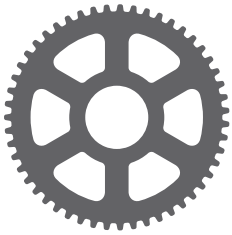

SKILL-BASED ACTIVITY
Gearing

Timeframe

Beginner: 30 minutes
Intermediate: 20 minutes
Advanced: 20 minutes

Objectives

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

1. Demonstrate exceptional or reliable performance of gearing as measured by the gearing rubric. (Psychomotor)
2. Demonstrate exceptional or reliable social behavior as measured by the social behavior rubric. (Affective)

National Standards

Standard 1
Standard 2
Standard 3
Standard 4
Standard 5

Equipment

- Helmets
- Head barriers
- Bicycles
- Bicycle Trainers (optional but recommended)
- Bicycle pump
- Allen wrench
- Red floor tape
- Cones, domes, polyspots or chalk to mark riding course

Teacher Overview

This activity introduces the concept of using bicycle gears to achieve effective riding. Properly using gears allows the rider to exert nearly the same amount of pedaling effort whether riding uphill, downhill or on flat land. Bicycle trainers are recommended for this activity. Beginner and adapted riders should only complete activity steps #12-16 if bicycle trainers are available.

Preparation

1. Designate a riding course that enables the teacher to see the students at all times. This will enable students to ride throughout the class period, even when they are not performing skills.
2. Set up a "chute" using cones, to indicate where the student will perform the skill and the teacher will conduct the assessment. This area should also serve as a teaching station in which the skill will be demonstrated for the students, and where students will return when instructed.
3. Set up a few bicycles on stationary bicycle trainers.
4. Identify what type of shifter the bicycles have and practice using the shifter before demonstrating to students.

5. If a full class set of bicycle trainers is available, set them up in the chute. Students will attach bicycles after completing the ABC Quick Check.

6. If a full set of bicycle trainers is not available, set up available trainers and extra bicycles in the chute. Groups of students will rotate through the trainers, while other students continue riding the designated course.

7. If no trainers are available, students will shift into the identified gear when entering the chute for assessment.

Directions

1. Introduce this activity using the following prompt:

   Today, we are going to talk about bicycle gears. Properly using the gears on a bicycle can result in a much more enjoyable and effective ride. Using the correct gear will make it easier to get to the top of the hill or help you go faster. Gears allow you to exert nearly the same amount of pedaling effort whether riding uphill, downhill or on flat land.

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

Q: Why are there gears on a bicycle? What do they do?
A: Bicycles have gears to allow your cadence, pedal speed, to stay relatively steady and at about the same level of effort, regardless of if you are climbing a hill or going down it. Your speed may change in different gears, but the effort pushing on the pedals should feel about the same. The gearing makes adjustments that allow you to either climb easier or go faster than you would if you had just one gear.

Q: How do you know if you are in the correct gear?
A: The 'correct gear' will vary for each person. Some people are comfortable pedaling harder in a high gear, while others prefer using a lower gear and spinning at a higher cadence. You will know that you are in the correct gear if you can ride efficiently and comfortably regardless of if you are going uphill, downhill or on flat land.

Q: What is meant by bicycling cadence?
A: Cadence is the number of times during one minute that a pedal stroke is completed. It is the rate of pedaling measured in revolutions per minute.

Q: Why does cadence matter?
A: Cadence can influence performance. Most bicyclists have a preferred cadence at which they are most efficient. For most recreational cyclists, a preferred cadence is around 50-60 RPM whereas competitive cyclists may have a preferred cadence that is around 80-100 RPM. A higher cadence improves your aerobic capacity, the body's ability to use oxygen and fat as fuel and results in a good cardiovascular workout.

Q: How does gearing make a difference in cadence?
A: Gearing allows the rider to change between a lower and higher cadence.

3. Complete the following steps #4-10 if Helmet Fit and ABC Quick Check have not been completed as part of the current day's lesson; otherwise proceed to step #11.

4. Divide students into groups of two or three.

5. Instruct students to fit helmets and have partner(s) check if the helmet is fitted correctly.

6. Instruct students to retrieve bicycles according to number assigned.

7. Instruct one student to complete the ABC Quick Check while the partner observes to ensure that the check was completed properly, and to provide prompts if an item was missed. Switch roles.

8. Instruct pairs to proceed to the riding area to meet teacher after students have successfully completed the helmet fit and ABC Quick Check.

9. Inspect helmets and instruct students to proceed on the riding course for the 'Check' of the ABC Quick Check and when finished return to the teaching station.

Bicycle trainers are highly recommended for the following steps.

