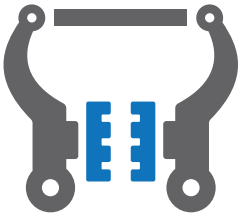

SKILL-BASED ACTIVITY
Brake Adjustment

Timeframe

Beginner: N/A
Intermediate: 40 minutes
Advanced: 30 minutes

Objectives

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

1. Demonstrate exceptional or reliable performance when adjusting brakes, as measured by the brake adjustment 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
- Screwdriver

Teacher Overview

This activity teaches students how to make minor brake adjustments when identified during the ABC Quick Check. Ensuring that brakes are working is an important part of bicycle maintenance. This activity is not recommended for beginner or adapted riders.

Preparation

1. Determine if students will work in small groups of 2-3 or individually.
2. Select the appropriate number of bicycles.
3. Practice disengaging the brakes using the brake quick release and adjusting brakes before demonstrating to students.

Directions

1. Introduce this activity using the following prompt:

In Unit 2, we talked about the importance of being able to appropriately use brakes to stop a bicycle. This requires that brakes are working properly. The ABC Quick Check is a good way in which to check on a regular basis if a bicycle's brakes are in good working condition. Today, we are going to learn how to make minor adjustments to a bicycle's brakes.

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

Q: How do you stop your bicycle?
A: Bicycle brakes

Q: How do bicycle brakes work?
A: If a bicycle has coaster brakes, the rider will stop the bicycle by pedaling backward. If the bicycle has rim or disc brakes, the rider will stop the bicycle by squeezing the brake levers on the handlebar. For rim brakes, this causes brake pads to close on the wheel's rim to stop the wheel from turning. For disc brakes, this causes pads to close on a disc that is attached to the wheel hub.

Disc Brakes

Rim Brakes

3. Instruct students to gather around the demonstration bicycle.

4. Remind students that if the brake lever comes less than about ¾ inch to the handlebar (**Cue: knuckle to knuckle**) when squeezed, the brake cable is too loose and needs to be tightened. If the brake lever doesn't move much when squeezed, the brake cable is too tight and needs to be loosened.

BMX Bikes. BMX bicycles may have coaster brakes and also a rim or disc brake on the rear wheel.

5. Explain and demonstrate the steps to disengage the front brake using the brake quick release reinforcing the following points. Riders should:

- Use one hand to squeeze the brake arms together to loosen the tension on the brake cable.
- Grab the brake cable noodle and pull the brake cable out of the bracket, using the other hand.

6. Explain and demonstrate the steps to tighten and loosen the front brake reinforcing the following points. Riders should:

- Loosen the lock nut from the barrel; screw the barrel away from the brake housing, toward the headset; and then tighten the lock nut to tighten the brake cable.
- Test the front brake lever to see the resulting changes.
- Loosen the lock nut from the barrel; screw the barrel toward the brake housing, away from the head set; tighten the lock nut.
- Test the front brake lever to see the resulting changes.

7. Explain and demonstrate the steps for further adjustment of rim brakes if the brake pads continue to touch the rim of the bicycle wheel, when the brakes are not engaged, after minor adjustments to the brake cables reinforcing the following points. Riders should:

- Make adjustments to the brake arms. This adjustment will take practice to get it right.
- Use a screwdriver to turn the screws on the brake arm, near the brake pad in small increments.

- Continuously apply brakes and watch brake tension change as the screw is adjusted.
- Turn the screw clockwise to put more tension on the spring on the side that is being tightened and to move the brake pad on opposite side closer to the rim.
- Turn the screw counterclockwise to put less tension on the spring on the side that is being tightened and move the brake pad on the opposite side away from the rim.
- Test to ensure all parts move freely. Both arms should move freely and brake pads should not touch rim as the wheel turns. If more tension is needed, the tension springs, located behind each brake arm, may be moved out of their retaining slots and bent by hand to increase tension.

8. Explain and demonstrate the steps to re-engage the front brake reinforcing the following points. Riders should:
   - Use one hand to squeeze the brake arms together
   - Use the other hand to grab the brake cable noodle and place the brake cable in the groove of the bracket.

Assessment

1. Assess the performance of adjusting the brakes using the following rubric.

PERFORMANCE RUBRIC: ADJUSTING BRAKES

Exceptional	Reliable	Inconsistent	Struggling/ Survival
Student is able to make adjustments to the brakes so that the bike can be ridden safely; Student is able to disengage and re-engage rim brakes, and make minor adjustments to brake cables, so that the bike is safe to ride; Student can easily differentiate between types of brakes.	Student is able to make adjustments to the brakes so that the bike can be ridden safely, but may require a little help from a teacher/aide or worksheet; Student is able to disengage and re-engage rim brakes, and make minor adjustments to brake cables so that the bike is safe to ride; Student can easily differentiate between types of brakes.	Student needs help from a teacher or aide while working on brake adjustments; Student does understand the process and may be able to complete a few steps on his own, but needs a significant amount of help otherwise; The bike could not be safely ridden without help from a teacher/aide.	Student is unable to make brake adjustments, 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, and 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, and 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, and 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, and 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 brakes to ensure they are properly adjusted and re-engaged at the end of this lesson before allowing students to ride bicycles.

