Safe Routes to School
On-Bike Curriculum Overview

Designed for Teachers & Instructors

MASSACHUSETTS
Safe Routes to School
MASS.GOV/SAFE-ROUTES-TO-SCHOOL

Overview

- Introduction to Curriculum
- Getting Started
- Lesson Organization
- Bike & Helmet Fitting
- Lesson 1: Biking Basics
- Lesson 2: Up for the Challenge
- Lesson 3: Road Warriors
- Lesson 4: Care & Repair
- Resources

Why an On-Bike Curriculum is Important

- Rising child obesity rates
- Disproportionate number of injuries and fatalities among bicyclists
- Teaches lifelong skill and independence
- Environmental benefits
- It’s fun!

Getting Started

- This curriculum combines classroom and on-bicycle activities
  - Classroom activities can be administered with minimal space/set up
  - On-bicycle activities need more advanced planning, and can be conducted in the gym, on a track, or in a parking area
  - Several lessons include videos for reference
- You don’t need to be an expert!
  - Confidence in your own bicycling skills is not a prerequisite
  - Ask for student volunteers to demonstrate skills
- You’re not alone!
  - Curriculum includes strategies and resources
  - Safe Routes to School is here to help!

Getting Started

Each lesson includes a materials list. Here are some of the things you will need for the on-bike portion of the curriculum:

- Bikes – student-owned, donated for the day, or donated for regular use
- Helmets – student-owned or donated; if students are sharing you will also need hairnets
- Lane markers – spray chalk is available free from Safe Routes to School
- Road signs – available in the Resources section
- Cones – if cones are not available you can substitute with tennis balls cut in half
- Volunteers – some of the lessons will be easier with parent volunteers; more experienced students can also help

Student Skill Levels

- Students in the same grade may have widely varying on-bike skills
  - Brand new rider
  - Using training wheels
  - Limited experience
  - Rode years ago
  - Regular riders – with families or alone
- Structuring lessons for multiple skill levels
  - More advanced students can partner with beginning riders to help them learn key skills
  - More advanced riders can start Lesson 1 in the middle to gain additional practice on more advanced skills like hand signals and group riding

Lesson Organization

- Lessons for each grade level (2nd, 4th, and 8th) are progressive so that students can build on their skills in each lesson
- Students learn additional age-appropriate skills as they advance by grade level
- Each lesson includes:
  - Target grade level
  - Learning standards addressed
  - Time needed
  - Materials list
  - Written lesson description

		2nd grade	4th grade	8th grade
	Bike & Helmet Fitting	x	x	x
Lesson 1: Biking Basics	Scoot & Glide	x	x	x
	Power Pedal and Stop	x	x	x
	Riding in a Straight Line	x	x	x
	Hand Signals & Turns	x	x	x
	Follow the Leader	x	x	x
Lesson 2: Up for the Challenge	Avoiding Obstacles		x	x
	Driveways & Crossings		x	x
	Challenge Course		x	x
Lesson 3: Road Warriors	Riding in the Roadway			x
	Intersections			x
Lesson 4: Care & Repair	Basic Maintenance • ABC Quick Check • Changing a Tire • Adjusting the Brakes			x

	Learning Standards
Lesson 1: Biking Basics	2.5 Explain the benefits of physical fitness to good health and increased active lifestyle
	2.6 Identify the major behaviors that contribute to wellness (exercise, nutrition, hygiene, rest, and recreation, refraining from using tobacco, alcohol, and other substances)
	2.11 Apply basic principles of training and appropriate guidelines of exercise to improve immediate and long-term physical fitness
	2.12 Participate in activities that promote physical fitness, decrease sedentary lifestyle, and relieve mental and emotional tension
	2.13 Explain the personal benefits of making positive health decisions and monitor progress towards personal wellness
Lesson 2: Up for the Challenge	2.7 Demonstrate responsible personal and social conduct used in physical activity settings
	2.10 Perform a rhythm routine that combines traveling, rolling, balancing, and weight transfer into smooth flowing sequences with intentional changes in direction, speed, and flow
Lesson 3: Road Warriors	9.3 Describe personal responsibility for reducing hazards and avoiding accidents
	9.9 List safety rules for recreational activities, including the use of helmets, pads, and the proper use of equipment
Lesson 4: Care & Repair	9.9 List safety rules for recreational activities, including the use of helmets, pads, and the proper use of equipment
	Enrichment (applies to all lessons)

Source: Massachusetts Comprehensive Health Curriculum Framework October, 1999, http://www.doe.mass.edu/frameworks/health/1999/1099.pdf

Bike & Helmet Fitting

- If students are using shared helmets:
  - Have students use a hairnet under their helmet
  - Older students can check each other's helmet fit
  - If helmets will be used over multiple days, have students write their name on masking tape and affix to their helmet to limit adjustments
- If students have their own helmets, the fit should still be checked

Grade Level	2, 4, and 8
Time Needed	30-60 minutes depending on class size, grade level, and number of adults
Materials	Helmets Hairnets Masking tape Marker Bicycles Allen wrench set Air pump
Prerequisites	❑ In-classroom training on bike and helmet fitting

Helmet Fitting Video (click image to play)

Bike & Helmet Fitting

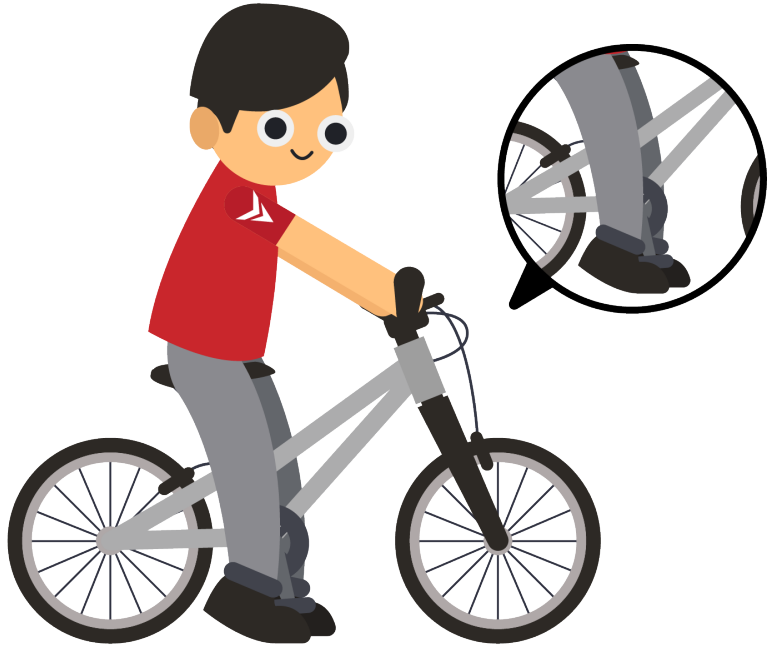
TIPS:

