PART I
THE BASICS

photo courtesy of TREK

Bicycling is not only fun, it is a great way to travel: to and from school, work, meetings, stores, restaurants or coffee shops, touring short or long distances, on or off-road. In this class, you will learn how to:

- **Choose an appropriate, properly fitted and comfortable bicycle for your needs;**
- **Learn about your bicycle and how it works;**
- **Practice the necessary skills to ride and control your bike;**
- **Wear a correctly-fitted, CPSC-approved helmet whenever you ride;**
- **Choose appropriate clothing and accessories for your needs;**
- **Perform a quick inspection of your bike before each ride;**
- **Obey and follow rules of the road;**
- **Review traffic principles;**
- **Be aware, visible, predictable and considerate wherever you ride;**
- **Be an ambassador for cycling wherever you ride.**

Choose Your Bicycle

Purchasing a bicycle need not be a big job. Only a couple of key decisions need to be made before you begin to shop.

How much to spend?

Bicycles are available in a wide range of prices from under $100 to several thousand dollars. What is the difference between a $300 bike and a $2,000 bike? As the price of the bicycle increases, the overall quality of the workmanship, frame materials and components improves. Know your personal budget.

What kind of bicycle to buy?

Ask yourself several questions:

- Why am I buying a bike?
- How fit am I?
- Where will I ride?
- What kind of terrain will I be riding?
- Will I need carrying capacity?
- Will I ride with a group?
- Do I want to ride off-road?

Where to buy?

Bicycle shops carry a wide range of quality products and have skilled personnel who can help you select a bike that fits your needs. Bike shops also provide skilled assembly, bike fit, and maintenance that are unavailable from other retailers. Specialty bicycle retailers are your one-stop shop for equipment, riding tips and local cycling information.

Not all bicycle retailers are equal. Find a shop where the sales people listen to you and help you make the correct purchasing decision. If they aren't listening, find another shop.

ROAD BIKE

MOUNTAIN BIKE

HYBRID BIKE

RECUMBENT BIKE

photo courtesy of TREK

BIKE DESIGNED FOR A WOMAN

What kind of bike is right for me?

Basic qualities of a good bike that will serve you well for many miles:

- Frame – Strong, but light: steel, aluminum, titanium or carbon fiber.
- Wheels – Aluminum rims, stainless steel spokes.
- Brakes – strong enough to stop you quickly and easy to use.
- Shifters – responsive and easy for you to use. Try different types.
- Saddle – Make sure the seat is comfortable for the kind of riding you'll be doing.

What type of bike?

Road bikes are built for riding on paved roads. People use road bikes to race, tour, commute and have fun. The ability to carry cargo depends on what the bicycle is designed for and how it is equipped. Manufacturers equip road bikes with different types of gearing based on their intended uses.

Mountain bikes have a flat or slightly upward-curved handlebar. The heads-up riding position, the larger, lower pressure tires and wide range of gears provide a comfortable ride. They can be as light as road bikes even though they are designed for riding on unpaved, challenging terrain. Most mountain bikes have front suspension and some have dual suspension.

Hybrid or comfort bikes are generally more stable and comfortable than a road bike. Hybrid bikes tend to be more efficient on paved roads than mountain bikes because of their narrower tires. They are not as capable of handling off-road conditions as mountain bikes, but handle unpaved roads well.

Recumbent bikes place the rider in a reclined position, and come in a wide variety of styles. These bikes tend to be primarily for road riding. Because of the various types, be sure to test ride a number of different bikes before purchasing a recumbent.

Tandem bikes are bicycles built for two riders and come in all the above styles. They can be a great way for two riders of unequal ability or fitness to share the joy of cycling.

Bikes designed specifically for women better accommodate female rid-

ers who generally have shorter torsos and arms relative to their height than men. Women-specific bikes generally have shorter top-tubes and components designed for smaller hands and narrower shoulders. A step-through style frame may be a good bike for anyone who cannot or does not want to lift a leg over the traditional bicycle — these are no longer considered "girl's bikes." Some men may find that bikes designed to fit women fit them better than other models.

BMX bikes are designed for racing or stunt riding. Now many people use them as utility bicycles in towns and neighborhoods. With only one speed and small frames, they are not well-suited for long distances but are very strong and can be used for shorter commutes and errands.

What size bike?

