

# Bicycles



## Selecting Bicycles

### FCS Classic Consumer Decision Making Study Guide

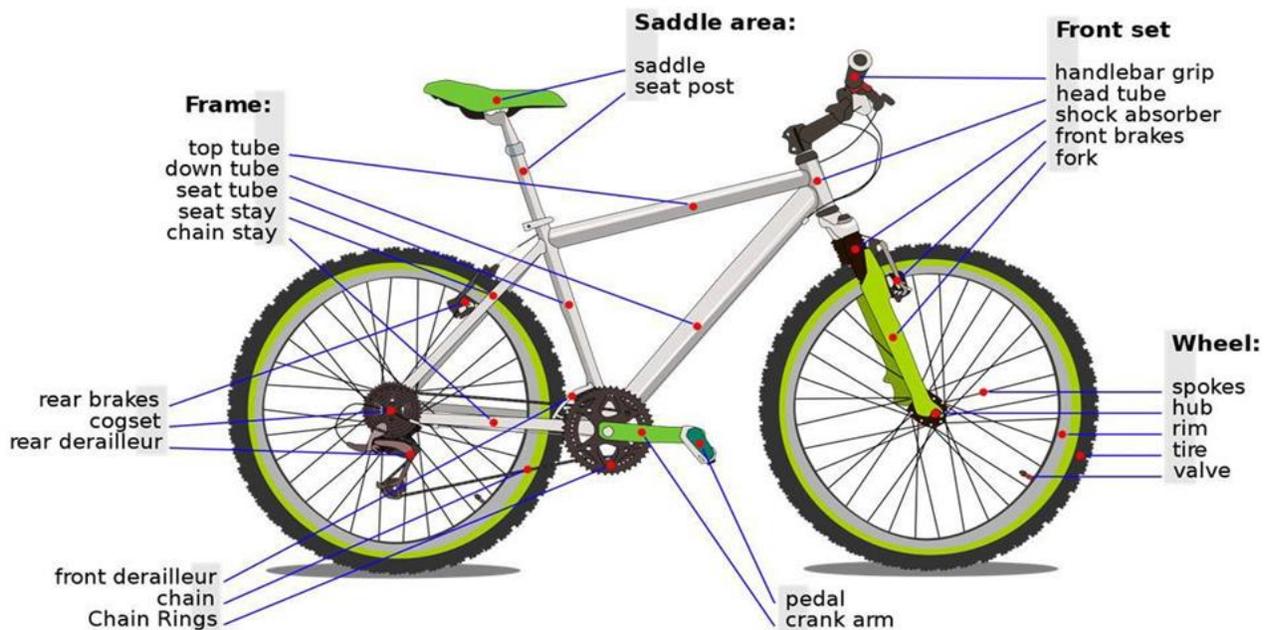
The bicycle has been around in various forms since the early 1800's. Today's bicycles are based on a design introduced in England in 1885. Bicycles are a study in physical science and physics. The main distinguishing feature of a boy's bike is the metal bar connecting the handlebars to the saddle, which bicycles for girls usually do not have. The frame style of girls' bicycles dates to the earliest years of bicycle design, when step-through frames accommodated the long skirts and dresses that women wore in the late 19th and early 20th century.

When selecting a bicycle you will need to think about how you will be using the bicycle. No matter which bicycle you choose, you still need to think about the things you need to be safe on your bicycle. Bicycles come in many shapes and sizes and everyone should be able to find a bicycle for their needs. Bicycles can be purchased used for a few dollars or you can spend thousands of dollars on a special built bicycle for racing.

Usually the more expensive bikes are made from lightweight expensive metals, like titanium and super strength steel or they have frames made with carbon fibers. These bikes usually weight less than 18 pounds.