- Students can review bicycle fit or bicycle part worksheets from in-classroom lessons while they wait for their bike fitting
- Speed up the process with help from volunteers

- If students are using shared bicycles:
  - Make sure bicycles are in good working order before each lesson (ABC Quick Check – see Lesson 4)
  - Fit bicycles to students; older students can help identify sizing issues
  - If bicycles will be used over multiple days, have students write their name on masking tape and affix to the bike to avoid major adjustments on later days
- Not enough bicycles?
  - Have students pair up with another student around their same size and assign one bike to the pair

Proper Bike Fit

Learner



Pedaler

Source: https://prevelobikes.com/blogs/news/how-to-size-a-kids-bike

Bike & Helmet Fitting

- Check the bicycle fit
  - Adjust the seat so both feet reach the pedals with a slight bend in the knees
  - Student should be able to comfortably stand over the bike frame, in front of the seat, with both feet flat on the ground or slightly raised for more advanced riders
  - When riding, the knees should not touch the handlebars
- Review this video for more details on bike fit

Source: Huffy Bikes; https://www.youtube.com/watch?v=bbnziWQpyBg

Lesson 1: Biking Basics

Most basic on-bike skills, designed for students who have never ridden before

Biking Basics covers:

- Scoot & Glide
- Power Pedal and Stop
- Riding in a Straight Line
- Hand Signals & Turns
- Follow the Leader

Grade Level	2, 4, and 8
Time Needed	60-75 minutes; can be divided into sessions
Materials	Helmets Bicycles Allen wrench Air pump Cones Tape measure or wheel Chalk or floor tape
Prerequisites	❑ Bike and helmet fitting ❑ In-class lesson on traffic signs and hand signals

Lesson 1: Biking Basics

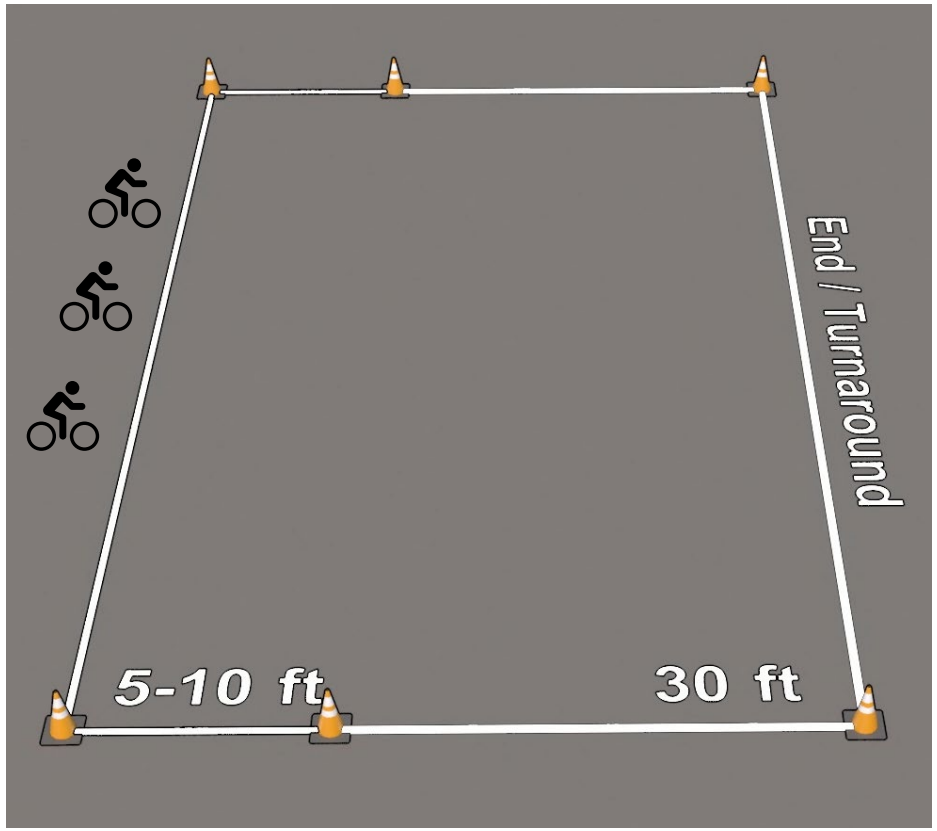
	Scoot & Glide	Power Pedal and Stop	Riding in a Straight Line	Hand Signals & Turns	Follow the Leader
Key Skills	• Balancing on a two-wheel bike • Using both feet to propel the bike forward • Lifting feet and gliding	• Adjusting the pedal to start position • Applying pressure to the pedals to get the bike started • Stopping the bike at a stop sign or spoken direction	• Pedaling with enough speed to eliminate wobbling	• Correctly demonstrate left, right, and stop when off the bike • Correctly demonstrate left, right, and stop when on the bike • Execute turns safely	• Riding with classmates • Maintaining enough space between riders • Following hand signals and spoken directions