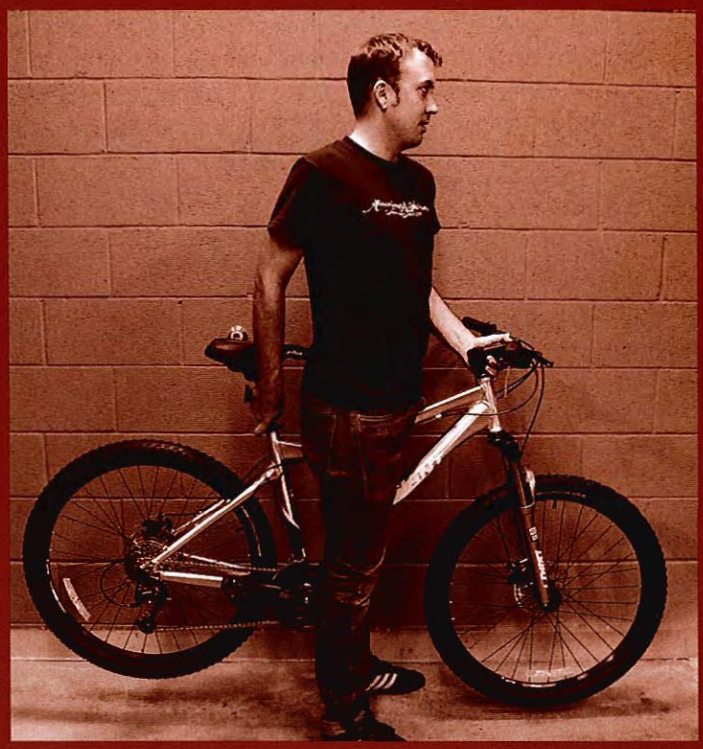
Bike fit is what is important. Because different manufacturers measure bike frames differently, use frame measurement as an approximation. Frame size is usually measured from the center of the bottom bracket to the center (or top) of the top tube where it joins the seat tube: generally in centimeters for road bikes, inches for hybrid and mountain bikes.

Stand-over height and top tube length must suit the rider's inseam, torso and arm length. For non-standard bikes like recumbents, the leg and arm extension is more important than the stand-over height.

To do a quick sizing on a standard bicycle frame, stand over the bike, straddling the top tube with both feet flat on the floor, about shoulder-width apart. Lift the bike by the handlebar and saddle as far off the ground as comfortable. With a road bike, there should be about 1" to 2" of clearance between the tires and the floor. For a mountain or hybrid bike, there should be 3" to 4". When seated, you should be able to reach the handlebars comfortably. When sitting on the saddle and holding the handlebars, you should not feel stretched out, hunched or cramped.

Bicycle fit summarized: you shouldn't hurt!

WHAT SIZE BIKE?



QUICK SIZE CHECK: Lift the bike by the handlebar and saddle as far off the ground as comfortable. With a road bike (above left), there should be about 1" to 2" of clearance between the tires and the floor. For a mountain or hybrid bike (above right), there should be 3" to 4".

Adjusting Your Bicycle

Riding should be fun, not painful. A few minor adjustments can dramatically improve your comfort and efficiency on the bike. A bike shop employee can help fit your bike to your body. Changes in components like the saddle, handlebar stem or handlebars can be made to improve fit or match your desired riding style. After each adjustment, it's vital to test ride your bicycle. The only way to decide whether the changes increase your riding comfort and efficiency is to ride.

Saddle

- **Height** — With the ball of your foot on the pedal, there should be a slight bend in your knee when the pedal is at point of greatest leg extension. If your hips rock when pedaling, the pedals are too far away. For recumbent bicycles, leg extension is the best judge of frame size.
- **Angle** — The saddle should be level, not pointing down or up. Any slant to your saddle puts unnecessary pressure on your pelvis, torso and arms.
- **Position** — The forward or backward position of the saddle should be adjusted so that the front of your knee is directly above the center of the pedal when the cranks are horizontal. This does not apply on non-traditional frames.
- **Type** — A saddle should support your pelvic bones and be narrow enough to prevent chafing. If your saddle is not comfortable then ask your bike shop to change it until you find a saddle that you can ride without discomfort.