Differentiating Instruction

Adapted and Beginner

- May be performed by students who are older and at a higher cognitive level, even though they may be beginning riders.

Best Practice

A trained, professional bicycle mechanic should work on major bicycle repairs.

CLOSING ACTIVITY
Journal Writing

Time Fame

Beginner: 15 minutes
Intermediate: 10 minutes
Advanced: 10 minutes

Objective

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

1. List and describe key concepts from Unit 6 that illustrate a clear understanding of basic bicycle maintenance, as measured by providing responses to questions in journals. (Cognitive)

National Standards

Standard 2
Standard 5

Equipment

- Journals or portfolios for each student
- Pencils

Teacher Overview

This activity prompts students to think about what they have learned during the sixth unit by asking questions about bicycle maintenance and providing written responses in journals.

Preparation

1. Determine method for distributing, collecting and storing portfolios or journals before beginning this activity.
2. Modify the questions to reflect the actual activities completed by students.

Directions

1. Introduce this activity using the following prompt:

   We have now completed Unit 6 – "Bicycle Maintenance." All of the skills learned in this unit will help you to ensure your bicycle is in good working condition.

2. Provide portfolios or journals for students to write in.
3. Choose a location where students can sit comfortably and complete the journal writing activity in class.
4. Use the following sample questions to prompt students' thinking about the content presented in this unit.

Q: Describe the 2 methods for fixing a fallen chain.
A: Method one:

- With your hand, push the bottom portion of the rear derailleur forward to give the chain slack and put chain back on whichever gear it has fallen off.
- Release the bottom portion of the rear derailleur to let chain tighten.
- Hand pump pedal to let chain slip into gear.

Method two:

- Determine if the chain has fallen off toward the frame or the crank/pedal.
- Shift to the gear furthest away from where the chain has fallen.
- Pedal the bike and allow the derailleur to do its job by picking up the chain and putting it on the appropriate gear.

Q: Which method of fixing a fallen chain did you prefer and why?
A: Responses will vary.

Q: Describe how to adjust the brakes if the cable is too loose.
A: Disengage the brake using the 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.

Adjust the brake:

- Loosen the lock nut from the barrel.
- Screw the barrel away from the brake housing, toward the headset.
- Tighten the lock nut.

Q: Put the following steps to change a flat tire in the correct order:

__ **Inspect the tire for damage and debris.**
__ **Close the wheel quick release.**
__ **Install new tube.**
__ **Install the wheel on the bicycle.**
__ **Deflate the tire using the bicycle tire levers.**
__ **Remove one side of the tire from the rim using the bicycle tire levers and remove the tube from the tire.**
__ **Release the front brake quick release and turn the bicycle upside down.**
__ **Inflate the tire to the recommended air pressure.**
__ **Release the front wheel quick release and remove the wheel from the fork.**
__ **Close the brake quick release.**

A:

1. Release the front brake quick release and turn the bicycle upside down.
2. Release the front wheel quick release and remove the wheel from the fork.
3. Deflate the tire using the bicycle tire levers.
4. Remove one side of the tire from the rim using the bicycle tire levers and remove the tube from the tire.
5. Inspect the tire for damage and debris.
6. Install new tube.
7. Inflate the tire to the recommended air pressure.
8. Install the wheel on the bicycle.
9. Close the wheel quick release.
10. Close the brake quick release.

Assessment

1. Be thoughtful about assessing journal writing, particularly when asking open ended "opinion-type" questions. Not all students may enjoy bicycling and should be allowed to voice their opinions. To encourage honest answers, refrain from grading thoughts and opinions. However, this should not be an excuse for not learning the material.

2. Consider assessing writing skills and integrate literacy (spelling, use of correct grammar and complete sentences, etc.) in journal writing. Some teachers may want to specify length of answers for specific questions (e.g., answer must be at least two sentences).

Safety

None

Differentiating Instruction

All levels

- Choose questions that are appropriate for the age and ability level of students.
- Some students may need to share their answers verbally with a teacher if they have difficulty writing.
- Some students may need the teacher or an aide to read the questions.

Best Practices

1. Complete this activity in classroom settings, health classes or science classes if cross-curricular units are planned or to maximize riding time in physical education class.

2. Assign the journal writing for Unit 6 as homework to maximize riding time in physical education class.