How often do students see images of teens walking, biking, or skating? Students might want to organize their information on charts or graphs, using examples from various media.

Community Health

Students could read articles about the healthiest cities. Many outdoor magazines run yearly articles that rate cities on their healthiness. The availability of alternative modes of transportation is usually one of the criteria used to judge the cities. Portland frequently ranks in the top twenty. See *Outdoor* magazine to start.

Experts

• Invite a bike messenger to class. Students could prepare interview

questions to ask the messenger. Questions might include: What do you do for a living? Describe a typical day. Describe the benefits that your job has on your personal health and on the environment.

• Invite a doctor or other health expert to talk to your class about the benefits of exercise.

Benchmarks:

English

Reading

Locate information and clarify meaning by skimming, scanning, close reading, and other reading strategies.

• Locate information and clarify meaning by using tables of contents, glossaries, indexes, headings, graphs, charts, diagrams, and/or tables.

Demonstrate literal comprehension of a variety of printed materials.

• Identify sequence of events, main ideas, facts, supporting details, and opinions in literary, informative, and practical selections.

Health

Healthy and Fit Body

Understand and integrate concepts of physical, mental, and emotional health.

Understand and analyze the relationships among nutrition, physical activity, psychological factors (such as stress) and personal hygiene and their effects on personal health and well being.

Understand key concepts of growth and development and their relationship to lifetime wellness.

Mathematics

Calculations and Estimations

Compute with whole numbers, fractions, decimals, and integers using paper and pencil, calculators, and computers.

• Perform calculations on whole numbers fractions, decimals, and integers using paper and pencil, calculators, and computers.

Physical Education

Physical Fitness

Demonstrate a physically active lifestyle (e.g., progressing from participating in physical education classes to independently pursuing a regular schedule of physical activity).

Pursue and maintain a health-enhancing level of physical fitness by developing a personal physical activity plan based on an accurate fitness assessment (e.g., progressing from informally exploring one's aerobic endurance, muscular strength and endurance, flexibility and body composition to accurately assessing, setting goals, and pursuing strategies to improve and maintain healthy standards).

Recognize the relationship of health-related fitness to the pursuit of physical activity.

Resources:

Bicycle Transportation Alliance (BTA)

1117 SW Washington Street

Portland, OR 97205

(503) 226-0676

There are many Web sites on teen health and exercise, including:

City Bikes -- A great resource for bicycle riders.

http://www.citybikes.com

Cool Nurse - Teen Health and More

http://coolnurse.com/

City of Portland, Office of Transportation

http://www.trans.ci.portland.or.us/TransServices.asp

International Inline Skating Association

http://www.iisa.org

Teens' Health -- A searchable database with hundreds of articles about teens http://www.teenshealth.org

The Cool Place for Health

http://coolmd.com/

World Resource Center

http://www.wri.org/enved/suscom-portland.html

HANDOUT: Fitness Evaluation

Directions: Follow the steps below. Use these steps to help you complete your *My Health and Goals* handout.

1) Choose all of the modes of transportation that you use at least once a week and record them on your My Health and Goals handout.

walking
biking
skate boarding
running
skiing
rowing
hiking
roller blading
skipping
galloping
using a scooter
others

2) Next to each mode of transportation that you entered on *My Health and Goals*, write down how often, how intensely, and how long you use the mode. Use the following as a guide for your answers.

How often?	How intensely?	How long per session?
Once per week	light	0-10 minutes
2 X per week	moderate	10-20 minutes
3 X per week	vigorous	20-30 minutes
4 X per week		30-40 minutes
5 X per week		40-50 minutes
6 X per week		50-60 minutes

3) Calculate the **total time** that you spend using each mode of transportation. Determine, **overall**, if the level of activity is light, moderate, or vigorous.

Record both on your handout.

4) Read the information below and then determine the recommended amount of activity for a person your age.

For middle school people, a healthy goal is 30-60 minutes of moderate activity almost every day, during which you get your heart rate up. (You'll learn more about this in a bit.) But a well-rounded program that improves not only your fitness, but also your strength and flexibility, is recommended. To improve your strength, add 2 to 3 days of strength training to your aerobic routine. Finish your aerobic and strength training activities with stretches to improve your flexibility.

Record the recommended amount of activity on your handout.

