

KNOW YOUR BIKE

MS 2 B

DISCUSSION

One of the areas in which all new cyclists struggle is making sure that their bike is adjusted correctly and knowing what to do if something goes wrong. If you are really interested in learning how to fix your bike, most local bike shops hold mechanics classes or workshops.

However, everyone should know the basics. Being able to make sure your bike is safe to ride and being prepared when you are out on a ride is an essential part of riding safely.

ABCD CHECK: The ABCD check is something you should do every time before you ride. These are four safety checks that can prevent larger accidents from happening.

A-Air: Is the air pressure in the tires correct? The ideal air pressure is on the side of the tire. That will let you know how much to inflate your tire. Having a good pump makes it easy to keep your tires inflated properly. Some people keep a pump on their bike in case they need to change a flat while out for a ride. That is a good idea and we will talk more about

changing a flat later.

B-Brakes: Are your brake pads in good shape? Can you feel or hear a rubbing sound when you spin the tire? Make sure your brake cables are neither too tight nor too loose. Cables that are too tight can make you brake too hard. You could flip over your handlebars or just not stop smoothly. You should be able to squeeze your brakes tight, with about an inch between your brakes and your handlebars. If your brakes are too loose you cannot stop effectively. If you can squeeze your brakes to the handlebars without coming to a complete stop, they are too loose.

C-Chain: Is the chain straight? Does it have any rust spots or kinks in it? A well maintained chain should be clean and lightly oiled. If you bike off road on dirt paths you might need to clean your chain after every ride to keep it in shape. Also, make sure your shoelaces and pant legs are out of the chain's way when you ride. Tuck in your shoelaces and roll up your jeans so they don't become a hazard. You can also buy ankle bands or tuck your pants into your socks.

D-Drop: Raise your bike an inch or two off the ground and drop it. Listen for rattles or funny noises. This can tell you if something is loose, like a reflector or a quick release lever. Be familiar with your bike. If you have quick release levers on your wheels or seat make sure they are tight before you hop on your bike and ride away. To tighten a quick release lever, start with the lever facing out. Hand tighten it on the other side and finish by pushing the lever in. It should feel tight and leave a faint imprint on your hand. Do not leave the lever pointing out.

YOUR SEAT: If a rider's legs are bending more than 90 degrees at the top of your stroke than the bike seat is too low. Your legs are capable of generating the most power when pushing between 90 and 180 degrees. If the saddle is too low, you do not use all the power in your legs and you will tire more quickly. If the saddle is too high, you lose power when you lose full contact with your pedal. You do not want to bike on tip toes. To adjust a seat correctly, position it level with the ground.



STANDARDS

- ☑ CA.PE.6.4 Students demonstrate knowledge of physical fitness concepts, principles, and strategies to improve health and performance.
- ☑ CA.PE.8.3 Students assess and maintain a level of physical fitness to improve health and performance.
- ☑ CA.ELA.7.LS.1.7 Provide constructive feedback to speakers concerning... a speech's content and delivery and its overall impact upon the listener.
- ☑ CA.M.6.NS.1.2 ...Interpret and use ratios in different contexts to show the relative sizes of two quantities, using appropriate notations

OBJECTIVES

- ☑ Students will know how to check their bike for safety.
- ☑ They will have a basic understanding of how to change a flat tire.
- ☑ They will be familiar with the different parts of the bike and how they work together.
- ☑ They will understand how shifting gears can change pedaling power.

MATERIALS

- ☑ Bicycle
- ☑ Parts of the bike hang tags
- ☑ Vehicle inspection check list
- ☑ Changing a flat DVD
- ☑ Gear Ratios handout
- ☑ City Biking Handbook

It should be high enough that one's leg is slightly bent when extended with the heel on the pedal in the lowest position. This means that when you stand up in your seat, your toes just touch the ground. This can be uncomfortable for the novice rider.

PARTS OF THE BIKE

It is really helpful to be familiar with the different parts of your bike and how they all work together. It's also good to know how to make minor adjustments on your own.

The Basics

Frame: Make sure the frame is the right size. Straddle the bike with the top tube between your legs. You should have 1-3" clearance. If you have a diagonal top tube, you should still have 1-3" clearance—just imagine it comes straight across, parallel to the ground.