10. Explain and demonstrate skills to students in the teaching station reinforcing the following points. Riders should:
    - Use the shifters to change gears. The shifter will activate the derailleur to move the chain to different gears. There are many different types of shifters.
    - Move through the gears one at a time; do not jump through multiple gears at once. Once familiar with how each gear feels, students can move through multiple gears when necessary (e.g., steep hill).
    - Use the left shifter to control the front chain rings. The large front chain ring is for speed. It is hard to pedal, but results in higher speeds and a lower cadence. The smallest front chain ring is for power, NOT speed. It is easier to pedal and you will have a higher cadence, but you do not go very fast. This gear is for going up hills. The middle front chain ring is a compromise, providing medium power and speed.
    - Use the right shifter to control the rear cassette. The size of the chain rings on the rear cassette is just the opposite of the size of the gears on the front chain ring. The number of chain rings on the cassette can vary greatly. The larger sized chain rings are the easiest to the pedal. The smaller chain rings are for speed; the pedaling effort will be harder.
    - Shift through the full range of gears to feel how cadence changes. Identify the gear ratio that they should primarily remain in for class riding. Students should stay in the middle front chain ring while riding in class. Students should find a comfortable gear in the cassette to remain in for class riding. Unless riding on terrain with hills, after this activity, students should not need to change gears.

If a full class set of bicycle trainers is available (follow #12-14):

11. Instruct students to attach the bicycle to the bicycle trainer.

12. Instruct students to experiment with gears to feel the impact on cadence.

13. Instruct students to identify the gear ratio that provides a comfortable cadence.

If a partial set of bicycle trainers is available (follow #15-19):

14. Divide students into groups based on the number of trainers available.

15. Instruct students to experiment with gears to feel the impact on cadence.

16. Instruct students to identify the gear ratio that provides a comfortable cadence.

17. Instruct other students to continue riding the designated course.

18. Rotate groups of students through the trainers.

If bicycle trainers are not available (follow #20-24):

19. Ensure that all bicycles are in the middle chain ring. Students should be instructed to only change gears with the cassette. So, they should not use the left shifter.

20. Instruct students to begin riding the designated course with a Power Start.

21. Instruct students to index through all of the gears of the cassette as they ride the designated course; using the right shifter until a comfortable gear is found.

22. Instruct students to continue riding the course in this gear. Blow the whistle and instruct students to index either up or down a set number of gears to mimic either riding uphill or downhill.

23. Instruct students to stay at this level until the whistle is blown. Students will then return to their comfortable gear ratio and desired pedaling cadence.

Bicycles can have 2-3 front chainrings. Most mountain bikes will have three, whereas most road bikes will have only two.

A rule of thumb is that the closer the chain is to the frame of the bike, the easier the pedaling effort will be. As the chain moves away from the frame of the bike, it becomes harder to pedal.

Assessments

1. Assess performance of gearing for each student using the following rubric.

PERFORMANCE RUBRIC: GEARING

Exceptional	Reliable	Inconsistent	Struggling/ Survival
Student understands and can explain how the gears on the bike are set up; Student can consistently shift into correct gear, according to terrain and their fitness level, while riding; Student can shift gears without causing the chain to fall off or to get locked up.	Student understands, but cannot explain, how the gears on the bike are set up; Student can shift into correct gear, according to terrain and their fitness level, most of the time, and do so while riding; Student can shift gears without causing the chain to fall off or to get locked up.	Student does not understand and cannot explain how the gears on the bike are set up; Student is often in the wrong gear, according to terrain and their fitness level, and tends to shift while stationary; Student cannot shift gears without occasionally causing the chain to fall off or to get locked up.	Student does not understand how the gears are set up on the bike; Student is always in the incorrect gear and needs to be told when to shift; Student is unable to shift while moving; Student often causes the chain to fall off or lock up because of poor shifting.

If using bicycle trainers, a travel video may be set up to create a stimulating environment that the students are 'riding' in. Students should be instructed to change gears in the cassette to reflect the type of terrain on the video.

2. Assess the performance of social behavior for each student 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

1. Follow the 2-2-2-2 Rule (2 wheels on the ground; 2 feet on the pedals; 2 hands on the handlebars; 2 fingers on the brake levers) while riding the bicycle.
2. Use the rear brake only to stop the bicycle, until the skill level advances to be able to safely use the front brake.
3. Instruct students to ride the bicycles on the designated course and demonstrate the skill components in the "chute."
4. Instruct students to keep at least three-bikes-lenghts between each rider.

Differentiating Instruction

Adapted and Beginner

- Complete activity steps #12-16 only if bicycle trainers are available.

Intermediate and Advanced

- Give students the opportunity to ride on different types of terrain (uphill & downhill) to practice gearing in real life situations.

Best Practices

1. Provide a discreet opportunity and safe environment for students to share information pertaining to their ability and comfort level for riding a bicycle.

2. Always complete the Helmet Fit and ABC Quick Check at the beginning of every class in which the students will be riding. The use of peers/partners to practice, inspect, and correct each other will make the most efficient use of class time and reinforce bicycle safety skills. This should not replace teacher assessment.
3. Review the three-bicycles-length rule to promote safe riding. The three-bicycles-length rule is a reminder of keeping a safe distance between cyclists while riding single-file. To help maintain proper spacing, have a marker on the course that allows students to see when it is their turn to go: when the person in front of them gets to the marker, the next student may start riding.
4. Explain gearing in a simple way because it can be very confusing. Students should get opportunities to practice gearing on a trainer, a flat surface and then an uneven surface. It is important that students are never in extreme gears (i.e., the smallest front chain ring and the smallest gear on the cassette; the largest front chain ring and the largest gear on the cassette).
5. Change gears one level at a time while pedaling in a forward direction. This will help ensure that the fleet of bicycles will remain in good working condition.