Handlebars

Select handlebars that are comfortable for you. Depending on style, they usually should be about the same width as your shoulders. For drop bars, handlebars should be adjusted so that your elbows are slightly bent when grabbing the top of the bar. For flat or riser bars, position the handlebars so that your elbows are slightly bent with your hands on the grips and your forearms and wrists in a straight line.

Handlebar Stem

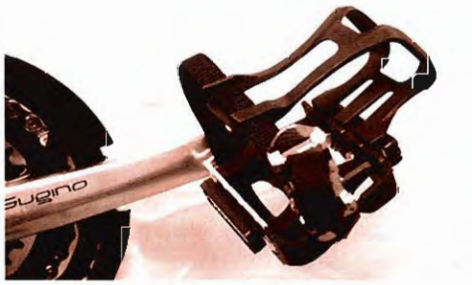
Length and rise of the handlebar stem should be determined by your riding style. Generally, the stem will be longer and lower for more aggressive riders, and shorter and higher for more casual riders.

Brake position

You should be able to comfortably apply the brakes when your hands are on top of the brake hoods. For drop bars, changing the stationary part of the brake lever requires unwrapping and re-wrapping handlebar tape — you may consider taking your bike to the shop for this adjustment. For flat or riser bars, the angle and reach of the levers can be adjusted easily with screws and bolts on the brakes.

Toe Clips/Clipless Pedals

Although platform or flat pedals suit many people, using a device that securely attaches your shoe to the pedal — either toe clips or clipless pedals (with shoe cleats that lock onto the pedals) — has several advantages. These products help you produce more power with each pedal stroke, keep your shoes from slipping off the pedals, and make it easier to raise a pedal after you have stopped so that you can get going again. Practice with these types of pedals on quiet streets before you ride in heavy traffic — many people fall once or twice while getting used to them.



TOE CLIP

CLIPLESS PEDAL

Cranks

Cranks come in different lengths, and generally need no adjustments. If your riding style or body dimensions are significantly different than the average rider, you may want to try different length cranks to see if they make your ride easier and more enjoyable.

Parts of the Bike

Label the parts of the bicycle: Place the letter of the bicycle part at the appropriate location on the diagram. (If you need help, turn to the back of the book for the key.)

Frame

A. Top tube
B. Head tube
C. Seat tube
D. Down tube
E. Fork
F. Seat stays
G. Chain stays
H. Dropouts
I. Headset
J. Bottom Bracket

Drive train

K. Pedal
L. Cranks
M. Chainrings
N. Front derailleur
O. Chain
P. Cassette
Q. Rear derailleur
R. Shifters and cables
S. Wheel - hub, spokes, rim, tire, rim strip, tube, valve

Other components

T. Saddle
U. Seat post
V. Handlebar
W. Handlebar stem
X. Brake lever and cables
Y. Brakes

Pre-ride Safety Check

ABC Quick Check

To insure your bike is in top condition, do this quick check before each ride. Timely bicycle maintenance can prevent crashes.

A is for Air

Check your tire pressure with a gauge — tubes should be inflated to the air pressure noted on the tire sidewall. While checking the pressure, take a moment to look for damage to the sidewalls or tread of the tire. If you can see loose threads showing through the rubber, the tire should be replaced.

B is for Brakes

Put your thumb between lever and the handle bar and squeeze the brake lever. You should not pinch your thumb. When you release the lever it should snap back into position. Visually check the brake pads for wear and the need for adjustment. If there is less than 1/8" of brake pads left at any point, they probably need replacing. Also squeeze the brakes to make certain that the pads are parallel to and aligned with the side of the rim when applied. How to adjust your brakes is found in the section on maintenance.

C is for Cranks, Chain and Cassette

Check to see that the bottom bracket, crank arms and chainrings are tight. To check the crank, take the left and right crank arms in your hands and attempt to move them sideways, away from the bicycle frame. If both move, you may have a loose or worn bottom bracket. If only one moves, the individual crank arm bolt is loose and must be tightened. Never ride with a loose crank arm. Make sure the chain looks like metal, not rust or black gunk. Turn the pedals backwards to see if the chain travels smoothly. Check the cassette to make sure it is clean and moving freely.

