DEPARTMENT OF TRANSPORTATION

Colorado Department of Transportation

Core Subject Lesson Plans: Resources

SafeRoutes
Colorado Safe Routes to School

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Introduction

There are many ways walking, bicycling and active liiving concepts can be intergrated into your students' daily lives. A lesson may be structured around a story where students share their experiences or walking or bicycling may be how students arrive at a lesson location. This section contains resources for lessons included in the curriculum as well as additional lesson ideas. If you can't find what you need here, perhpas you will be inspired to create a lesson that incorperates these ideas!

In this section you'll find additional resources and items listed in the Materials section of each plan as well as a book list, and where to find items listed in the lesson plans (helmets, bike rodeo materials and additional bicycle safety resources) and links to websites that will help incorperate healthy living ideas into your students' daily lives. Videos can be helpful teaching resources and have been incorporated into many of the lessons. The lesson ideas later in this section are included as additional resources. While not compelete lessons, they may be used inconjunction other lessons or may be used to inspire the creation of other lessons.

Books

The following list of books was complied from numerous sources and offers books for all age groups. From fiction to non-fiction and poetry, there are a variety of resources available to satisfy the need in any genre. This list also includes suggestions for parents.

Title: Fiction Ages 4-8	Author
I Went Walking	Sue Williams
Madison and the Two Wheeler	Vanita Braver
Sally Jean, the Bicycle Queen	Christine Davienier
Franklin Rides a Bike	Paulette Bourgeois
Super Ben's Brave Bike Ride	Shelley Marshall
A Crash Course for Molly	Eva Eriksson
Bear's Bicycle	Emilie W Mcleod
Yuki's Home	Manya Tessler
Curious George Rides a Bike (book w/c.d.)	H.A. Ray
Franklin's Bicycle Helmet	Paulette Bourgeois
Play it Safe	Mercer Mayer
Gracie Goat's Big Bike Race	Erin Mirebella
Duck on a Bike	David Shannon
Vera Rides a Bike	Very Rosenberry
The Bike Lesson	Stan Berenstein
The Berenstain Bears and the Green-Eyed Monster	Stan Berenstein
Every Cowgirl Needs a Horse	Rebecca Janni
Office Buckle & Gloria	Peggy Rathmann
Are Your Ready to Play Outside?	Mo Willems
The Adventures of a Plastic Bottle: A Story About Recycling	Alison Inches
The Adventures of an Aluminum Can: A Story About Recycling	Alison Inches
I Can Save the Earth!: One Little Monster Learns...	Alison Inches
The Foot Book	Dr. Seuss
Happy Feet, Healthty Food: Your Child's First Journal of Exercise and Healthy Eating	Carol Goodrow
Happy Hands and Feet: Art Projects for Young Children	Cindy Mitchell

Title: Fiction Ages 4-8	Author
Title: Non-Fiction Ages 4-8	
Be a Better Biker (Girls Rock!)	Annie Buckley
Safety on Your Bicycle	Joanne Mattern
Stay Safe! Bicycle Safety	Sue Barraclough
Seguridad Y Las Bicicletas/ Bicycle Safety	Sue Barraclough
Bicycle Safety	Peggy Bancella
Bicycles (World show-and-Tell)	Kate Petty
Bicycles Have Feelings Too	Barbara E. Scherz
Help Your Parents Save the Planet: 50 Simple Ways...	Playbac

Title: Beginning Chapter Books Ages 4-8	
Gus and Grandpa and the Two-Wheeled Bike	Claudia Mills
The Fantastic Flying Bicycle (Freddit Fernortner series	Jonathan Rand
Ready, Freddy! Yikes! Bikes!	Abby Klein
Marvin Redpost, Super Fast, Out of Control!	Louis Sachar

Title: Picture/Ficton Books Ages -12	
Me and My Bike	Ander
My Sister's Rusty Bike	Jim Aylesworth
Pop-up Tour de France	Pamela Pease
Lance in France	Ashley MacEachern
Mike and the Bike	Michael Ward
Mike and the Bike meet Lucille the Wheel	Michael Ward
Marta and the Bicycle	Germano Zullo
Walking to School	Eve Bunting

