SKILL-BASED ACTIVITY
Fixing a Flat Tire

Timeframe

Beginner: 45-60 minutes
Intermediate: 40-50 minutes
Advanced: 30-40 minutes

Objectives

At the conclusion of this activity the student will be able to:

1. Demonstrate exceptional or reliable performance when changing a flat tire, as measured by the flat tire rubric. (Psychomotor)
2. Demonstrates exceptional or reliable social behavior as measured by the social behavior rubric. (Affective)

National Standards

Standard 1
Standard 2
Standard 4

Equipment

- Bicycles
- Bicycle tire levers
- Bicycle air pump(s) with pressure gauge
- Bicycle tire tubes
- *Fixing A Flat Tire* worksheet
- Pencils
- Bicycle work stand (optional)

Teacher Overview

This activity teaches students how to fix a flat tire on the front wheel.

Preparation

1. Determine if students will work in small groups of 2-3 or individually.
2. Select the appropriate number of bicycles.
3. Provide a set of bicycle levers, a bicycle tube and bicycle pump for each bicycle.
4. Practice changing a flat tire before demonstrating to students.
5. Make an appropriate number of copies of the *Fixing a Flat Tire* worksheet.

Directions

1. Introduce this activity using the following prompt:

   It is important to have the appropriate amount of air in the tires to ride safely and efficiently. Flat tires can happen just about anywhere so it is important to know how to fix a flat tire. Today, we are going to practice the necessary steps to fixing a flat tire on the front wheel.

2. Use the following sample questions to prompt students' thinking about the content in this activity.

Q: What are some things that cause flat tires?
A: Any of the following are acceptable:
- Glass
- Nails
- Pothole
- Tire inflation too low
- Other responses may be accepted

Q: Have you ever had a flat tire, either on your bike or car?
A: Responses will vary with each class

Q: How was the tire repaired?
A: Any of the following are acceptable:
- Patched the tube
- Replaced the tube

3. Instruct students to gather around the demonstration bicycle.

4. Explain and demonstrate the steps to remove the wheel from the bicycle reinforcing the following points. Riders should:
   - Turn the bike upside down, resting on the handlebars and saddle. (Optional: A bicycle stand can be used instead of turning the bicycle upside down.)
   - Release the front brake quick release (refer to the Brake Adjustment activity on page #313).
   - Remove wheel from fork.

The correct way to use the wheel quick release is to swing the lever from the closed position to the open position. Then use the knob to loosen the quick release.

5. Explain and demonstrate the steps to remove the tube from the tire reinforcing the following points. Riders should:
   - Deflate the tire.

Note the difference between Schrader and Presta valves. Presta valves only allow air to be expelled after unscrewing and pushing down gently on the top of the unscrewed valve. Use the hooked end of a tire lever to deflate a tube with a Schrader valve.

- Loosen the tire from the rim by squeezing along the entire circumference of the tire.
- Insert the flat side of the tire lever between the rim and tire, underneath the tire bead.
- Move the bead to the outside of the rim by leveraging the tire lever against the rim of the wheel. Once the bead is outside of the rim, slide the tire lever all the way around the rim to completely remove one side of the bead.

Changing a Bicycle Tire

New tires may be very stiff and require the use of two tire levers. Attach the hooked end to a spoke to hold the tire lever in place, keeping the tire bead on the outside of the rim. Using a second tire lever, insert the flat side of the tire lever under the rim of the tire, slide underneath the tire bead, moving around the rim to completely remove one side of the bead.

- Only remove one side of the tire off the rim. Do not take the whole tire off the rim.
- Pull the tube out of the tire by grabbing onto the valve stem and gently guiding the tube from the tire.

6. Explain and demonstrate the steps to inspect the tube, tire and rim tape to identify where the hole is on the tube reinforcing the following points. Riders should:
   - Lay the tube on the outside of the tire to check for any object that may have caused the flat. It can be difficult to find small holes; inflating and then spraying the tube with water can expose the hole. If the hole is small, a patch kit can be used instead of using a new tube.
   - Inspect the tire for damage and debris (sharp objects). Run fingers around the inside of the tire to check and remove debris that may have caused the flat (you may use plastic gloves or a rag to check for sharp debris). Pull out any sharp object (glass, thorn, nail, screw). It may be necessary to complete this step by first taking the entire tire off the wheel, instead of leaving one side on the wheel.
   - Look for any larger holes in the tire, in which the tube may bulge through. If there are large holes or slits in the tire, the tire should be replaced.
   - Inspect the rim tape to make sure it is covering all of the spoke nipples. If the rim tape and/or spoke nipple is damaged, see a professional bicycle mechanic.

