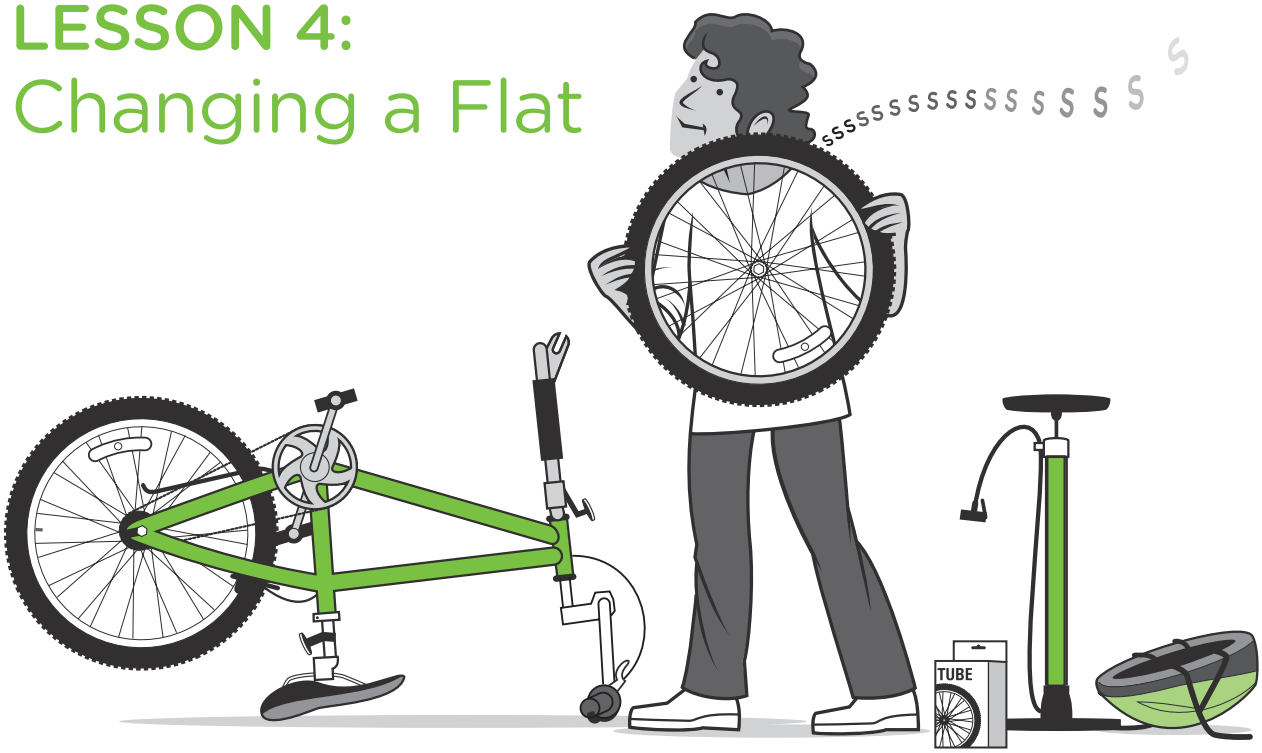
LESSON 4:
Changing a Flat



OVERVIEW

Educational Goal: To understand why it is important to know how to fix a flat tire and what equipment is needed to change a flat.

Preparation

It is recommended that if you are not experienced changing a flat tire, call the local bike shop for a bike mechanic to be your guest speaker for this lesson. You may also visit **www.bikemn.org/education/minnesota-league-cycling-instructors** for a list of Minnesota League Cycling Instructors who would be able to help with this lesson.

NOTE: In this lesson, students will watch a demonstration on how to change a flat tire and come away with an understanding of the equipment needed to change a flat. Time may not allow for each student to practice changing a flat. Ultimately, a fifty- to eighty-minute class period would be appropriate for students to have a hands-on experience learning how to change a flat tire.