Q is for Quick Release

Your bike likely has quick release levers holding the wheels to the bicycle, on the brakes and maybe even on the seat post. Quick releases on the hubs of your wheels feature a lever on one side and a nut on the other. Check to ensure that the wheels are clamped securely before each ride. To adjust the quick release, first pull the lever open. Make sure the wheel is firmly in place. Hold the quick release lever with one hand while gradually tightening the adjusting nut with the other hand in a clockwise direction. Tighten the nut until you feel resistance on the lever, then use the palm of your hand to close it.

Check

Before you set out, take a brief, slow ride to check that your bicycle is working properly.

If, during your ABC Quick Check, you determine that adjustments are necessary and beyond your ability, enlist the help of a mechanic at your local bike shop.

photo courtesy of Kona Bicycle Co.

Tire Repair

Fixing a flat

Flats happen to everyone sooner or later. A puncture is caused by something sharp, like a tack, a glass shard, or a thorn penetrating the tire and the tube.

A pinch flat or "snakebite" is caused by riding over an edge like a steel plate or a pothole. The tire is flattened against the rim and the tube is torn by the impact. The tube will show two parallel slits. Tires that are not inflated to the recommended pressure are especially prone to this kind of flat.

Flats can also be caused by improper remounting of the tire, worn out or damaged tires or rim tape failure which exposes sharp surfaces that can puncture the tube.

Steps to fixing a flat tire

Fixing flat tires can be the most frequent maintenance you do on your bicycle. With practice, a flat can be fixed in less than 10 minutes. You will need to carry the appropriate equipment for the task: tire levers, spare tube, pump and patch kit. By being patient and following the procedure, you will find that the likelihood of follow-up flats will be reduced.

1. If the flat is on the rear wheel, shift to the smallest cog on the cassette.
2. Release the brakes to allow the tire to clear the brake pads.
3. Rotate the wheel slowly to check for any obvious causes for the flat and mark with a crayon or pen.
4. Release the quick release or nut and unscrew until the wheel is free.
5. Remove the wheel.
6. Deflate the tube completely. Push the valve pin in (schrader valve), or first unscrew the nut, then push the valve pin (presta valve).


SCHRADER VALVE


PRESTA VALVE

7. Push one bead of the tire towards the center of the rim around the entire wheel. Insert tire levers opposite the valve and pry the bead out of the rim. Two or three spokes further around, insert the second tire lever. If necessary, insert a third tire lever.
8. Pull one of the tire levers all the way around the rim removing one side of the tire. Do not remove both sides of the tire from the wheel rim.
9. Starting opposite the valve, pull the tube from the tire — keeping the relative positioning of the tire and tube intact.
10. Inflate the tube with enough air so you can find the hole by feeling or hearing the air escape. The location of the hole(s) in the tube will tell you where to look in the tire for the cause of the flat. Make sure the offending object, if any, is gone before you continue or you'll quickly get another flat. If the hole in the tire is larger than a pinhole, insert some form of boot to cover the space.
11. Inflate the good tube with just enough air to give it shape.
12. Insert the tube into the tire, starting at the valve stem then feeding it into the tire with both hands moving in opposite directions.
13. Beginning at the valve, seat the tube over the center of the rim.

ROUTINE MAINTENANCE

There are bicycle maintenance issues that must be addressed on a weekly, monthly or annual basis to keep your bike in top fitness. It is also a good idea to become attuned to the way your bike sounds while you are riding, and notice any changes or mechanical abnormalities that may happen, such as rattles, soft tires or looseness in grips, pedals or bolts.

Here is the maintenance we recommend you do on a routine basis.

Weekly
- Check tire pressure
- Wipe down and lube chain

Monthly
- Check rim brake pads for wear (should be showing at least 1/8" for entire pad)
- Clean rims
- Inspect tires for wear
- Inspect frame for cracks
- True wheels (if wheels are wobbling)
- Inspect hubs — checking for looseness. Do this by moving the wheel side to side and making sure there is no play in the wheel.
- Ensure bolts are tight
  - crank bolts
  - stem bolts
  - seat post clamp
  - derailleur fixing bolts
  - shifter/brake lever fixing bolts
  - water bottle cage bolts

Six Months
- Replace brake pads, if worn
- Check disc brake pads for wear

Yearly
- Replace cables and housing, if worn or frayed
  - Brake cables and housing
  - Derailleur cables and housing

Every 18 months
- Replace cassette and chain, if worn
- Check bottom bracket, headset and internal geared hubs for wear.