7. Explain and demonstrate the steps to install a new tube in the tire and inflate reinforcing the following points. Riders should:
   - Inflate the new tube slightly, prior to putting tube in tire.
   - Put the valve stem in the wheel (take care that it is in fully and correctly); then put the rest of the tube in the tire.
   - Work the tire bead back behind the lip of the rim, so the tire is perpendicular to the rim.
   - Use the flat end of the tire lever to help insert the bead, being careful not to pinch the tube between the tire and the rim. Again it may be necessary to use two tire levers, as it was to take the tire off the rim.
   - Inspect the tire bead and tube all the way around one side of the tire, beginning at the valve stem. The tire bead should be seated correctly on the rim and the tube should not be pinched by the bead. Then inspect the other side. A pinched tube will result in another flat.
   - Inflate tire to the air pressure indicated on the tire wall.

8. Explain and demonstrate the steps to reinstall the wheel on the bicycle reinforcing the following points. Riders should:
   - Replace the wheel onto the bicycle fork.
   - Ensure the wheel is rotating in the correct direction, if the tire is directional, when attaching the wheel to the bicycle.
   - Make sure the quick release is on the left side of the bicycle (opposite the derailleurs) and that the wheel is evenly spaced between the forks.
   - Close the quick release by changing the lever's position from fully open to fully closed.
   - When the lever is pointing straight out (sideways or perpendicular) from the wheel there should be some resistance. If no resistance is felt at this point, tighten the clamping force (which is the knob opposite the quick release lever). If there is resistance before this point, loosen the clamping force.
   - Spin the wheel to ensure that the tire is positioned correctly and does not rub on the brakes. Close the brakes. If the wheel rubs on the brakes, make minor adjustments to the wheel quick release and possibly the brakes until the wheel no longer rubs. (refer to the Brake Adjustment activity on page #313)
   - Ensure that the wheel is tight in the fork prior to riding, or there will be an increased risk of the wheel falling off during a ride.

9. Divide students into pairs to practice changing a flat tire using the *Fixing a Flat Tire* worksheet.

Assessment

1. Assess the performance of repairing a flat tire using the following rubric.

PERFORMANCE RUBRIC: REPAIRING A FLAT TIRE

Exceptional	Reliable	Inconsistent	Struggling/ Survival
Student is able to fix a flat tire without assistance from a teacher/aide; Student knows the steps and works through them correctly and efficiently; As a result, the bike can be ridden safely.	Student is able to work through nearly each step for fixing a flat tire, without assistance from a teacher/aide; Student may require help, but it is minimal, and can fix a flat tire with help from a worksheet; Student knows the steps and works through the majority of the steps correctly and efficiently; As a result, the bike can be ridden safely	Student needs help from a teacher or aide to fix a flat tire; Student does understand the process and may be able to complete a few steps on her own, but needs a significant amount of help; The bike could not be ridden without help from a teacher/aide.	Student is unable to fix a flat tire, even with help from a teacher/aide; Student does not seem to understand the process at all.

2. Assess the social behavior of the student during the activity using the following rubric.

PERFORMANCE RUBRIC: SOCIAL BEHAVIOR

Exceptional	Reliable	Inconsistent	Struggling/ Survival
Student is respectful toward classmates, teacher, & equipment; Student receives and uses feedback from teacher and peers in a courteous manner; Student participates fully, without teacher prompting or supervision; Student is able to work cooperatively and productively with classmates, including during peer assessments; Student perseveres, even through difficult skills/activities, and maintains a positive attitude; Student is committed to learning; Student is committed to engaging in cycling in a safe manner, and keeping all classmates safe during the cycling unit.	Student is respectful toward classmates, teacher, & equipment; Student receives and uses feedback from teacher and peers in a courteous manner; Student participates fully, but needs some teacher prompting and/or supervision; Participates in most class activities at an appropriate and productive level; Student is most often able to work cooperatively and productively with classmates, including during peer assessments; Student is able to work hard and not get frustrated with setbacks; Student is committed to learning; Student is committed to engaging in cycling in a safe manner, and keeping all classmates safe during the cycling unit.	Student may not always be respectful toward classmates, teacher, & equipment; Student may listen to feedback from teacher or peers, but may not attempt and/or have difficulty applying it; Student requires some teacher supervision, but does exhibit some self-control at times; Student demonstrates the ability to work cooperatively and productively with classmates, but may need teacher direction or supervision; Student participates in most class activities; Student is willing to try, but may get frustrated with setbacks, and pout and/or verbalize frustration; Student may fluctuate between riding safely and unsafely at times.	Student may struggle with being respectful toward classmates, teacher, & equipment and/or show anger and/or blame others for cycling mishaps; Student does not listen to feedback from teacher or peers, and does not attempt to apply it; Student requires ongoing supervision and does not ride safely; Student may be unprepared and show very little interest in learning or the activity; Student becomes frustrated easily and may quit participating.

Safety

Inspect all tires to ensure they are properly attached at the end of this lesson before allowing students to ride bicycles.