Title: Chapter Books Ages 9-12	
The Time Bike	Jane Langton
The Big Bike Race	Luce Jane Bledsoe
The Great Bicycle Race Mystery (The Boxcar Children #76)	Charles Tang
The Golden Ghost	Marion Dane Bauer
That Old Bike	Robin Bruce

Title: Nonfiction Books Ages 9-12	
Mystery Science: Case of the Missing Bicycle	Suzanna E. Henshon Ph.D
The Bicycle	Larry Hills
Go Fly a Bike (The ultimate book)	Bill Haduch
A Kid's Guide to Staying Safe on Bikes	Maribeth Boelts
The World of BMX	J.P. Partlend
Cyclist Bike List: The book for every rider	Laura Robinson

Title: Nonfiction Books Ages 9-12	
Popular Mechanics For Kids The Best Book of Bikes	Amy Pinchuk
Storied City: A Children's Book Walking – NYC	Leonard Marcus
True Green Kids: 100 Things You Can Do to Save the Planet	Kim McKay
Easy to Be Green: Simple Activities You Can Do to Save the Earth	Ellie O'Ryan
101 Ways You Can Help Save the Planet Before You're 12!	Joanne O'Sullivan
Our Earth: How Kids are Saving the Planet	Janet Wilson

Title: Chapter Books Ages 10-12	
Mike Harte was Here	Barbark Park
Bikes and Bullies: A Neil Everheart Mystery	Michael Swarts
On My Honor	Marion Dane Bauer
The Amazing Flight of Darius Frobisher	Bill Harley

Title: Poetry	
Because I Could Not Stop My Bike And Other Poems	Karen Joe Shapiro
Angels Ride Bikes and Other Fall Poems	Francisco X. Alacon
I Was Walking Down The Road	Sarah E. Barchas and Jack Kent

Title: Parents	
Kids in the Wild: A Family Guide to Outdoor Recreation	Cindy Ross and Todd Gladfelter
Introducing Your Kids To The Outdoors	Christopher Van Tilburg
Extreme Kids: HT Connect with Your Children…	Scott Graham

Information about the Bike Smart and Walk Smart CDs

Bike Smart and Walk Smart are interactive CD-ROMs that have been incorporated into this curriculum to partner indoor activities with outdoor realities. The programs were designed for children in grades K-3. They were produced, with support from the National Institute of Child Health and Human Development, by the Oregon Center for Applied Science. Using animations and video demonstrations, these self-paced programs are fun and engaging. They teach children the basic skills and knowledge they need to be safer pedestrians and bicyclists.

Concerned parents, educators and safety officials were directly involved in the design and evaluation of Walk Smart and Bike Smart. Pedestrian/motor vehicle crashes are the most common cause of death from trauma for children 5-9 years old. These crashes most often occur while the child is walking along, playing in, or crossing the street. Non-fatal bicycle crashes represent one of the most common causes of serious brain injury in children--with more than 138,000 children under the age of 14 sustaining bicycle-related head injuries each year.

“What differentiates the Walk Smart and Bike Smart programs from traditional safety curricula are their emphasis on breaking down complex skills such as street crossing into component parts: responding to signals, discriminating dangerous vehicles, and understanding traffic distance”, noted Ann Glang Ph.D., Principal Investigator. “The program then teaches each of these skills to mastery before integrating them into the more complex task of walking safely across a busy street. Pre-teaching the component skills involved in a complex response is a critical feature of effective instructional programs.”

Both programs were thoroughly evaluated in studies involving several hundred children. The studies demonstrated that after children used the program, most did significantly better identifying hazardous situations than they had prior to using the program. The studies also demonstrated that even children with no computer or reading skills were able to use the programs.

Resource Guide is available at:
http://www.dashbc.org/index.php?option=com_content&view=article&id=62&Itemid=83

To purchase:
http://www.icbc.com/4teachers

Helmet Resource List

Helmets are available from a variety of resources. There may be statewide or local helmet grants funded by the Highway Safety Grants or Safe Routes to School Grants. Contact the Safe Routes to School Coordinator or the State Bicycle and Pedestrian Coordinator for more information.

