

FITNESS

Gear basics

First, let's go over how to control your gears and what they mean.

The shifting mechanism on the handlebars determines which gears your chain falls into. Shifters vary among mountain and road bikes. Some mountain bikes shift by twisting the handlebars or by squeezing a lever parallel to the handlebars.

On road bikes, and some mountain bikes, the shifting and brake mechanisms are often integrated. The brake lever — by moving it left to right — will shift one way. Another lever, either parallel to the brake lever or mounted on top of the handlebars and operated by the thumb, shifts the other way.

Regardless of your setup, these rules generally hold true:

The right shifter controls the rear cassette.

The left shifter controls the front chain rings.

Next, let's define the four most important components of the gears: **chain rings, cassettes, chains and derailleurs.**

Chain rings. These are the big circular rings in front, where the pedals are. Mountain bikes have three. Road bikes generally have two or three. They're also called sprockets.

Cassette. This is the combination of smaller rings, called cogs, around the hub of the rear wheel. Mountain bikes generally have up to nine cogs, whereas road bikes have up to 10. If you want to find the total number of gear combinations on your bike, multiply the number of front chain rings by the number of rear cogs.

Chain. Your chain allows the chain rings and cassette to work with your pedals to move you forward. When you shift, you're moving the chain up and down the cassette and between the chain rings.

Derailleurs. These guide the chain from one gear to another and take up the slack in the chain depending on the selected gear. When you click or turn the shifter, you move the cable, and the cable triggers the derailleurs. There are generally two: one in front and one in back. A bent or unadjusted derailleur can impede shifting.

Cassettes are identified by a range, such as 11-23. This indicates the number of teeth in the smallest and largest cogs on the cassette. Small numbers indicate higher gears; large numbers, lower gears.

Generally, the higher or smaller cogs in back and the larger chain rings in front are the "harder" gears, or those that require more strength but less pedaling.

The lower or larger cogs in back and the smaller chain ring in front are the "easier" gears, or those that require less strength but more pedaling. They're often a necessity when you're going up steep hills.

It's confusing because the smaller gears in back are equivalent to the larger gears in front. But Rick Gurney, owner of Plano Cycling & Fitness, says to just think "inside" — meaning the gears in the front and back that are closest to the bike. Those gears work in tandem, and vice versa.

A good definition of how gears affect performance comes from the Web site of the late Ken Kifer. (Mr. Kifer was an Alabama cyclist who was riding his bicycle when a drunken driver struck and killed him in 2003.)

Mr. Kifer wrote: "Let me compare it to walking. In walking up a hill, your pace will become shorter and your forward movement slower, while in walking down a hill, your pace will become longer and your movement quicker. If you tried walking up a steep hill without slowing down, you would rapidly become exhausted."

"However, on a bicycle, you don't slow down the speed of your legs, but you gear down to reduce the amount of pressure you have to apply to the pedals. So a cyclist going up a hill and down a hill may be spinning his legs at the same pace and making the same effort, but the bike travels a shorter distance with every turn of the crank while going uphill and a longer distance with every turn of the crank while going down. The cyclist on the uphill gives up speed to save effort, the same as the person walking up a hill."

The right pace

You know you're in a good gear when you get the proper cadence and heart rate for your physical condition and cycling goal, Mr. Gurney says.

Despite all the talk about ratios and revolutions per minute, he says it basically comes down to "whatever is comfortable."

He says people with a lot of strength in their legs but not a lot of lung capacity might be inclined to "mash" their gears, or to push themselves while they're in the smaller



CASSETTE

Working your Shift

Using
your gears
properly
makes
for a
sweeter
ride

By PAULA LAVIGNE
Staff Writer

Letter from Hotter'N Hell organizers, 4E

Getting the best workout out of your cycling routine isn't just a matter of pumping those hamstrings and quads and stretching those calves. It's all about shifting gears.

Sure, you know enough about shifting to ease the burden when you're climbing a steep hill, but there's actually a lot more to picking the right gear combination.

Gearing determines your cadence — essentially, your pace — and how hard your muscles, heart and lungs work. Switching gears simply changes the amount of resistance.

Get the right groove and you can lose more weight, gain more muscle or increase your speed.