#### Bike Parts:

The frame is the main part of a bike. It is a triangular shape, is very sturdy and can be found on all bikes. The top of the seat post is very important– the seat, or saddle, that you sit on. The crank is what you make go round and round when your feet are on the pedals. The chain and the chain rings are part of the system that helps transfer the energy from you to



make the bike go forward. The fork is what the front wheel is connected to. The rim is the outermost part of the wheel where the tire is. The spokes keep the wheel round. The valve stem is the part of the tube where you attach a pump to put air in the tire. Brakes are used when you want to stop. Lastly, the reflectors on the front (white), rear (red) and in your wheels are the part of the bike that help make you more visible to others.

**Saddles or Seats:** Seats come in a variety of shapes and sizes. Some are springy and wide while others are hard and narrow. Some have two little pads, one for each cheek and without the front part of the saddle.

**Wheels:** The bigger the wheel, the faster you go and the harder it is to turn the wheel. The smaller the wheel the slower you go, making it easier to push the pedal with one revolution of your leg. In one revolution of a small wheel, you go a short distance, but it is easier. In one revolution of a large wheel you go a further distance but it's harder to push because you are covering more ground. The smaller the wheel the closer to the ground and more stable you are. The larger the wheel the faster you will go and the higher up you will sit.

**Handlebars:** The handlebars are what you use to steer the bike. If adjusted correctly, you should not have to stretch too far to put your hands on the handlebars. Your elbows should be slightly bent and you should be comfortable.

**Gears and Shifting:** A gear is part of a bicycle that helps with speed and ease of pedaling. The more gears you have the easier ride you will have while pedaling up and down hills and in rough areas like trails. Using bicycle gears allows you to pedal with the same amount of effort whether you are riding uphill, downhill or on the flat.

Old-fashioned bicycles had the pedals attached directly to the front of wheel. The wheel would be able to make one revolution only when the bicyclist's feet on the pedals would make one revolution. Inventors then designed a bicycle with a big front wheel so the bicyclist could go a longer distance with each pedal revolution and coast. The bigger the front wheel, the further one could go per revolution. Next, they designed a bike with the pedals connected to the rear wheel by a chain. This new design allowed the bicycle with smaller wheels to travel farther with one revolution of the pedal. Today, all bicycles have at least one gear, providing for more efficient riding.

Gearing uses basic math ratios. For bicycle gears, the ratio is the number of teeth in the front divided by the number of teeth in the rear cog that is engaged. The ratio would be front teeth:rear teeth. A larger ratio indicates the pedal requires more force to turn. So, a ratio of 40:8 is harder to turn than 30:15. So in general, the "high gear" combination of the larger ring in the front and the smaller ring in the back makes it hard to pedal. The "low gear" combination of the smaller ring in the front and the larger ring in the back makes it easier to pedal.

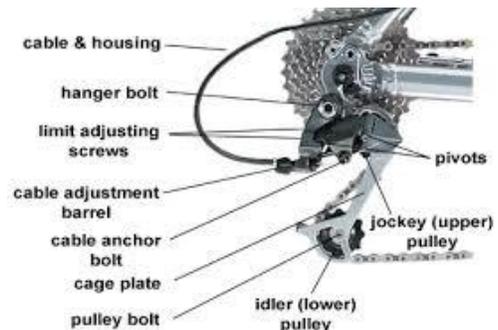
There may be duplicate gears. If your front chain wheel has three rings and your rear cassette has eight rings, you have 24 gears. Yet, you will notice that some gears feel similar even in different combination of front and rear.

## Shift Levers:

The Left shift lever controls the front derailleur and which chain ring your chain is on. It is not used as much as the rear derailleur. You will need to pay more attention when shifting with the front derailleur.

The Right shifter controls the rear derailleur. This is the fine tuning of the gear range. It is used most often to adjust to minor terrain changes. Two or three shifts down is equal to one shift down on the front derailleur.