Lesson 1: Teacher Tips

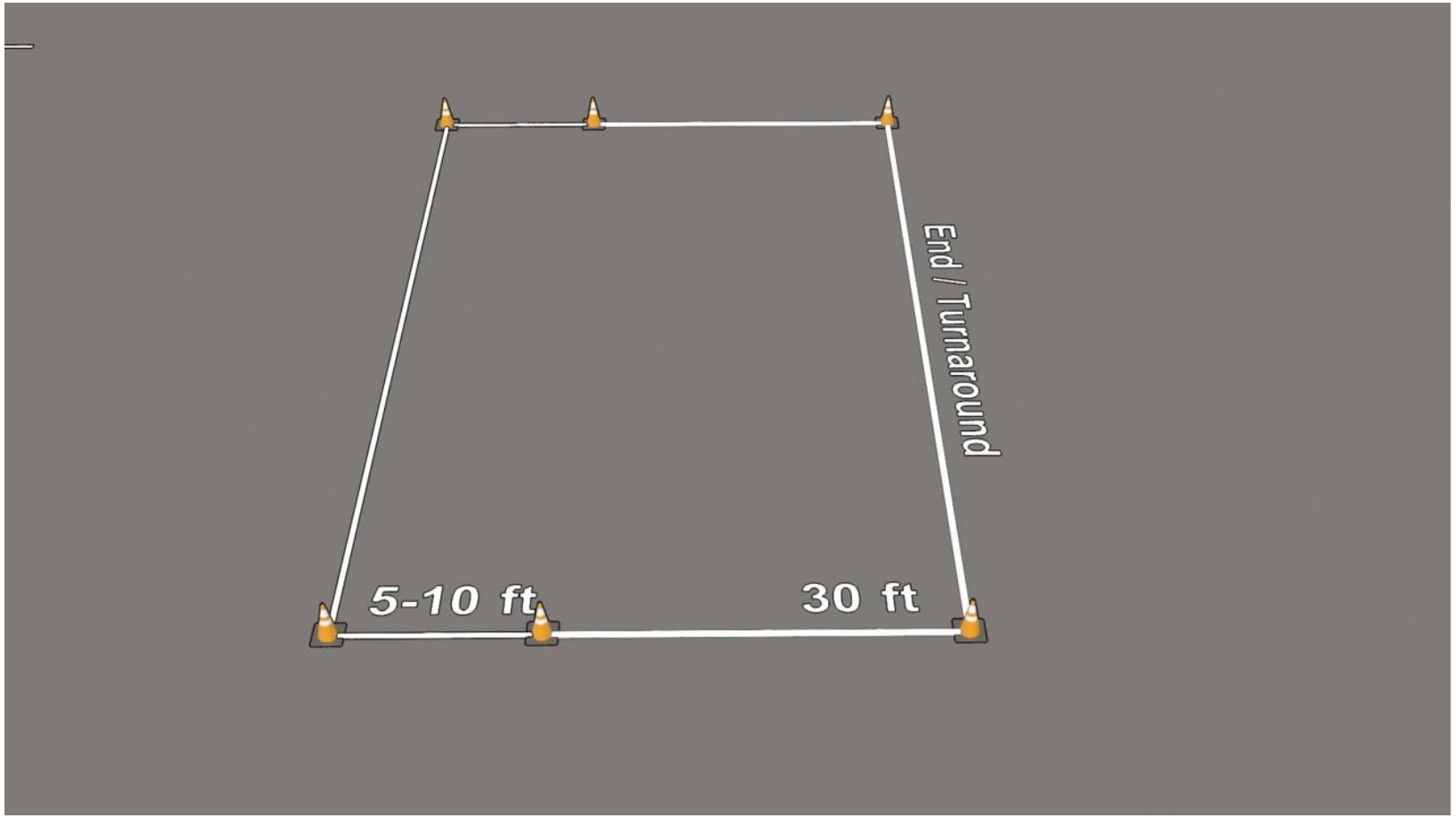
- Lesson 1 activities can take place inside a gym, in a parking lot, or on a paved playground or basketball court
- Use spray chalk to create bike lanes, arrows, and other lines for the lessons
- Use tennis balls that have been sliced in half for lane markers and obstacles
- Contact Safe Routes to School for a free kit that includes safety vests, spray chalk, and more

Scoot & Glide Description

1. Students line up with their bikes side by side with ample space between students
2. Students sit on their bikes with both feet on the ground
3. Ask students to lift up their feet; what happens? (students should instinctively put both feet down)
4. Using both feet (like a frog) ask students to move forward 10 feet
5. Using both feet again, ask students to do three frog kicks and lift their feet up; direct them to put their feet down when they feel like they are going to fall
6. Ask students to turn around and kick/glide back to start; repeat as needed



Scoot & Glide Video (click image to play)

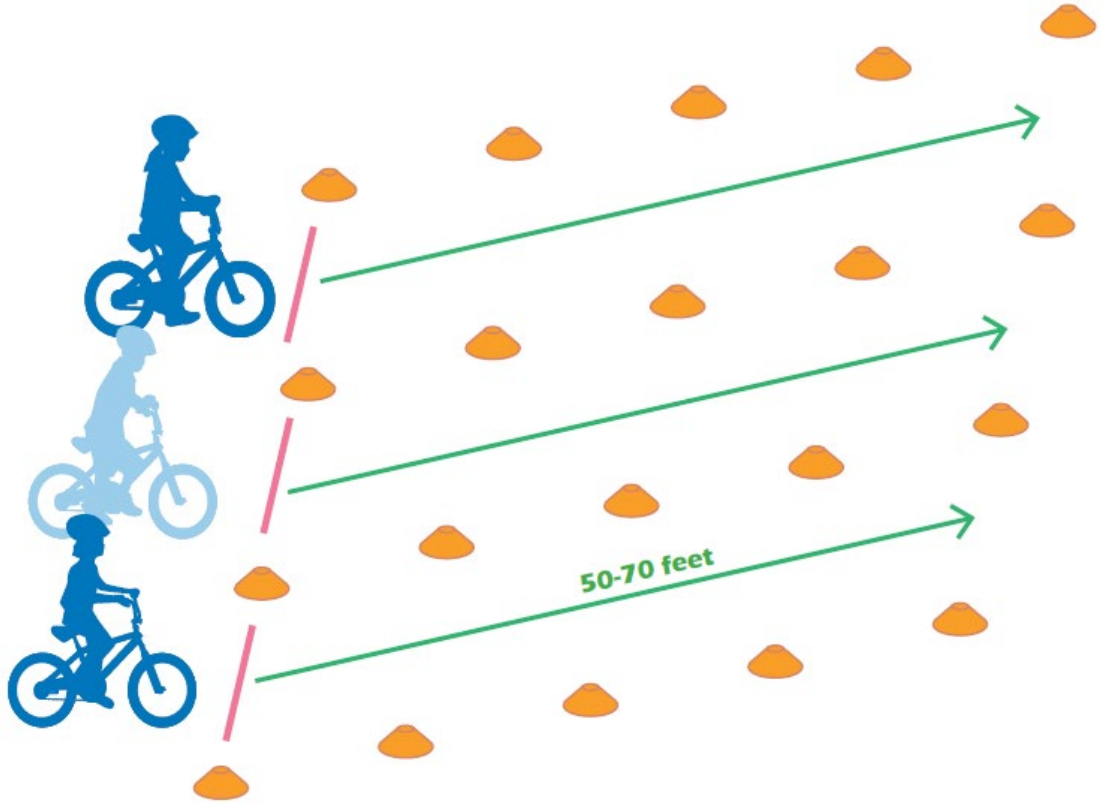


Power Pedal and Stop Description

1. Review “power pedal” position; pedal should be slightly forward past the top of a revolution
2. Review the meaning of GO, SLOW, and STOP signs
3. Students line up at the start line, in “power pedal” position

Power Pedal and Stop Description

4. Hold up GO sign and children start riding
5. Hold up SLOW sign and children begin to brake
6. Hold up STOP sign and children come to a full brake
7. Repeat steps 4 through 6 until students come to the end of the course