Fork: This is the part of the bike that connects the frame to the front tire. It is part of the steering system. Make sure the front tire is on securely and that the fork is aligned with the handle bars.

Handle Bars: Make sure when you straddle your bike that the handlebars are perpendicular to the frame and the front tire. The front tire and frame should be parallel. When you twist the handlebars from side to side the bars and the fork should move together. The handlebars should not move up or down.

Saddle: Saddle is another word for seat. See seat adjustment.

Reflectors: Reflectors make a big difference in your visibility. Just like cars, bikes need to have a white reflector or - even better - a headlight in front, and a red reflector or flashing red light in the back. Make sure your reflectors are clean so that they can do their job.

Wheels

Tire: The tire is the part of the bike that touches the ground. Make sure your tire does not have cuts or worn spots. These

can lead to blow out flats.

Tube: Goes inside the tire. Be sure to keep properly inflated.

Rim: The rim is what holds the tire in place. Not keeping your tires inflated can harm your rim and make for an uncomfortable ride.

Spokes: The spokes keep your rims in a true circle. If you have a missing or broken spoke, get it fixed right away before you have to replace the whole wheel.

Brake System

Front Brakes: The front brakes can be found at the top of the fork. To test your front brakes, squeeze the left hand brake and try to move the bike backwards. Make sure the pads touch the rim of the wheel and not the tire. When the brake lever is released, pads should not touch the rim.

Rear Brakes: The rear brakes are found attached to the frame behind the seat. To test the rear brakes squeeze the right hand brake and try to move the bike forward. Check the pads the same way as for the front brakes.

Brake Levers: The front brake is always on the left side and the right lever connects to the rear brake. To check the brake levers pull them and make sure there is a finger width between the lever and the hand grip. If it pinches your finger, it is too loose. You can adjust it by turning the barrel nuts/adjusters at the brake lever or at the brake.

Drivetrain

Pedal/Crankarm: The pedal is what you put your foot on that attaches to the crank arm. It is how your energy transfers to the bike.

Chain: The chain connects the gears and transmits the energy generated by the riders' legs to the wheels. Chains need to be tight with little slack. See the ABCD check for details.

Derailleur: The derailleur helps maintain the proper tension on the chain. It works to shift the chain from one gear to the next.

Gears: The front gears, also called the chainring connect to the crankarm. The rear gears, or sprockets, connect to the rear wheel axel. The chainring and the sprockets are connected by the chain. Different size gears change the amount of slack in the chain. With a smaller gear and more slack, pedaling is easier. You get less resistance coming from the bike. However, it is slower. Using a smaller gear is helpful when going up a big hill. When you use a larger gear you have more power but having less slack uses more energy. Using larger gears when you go downhill helps maintain control.

Gear Shift Lever: The gear shift levers are located on your handle bars. They connect to the derailleurs by cables. The left lever connects to the front derailleur, and the set of gears that connects to the crankarm. The right lever connects to the rear derailleur and moves the chain between the rear gears.

CHANGING A FLAT

You never know when a flat tire is going to happen. The road is full of glass and other sharp objects. Many cyclists carry a hand pump and a small tool kit under their seat with a patch kit and levers just for such emergencies. Patch kits are small and light. They are easy to throw into a back pack or purse as well. Many cyclists also carry an extra tube for those times when they are in a hurry or cannot find the hole in the tube.

What will I find in a patch kit?

A patch kit contains more than a patch. It also contains glue, sandpaper and instructions. You also need a set of tire changing levers and a pump. Levers are small and light, and can fit in a saddle bag. A hand pump can fit on your frame.

How do I use a patch kit?

When you have a flat, the first thing you want to do is use the tire levers to remove the tire from the rim. Use one lever as a wedge between the rim and tire.