5) Read about heart rate:

Heart rate (HR) is the number of times that your heart beats in a specific amount of time – usually 10 seconds. In order to get the most from exercise, you want your heart to beat faster at different times during your exercise activity. Read on to find out how fast you want it to beat during different parts of your workout.

At the start: After your warm-up, your HR should be close to the lower end of your target zone. (You'll learn about the target zone in step number 7 below.) If you're over the upper limit of your target HR zone, slow down the next time you do your warm-up.

In the middle: Halfway into your workout, your HR should be up. If it is higher than the upper limit, pull back and ease off on the intensity that you are working.

Before you finish: Toward the end of your workout, your HR should still be up. If your HR is within the lower end of your zone, work harder on your next workout.

Afterward: At the end of your cool-down, your heart rate should be around your resting rate. If it is still up, take a little more time just to walk around a bit and bring your heart rate down. The transition from working out to a dead

stop can be hard on your heart.

6) Take your pulse rate.

Using two fingers, press lightly against the place where you are going to take your pulse. Use your index and middle finger, not your thumb to take your pulse. If you use your thumb, you can feel a different pulse and that pulse is going at a different rate than the other pulse points.

Take a pulse check at your carotid (the area on your neck below the jaw), your radial (on the wrist on the same side as your thumb), or your chest (the area that is just above your heart and slightly to the side). Calculate your resting heart rate (RHR):

- Take your heart rate on a regular basis right after you wake up in the morning (before you even get out of bed) to find out what your real resting heart rate is.
- Count how many heartbeats per ten seconds. By keeping track of your resting heart rate you will notice that as you become more fit, your resting heart rate will lower. The average resting heart rate is 12-13 beats per ten seconds.

Record your RHR on your My Health and Goals handout.

7) Calculate your target heart rate zone (THR):

- Subtract your age from 220.
- This is your maximum heart rate (MHR).
- Multiply your MHR by 0.8 and divide whatever number you get by 6. This is the upper limit of your target heart rate zone in a ten second count.
- Multiply your MHR by 0.6 and divide the resulting number by 6. This is the lower limit of your target heart rate zone in a ten second count.
- Your target heart rate zone is between the upper and lower limit of beats per ten seconds. Your maximum heart rate is the most your heart rate should reach after a strenuous workout. Checking one's heart rate is also

known as taking a pulse check.

Record your THR on your My Health and Goals handout.

- 8) Read the handout *Health Facts*.
- **9)** Set a goal for yourself. Identify the activities you would like to do and how often you will do them. Record where your heart rate should be during the activity. Describe the benefits that are the most important to you. Record your responses on your *My Health and Goal* handout.

HANDOUT: Health Facts

Benefits of Walking

- Walking helps control weight, blood sugar, and cholesterol levels.
- A brisk walk can burn up to 100 calories per mile or 300 calories per hour.
- Walking improves cardiovascular fitness. As an aerobic exercise, walking gets the heart beating faster to transport oxygen-rich blood from the lungs to the muscles.
- The heart and lungs grow more efficient with a regular walking regimen, reducing blood pressure and resting heart rate.
- Psychologically, walking generates an overall feeling of well-being and can relieve depression, anxiety, and stress by producing endorphins, the body's natural tranquilizer. A brisk walk will relax you and stimulate your thinking.

Benefits of Roller Blading

- On the average, inline skating at a steady, comfortable rate expends 285 calories per 30 minutes and produces a heart rate of 148 beats per minute.
- Roller blading builds up hip and thigh muscles, develops hamstring
 muscles, and improves muscle tone in the entire upper leg, rear end, hips,
 and lower back. Muscles in the upper arms are also developed when arms
 are swung vigorously while skating.

Benefits of Biking

- Biking expends 360 calories per 30 minutes and increases heart rate to 148 beats per minute.
- Biking can also help prevent high blood pressure, and even lower blood

pressure that is above normal levels.

• Biking supports your body weight so it is less stressful on joints than running.

General Benefits of Daily Physical Activity

- Reduces the risk of heart disease by improving blood circulation throughout the body
- · Keeps weight under control
- Prevents bone loss
- Boosts energy level
- Helps manage stress
- Releases tension
- Improves the ability to fall asleep quickly and sleep well
- Improves self-image
- Counters anxiety and depression and increases enthusiasm and optimism
- Increases muscle strength, increasing the ability to do other physical activities
- Provides a way to share an activity with family and friends

(Based on information provided by the American Heart Association.)