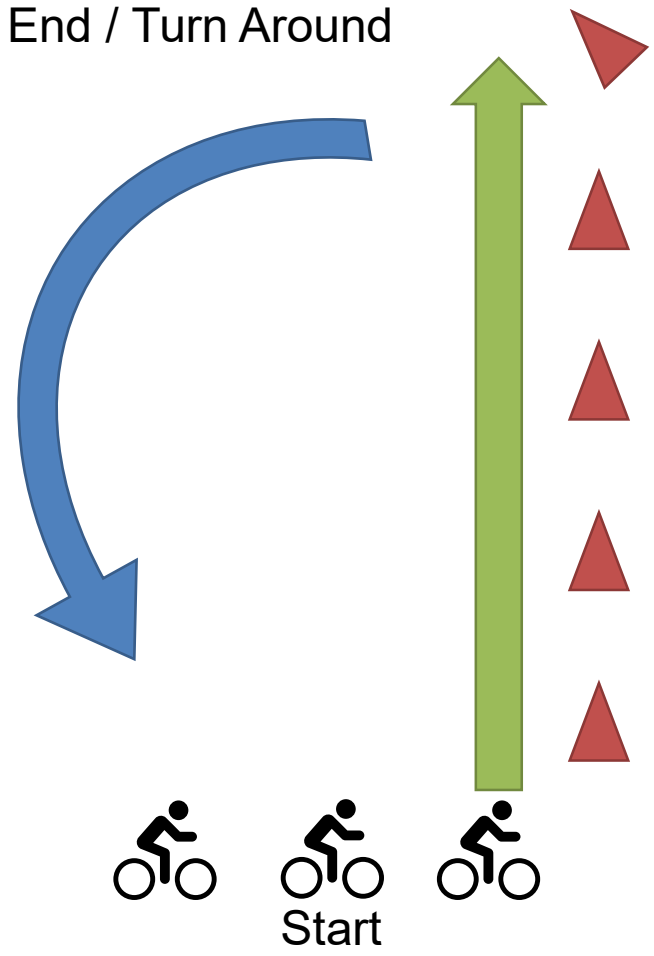


Power Pedal and Stop Video (click image to play)

Riding in a Straight Line Description

Now that students are comfortable starting and stopping they should practice riding in a straight line for longer distances.

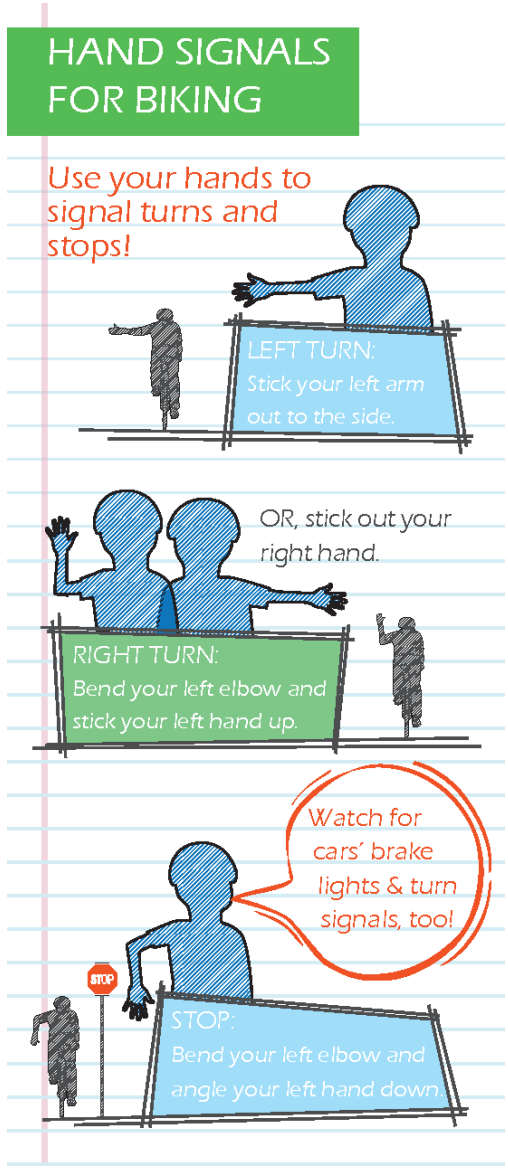
1. Make a straight line with chalk or tape for students to follow
2. Explain that riding in a straight line requires strength and balance
3. Have students try to ride along the line one at a time; they can pedal or glide back to the end of the line
4. Repeat as needed for students to master the skill



Hand Signals & Turns Description

Students don't need their bicycles for this skill. They will practice what they learn on their bikes later.

1. Explain why hand signals are needed
2. Demonstrate the three hand signals
3. Call out "left," "right," and "stop" several times, varying the order for students to practice



Hand Signals & Turns Video (click image to play)

Follow the Leader Description

This activity combines all the skills in Lesson 1.

1. You will need a wide open area for the group to ride in; depending on the number of students and instructors, you may want to split into groups
2. Start with the instructor at the front of the line, with students lined up single file behind the instructor
3. Remind students to keep enough space between themselves and the bicycle in front of them
4. Call out instructions for students to follow; students begin riding, using their hand signals and practicing turning left and right, as well as starting and stopping
5. Let students take turns leading the group

Lesson 2: Up for the Challenge

This lesson teaches intermediate on-bike skills to students with a mastery of the skills in Lesson 1.

Up for the Challenge covers:

- Avoiding Obstacles
- Driveways and Crossings
- Challenge Course

Grade Level	4 and 8
Time Needed	60-75 minutes
Materials	Photos of common obstacles Posters of road signs Helmets Bicycles Allen wrench Air pump Cones
Prerequisites	❑ Bike and helmet fitting ❑ Lesson 1 ❑ In-class lesson on driveways and crossings

Lesson 2: Up for the Challenge

	Avoiding Obstacles	Driveways and Crossings	Challenge Course
Key Skills	• Demonstrate knowledge of potential hazards • Understand how to avoid hazards	• Identify different types of intersections and crossings • Understand the concept of right-of-way at intersections and crossings • Safely exit a driveway and signal turns	• Practice avoiding hazards • Obey road signs • Signal intentions to other road users • Avoid conflicts with other road users

Avoiding Obstacles Description

Source: image by F. Muhammad from Pixabay

Discuss the obstacles students may encounter when riding their bicycles. Students don't need their bicycles for this skill. They will practice what they learn on their bikes later.

Use photos to prompt discussion. What is in each photo? Why might it be a problem for someone riding a bicycle?

- Overgrown vegetation
- Parked cars
- Potholes, branches, trash in the roadway
- Loose dog
- Railroad tracks

Avoiding Obstacles Description

Continue with a discussion about the cues given by other roadway users. What do they mean? How should students react on their bicycles?

- Approaching a vehicle with a left turn signal from the front
- Approaching a vehicle with a right turn signal from the back
- Brake lights
- Pedestrians crossing
- Back up lights

Driveways & Crossings Description

This lesson helps students riding their bicycles understand how to safely navigate driveways and street crossings.