14. Work the bead of the tire back onto the rim. Use your hands to avoid pinching the new tube with a tire lever. If your thumbs aren't strong enough, use the palms of your hand to roll the last part of the bead over the rim.
15. As you refill the tube, check that the tire does not bulge off of the rim. Pump the tire up to the recommended pressure shown on the tire sidewall.
16. Install the wheel on the bike. Adjust any brakes you released.

Adjusting Brakes

There are three major types of bicycle brakes: rim, coaster and disc.

Coaster brakes use a mechanism inside the rear hub to stop the wheel from turning and require you to push backwards on the pedals to stop. Coaster brakes should be taken to a shop for repair or adjustment.

Rim brakes apply force to the wheel rims to stop them from turning and are available in a variety of types including cantilever, linear pull, and sidepull.

Disc brakes apply force to metal discs, called rotors, attached to the wheels to stop. Like rim brakes, disc brakes are activated by hand levers.

Take disc or coaster brakes to your mechanic unless you are confident you can correctly adjust them.

Rim Brake Inspection

Check to make sure the wheel rim and brake pads are clean. If not, wipe rim clean and lightly sand the surface of the brake pad with sandpaper.

Squeeze the brake and let go quickly to ensure the cables aren't sticking within the housing. Enlist the assistance of a bicycle mechanic if you find difficulties with the cables or housings.

Push on the brake hood sideways to be sure it is firmly clamped to the handlebar. Then place your thumb between the lever and the handlebar. When the brake is fully applied, the lever should not pinch your thumb.

Make sure the brake arms move freely when the lever is squeezed and return quickly with the lever is released. The brake pads or arms should not rub the rim or tire when the lever is released.

Rim Brake Pad Adjustment

Proper brake pad adjustment reduces squealing and improves braking performance. As a brake pad wears, its alignment relative to the rim changes. You should regularly check the alignment of brake pads where they contact the rim and adjust them if they don't align properly.

It is preferable to adjust the front end of each brake pad so that it contacts the wheel rim before the rear of the pad — this is called a "toe-in." You'll need a 5 or 10 mm Allen wrench.

Loosen the nut or bolt that holds the brake pad to the brake arm by one turn.

Wrap a thick rubber band around the back end of the brake shoe and pad.

While applying the corresponding brake lever with modest hand force, move the brake pads into position against the rim and increase lever force. You may have to twist the brake pad and the underlying washers to achieve this position.

While holding the pad in position with one hand, tighten the bolt to secure the pad.

Remove the rubber band.

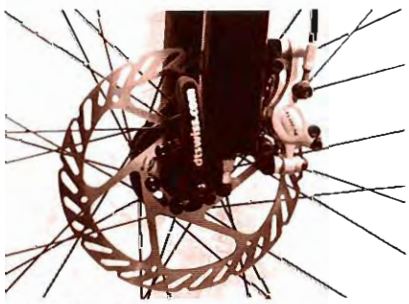
Check to make sure the brake works correctly and fine tune the adjustment if necessary.

Brake Movement Adjustment

The most common type of brake adjustment involves compensating for brake pad wear by tightening the cables. First, make brake pad adjustments. If the brake still does not grip well or the lever travels too far, a cable that is slightly too long is the most likely cause. Adjust initially by loosening the barrel adjuster counterclockwise on your brake lever or brake until the brake engages when 3/4" clearance remains between lever and handlebars.

If the correct adjustment cannot be obtained, you should enlist the assistance of a bike mechanic to adjust the length of the cable using the binding bolt on the brakes.

RIM BRAKES



DISC BRAKES

COASTER BRAKES

Adjusting Derailleurs

Rear Derailleur Adjustment

Many problems with shifting the rear derailleur are a result of the cable having stretched. If your cable tension is too loose, your shifting will not be smooth. Taking up cable tension can be done on the road by turning the barrel adjusters, if your bike has them. If you are unable to fix the problem by turning the barrel adjuster at the shifter or derailleur, you might need to do a minor operation to take up the cable tension. This operation is best left to a mechanic unless you are confident you can handle it.