HANDOUT: My Health and Goals

Name	2		Date		
1.	Mode	How Often?	How Hard?	How long?	
2.					
3.					
4.					
5.					
Total	Activity Tir	me =			
Overa	all, the inten	sity level of my activit	ries are =		
How	much activit	ty a person my age sho	ould do =		
My R	esting Heart	t Rate(RHR) =			
Му Т	arget Heart	Rate (THR) =			

My Health Goals:

- Physical Activities (including biking, walking, skating)
- Where my heart rate should be during the activity
- Desired Health benefits

What Do You Know Bingo

Overview: This bingo game offers students a fun opportunity to demonstrate what they know about decision making, environmental science, safety, health, alternative transportation, and urban planning. The game can be used as a pre- and post-test for the information in the SMART MOVES Curriculum as well as a tool to reinforce concepts throughout the school year.

Time: 1 class period

Objectives:

Students will be able to

- Demonstrate their knowledge of concepts taught in the SMART MOVES Curriculum: decision making, environmental science, safety and health, alternative transportation, and urban planning.
- Work cooperatively in groups to develop answers to the questions.

Materials:

- Student Handout: What Do You Know Bingo Card
- Blank sheets of paper (for teams to record answers to the bingo questions)
- Marking pens
- Teacher's Resource: Questions for What Do You Know Bingo

Before you begin:

If you are using the game for post-assessment:

Preview the Teacher's Resource *Questions for What Do You Know Bingo*. Photocopy those pages of the resource that are relevant to the lessons your students completed in the SMART MOVES Curriculum. Cut on the lines between questions, discard those that do not apply to your students, and then place the questions in a container to draw from during the game.

In addition, photocopy the blank pages at the end of the resource and write questions that assess learning that resulted from your adaptations

of, additions to, extensions of, or changes to the lessons. (For example, you might have approached defining values in a different way from how it was presented in the original lesson "Making Choices 1" or perhaps you offered additional information on global warming during "Cars, Trees and CO2.") Cut between the questions that you develop and place these in the container with the other questions.

If you are using the game as a pre-assessment:

Photocopy and cut up those pages of the resource that match the lessons that you plan to deliver.

Procedure:

- 1. Tell students that they will play a game that tests their knowledge of information related to transportation, safety and health, and actions that can improve our environment. (If you are using the lesson as a post-assessment, you might begin by summarizing briefly the lessons students completed and asking them to recall a few facts or activities from the lessons.)
- 2. Now have the class form teams of 2-4 students. Distribute one *What Do You Know Bingo Card* per team, an ample supply of blank paper, and marking pens. Have each team choose a secretary. Point out the five categories on the bingo card and then explain the following rules:
 - 1) You will randomly draw a question, announce the category, and then read the question aloud.
 - 2) Each team will confer and come to a consensus on an answer, whereupon the secretary will write the team's answer on a blank piece of paper and raise his hand.
 - 3) After all teams have formulated an answer, you will ask the secretary who raised his hand first to display and announce the team's answer.

- 4) If the team has the correct answer, a team member will make an X over the initials in any box in the appropriate category. (Tell the group that some questions may have multiple right answers and that you will be the judge of whether answers are correct.)
- 5) If the first answer is incorrect, without revealing the correct answer, you will ask the secretary who raised his hand second to display his team's answer if it is different from the first team's incorrect response. Proceed until a team gives the correct answer. Supply the correct answer if no team is able to give it. If time allows, briefly discuss the correct response.
- 6) The first team to cross out a row, column or diagonal line wins. (Or you might play "blackout bingo," in which all boxes on the card must be crossed out in order to win.) If time allows, distribute more cards and play again with the unasked questions and those that the teams were unable to answer correctly during the first game.
- 1. If you used the game as a pre assessment:

 Tell the class that they will learn more about the topics covered in the game during the next few weeks and that they should be prepared to think about their personal principles and how they might apply them to daily decisions affecting the environment and their safety.
- 2. If you used the game as a post assessment:
 Suggest that many of the questions tested their knowledge of facts only.
 Ask how they might use these facts during their everyday routines. For example, how could they convert into action their understanding of facts about using seat belts, planning an environmentally-sound city, or minimizing global warming. (If students participated in the "Making Choices" lessons, have them refer to the list of principles that they developed as a guide to their actions.)

Extensions:

More Games

- Invite your students to create more questions for *What do You Know Bingo* as you continue to study transportation issues.
- Challenge your students to develop their own transportation and planning games. Your students could take these games to other classrooms to both teach and assess knowledge.