Modern **Front and Rear Derailleurs** typically consist of a moveable chain-guide that is operated remotely by a cable attached to a shifter mounted on the down tube, handlebar stem, or handlebar. When a rider operates the lever while pedaling, the change in cable tension moves the chain-guide from side to side, "derailing" the chain onto different sprockets.



**Chain Rings:** Bicycles come with two or three chain rings. Three rings are for mountain biking and touring. These are low, medium, and high range or low and high for road bikes with two chain rings. The small ring is low gear for climbs, the middle ring for flat stretches and the big ring for descents. Bicycles today are available with as many as ten cogs on the rear and three chain rings up front.

**Pedaling:** Pedal at about 90 revolutions per minutes both while climbing and descending. 90 rpm's are faster than you think. Shift into an easier gear before you need it, before climbing instead of during one. You should use the same pedal force and cadence to climb as you do to descent.

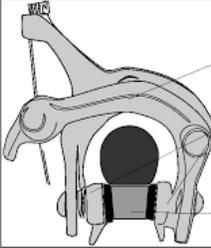
**Brakes:** The brakes on a bicycle are the part that stops or slows the wheels. There are many types of brakes to choose from when purchasing a bicycle.

**Coaster brakes** are a type of brake that works by pedaling backward. This is a good brake for the beginning rider or the trick rider.

**Handbrakes** are engaged by a grip on the handlebars that engages the brakes. There are 4 types of hand brakes:

- Caliper brake move calipers inward toward the rim. A caliper brakes moves both sides of the caliper to the rim in one motion. Never pull the front brake without the back brake to avoid a head over heels crash. They don't work as well as others when they get wet.
- Cantilever brakes have two separate arms one on each side of the rim. Cantilever brakes require less hand force to stop the bicycle than a caliper brake. One style is called the "V" brake or Shimano brake system.
- Hydraulic Disc brakes are a closed system of hoses and reservoirs containing a special hydraulic fluid to operate the brakes. A plunger pushes fluid into the caliper where pads push on the rotor and stop the bike. Advantages: system is closed to water, dirt and debris. There is a good feel at the lever and gripping power at the wheel. Disadvantages: Disc brakes must be inspected on a regular basis. Air bubbles in the system can cause the brakes to fail.

- Drum Brakes are less common. They work by applying friction from a pad in an enclosed drum. The drum is a part of the wheel. Do not touch the hub of the wheel until it cools off. Drum brakes generate a lot of heat.

 <p>Caliper Pads Rim(rotor)</p>	 <p>V- Brakes Canti-Lever</p>	 <p>Hydraulic line Bosses Caliper Adapter Rotor</p>
Caliper Brake	Cantilever "V" Brake	Hydraulic Disc Brake

There are many styles of bicycles,

	<p><b>Mountain Bikes</b> are designed for "off road" riding. They also work great on paved and rocky trails because of their toughness. The big, knobby tires on mountain bikes give you good traction so you do not slip. On paved roads, the tires will make lots of noise. The handlebars are upright and straight so you can sit upright. They usually have a 26 inch tire and the frame sizes vary to match the size of the rider. Some mountain bikes have shock absorbing suspensions, lockouts, and disc brakes. They usually have 21 to 27 speeds to help along the trail.</p>
	<p><b>Trail Bicycles or Light Duty Mountain Bikes</b> are good for trails and roads. These bicycles are ideal for fun and family riding. The tires for kids trail bikes are 20-inches and 24-inches and for adults, 26-inches. Trail bikes have 21 – 24 gears. Their frames are not strong enough for mountain biking. The handle bars are upright.</p>
	<p><b>Road/Distance bicycles</b> are designed for use on roads and smooth trails. They are popular for commuting and exercising. They typically have a 27-inch tire. They are built for speed with narrow smooth high-pressure tires for a highly efficient ride. The handlebars are bent and the rider leans lower while riding to keep air from slowing the bike down. There can be many speeds. Road bicycles can be purchased with an aluminum frame which is lighter than steel.</p>
	<p><b>BMX</b> is often considered a stunt bicycle and needs a stronger lightweight bicycle frame for racing. The tires are usually 20-inch and are knobby. They are one-speed bikes with a short wheel and are mostly used for general purpose and dirt riding. BMX bikes have a single handbrake for the rear wheel. They have a light weight guard, kickstand and front and back wheel pegs.</p>