You'll need a few simple tools, such as a small screwdriver and Allen wrenches. It's best to put the bike in a bicycle workstand. Consult a qualified mechanic if you don't have the tools or are unclear about how to do the following:

1. Shift the chain onto the smallest rear cog. Screw the barrel adjuster in all the way and loosen the anchor bolt just enough to release the derailleur cable.
2. By sighting down from the rear of the bike, use the 'H' set screw to line up the upper pulley on the derailleur with the smallest cassette cog. Turning the screw clockwise moves the pulley toward the frame and counter-clockwise moves it away.
3. Remove slack from the cable and tighten the cable anchor bolt.
4. Shift down one gear while rotating the pedals. If shift is precise and quick, go to step 6.
5. Unscrew adjuster barrel in half-turn increments until shifting is precise.
6. Shift to largest cog. Loosen the 'L' set screw if chain does not reach largest cog. Be careful not to loosen the setscrew too far, which will make the chain drop into the spokes of your wheel.
7. Tighten the 'L' set screw while in largest cog. This will limit the travel of the rear derailleur. Turning the screw clockwise moves the pulley to the right and counter clockwise moves it to the left.
8. Check all gears. Repeat steps as necessary until shifting is smooth. Make fine adjustments by loosening or tightening barrel adjuster at the derailleur.

Front Derailleur Adjustment

Adjustment to the front derailleur is necessary when shifting drops the chain off of the inside or outside of the chainrings or the chain rubs the derailleur cage in your smallest or largest gear combination. Unless you're confident that you know what you are doing, take front derailleur adjustments to your local bicycle mechanic — the front is trickier than the back.

1. Release the cable from the anchor bolt.
2. It is crucial that the derailleur cage remain perfectly parallel to the chainrings and 1 to 2 mm above the largest chainring when shifted to that position. If you can't get this correctly parallel, stop and take your bike to a shop.
3. With the chain on the lowest gear combination (smallest ring in front, largest cog in back), tighten the 'L' set screw until the inside plate of the derailleur is 1 to 2 mm away from the chain. Remove slack from cable and tighten the anchor bolt.
4. While turning the cranks by hand, shift the front derailleur to the largest chainring and smallest cassette cog.
5. Tighten the 'H' set screw if the chain jumps off the large chainring and falls to the outside. Loosen 'H' set screw if the derailleur cannot reach the large chainring from the smaller one.
6. Check all gears. Repeat as necessary until shifting is smooth. Loosen 'L' set screw one half turn to improve shifting to small chainring. Make fine adjustments by loosening or tightening the barrel adjuster at the shifter.

TOOLS for the ROAD

There are a few tools bicyclists should carry on every bike ride. To determine what tools are right for you, ask yourself this question:

What do I know how to fix?
Only carry tools for work that you know how to do. Carrying tools that you don't know how to use will help only if someone who knows about bikes happens along.

MUST HAVES

Some items should always be carried for safety's sake:

- Identification – A copy of your driver's license and medical insurance card should be the minimum.
- Money or cell phone for phone call.
- Tools for fixing a flat tire.

If you only ride close to home, these should be enough. For longer rides, you'll probably want to carry more tools and a few spare parts. For most bikes, the following tools will handle the majority of on-road repairs and adjustments:

- Tire levers
- Patch kit and spare tube
- Tire pump or other device to inflate tires — there are two different kinds of valves on tubes, so make sure the pump fits the ones you have.
- Allen wrenches of 4, 5 and 6 mm

Multi-tools made specifically for bicycles have many of the tools you need for simple, on-the-road repairs.

If you know how to adjust other parts of your bike, be sure to carry the tools you need to make those adjustments.

Clothing & Accessories

Helmet

A bicycle helmet, like any piece of protective equipment, is designed to be worn a certain way. When it is used correctly, it will do what it's supposed to do: protect your head.

Follow the instructions below to make sure you are wearing the right size helmet and that you are wearing it correctly. If you already own a helmet and it won't adjust properly after following these steps, you may need to try another size or brand.

If your helmet hits the ground during a crash, you need to replace it. Even a minor crack or a small crushed spot in the foam can reduce the protection it offers.

Bicycling gloves

Gloves are important for two reasons: they help distribute handlebar pressure across your palms, preventing blisters and nerve compression, and they may protect your hands in a fall. There are fingerless styles and full-finger gloves for when it gets colder. Be sure to get a pair that fit your hands snugly.

Cycling shoes

Cycling shoes help you transmit power to the pedals efficiently and may allow you to use clipless pedals. They generally have a stiff sole that resists bending. They allow you to ride longer and stronger, while preventing foot fatigue and soreness. They may not be the best choice if you are going short distances with lots of walking in between riding.