Benchmarks:

Check the specific benchmarks for the lessons from which you used questions.

Resources:

In addition to the resources listed at the end of the lessons, consider the following for sources of more bingo questions:

Federal Highway Administration

FHWA Regional Office Region 10 KOIN Center, Suite 600 200 SW Columbia Street Portland, OR 97201 (503) 326-2053

Federal Highway Administration

FHWA Division Office 530 Center Street NE, Suite 100 Salem, OR 97301 (503) 399-5749

State Bike/Pedestrian Coordinator

Oregon DOT Transportation Building Room 200 Salem, OR 97310 (503) 378-3433 **State Highway Safety Office**

Department of Transportation 135 Transportation Building Salem, OR 97310 (503) 378-6388

Handout: What Do You Know Bingo Card

VDA Values Decisions Actions	ES Environmental Science	SH Safety Health	AT Alternative Transportation	UP Urban Planning
		free		

Teacher's Resource: Questions for What Do You Know Bingo

Questions for VDA: Values/Decisions/Actions Category Lessons: "Making Choices 1" and "Making Choices 2"				
Category: VDA Question: Who were John Locke, Jean Jacques Rousseau and Thomas Hobbes?				
Answer: They were philosophers.				
Category: VDA Question: What does the phrase <i>the common good</i> mean? Answer: A social system and environment that benefits all people				
Category: VDA				
Question: Two rules for scholarly discussion are: 1) There are no right answers, only answers with better reasons; and, 2) Disagree respectfully. What is the third rule of a scholarly discussion?				
Answer: Really listen to the other person				
Category: VDA Question: Moral philosophy deals with right behavior; for example what is good and bad conduct for a government, group, or individual. What is another word (beginning with the letter "e") for "moral philosophy"?				
Answer: Ethics				

Answer: the U.S. Constitution

Category: VDA Question: Some vegetarians never eat meat because they believe this is morally wrong. Concerning their diet, these people's philosophy could be described as which one: absolutism or consequentialism? Answer: Absolutism Category: VDA Question: Supply the last word in the slogan that typifies the philosophy called utilitarianism. "The greatest happiness for the greatest Answer: number Category: VDA Question: Which philosopher described humans' natural state as "nasty, brutish, and short"? Answer: Thomas Hobbes Category: VDA Question: Early English kings and queens probably really liked the philosophy of Thomas Hobbes? Why? Answer: He believed in the absolute power of the monarchy (king, ruler). Category: VDA Question: John Locke's system of checks and balances on governmental

power was a basis for a very important United States document. Which one?

Category: VDA

Question: Defining your values can help you make decisions about how to conduct your life. When your actions match your values, you could be described as having a positive character trait. What is that character trait?

(Hint: It begins with the letter "i.")

Answer: integrity

Category: VDA

Question: What are the four problem-solving steps you used to address the

problem of air pollution?

Answer: 1) Recognize a Real Problem, 2) Get the Facts, 3) Evaluate Options for Personal Action, and 4) Make a Decision

Category: VDA

Question: What are two right versus right issues in the problem of air

pollution?

Answer: Answers may vary: people want to drive, but they also want clean air.

Category: VDA

Question: Name two reasons why people might have a hard time reducing

their driving.

Answer: Answers may vary: You can go anywhere at any time in a car. It's easier to haul things around in a car. You have privacy. People are lazy; it's easier to drive than walk.

Category: VDA

Question: Name two reasons why people might want to use modes of

transportation other than automobiles.

Answer: Answers may vary: Cars pollute. Taking light rail or buses means you don't have to find parking. Walking or biking is healthy for you.

Category: VDA

Question: Approximately how much carbon dioxide would you save the

environment if you walked two miles instead of driving?