1. Begin the lesson with a review of common road signs (Stop, Yield, Pedestrian Crossing) and their meanings; explain that these signs apply to people riding bicycles the same way that they apply to people driving cars
2. Ask students whether there is a stop sign at the end of their driveway (or exiting the parking lot of their apartment building)
3. Explain that even if there is no stop sign, students should always stop when exiting a driveway or parking lot to look for pedestrians and vehicles; this also applies to all intersections and trail crossings

Driveways & Crossings Description

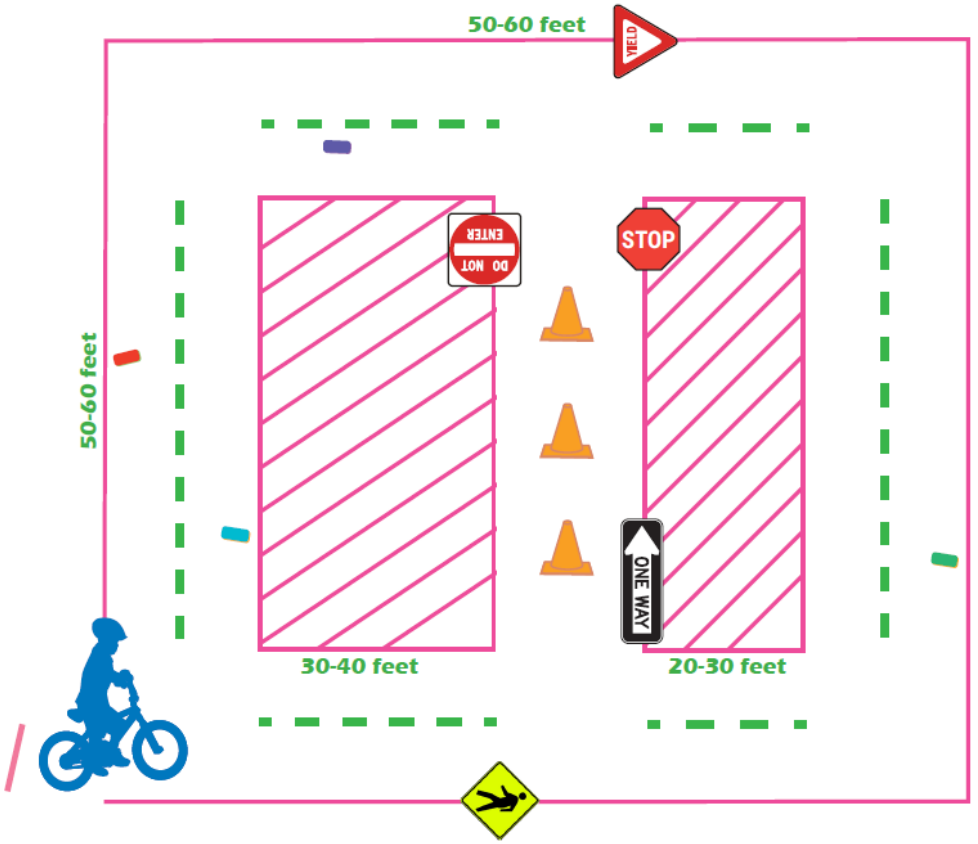
4. Assign students different roles (stop sign, moving car, bike rider, etc.) and let them act out the correct way to interact with each role (for example, bike riders should make eye contact with drivers and pedestrians, yield to pedestrians, and make sure it's safe to cross)
5. Set up different types of crossings:
    - 1-way or 2-way stop
    - 4-way stop
    - Signalized intersection
6. Set up a driveway course so that students can practice coming to a stop at the end of a driveway

Driveways & Crossings Video (click image to play)

Challenge Course Description

The Challenge Course lesson simulates real world conditions for students to practice the skills they have learned.

- Set up a Challenge Course with opportunities to practice using hand signals, following road signs, and avoiding obstacles
- The larger the course, the more students can ride it simultaneously
- For younger students, you can add a few skills at a time and build up to more skills
- Students who aren't riding can hold posters of cars, or act as pedestrians and interact with the students riding bicycles



Challenge Course Video (click image to play)

Lesson 3: Road Warriors

Lesson 3 teaches advanced bicycling skills for older students. Students should have a mastery of the skills from Lessons 1 and 2 before advancing.

Road Warriors covers:

- Riding in the roadway
- Intersections
  - Yielding
  - Determining right of way
  - Adding pedestrians
- Field Trip around the school

Grade Level	8
Time Needed	60-75 minutes including Field Trip
Materials	Photos of bicycle facilities (shared lane markings, bike lanes, separated bike lanes, shared use path, etc.) Cones Chalk or floor tape Measuring tape or wheel Helmets Bicycles Allen wrench Air pump
Prerequisites	❑ Bike and helmet fitting ❑ Lesson 1 ❑ Lesson 2 ❑ In-class lesson on riding in the roadway and intersections

Lesson 3: Road Warriors

	Riding in the Roadway	Intersections	Field Trip
Key Skills	• Recognize different types of bicycle facilities • Learn the dangers of wrong-way riding • Understand where bicyclists should position themselves on the roadway	• Identify different types of intersections and crossings • Understand and demonstrate the concept of right-of-way at intersections and crossings	• Successfully apply skills from Lessons 1, 2, and 3 on the road with traffic

Riding in the Roadway Description

1. Ask students:
   - Should pedestrians walk in the same direction as traffic or facing traffic? *(Answer: facing traffic, especially if there are no sidewalks)*
   - Should bicyclists ride in the same direction as traffic, or facing traffic? *(Answer: with traffic at all times)*
2. Explain that bicycles are considered vehicles and must follow all traffic laws and that wrong way riding is dangerous and leads to collisions, especially at intersections
3. Next, show students photos of different types of bicycle facilities (bike lanes, sharrows, etc.) and ask questions about which ones they have seen and how each of them should be used

Riding in the Roadway Description

Source: http://bicycledriving.org/roads/centresouth-bike-markings-plan

4. Explain that when there is no bike lane, bicyclists should generally ride towards the center of the right-most lane
    - This requires drivers to slow down and change lanes to pass
    - Being in the center of the travel lane keeps bicyclists away from the “door zone” of parked cars – an open car door can cause an accident
    - Bicyclists should not weave between parked cars, as this makes them less predictable and visible to motorists
5. Even when there IS a bike lane, bicyclists should not ride in the “door zone”
    - Bike lanes next to parked cars are commonly within range of car doors, which can extend 3 feet from a car (see photo)
    - Opening a car door into approaching bicyclists is illegal, but it is one of the most common causes of car-bike collisions