Slide the other lever around the rim of until the entire tire is loose. Before removing the inner tube, check the outside of the tire for any noticeable objects that caused the puncture. If you find the object, pull it out, and note on your tube where the hole is (put a piece of tape on it or mark it). Second, you need to remove the inner tube from the tire. If you haven't already, figure out where the hole in the inner tube is. If it is not readily visible, pump the tube full of air and feel around the tube for the leak. Once you've found it, use the sandpaper to rough up the area around the hole. Make sure that the rough area is larger than the patch, so the patch will stick well. The patch adheres better to a rough surface. Apply glue to the roughed up surface. Give the glue a couple of minutes to dry before attaching the patch. While you are waiting for the glue to dry, check out your tire. If you haven't already, make sure that whatever caused the flat (such as a piece of glass or nail) is no longer embedded in the tire. Rub your fingers along the inside of the tire. Check for worn spots or cuts in the tire. A weak tire can get you home but should be replaced. Return to the inner tube. Set the patch over the glue spot and rub it until it is securely attached. Make sure there are no wrinkles or bubbles in the patch. Place the tube inside the tire and inflate it slightly. Remember to make sure that the tire tread is going in the correct direction. Use the tire levers to help reattach the tire to the rim. Finally, inflate the tire to its full capacity. Hop on your bike and have some fun.

ACTIVITIES

TEACHING TIPS: You need a bike when you teach this section. If you do not have a bike or a student who rides to school, contact SRTS about obtaining a loaner. Demonstrate as many of the safety checks as possible. Like other sections, this one has enough activities to fill a full class period or more. If you are only taking half a class period, make sure you cover the ABCD check, seat height and how to change a flat tire.

PARTS OF THE BIKE: Copy tags onto card stock. Cut out and laminate the tags. Attach a pipe cleaner so they can be hung on a bike. These make the discussion more interactive and engaging. Pass out the tags. Have students read their tag then come up and place it in the appropriate place on the demonstration bike. As they place the tags, follow the parts of the bike discussion to give students detailed information about the different parts.

VEHICLE INSPECTION CHECK LIST: This should be given as homework or home reference. It reiterates all the safety checks discussed in this section. Students can conduct checks on their bikes at home and report back to the class or write a paragraph.

WRITING PROMPTS:

"The most important part of my bicycle is... because..."

"What I discovered when I did a maintenance check on my bike..."

"If I was going to improve my bike I would want to..."

"One thing a bike should have to make it safer should be..."

If you could go to a special place on your bicycle where would you go?

What would you do to make your neighborhood more bike friendly?

CHANGING A FLAT DVD: This is a short (3 minute) DVD that demonstrates changing a flat tire. It provides a helpful visual to go with instructions. Cue the DVD to 1:38 in the [First Gear An Introduction to Bike Safety DVD](#)

CITY BIKING HANDBOOK: This is a handy reference guide for students. They can use it when they do their bike safety inspections.

GEAR RATIOS:

Calculating bike gear ratios is a great way to incorporate practical applications of math principles into your lesson. Turn your bike upside down and rest it on the saddle and handlebars for a stable work space.

Calculating gear ratios is a mathematical

process for determining the ease or difficulty of a particular gear combination. A bicycle with multiple gears will have multiple ratios, each ratio determined by the particular combination of front and rear gear. Competitive cyclists sometimes use gear ratios to determine the ideal gearing for a particular race. A larger gear ratio means a larger gear combination; the bike will travel further per pedal stroke, but the cyclist will need to exert greater effort to turn the gear.

Instructions: (see Gear Ratios Worksheet)

Step 1

Determine the number of teeth on each of the sprockets, the rear gears that attach to the rear wheel axle. Bikes in 2010 can contain anywhere from 1 to 11 sprockets. The number of sprocket teeth is often stamped on the individual sprocket. If there is no stamp, you will need to count the teeth on each sprocket. A 13T sprocket, for instance, contains 13 teeth.

Step 2

Determine the number of teeth on each chainring, the front gears that attach to the crank arm and pedals. Your bicycle will have from 1 to 3 chainrings. Again the number of teeth may be stamped on the chainring. If not, count the teeth on each chainring and note the results.

Step 3

Calculate each gear ratio. The ratio is determined by dividing the number of teeth on the chainring by the number of teeth on a rear sprocket. For instance, a gear combination of 53/13T (a 53 tooth chainring/13 tooth sprocket) results in a gear ratio of 4.07 to 1. The sprocket spins 4.07 times to every revolution of the chainring. In other words, with each pedal stroke, your wheels turn 4.07 times.