CNS National Helmet Program
ProRider, Inc.
7818 South 212th Street
STE 106
Kent, WA 98032
(800) 642-3123
www.prorider.com/org
outlet@prorider.com

Bell Sports
1924 County Rd. 3000 N
Rantoul, IL 61866
(800) 456-BELL (2355)
www.bellsports.com
desk@bellsports.com
*Contact a Safe Kids Coordinator
*Bell Sports also sells the multi-sport helmet, meets standards for cycling, skate boarding and roller blading.

Pedestrian and Bicycle Education Videos

Walk Smart/Bike Smart
Interactive CD
HealthComm Interactive, Inc.
260 E 11th Ave.
Eugene, OR 97401
Local: (541) 349-4880
Toll-free: (866)846-4880
HCImarketplace.com

Bill Nye the Science Guy
and Bicycle Safety
Order it online at Disney.Go.com
http://www.dep-store.com/product-p/77a92vl00.htm

"Be Safe On Your Bike" Video
(suited for grades 5-7)
Los Angeles Police Department
4125 South Crenshaw Blvd.
Los Angeles, CA 90008
Running time: 13 minutes
http://www.safetylca.org/t/vrf.asp?loc=t&tag=t4&pg=vrf.asp&page=9

"Stop and Listen- Whillie Whistle - Pedestrian Safety Video for Children (ages k-2)"
National Highway Traffic Safety Administration (NHTSA)
1200 New Jersey Avenue, SE
West Building
Washington, DC 20590
(888) 327-4236
Running time: 7 minutes
www.nhtsa.dot.gov/people/injury/willie/video

Pedal Smarts (suited for teenagers)
The Bicycle Zone (suited for children)
Getting There by Bike (suited for high school and adults)
Transit Media Communication
PO Box 1084
Harriman, NY 10926
(800) 343-5540
Running time: 18 minutes, 18 minutes and 12 minutes
info@transitmedia.com

Jello in a Jar (for helmet importance)
The National SAFE KIDS Campaign
1301 Pennsylvania Ave. NW, Ste. 1000
Washington, DC 20004-1707
(202) 662-0600
info@safekids.org

"Operation School Bus Safety: Be Cool, Follow the Rules" Video
(suited for grades 1-4)
Navistar International Transportation Corp.
4956 Wayne Road
Battle Creek, MI 49015
(616) 968-4856
*now available through the Florida Traffic and Bicycle Safety Education Program

"Children in Traffic" and
"The Safest Way Out: Emergency School Bus Evacuation" Grades K-9
AAA Foundation for Traffic Safety
PO Box 1020
Sewickley, PA 15143
(800) 305-SAFE

"How to Use & Fit a Bicycle Helmet"
Seidler Productions
367 Buckhorn Creek Road
Sopchoppy, FL 32358
(850) 962-2225
http://seidlerproductions.com/products/elementary_traffic/index.html

Cycle Songs CD by Linda Crider
(suited for all ages)
Bike Florida, Inc.
info@bikeflorida.org
(352) 224-8602
$10.00 Check pay

Lesson, project, or science fair ideas

History: The bicycle played a key role in the development of our society. During the last decade of the 1800s, at least on third of all patent applications were bicycle related. By the beginning of the 1900s, the United States maintained a separate patent office to process bicycle related applications. Technological innovations that can be credited to the bicycle industry include pneumatic tires, steel tube frames, chain drives, differential gears, sheet metal stamping, electric welding, even asphalt paved roads. Many of the names we associate with motor cars or car parts got their start in bicycling: Ransom Olds, Armand Peugeot, Henry Ford, Herbert Austin, Ferdinand Porsche, Vincent Bendix, and John North Willys (of Willys Jeep fame). Albert Champion (spark plugs) won the Paris-Roubaix bicycle race. Of course the Wright Brothers were owners of a bike shop. Glen Curtiss (who created the P-40 Warhawks used by the Flying Tigers) was a bike racer and bicycle messenger; he continued to ride his bike to work after he became a millionaire.