But if you're like a lot of beginning cyclists, you're probably a little confused about all those little wheels with teeth.

"Now, was it the large circle in the front with the big circle in the back that I want? Or was it the second little circle in the front and the big circle in the ... oh, heck!"

A road bike with three chain rings in the front and 10 cogs — or circles with teeth — in back can have 30 possible gear settings.

That's a pretty wide selection, but it's really not complicated once you learn how to determine where you should be most of the time.

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SHIFTER



CHAIN & CHAINRING



DERAILLEUR

cogs and larger chain ring.

People with less strength will likely "spin" more. That means they'll be in an easier gear with less resistance that forces them to pedal faster. Mashing uses more resistance; spinning uses less.

To find the right balance, cyclists should maintain 80 to 110 revolutions per minute, or rpms, he says. If a cyclist is pedaling along and the slope of the road slows him down, before he drops below 70 rpm, he should shift into an easier gear to maintain that 80 to 110 range.

Bike shops, including Plano Cycling & Fitness, sell computers that measure cadence, or rpms, and basic models range from \$20 to \$50, Mr. Gurney says.

To get a precise range, cyclists should also measure their heart rate and pick the cadence that produces their target heart rate, says Dr. Luis Palacios, associate professor in the department of family and community medicine at University of Texas Southwestern Medical School at Dallas.

Dr. Palacios has practiced sports medicine since 1991. He's also a cyclist.

Here's how you calculate your target heart rate:

Subtract your age from 220 to get your maximum heart rate.

Multiply that number by 0.6 and 0.8.

The two resulting numbers represent 60 percent to 80 percent of your maximum rate. Your target heart rate should fall in that range.

What's your goal?

There's a bit of wiggle room, depending on what you want to accomplish, Dr. Palacios says.

"People will need different workout intensities and frequencies based on the motivation and reason for exercise," he says.

If someone is trying to lose weight, he'll have a hard time if he's in a gear with too much resistance because he won't be getting the best cardio workout, the doctor says. But he shouldn't spin too much because then he'll lose weight without developing muscle tone.

Competitive cyclists often do a lot of spinning in the off-season to maintain their cardio status, he says, and increase resistance to build muscle closer to race time.

"You do develop strength and endurance using the right gear combination," he says.

Mr. Kifer suggested that a beginning cyclist would pedal at 60 rpm going 10 miles an hour, the tourist or intermediate cyclist would spin at 80 rpm going 15 miles an hour, and the racer would "twirl" at 100 rpm going 20 miles an hour.

Changing how much you spin is also a good strategy if you're going on a multiday ride, Mr. Gurney says. If you push your muscles too much on the first day, they could ache and give you problems the next morning, he says. So a little easy going in the beginning will benefit you in the end.

Once you get more comfortable with how your gears work and the pace you want to keep, there are other strategic moves you can make.

The cassette, or the set of rear cogs, can be changed. If you have a cassette with a range of 11-23, and you think you'd benefit from a range of cogs that allow for more spin, you can get a cassette with a 12-27 range, Mr. Gurney said. (Just make sure your derailleur, or gear-shifting mechanism, can accommodate the new set.)

He said the front chain rings could also be changed. If you have a road bike with a large ring with 53 teeth and a small ring with 39 teeth and you're going to be riding a lot of hills, you could, depending on your bike, get a set with 50 and 36 teeth instead.

Most beginning cyclists with a road bike are steered toward buying a bike with three front chain rings so they have more options to test before they find their best fit, says Geoff Godsey, central region dealer and account manager for Specialized bicycles.

As cyclists improve and are more concerned about speed, they can have one of those rings removed to make the bike weigh a bit less, he says.

(Mountain-bike riders will almost always stay with three chain rings because of the varying terrain and climbs they need to negotiate.)

Maintenance

OK, so now you're geared up. Here are just a few more things to keep in mind. The cables leading from the shifting mechanism to the gears will stretch over time and can be adjusted by a professional at a bike shop, Mr. Godsey said.

Cyclists also should maintain their gears by keeping the chain and derailleur cleaned and lubed. Off-road mountain bikes need lubrication more often than road bikes.

NATALIE CAUDILL/Staff Photographer; Cannondale road bike courtesy of Debo Cycle Sport



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