Answer: Approximately 2 pounds (or 0.98 lbs. per mile)

Questions for ES: Environmental Science Lessons: "H2O and Cars," "Trees, Cars, and CO2," and "Making Choices 2"
Category: ES Question: There is the same amount of water on Earth as there was 3 billion years ago. Why is this fact important to keep in mind?
Answer: Water is not being created so we should be careful not to pollute what we have.
Category: ES Question: Why is 99% of the Earth's water unavailable for human use?
Answer: It's too salty or exists as polar ice.
Category: ES Question: What is the connection between cars and water quality?
Answer: Cars can pollute the water.
Category: ES Question: After changing the oil in a car, why is dumping the dirty oil into the storm sewer a bad idea?
Answer: It goes into the river and pollutes the water.
Category: ES Question: What are two environmentally sound reasons for taking a car to a commercial car wash rather than washing it by hand?
Answer: Uses less water and water is recycled

Category: ES Question: Cars emit CO₂, a colorless, odorless gas. What does CO₂ stand for? Answer: Carbon dioxide Category: ES Question: Why is the greenhouse effect of concern to scientists and the world's citizens? Answer: Causes warming of the atmosphere that affects our climate, health, and livelihood Category: ES Question: Give 3 negative effects of global warming. Answer: Any three of the following: extreme weather events such as flooding; spread of disease and other health problems; stress on natural habitats of animals; dislocation of agriculture; expansion of deserts; rise in sea level. Category: ES Question: What's the relationship between cars and climatic changes? Answer: Burning fuel causes CO2; too much CO2 causes global warming. Category: ES Question: Trees absorb CO2 and emit oxygen. Give two reasons this fact is important to humans and other animals with lungs? Answer: Absorbing CO2 can help minimize global warming; humans need oxygen to breathe.

Category: ES

Question: If your values include helping improve the air for everyone, what

should your family consider when purchasing a car?

Answer: Fuel efficiency

Category: ES

Question: Regarding transportation, what are two things you can do to

improve air quality?

Answer: Reduce trips in fuel-burning vehicles; use transportation other than

the car; use fuel-efficient cars.

Category: ES

Question: In what way are Tri-Met buses or MAX trains more

environmentally friendly than the cars?

Answer: Buses and trains carry more passengers for the amount of fuel

burned.

Category: ES

Question: What is the mathematical formula you could use to figure how many pounds of CO2 is emitted into the atmosphere from your car travel each week?

Answer: miles traveled per week x lbs. of CO2 per gal burned = lbs of CO2 emitted Miles per gal

Questions for SH: Safety and Health Lessons: "Safety" and "Get Moving and Get Healthy"					
Category: S H Question: Why is it more appropriate to refer to transportation mishaps as "crashes" or "collisions" instead of "accidents"?					
Answers: "Accident" implies no blame; most "accidents" are preventable.					
Category: S H Question: What should you do as soon as you get into a car for even a short trip?					
Answer: Buckle your seatbelt.					
Category: SH Question: What is dangerous about having fun with your friends as you walk along a busy street?					
Answer: Lose focus on traffic					
Category: SH Question: You have the walk light to cross the street, but a car is turning at the intersection. What should you do to make certain you will not be hit?					
Answer: Make eye contact with the driver; make certain the driver sees you.					
Category: SH Question: What is the difference between traffic rules a car driver must obey and those a bicyclist must obey?					
Answer: None. Bicyclists must obey the same rules of the road as drivers.					

Category: SH Question: What safety problem do vehicles powered by electrical engines, such as MAX trains or electrical cars, pose for pedestrians and even drivers of cars? Answer: They are quiet so people are less likely to hear them coming. Category: SH Question: In the United States, 800 people die from bike crashes each year. What type of injury have most of them sustained? Answer: A head injury Category: SH Question: What safety equipment should a bicyclist, skate boarder, or in-line skater always wear? Answer: A helmet Category: SH Question: When are bus drivers required to let you off between regular bus stops? Answer: At night (if you are traveling alone and disembarking on a dark street) Category: SH Question: What are your chances of being seriously injured in a car accident during your lifetime? Answer: 1 in 3

Category: SH

Question: Some people don't fasten their seat belts because they think it is safer to be thrown from a vehicle than to be inside it during a crash. Is this

true or false?

Answer: False

Category: SH

Question: Over half the traffic fatalities in the state of Oregon involve speeding. Okay, you may be too young to drive, but what are two things you

can do as a passenger to protect yourself against speeding drivers?

Answer: Remind the driver to obey the speed limit; don't ride with friends who speed; be ready to start trips on time.

Category: SH

Question: There are several strategies for avoiding injury when you are falling from a skateboard or off in-line skates. Name one.

Answer: Rolling, relaxing, purposely landing on fleshy parts of the body

Category: SH

Question: Should a pedestrian face toward or away from oncoming traffic?

Answer: Toward

Category: SH

Question: The word that describes a pedestrian who crosses the street between intersections is jaywalker. Why is jaywalking dangerous?