Learning Objectives and Minnesota Physical Education Standards (SEE PAGE VI FOR "STANDARDS")

At the end of this lesson, students will be able to:

1. Identify common causes of flat tires. (Standard 2)
2. Explain how to change a flat by replacing the tube. (Standards 2 and 3)

LESSON 4

Timeline

30 MINUTES
Fixing Flats 52

Materials and Equipment

- "How to Fix a Flat" video: www.bikemn.org/education/walk-bike-fun/supplemental-resources
- Computer, speakers, and projector with Internet connection, or Smartboard
- One bicycle with quick-release wheels
- One bicycle without quick-release wheels
- Crescent wrench or metric box/open wrenches (14mm & 15mm)
- Five to six wheels with tube and tire installed
- Five to six tubes
- Ten to twelve tire levers
- Baby powder
- Examples of Presta and Schrader valves (RESOURCE GUIDE PAGE 173)
- Hand pump or floor pump with gauge (with adjustable valves – Schrader and Presta)
- "How to Fix a Flat Tire" handout (RESOURCE GUIDE PAGE 174)

FIXING FLATS

Focus Point: Few parts of a bicycle receive more abuse and neglect than the tires as they roll over concrete and asphalt along the ride. There is a lot of debris that is picked up during a bike ride. Getting a flat tire and not being able to fix it can ruin a ride but also, with younger students, make a bike unrideable until their parents have time or get an expert to help. To optimize rider safety, comfort, and peace of mind, ensure bicycle tires are properly inflated and maintained.

Materials and Equipment

- "How to Fix a Flat" video: **www.bikemn.org/education/walk-bike-fun/supplemental-resources** (three minutes)
- Computer, speakers, and projector with Internet connection, or Smartboard
- One bicycle with quick-release wheels
- One bicycle without quick-release wheels (OPTIONAL)
- Crescent wrench or metric box/open wrenches (14mm & 15mm)
- Five to six tires
- Five to six tubes
- Ten to twelve tire levers
- Examples of Presta and Schrader valves (RESOURCE GUIDE PAGE 173)
- Hand pump or floor pump with gauge (with adjustable valves—Schrader and Presta)
- Baby powder (OPTIONAL)
- "How to Fix a Flat Tire" handout (RESOURCE GUIDE PAGE 174)

Preparation

- Set up technology to view and listen to video from the Internet.

Tips to Differentiated Learning

- Use peer coaching for youth with mobility limitations.

Discussion and Demonstration

1. Ask the students:
   - *Has anyone experienced riding their bike and getting a flat tire?*
   - *What did you do?*

2. Discuss the importance of being prepared to repair a flat:
   - *Always carry tools on the bike to change a flat tire.*
   - *Always carry a spare tube on the bike.*

3. Watch the video "How to Fix a Flat:" **www.bikemn.org/education/walk-bike-fun/supplemental-resources**. Turn on "Closed Captions" if available.

4. After watching the short video, demonstrate how to remove and replace the rear wheel:
   a. *Open the quick release and loosen it at least three full turns. Use a crescent or box/open end wrench*

for wheels without quick releases. Loosen the nut sufficiently to allow wheel removal. It may help to shift into the smallest gear, which releases tension on the chain and provides a reference point when replacing the wheel.

b. *Taking care to pull the derailleur back, pop the wheel free, and guide the chain off the gears and away from the axle.*
c. *Replace the wheel by reversing the procedure. Rear wheels can only be replaced one way. If replacing a front wheel, make sure the quick release is on the* ***left*** *side of the bicycle. (Compare with the rear wheel.)*
d. *Adjust the quick-release tension by tightening the knob on the other side of the clamp. Correct tension is achieved when the clamp leaves a slight impression in your palm when closed.*
e. *Visually check that the wheel is centered in the frame and brake calipers. If not, open the quick release and gently push the wheel into the center while closing the clamp again.*