Cycling shorts

By cushioning your sit bones and reducing chafing in sensitive areas, cycling shorts add comfort to your ride. Choose traditional tight shorts with a padded insert, or find a pair of casual, loose-fitting cycling shorts with padding on the inside. It is best not to wear underwear under your cycling shorts, as the seams are in all the wrong places and the material may chafe.

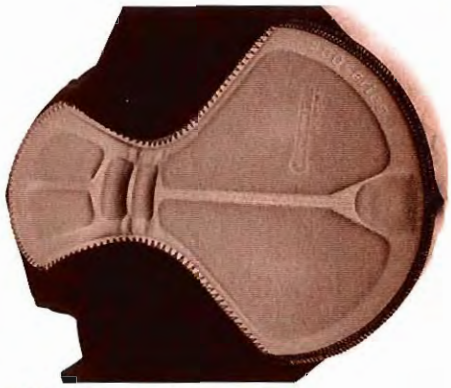
HELMET FIT & ADJUSTMENT

A helmet should be level on the head (not tilted up, back, or sideways), with the side and chin straps properly adjusted and fastened securely. If you wear a helmet every time you ride, you're taking great strides in safeguarding that brain of yours.

1. Start out with the smallest size helmet that fits your head. Try on different sizes and brands of helmets until you find one that fits. It should cover the majority of your forehead so you can see the front edge. Even without the straps fastened or the pads in place, there should be little movement when you move your head from side to side.
2. If you need a snugger fit, put in the foam pads that come with the helmet or adjust the strap at the back of the helmet. Your goal is to have the helmet snug enough that it will not fall off when you bend over.
3. When adjusted correctly, each ear strap should meet at a point directly below your ear lobe, with no loose play in the straps. Make sure you base your adjustment decisions on a properly positioned helmet worn level on your head! Only after these straps are adjusted should you try adjusting the chin strap. The chin strap should be tight enough so the helmet moves when you open your mouth widely.

BICYCLING GLOVES

CYCLING SHOES



CYCLING SHORTS

Cycling jerseys

Many jerseys are made of technical fabrics that pull moisture away from your skin. Depending on what fabric you choose, it can either help keep you warm or cool. Jerseys usually have pockets on the back to carry food, tools, money or other items you want to keep accessible. Be sure to buy jerseys that are light colored to improve rider visibility on the road.

CYCLING JERSEY

Rainwear

Important considerations when purchasing rainwear include breathability and coverage. Florescent yellow-green (Hi-Vis), yellow or orange are the most visible colors in rainy conditions. If the temperature is below 50 degrees, your rainwear should be waterproof to keep cold water off of your skin.

Cold weather wear

Cold weather clothing should be made of fabrics that wick moisture away from your body, insulate you, and screen you from the wind. The weather conditions you elect to ride in will determine how many layers of clothing you put on. An extra layer of socks or shoe covers, as well as thick gloves or mittens, are vital for keeping your extremities warm while riding in cold weather. Arm and leg warmers are also widely available and easy to carry.

Glasses

Sunglasses offer protection from wind, grit, and ultraviolet light. Look for glasses that wrap around your field of vision, permitting a good peripheral view. Lenses should be distortion-free and made of a high-impact, shatter-proof material. Clear or amber lenses are recommended for cloudy, gloomy or rainy weather.

Water

You need to carry water if your ride is longer than one hour. Your bike should have cages to carry water bottles. Hydration packs allow you to carry more water and drink hands-free while riding. Be sure to carry enough water for your ride.

Bike Lock

If you leave your bike unattended for even short periods of time, your standard equipment should include a good lock. Do not carry a lock slung over the handlebars, as it could impede your steering. Racks, brackets or backpacks are better options for

HELMET FIT — REMEMBER THESE THREE TIPS

EYES: You should be able to see the front edge.

EARS: the straps should meet in a "Y" just below the lobe of your ear.

MOUTH: the chin strap should be tight enough so the helmet moves when you open your mouth wide.

carrying locks while riding. For the best level of security, use two different kinds of locks connected together.

BIKE LOCK

Lights and Reflective Materials

Riding in the dark or in the rain requires that you be properly equipped to see and be seen. The safest thing to do is always use front and rear lights if you ride at night. At the very least, all state laws require a front light and rear reflector. Lights range widely in their brightness and effectiveness. Some use batteries; others use generators that allow the bike and rider to generate power. Rear reflectors may be all that is legally required, but they are not enough for your safety.