Possible activities: Prepare a poster, paper, or presentation on the bicycle's role in American history.

Science/Math: The first bicycles were powered by pedals attached to the central hub of the front wheel. Each time the pedal made a revolution, the wheel made a revolution. To make it easier to ride a bike at a higher speed, the front wheels of bicycles were increased in size – the larger the wheel, the faster the bike could (theoretically) be ridden. The inseam of the bicycle rider dictated the maximum size wheel that could be ridden. These high wheeler or penny farthing bicycles typically had wheels 50 to 60 inches in diameter. Since large wheels were difficult to start from a stopped condition, bicyclists typically got their bikes moving prior to mounting them. As chain drives were developed, gears were used to provide mechanical advantage an allow bicyclists to ride faster, and the large front wheels disappeared from the new bikes. Even today, however, bicyclists still describe the combination of gears and wheel size in terms of gear inches denoting the size wheel that would be needed to obtain the same mechanical advantage. To obtain the gear inches, you need to know the rear wheel diameter, the number on teeth on the gear connected to the pedals (chain ring) and the number of teeth on the gear connected to the rear wheel (cog). The equation for gear inches is provided below:

Gear Inches=wheel diameter((teeth on chain ring)/(teeth on cog))*

Using this equation cyclist can produce charts which represent the gear inches of their chain ring and cog combinations. An example table produced for a bike intended for long tours is provided below:

Gear Inches
for a 27-inch or 700c wheel

		Teeth on Chainring		
		30	40	50
Teeth on Cog	12	67.5	90.0	112.5
	13	62.3	83.1	103.8
	15	54.0	72.0	90.0
	17	47.6	63.5	79.4
	20	40.5	54.0	67.5
	26	31.2	41.5	51.9
	30	27.0	36.0	45.0
	34	23.8	31.8	39.7

Bicycles used for road racing have a much different set of chain rings and cogs.

Possible Activities: Have a student prepare a gear inches chart for his or her bicycle. An added layer of complexity could be added by introducing the concept of cadence – pedal revolutions per minute.

Determine how fast (pedal revolutions per minute) a child riding a bike with 20-inch wheels (assuming a chain ring with 44 teeth and a cog with 15 teeth).would have to pedal to keep up with a parent riding a mountain bike with 26-inch wheels, pedaling 60 pedal revolutions per minute (assuming a chain ring with 32 teeth and a cog with 17 teeth).

A variation on the above is to have a student ride with a parent and compare gear inch selection and cadence for particular speeds.

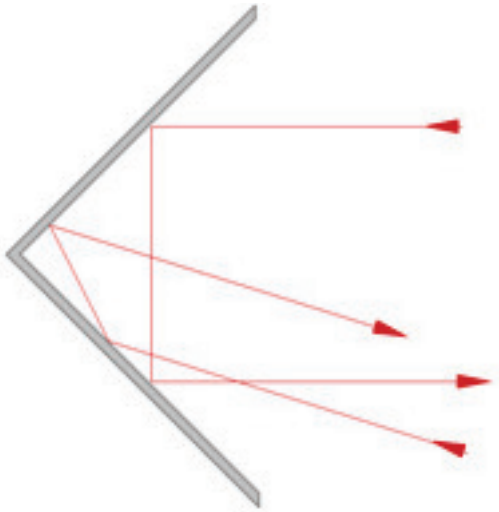
Science: A disproportionate number of pedestrian and bicycle crashes occur during the hours of darkness. Ensuring one is visible is a way to improve safety when walking or bicycling at night. A motorist driving with regular headlamps can see a person wearing blue clothing 50 feet away. A person using lights can be seen 500 feet away.