Intersections Description

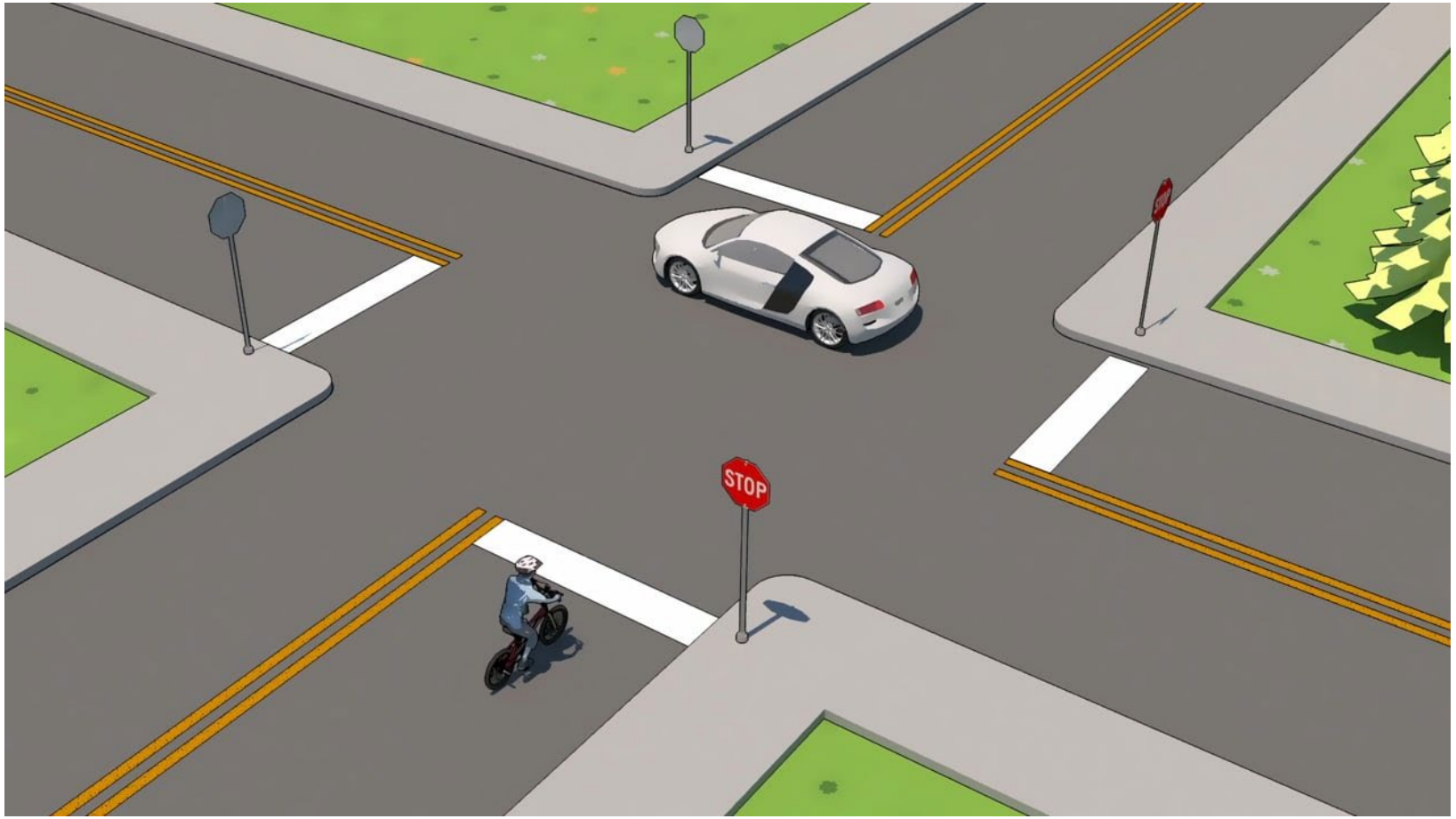
- Begin the lesson with a refresher discussion about different types of intersections and how bicyclists should act at each type
    - 1-way or 2-way stop
    - 4-way stop
    - Signalized intersection
- Discuss proper lane positioning for bicyclists at intersections depending on roadway conditions and bicyclist's intent
    - Turning left
    - Turning right
    - Continuing straight

Source: image by Pexels from Pixabay

Intersections Description

- Have students practice lane positioning and turning on a Challenge Course similar to the one in Lesson 2
    - Practice right-hand turns by turning from the right third of the lane into the right third of the lane on which you are turning
    - Practice going straight from a shared-use lane by moving to the middle of the lane, proceeding through the intersection, and after crossing the intersection, moving to the right third of the lane
    - Practice left-hand turns in a left-hand turn only lane by starting in the right third of the turn lane
    - Practice left-hand turns in a shared-use lane by turning from the left third of the lane into the right third of the lane on which you are turning
- Have multiple students ride the course at the same time to practice yielding right-of-way and avoiding conflicts with other riders

Intersections Video (click image to play)



Field Trip Description

1. Choose a destination (i.e., park, library) within 3-5 miles of school
2. Plan out the route in advance, looking for low-traffic, low-speed streets and/or streets with dedicated bicycle facilities and signals at major intersections
3. Recruit additional volunteers as needed to ride with the group
4. Share the route map with students and review riding practices
5. Ride to the destination; take a break for water and talk about the experience
6. Ride back to school; allow students to lead if appropriate

Source: image by Hans Braxmeier from Pixabay

Lesson 4: Care & Repair

This lesson is for older students to learn more about basic bike maintenance so that they are able to make small repairs independently.