Read more: [How to Find the Gear Ratio on a Bike | eHow.com](#)
http://www.ehow.com/how_6020216_gear-ratio-bike.html#ixzz0tCErrvRe

Gear ratio calculator:

<http://www.sheldonbrown.com/gears/>

Frame

Frame Fork

Handlebars

Saddle

Reflectors

Tire and Rim

Spokes

Rear Brakes

Front Brakes

Rear Brake
lever

Front Brake
lever

Chain

Pedal/
Crankarm

Deraillieur

Front gears/
Chainrings

Front gear
shifter

Rear gears/
Sprockets

Rear gear
shifter

Vehicle Safety Inspection Checklist

The Basics:

Frame: 1-3" clearance between you and the bike when you straddle it.

Frame Fork: Securely attached to the front wheel and in line with the handlebars

Handlebars: Tight and in line with the front wheel. Handgrips are in good condition & handlebars don't extend past the handgrips.

Saddle: In line with the top tube & the right height. (Toes just touch the ground.) Quick release is secure.

Reflectors: White in front and red in the rear.

Lights for riding at night: Batteries are charged and reflectors are clean.

Drivetrain:

Pedals/Crankarm: Not worn and in good condition.

Chain: Should run smoothly. If it is dry, rusty, dirty or squeaking, clean it and add some lubrication. If it is loose, it needs to be replaced.

Derailleur: Doesn't make clicking or ticking noises. Changes gears smoothly without slipping.

Gears: Check that teeth are not worn or loose. Chain moves without slipping.

Shifters: Make sure they are properly adjusted, giving you the full gear range.

Braking System:

Brakes: Squeeze the brakes and rock your bike forwards. Both brakes should grip the rims smoothly. Make sure pads are not worn and cables are not frayed.

Brake Levers: When you squeeze the brake levers you should have at least one fingers width in between the handlebars and the lever.

The Wheel:

Tire: Properly inflated and in good condition. No cracks worn spots or bulges.

Rim: Check to see that the brake pads only contact the rim not the tire. Quick release is securely fastened.

Spokes: None are missing, loose or bent.

You should be able to conduct a safety inspection on your own. Some of the problems you find you can fix yourself. If you find any problems you do not know how to fix bring it to a local bike shop. Interested in learning more? Several bike shops in the Sonoma County area have free or low cost bike mechanic clinics. They provide information and access to tools. This is a good way to learn how to fix your own bicycle.





Where do reflectors go on a bike? Draw them in and label them. What color reflector should you have in the back? What color in the front?

What side of the handlebars are the front brakes on? Distinguish between the front brakes and the rear brakes, and then label them.

Label the rear gears. What is another name for them?

Label the front gears. What is another name for them?

Where does one usually find the front and rear gear shifters? What side are the front gear shifters on? What side are the rear gear shifters on?

Gear Ratios

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Step 1

Determine the number of teeth on each chainring, the front gears that attach to the crank arm and pedals. Your bicycle will have from 1 to 3 chainrings. Again the number of teeth may be stamped on the chainring. If not, count the teeth on each chainring and note the results. We'll call that A:

A. _____

Step 2

Determine the number of teeth on each of the sprockets, the rear gears that attach to the rear wheel axel. Bikes in 2010 can contain anywhere from 1 to 11 sprockets. The number of sprocket teeth is often stamped on the individual sprocket. If there is no stamp, you will need to count the teeth on each sprocket. A 13T sprocket, for instance, contains 13 teeth. We'll call that B:

B. _____

Step 3

Calculate each gear ratio. The ratio is determined by dividing the number of teeth on the chainring (A) by the number of teeth on a rear sprocket (B). For instance, a gear combination of 53/13T (a 53 tooth chainring/13 tooth sprocket) results in a gear ratio of 4.07 to 1. The sprocket spins 4.07 times to every revolution of the chainring. In other words, with each pedal stroke, your wheels turn 4.07 times.

A/B = _____

Step 4

Repeat this process for multiple gears. Try to find different gear combinations that have the same or similar ratios. How many different speeds does your bike have if you count the same or similar ratios as 1 speed? Use the back of this paper if you need more space.
