

Name: _____

Date: _____

Bicycles

So far, you have investigated gears and how they work, and you have looked at machines that use gears. There is one machine with gears that you may know well – a bicycle. Bicycles have **sprocket and chain gears** that work like some pulley systems. A chain connects the sprocket gears on the pedals to the back wheel. The chain also allows the gears to turn in the same direction. The sprockets keep the chain from slipping as it turns. What do gears do for a bicycle and a bicycle rider? To find out, you will be looking more closely at the gears on a bicycle.

Equipment:

- Bicycle
- Tape
- A glove

Procedure:

1. Turn the bicycle upside down so it rests on the handle bars and seat.
2. Put a piece of tape around the back tire as a location marker.
3. Take a look at the back sprockets (gears), and answer the following questions:
 - a. How many sprockets are at the back?
 - b. How are the sprockets similar?
 - c. How are the sprockets different?
4. When the chain passes around a large back sprocket the bicycle is in “low gear.” Put the bicycle in low gear.
5. Count the number of teeth on both the front and back sprocket that are currently holding the chain (record these numbers in your table.)
6. Use your glove to apply friction to the back wheel.
7. Turn the pedal one complete turn while watching the back wheel (record your observations.)

SAFETY: Turn the pedal slowly and keep your fingers away from the moving parts.

8. Repeat step 7, this time take note of the force needed to turn the pedal.
9. When the chain passes around a small back sprocket the bicycle is in “high gear.” Put the bicycle in high gear.
10. Repeat steps 5 through 8.
11. If there is time, you may set the bicycle up using another combination of sprockets.

Observations:

Gear Ratio	Number of Teeth on Front	Number of Teeth on Back	Number of Pedal Turns	Number of Back Wheel
Low Gear			1	
High Gear			1	
Other				

Discussion:

1. Why do you think there are different sprockets attached to the pedals, and other sprockets attached to the back wheel?

2. Which gear would be best for going up a steep hill? Why?

3. Which gear would be best for travelling the fastest on flat ground? Why?

4. What is different about the way gears on a bicycle turn in comparison to standard spur gears?

5. Why do you think oil is put on the chains of bicycles?