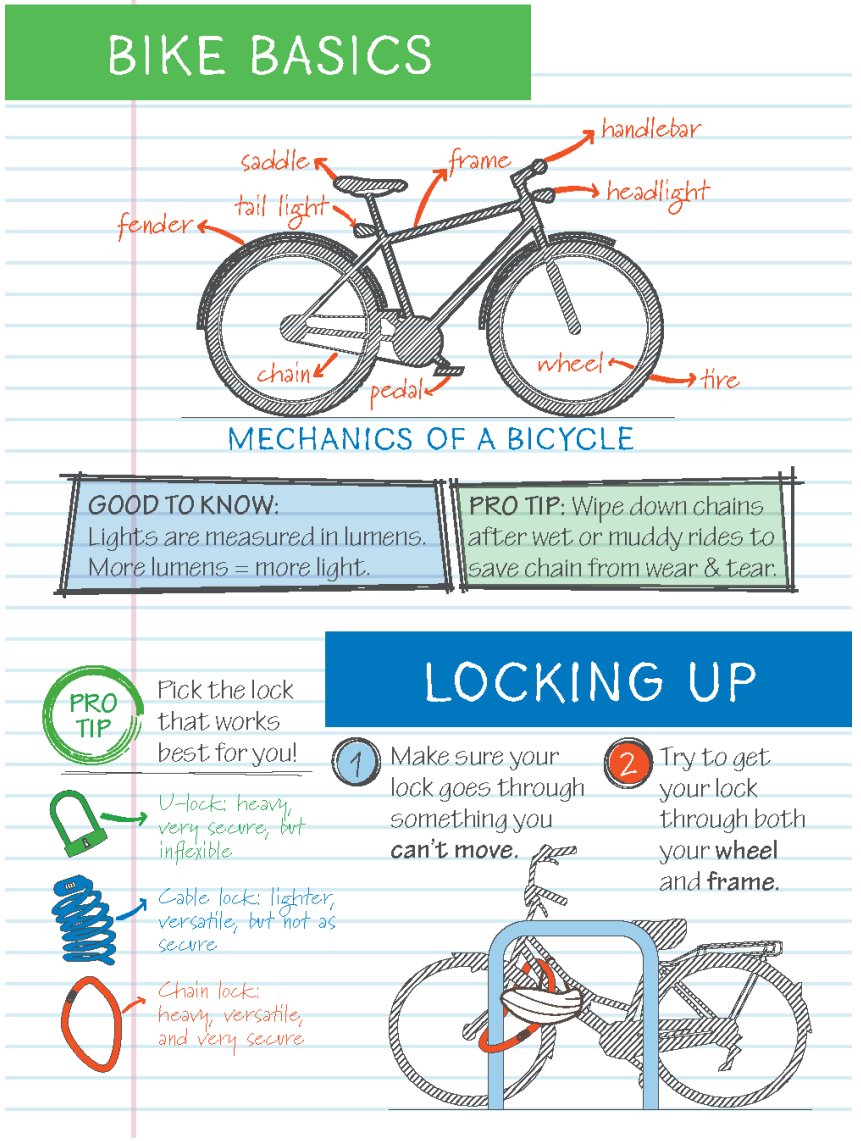
Care & Repair covers:

- ABC Quick Check
- Changing a tire
- Adjusting the brakes

Grade Level	8
Time Needed	45-60 minutes
Materials	Bicycles Wrench set Allen wrench set Air pump Tire levers Rag for cleaning hands
Prerequisites	❑ In-class lesson on bicycle parts

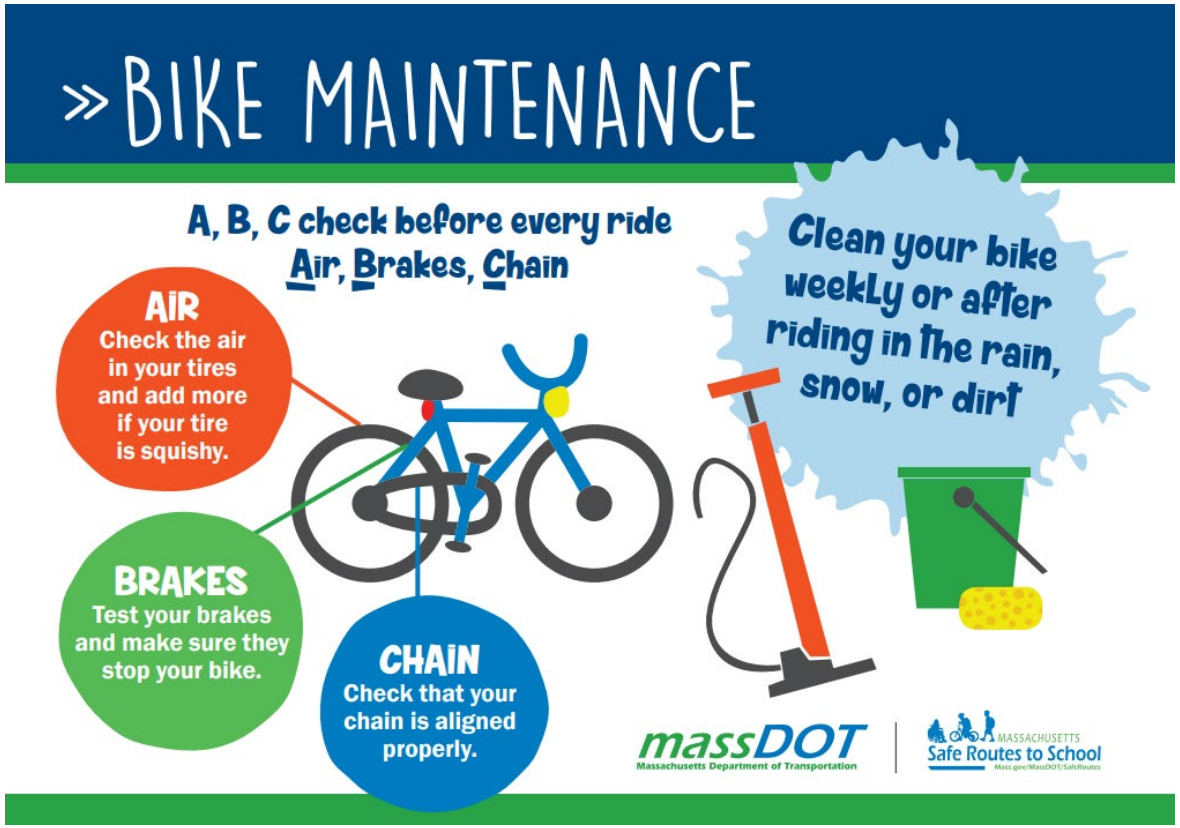
Lesson 4: Teacher Tips

- Review the parts of the bike before the lesson
- Partner with a local bike shop to demonstrate basic bike maintenance
- Ask for a parent volunteer who is comfortable with bike maintenance to come in for demonstrations
- Remind students to always use a bike light at night – it's the law
- Bring in a variety of bike locks for students to try
- Use a bike stand for maintenance work; if you do not have a bike stand you can flip the bike over onto the seat and handle bars



Middle School Tip Sheets are available free from Safe Routes to School

ABC Quick Check



ABC Quick Check cards are available free from Safe Routes to School

The ABC Quick Check should be performed before each ride.

1. Explain that proper tire pressure makes riding easier and helps prevent flat tires
2. Brakes are essential for safety of the rider and other road users
3. The chain makes the bike operate – if the chain is old, rusty, or loose, it should be replaced; it should also be cleaned regularly to prolong its useful life

ABC Quick Check

5. The “Quick” in Quick Check is for checking to make sure all quick releases are closed
6. Finally, check the bike’s operation with a slow ride of a few feet
7. View the video on the ABC Quick Check with students

Source: The League of American Bicyclists; https://www.youtube.com/watch?v=mQ1_yx_6B-U

Changing a tire

Source: [Common Cycle / Fixpert Comics]

How to Fix a Flat

You can do it!