Differentiating Instruction

Adapted and Beginner

- An aide or a peer can help with this activity.
- This may be performed by students who are older and at a higher cognitive level, even though they may be beginning riders.

Best Practice

Teach all bicycle maintenance lessons to intermediate, advanced and beginning riders of a higher cognitive level.

FIXING A BICYCLE FLAT TIRE WORKSHEET

Student _____ Date _____

Directions: Partner will observe the student completing each activity necessary to repair a flat tire. Insert a " ✓ " if it is completed correctly. Insert a (—) if it is completed incorrectly. Students should continue to repeat the activity until each segment of the task is completed correctly.

Activity	Attempt #1	Attempt #2	Attempt #3
Turn the bicycle upside down and release the front brake quick release:			
• Using one hand, squeeze the brake arms together to loosen the tension on the brake cable.			
• Using the other hand, grab the brake cable noodle and pull the brake cable out of the bracket.			
Release the front wheel quick release:			
• The correct way to use the wheel quick release is to swing the lever from the closed position to the open position.			
• Then use the knob to loosen the clamping force. The wheel can now be removed from the fork.			
Deflate (if not already deflated) the tire using the bicycle tire levers:			
• Remove the valve cap.			
• (Schrader) Using the hooked end of the tire lever let the air out by pressing down on valve.			
• (Presta) Unscrew the top; push down on top to deflate.			
• Completely deflate the tire.			

Continued >

Activity	Attempt #1	Attempt #2	Attempt #3
Remove the tire and tube with the bicycle tire levers:			
• Make sure the tire is totally deflated.			
• Squeeze all around the tire to loosen it from the rim.			
• Starting on the side of the tire opposite the valve, insert the flat side of the tire lever between the rim and tire - underneath the bead of the tire - moving the bead to the outside of the rim.			
• Slide the tire lever underneath the tire bead the rest of the way around the rim; to completely remove one side of the bead.			
• New tires may be very stiff and require the use of two tire levers. Once the flat side of the tire lever is inserted under the rim of the tire, attach the hooked end to a spoke to hold the tire lever in place, keeping the tire bead on the outside of the rim. Use a second tire lever to slide underneath the tire bead the rest of the way around the rim; to completely remove one side of the bead.			
• Do not take the whole tire off the rim. Only remove one side, unless a closer inspection is necessary.			
• Gently pull the tube out of the tire by grabbing onto the valve stem.			
Inspect the tire for damage and debris (sharp objects):			
• Remove the tube, slightly inflate and find the hole.			
• Note where the hole is on the tube and lay the tube on the outside of the tire, to check for any object that may have caused the flat.			
• Run fingers around the inside of the tire to check and remove debris that caused the flat (you may use plastic gloves or a rag to check for sharp debris). Remove debris.			
• Inspect the rim tape to make sure it is covering all of the spoke nipples. If rim tape and/or spoke nipple are damaged, see a professional bike mechanic.			
Install a new tube in the tire:			
• Slightly inflate the new tube.			
• Begin by putting the valve stem in the wheel (take care that it is in fully and correctly). Then put the rest of the tube in the tire.			
• Work the tire bead back behind the lip of the rim, so that the tire is perpendicular to the rim.			
• Use the flat end of the tire lever to help insert the bead, being careful not to pinch the tube between the tire and the rim. Again it may be necessary to use two tire levers.			

Activity	Attempt #1	Attempt #2	Attempt #3
Inflate the tire to the air pressure indicated on the tire wall **Reinstall the wheel on the bicycle:**			
• When attaching the wheel to the bicycle, make sure the wheel is rotating in the correct direction if the tire is directional.			
• Replace the wheel onto the bicycle fork. Make sure the quick release is on the left side of the bicycle (opposite the derailleurs) and that the wheel is evenly spaced between the forks.			
Close the wheel quick release:			
• To close the quick release, swing the lever from full open to full closed.			
• When the lever is pointing straight out (sideways or perpendicular) from the wheel there should be some resistance.			
• If no resistance is felt at this point, tighten the clamping force (which is the knob opposite the quick release lever.)			
• If there is resistance before this point, loosen the clamping force. Ensure that the wheel is tight in the fork prior to riding, or there will be an increased risk of the wheel falling off during a ride.			
• Spin the wheel to ensure that the tire is positioned correctly and does not rub on the brakes. Close the brakes. If the wheel rubs on the brakes, make minor adjustments to the wheel quick release and possibly the brakes until the wheel no longer rubs.			
Close the brake quick release:			
• Using one hand, squeeze the brake arms together.			
• Using the other hand, grab the brake cable noodle and place the brake cable in the groove of the bracket.			
• Spin the wheel to ensure that the tire is positioned correctly and does not rub on the brakes.			
• If the wheel rubs on the brakes, adjust the wheel and/or brake alignment.			