Answer: Drivers don't expect to see people in the street between intersections; cars are going faster between intersections.

Category: SH

Question: What is the average number of minutes a person your age should

spend in moderate activity each day?

Answer: 30-60 minutes

Category: SH

Question: To take your pulse you should use your thumb to feel for the heart

beat. True or false?

Answer: False

Category: SH

Question: Biking burns how many calories every 30 minutes?

Answer: 360 calories

Category: SH

Question: Name three benefits of vigorous exercise such as brisk walking,

biking, or roller blading.

Answer: Answers may vary: Exercise helps control weight; prevents bone

loss; increases strength; helps manage stress; helps you sleep better.

Questions for AT: Alternative Transportation Lessons: "Pushing Pedal Power," "Making Choices 2," "Get Moving and Get Healthy"

Category: AT

Question: Name two ways that advertising agencies make

automobiles seem desirable to buyers.

Answer: May vary: Great care is taken to photograph the automobile so it looks like a beautiful object; advertisers use beautiful people and gorgeous surroundings to enhance the car; the text or voice-over uses strong language that suggests fun, adventure, and beauty.

Category: AT

Question: How does the reality of driving a car differ from the automobile advertisements?

Answer: May vary: Driving a car can be more stressful than the ad shows and the trip isn't usually as beautiful or as exciting as the advertisements suggest.

Category: AT

Question: Name four modes of transportation – other than the car – that you can use to get around Portland.

Answer: May vary.

Category: AT

Question: Name three things that the City of Portland has done to encourage commuting by bicycle.

Answer: The city has built bikeways and installed bicycle racks and bicycle lockers.

Category: AT

Question: What is the most significant thing that makes a bicycle kind to the environment?

Answer: May vary: It doesn't burn gasoline and doesn't emit pollutants.

Category: AT

Question: How does the size of a bicycle contribute to making a city a more

livable place?

Answer: May vary: It requires minimal space for storage and it doesn't require the construction of parking lots. It doesn't take up much space on the road.

Category: AT

Question: What are two things that make bicycle riding attractive to an

individual person?

Answer: A bicycle is far less expensive than an automobile and bicycle riding is good for one's health.

Category: AT

Question: Buses burn gasoline just like cars. Why are they considered a cleaner alternative than cars?

Answer: A car only carries 1-4 people. Buses can carry up to 60 people, which means fewer cars on the road polluting the air.

Category: AT

Question: What if you want to ride your bike and take the bus? How do you get your bike on the bus?

Answer: The Portland buses have bike racks on them so you can ride your bike to the bus, then put your bike on the bike rack and hop on the bus.

Category: AT

Question: What are two advantages of having a light-rail train in a city?

Answer: Three hundred people can ride on one train; they eliminate the need for parking; they are quiet; they never experience gridlock; and they run on electricity.

Category: AT

Question: Name a form of transportation that's been around for thousands of years, doesn't involve a vehicle, and is the cleanest one of all.

Answer: Walking

Questions for UP: Urban Planning

Lessons: "Form, Function, and Freeways" and "ECO Town"

Category: UP

Question: How did our highways and roads come into existance? Name two

causes.

Answer: May vary: Natural causes – old, flat riverbeds and dry glacial flows made for easy passage. Economic reasons – the Native Americans and early White settlers used convenient paths to get from fishing sites or trading sites and back to their homes.

Category: UP

Question: What does a platter do?

Answer: Considers land uses and designs streets to meet the needs of pedestrians and drivers of vehicles

Category: UP

Question: What would be the first thing a platter would do before he or she began to consider a new design for a roadway.

Answer: Observe or study how the existing roadway is used

Category: UP

Question: Name ten transportation facilities that a platter might need to

include in his or her plan for a street.

Answer: May vary – crosswalk, bus stop, bus shelter, street lights, trashcan, sidewalks, bike path, bike stand, speed bumps, streelights, benches, medians, planters

Category: UP

Question: A city platter tries to design a street so that it meets a mix of transportation needs. The platter wants to be sure that the various modes of

transportation are not in conflict with each other. Describe a typical conflict between two different modes of transportation.

Answer: May vary: A pedestrian trying to cross a busy street, a bicyclist slowing down a driver, etc.
Category: UP Question: [ECO Town/to do]
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Form for questions that reflect adaptations, changes, and/or extensions to the original lessons								
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