	<p><b>BMX jumping bicycles</b> are just like the regular BMX bike, but the frames and axels are heavy duty to make jumping safer. They have 48 spoke wheels. BMX jumpers need additional safety gear such as a full face helmet, shin pads, gloves, elbow and knee pads and wrist guards.</p>
	<p><b>Free style or trick bicycles</b> have handlebars that can spin around. The frame has pegs for the rider to stand on while performing tricks. They feature handbrakes for each wheel. The tires are 20" and have many spokes (48) to make the wheels strong. The tires on trick bikes are smooth. These bikes have only one speed.</p>
	<p><b>Comfort bikes</b> have 26 inch wheels and 7 to 24 gears. They are similar to mountain/trail bikes but are shorter from the seat to the handlebars (wheelbase) for more upright riding. Shock absorbing seat posts provide more riding comfort along with shock absorbing handlebar stems or telescoping shock absorbing front forks. They have wider softer saddles (seats) and wide pedals. They are ideal for comfortable recreational trails or commuting. Any bike can be used as a commuter bike, however with some adaptation. Commuter bikes also have a bell or horn, fenders, durable wheels and tires, lights and panniers.</p>
	<p><b>Children's bicycles</b> have smaller wheels (less than 20-inches) and either coaster brakes or handbrakes. The handlebars are straight or bent. Children's bikes have only one speed.</p>
	<p><b>Recumbent bicycles</b> are specially designed bicycles with 20 – 24 inch wheels and 21-100 gears which allow the rider to sit in a reclining positions with the feet forward. The seats are more like lounge chairs with less leaning forward. These bicycles sit low to the ground. They are made by specialty manufacturers and are very expensive. Recumbent bikes are available in a variety of shapes and sizes and from two to four wheels. People with back and neck problems like this type of bike.</p>
	<p><b>Tandem Bikes</b> or bicycles built for two are designed for on or off road as well as recumbent riding. Tandem refers to the in-line position of the riders. Because of the extra weight and stresses, tandem wheels may use a higher spoke count, sturdier rims, higher pressure tires, and a stronger freewheel.</p>

**Safety:** make sure that the bicycle fits you now and it isn't something that you will grow into. Be sure to follow the rules of the road, stopping at stop signs. Pay attention to those around you. You don't want to hit someone and you don't want a car to hit you.

**Safety Gear:** Remember professional bicyclists always wear safety gear. If you are just learning or are stunt riding you need knee and elbow pads and wrist guards too. Make sure you also wear good shoes. Flip-flops are not a good choice of shoes for bicycling because they do not protect your feet. Always wear a properly fitted bicycle helmet. It will protect your head from unwanted bumps and accidents on your bicycle.



Make sure your helmet fits properly and the pads hold it in place. Then get the side straps up under your ears. You should be able to put two fingers between the chinstrap and your chin. (see photo) In the last picture, you can see how a bicycle helmet should fit to protect all parts of your head.

**Accessories:** Your bicycle may have a light, a basket, a bell, a water bottle holder or any other item that will meet your needs as a bicyclist. Choose what you need, what you enjoy, and what you can afford.

The NDSU Extension Service does not endorse commercial products or companies even though reference may be made to tradenames, trademarks or service names.

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This publication was revised by Brenda Bishop, New Mexico State University Quay County Extension Service Program Director in 2016 from North Dakota State University publications: 2007 Consumer Choices Study Guide Junior and Senior Bicycles and 2016 4-H Consumer Choices Study Guide Beginner Bicycles. Used with permission.

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