5. Demonstrate how to fix a flat tire by following these steps:
   a. *Remove the rear wheel as described.*
   b. *Remove any remaining air in the tire.*
   c. *Starting at the valve stem, slip the flat end of the tire lever over the rim and under the bead. The end of the lever should be between the inside of the tire and tube. Clip the lever on one of the spokes. Insert another tire lever a few inches away (clockwise) in the same manner.*
   d. *Slide this lever away from the valve stem and carefully around the edge of the rim (clockwise), guiding the bead up and over the wheel rim. After a few more inches, the bead should easily slide up and over.*
   e. *Continue until the bead on one side of the tire is completely off the rim. This is enough to gain access to the tube and tire.*
   f. *Pulling the tire aside, push the valve stem through the wheel and remove the tube, taking care to not lose the reference point of where the tube was installed in the tire.*
   g. *Make a visual inspection of the tire. Look for punctures, holes, cuts, or debris inside the tire. If any are found, turn the tire inside out and carefully probe the area. If the foreign object is still imbedded, remove it. Avoid sweeping the inside of the tire with your fingers, as any object still imbedded can cause severe injury. If there is no apparent damage to the tire, turn your attention to the tube.*
   h. *Find the hole by filling the tube with air. Its location, for most purposes, will tell you why it went flat. (Utilize reference point noted in "f.")*

6. Installing the new tube:
   a. *Unwrap the new tube and add just enough air to "round it out," so the tube has enough air in it to hold its shape, but not so firm its difficult to manipulate. Do not overinflate!*
   b. *Dust a very small amount of baby powder all around the inside of the tire.*
   c. *Line the valve stem up with the hole in the rim. Pull the tire aside and insert the valve stem down into the rim. Put the valve cap on (Schrader) or screw the washer on loosely (Presta).*
   d. *Show picture from Resource Guide page 173 that shows the difference between the two valves.*
   e. *Carefully, working clockwise, tuck the tube up over the rim and into the tire.* ***Keep the valve stem straight*** *(ninety-degree angle to the rim). If you need to let some air out, go ahead. Take your time!*

FIXING FLATS
(CONT.)

f. *When finished, verify there are no folds, kinks, or wrinkles in the tube, and that the valve stem is perpendicular to the rim.*

g. *Starting at the valve stem, push the tire bead over the rim by squeezing the top of it with your thumb and fingers. Hold it in place with one hand. Continue around the wheel clockwise, squeezing the bead up and over, with your fingers only.* ***Keep the valve stem straight****. As you work your way around to the valve stem, it will get progressively harder. Use of tire levers or screwdrivers at this point will practically guarantee ruining the tube. Rest your hands if necessary. Be patient!*

h. *Once you have the bead re-seated, verify that the tube is completely contained in the tire. Pull the bead away from the rim, looking for any small portion of the tube that might have slipped out. Pay extra attention around the valve stem.*

i. *Holding the valve stem with one hand, attach the pump, and pump the tire to 15–20 PSI. Check that the tire has seated properly on the rim. Let air out if necessary to adjust the tube.*

j. *Fill the tire to full recommended pressure. The wheel can be installed on the bicycle.*

Activity (IF TIME ALLOWS)

1. After the demonstration, divide the class into groups of two to three students. Each group will have a tire and set of tire levers, and a hand pump (with adjustable valves—Schrader and Presta).

   ACTIVITY MODIFICATION: *Pre-group the students and be sure to allow students with disabilities to be included and work with their adaptive equipment..*

3. Have members of each group practice removing one side of the tire and tube from the rim.

3. Practice replacing the tube and successfully placing the tire back on the rim. They should inflate the tire and put the wheel back on the bicycle to complete the activity.

4. Emphasize that bicyclists should always carry two to three tire levers, new tubes, and a hand pump in case of a flat tire.

Review

1. Ask students:
   - *Do you think you might be able to change a flat tire someday?*
   - *What is the first thing you should do when you experience a flat tire?*
   - *How can you avoid getting a flat?*
   - *What tools are needed to change a damaged tube and fix a flat?*

2. Distribute the "How to Fix a Flat Tire" handout to each student.