1. Meet our flat tire kit!

2. Remove your wheel.

Flip up the quick release handle and spin it counter-clockwise to loosen.

No quick release? Use a wrench to loosen the bolt (usually 15mm).

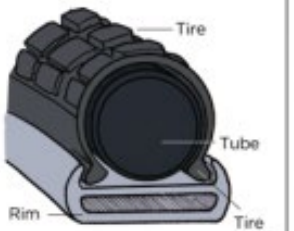
You may have to loosen your brakes to get the wheel off.

3. Let any air out of the tube.

If your valve looks like this, it's a **Schrader valve**. Push the little bit inside to let the air out.

If your valve looks like this, it's a **Presta valve**. Unscrew the top part, then press it down to let the air out.

4. Bike wheel cross-section:



9. Pull the tube out from under the tire.

10. Pump up the tube like a balloon.

Press the nozzle onto the valve, then flip the lever up. If the pump has two holes, use the smaller for Presta, and the larger for Schrader.

11. Listen & feel for air coming from the puncture.

You can draw a circle around it to keep track of where it is.

12. Sand the area, apply glue.

Sand the area around the puncture. Apply a **thin** layer of glue around the puncture (larger than the size of the patch) and let it dry completely.

13. Apply the patch.

While you're waiting for the glue to dry, check your tire and rim for glass, nails, sharp points etc. Push the patch onto the tube, especially around the edges.

14. Push the valve through the hole in the rim.

It helps to have *just* enough air in the tube so it will hold a circular shape, but no more than that. Place the valve at a 90° angle to the rim.

15. Push tube back under tire.

Try to seat the tube on the rim, the way it was before you took it out.

16. Roll tire back onto rim.

Use the heel of your hand to work the tire back on the rim, starting at the valve. If you use levers for this, careful not to puncture the tube!

5. Stick the lever between the tire and the rim.

Hook the lever under the tire bead closest to you. Try not to pinch the tube with the levers.

6. Push lever handle down.

Your tire might be on there pretty tight! Use leverage between the lever and the rim.

7. Hook lever around spoke.

That will hold it in place while you insert a second lever and repeat steps 6 and 7.

8. Push the two levers apart.

Work the levers around the rim until you've completely removed the tire from one side of the rim.

17. Check that the tube isn't poking out of the tire.

Before you fully inflate the tube, work all the way around the wheel, pushing the tire away from the edge of the rim, checking that the tube isn't poking out from the tire at all.

18. Inflate your tube.

Inflate your tube all the way. The side of your tire should say what the maximum pressure is, but if it doesn't 60 PSI is a safe bet.

19. Ride away triumphant!

You did it! Great job!

About this Flyer

Brought to you by **Common Cycle**

COMMON CYCLE

commoncycle.org

Created by **Sally Carson**

fixpert.com

Changing a tire

This video shows students how remove and install a wheel.

Source: Park Tool

This video shows students how to fix the flat tire once the wheel is removed from the bike.

Source: Park Tool

Adjusting the brakes

This video shows students how to adjust bike brakes.

Source: Howcast

Safe Routes to School Resources

Many helpful materials are available FREE from Massachusetts Safe Routes to School; some are downloadable on our website:

- Student Bike Assembly Presentation
- Safe Routes to School Toolkit
- Elementary School Tip Sheets
- Middle School Tip Sheets
- Middle School Resource Guide
- Bike Hand Signal Bookmarks
- Winter Biking Tips
- ABC Quick Check Cards
- Bike Rodeo Guide
- Lessons & Curriculum
- Walking School Bus Kits
- Crossing Guard Guides & Training Video

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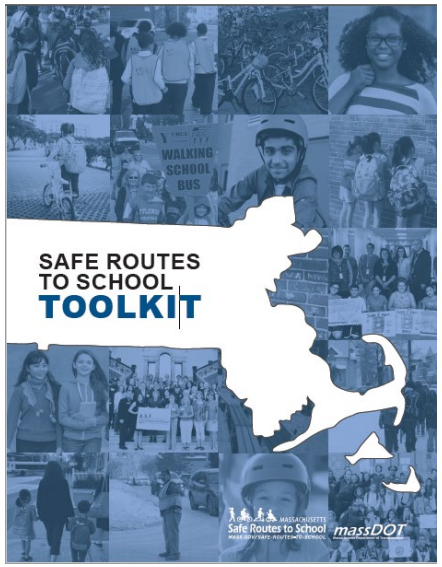

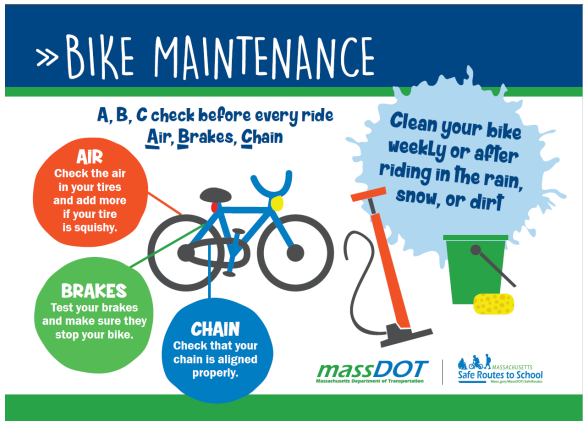

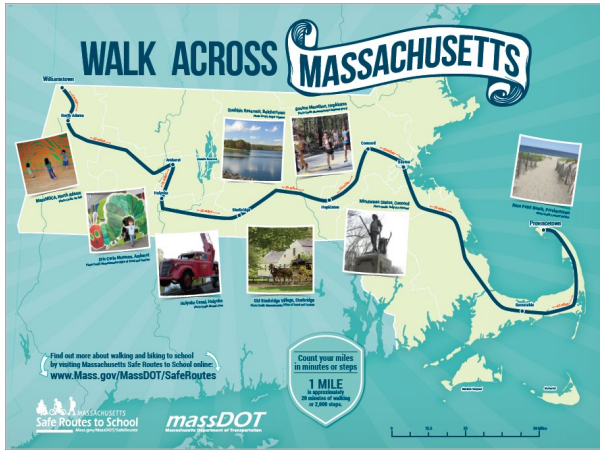

Thank You for Supporting Safe Routes to School!

Additional bike accessories (safety vests, reflective arm and leg bands, bells, lights, helmets) may be available through Safe Routes to School. Contact us for more information.

Contact Us:

Web: www.mass.gov/safe-routes-to-school

Phone: (888) 426-6688

Request Form: https://www.mass.gov/forms/safe-routes-to-school-request