In addition to using reflectors on your bike, consider wearing reflective clothing. At a distance, your lights show up first. As a motorist gets closer, small LED lights will get overpowered by automobile headlights, and reflective tape won't. Most cycling-specific jackets have some reflectivity built-in, and adding a reflective vest or reflective tape on your bike will help make you very visible.

LIGHTS

Bicycle Handling Basics

Gears and Gear Selection

Whether you use them all or not, you likely have many gears on your bike so that you can exert nearly the same amount of pedaling effort whether you're riding up a hill, down a hill, or on level ground at a wide range of speeds.

For good efficiency and low impact on your knees, most people find a pedaling cadence of 75-95 revolutions per minute (rpm) to work for them. You can determine your cadence by manually counting how many times one pedal goes around in a minute.

When you are maintaining a steady cadence, the bike will travel different distances depending on the gear you select. For example, when a bike is in high gear, each revolution of the pedals propels it a long distance — perhaps 25 feet or so — but pedaling effort is very high. When the bike is in low gear, each revolution propels it only a short distance — perhaps as little as five feet — but the pedals are easier to turn.


CASSETTE WITH NINE COGS

If your bike has three chainrings, you will do much of your riding in the middle one. Most of your shifting will be done with your right hand to use the rear derailleur to find a comfortable gear. Remember to shift with derailleurs only when pedaling.

If the change in terrain is pronounced, you will need to shift the front derailleur as well. Move it onto a smaller chainring (toward the bike) for a lower gear, and onto a larger chainring (away from the bike) for a higher gear. Use the shifter at your left hand to move the chain while pedaling. Remember, moving the chain towards the bike makes it easier to pedal and moving the chain away from the bike makes it harder to pedal.

CHAIN IN LOW GEAR (BIG COG)

CHAIN IN HIGH GEAR (SMALL COG)

Starting/Stopping

Riding confidently and competently in traffic sends the message that you belong in the roadway. One of the best ways to do this is to start quickly and confidently. You do this by starting with one pedal in an up position, then putting all your weight on the pedal to launch you and your bike across the intersection. As you are pushing on the pedal, ease back onto the saddle.

To stop smoothly and evenly, use both brakes with more pressure on the front one. Just as you come to a complete stop, turn the handlebars a little bit away from the side you want to step down on. The bike will lean to that side so you can step down.

Steering a Straight Line

If started in motion carefully, a bicycle without a rider can coast all the way across a parking lot before it eventually falls down. Your job is to use small motions to steer the front wheel as little as possible so as to keep the bike directly under your center of gravity. So look up and let the bicycle work for you.

If the bike leans to the right, the front wheel will tend to steer itself to the right, and if the bike leans to the left, the wheel will steer to the left, assuming no force is applied to the handlebar.

On a bike that is moving and upright, the caster effect keeps the wheel lined up in the direction of motion.

Scanning

When riding in traffic, you need to be predictable and communicate with drivers when you are going to change your speed or roadway position. You can do this by looking around, or scanning, and when it is safe, signaling your intentions.

Scanning is the act of looking over your shoulder. You do it to check for overtaking traffic or to see that you are clear before merging or changing lanes. This is a skill that you'll need to be proficient at so you can keep the bicycle moving in a straight line while you are looking back. Practice looking over each shoulder until it becomes second nature and you are able to maintain a straight line of travel while looking back.

Signaling

A large part of being predictable in your actions on the road is letting others know what you plan to do before you do it — hand signals are a vital communication tool. Scanning behind you while riding in traffic may act as a secondary signal to motorists that you plan to change your position on the roadway.

The right-turn signal has historically been the left arm outstretched and bent upward at the elbow. When used by a cyclist, this signal may be difficult for motorists to see. Some states now allow the outstretched right arm to indicate a right turn. Always use hand signals when turning, changing lanes and even when changing position in a given lane. Motorists will appreciate the courtesy and respond in kind.

Be sure to stop signaling well before entering the intersection. At this point, it is more important for you to have both hands on the handlebar for maximum control and maneuverability.

HAND SIGNALS are a vital communication tool. Let other motorists know what you plan to do before you do it.