Possible Activity: Prepare a poster or presentation representing how far away a pedestrian or bicyclists can be seen wearing various clothing or equipment. This could be done through simple internet research, or could be done as a science fair project. The science fair project would likely involve a student and assistant driving to a dark section of road and testing various combinations of clothing and lighting devices. The student should sit in the car, while the assistant walks/rides toward the car with a two-

way radio or cell phone (a cell phone's light would have to be shielded). The distance from where the "driver" can first see the approaching pedestrian/bicyclist should be measured and noted. It should be noted that this experiment assumes the best possible conditions for visibility: an observer looking for a known object at a known time. Students should include a discussion of how these conditions vary from real driving conditions.

Science: Bicycles are required to be sold with reflectors. Typically, reflectors are attached to the pedals, wheels, seat post and handlebar stem. This lesson or project is to illustrate concepts of reflectivity.

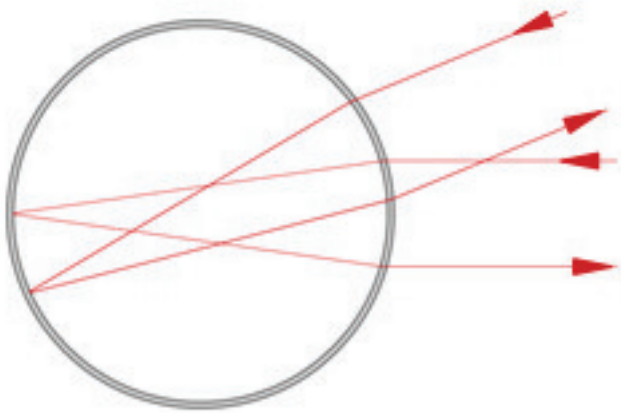
A reflector is a collection of three way reflective cells. Each cell is a combination of three reflective surfaces joined so that they create what is essentially the interior of half a box. Most people are familiar with the phenomenon of seeing one's self in a pair of mirrors placed in a corner. Similarly, if you hold a flashlight next to your head and shine it at one of the mirrors, the light will come right back to your eyes. As long as your eyes are level with the mirrors, the light will come back to your eyes no matter how far you move to the right or left.



But this only works in two directions, if you are below the mirrors and shine the light up at the pair of mirrors you will see the light shining above the mirror (on the bathroom ceiling in many cases). Consequently, this "always see one's self" effect only occurs in two dimensions. A third dimension can be added by placing another mirror at a right angles to the first two – creating the inside of a box. Then no matter what angle the combination of mirrors is viewed from you see yourself at the point where the three surfaces come together. Likewise, a light is always reflected back to the source.

Retroreflectivity uses glass spheres to reflect light back to the source. The glass beads work like the eyes of a cat (or dog, or frog, or even a spider) and reflect light back at the source. They combine refraction with reflection to shine light back at a source. This is the approach use for street signs, roadway striping, backpacks, running shoes, and

even some tee-shirts.



Procedure:

1. Cover one side piece of cardboard with a piece of aluminum foil, shiny side out.
2. Mount the cardboard vertically.
3. Stand back from the foil surface 50 feet at a measuring point directly in front of the surface.
4. Hold the flashlight next to your eyes and shine the flashlight at the foil surface.
5. Move the left and right aiming the flashlight up and down, and from one side to the other.
6. Measure the maximum distance left and right you can move and still see the flashlight beam clearly.
7. Cover a second piece of cardboard to with foil and attach it to the first at a 90 degree angle with the foil on the interior of the angle.
8. Place the angled connected pieces of cardboard on a stand so that the seam is vertical.
9. Repeat steps 3 through 6.
10. Rotate the angled pieces of cardboard so that the seam is horizontal and the surfaces are at 45 degrees from the horizontal plane.
11. Repeat steps 3 through 6.
12. Cover a third piece of cardboard to with foil and attach it to the other two with all three pieces of cardboard connected at a point so that you create half of a box with the interior faces covered with aluminum foil. At this point, you will have essentially created one cell of a reflector.
13. Place the half box so that one seam is vertical and the interior point where the three surfaces meet is clearly visible from the measuring point.
14. Repeat steps 3 through 6.
15. Rotate the half box and that one seam is horizontal and the interior point where the three surfaces meet is clearly visible from the measuring point.
16. Repeat steps 3 through 6.
17. Prepare a presentation to show the results.