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This book
is for you,
a high
school
runner.

Preface

In the early 1990s, I was a decent, but not exceptional, high school runner in Castle Rock, Colorado. I had a number of minor successes, the biggest being that I ran just fast enough my senior year to walk on at the University of Colorado.

For several years in Boulder, I was the slowest varsity guy on some very good cross country teams. In 1998, my senior year, I was part of the squad that finished third at the NCAA Cross Country Championships, but I wasn't a scorer. There is a book about that season of ours, *Running with the Buffaloes*, and maybe you'll read it someday when you're in college. It contains a number of great lessons, but what works in the NCAA doesn't always translate to high school racing and training.

There is a lesson that's universal, though: the gift of confidence. No matter a runner's ability—whether they've just barely made varsity or they're about to defend their state title—any runner can step onto the starting line ready to execute a race plan with confidence.

This book is about gifting yourself with that confidence. Besides *Running with the Buffaloes*, there are many inspiring books about our sport, from novels like *Once a Runner* to nonfiction works about Emil Zatopek and Deena Kastor. But most of these books focus on older athletes running longer races. Again, the great lessons don't always translate for teenagers. This book, however, is for you—a high school runner.

This book makes some assumptions about you:

1. It assumes you want to have fun.
2. It assumes you want to compete—against yourself and against your competitors.
3. It assumes you want to have a lot of fun in those competitions.
4. It assumes you want to see how fast you can run.
5. It assumes you value track and field as much as you do cross country.

You might relate to some of the assumptions on the opposite page more than others, and that's okay. Some runners thrive in major competitions, and others just like to race the clock. Same with liking cross country and disliking track: it's okay to prefer one over the other, and preferring the one you're better at is completely understandable. The very best runners, though, value both seasons. They see the connection between the two, just like they see the connection between having fun and competing well.

I sometimes lost sight of the fun when I ran in high school, because I was constantly questioning my team's training. Were we just winging it, I often wondered. When I arrived at CU, I followed the training to the letter my first two years, and I made a huge jump compared to my high school times. As a college sophomore, for instance, I came through the 3,200m mark of a 5,000m race some 30 seconds faster than my high school 3,200m PR and then sped up over the remaining four and a half laps.

But as a junior, I added unauthorized double runs and weightlifting in my training, in hopes of improving. My self-directed experiment led to a year and a half of poor training and pitiful racing. I simply dug a hole and struggled to get out. There was a silver lining to this period, though: As I became more and more curious about human physiology, and how our bodies and minds can best work together, I decided to become a coach. I was on track to get my undergraduate degree in kinesiology, and I decided to pursue a master's degree in

it and applied physiology, which gave me the background to understand the exercise physiology that informs the 15 lessons of this book.

After hanging up my spikes, I didn't leave the sport. Instead, I began my coaching career, nearly 20 years ago, at Pratt Community College in Kansas. A few years later, I headed back to CU. After that, I had the chance to coach several professional runners, three of whom won USATF championships. Along the way, I have continued to learn about physiology, training philosophies, and race strategies—their differences and their similarities. But perhaps best of all, I have worked with high school athletes since 2003 as the director of the Boulder Running Camps. It's this rewarding experience that has truly shaped the book that follows.

I have many opinions on training, racing, and how coaches can work to build a culture where running is fun—where working to become faster is a joyful process. This is not a book full of my opinions, though. Rather, it explains the fundamentals of running—fundamentals that all good coaches will agree on. Here's an example: It's not my opinion that a block of injury-free training, with thoughtful workouts and adequate recovery, will almost always lead to good performances. Coaches at every level, and successful runners who have been running for years, will agree with this fundamental truth. It's also not my opinion that the well-rested athlete will be able to train and race at higher levels

than an athlete who fails to get adequate sleep. It's not my opinion that training the aerobic system must be done every month of the year if an athlete is to reach his or her potential. And it's not my opinion that if the word “consistent” can honestly describe your training, you will find yourself racing at or near your potential.

So, are you ready to get started?

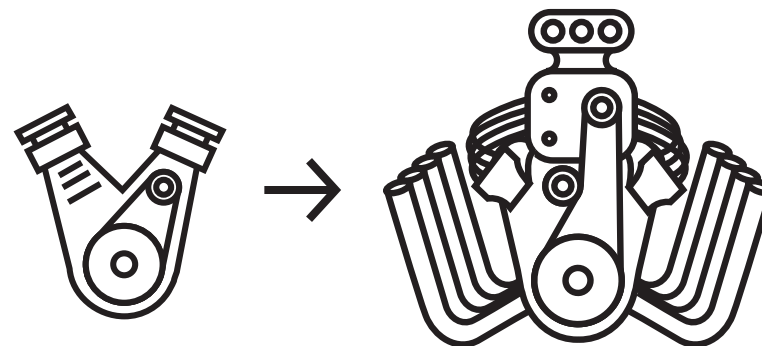
Ready
to get
started?



5. Build Your Aerobic Engine

Think of your body as a car. While the analogy isn't perfect, it can help you understand some of the keys to consistent improvement.

Distance runners need to build their aerobic engines if they want to race faster. And the reason is simple: what's known as your aerobic metabolism contributes the majority of the energy that your muscles need to power you down the track or around the cross country course.



Take a moment to consider the following table:

<i>Distance</i>	<i>Aerobic %</i>	<i>Anaerobic %</i>	<i>Phosphogen %</i>
800m	60%	35%	5%
1,600m	82%*	18%	0–2%
3,200m	90%	10%	0–2%
5,000m	95%	5%	0–2%

*There is a debate as to the exact percentage for the 1,600m, ranging from 80% to 85%

There's a lot going on in this table, but you really only need to take away two essential points. First, every distance you'll race is more aerobic than anaerobic—in other words, the energy system that requires oxygen is doing more of the work than the energy systems that don't. Second, the aerobic contributions to performance increase as the distance gets longer (with a 5,000m cross country race being 95 percent aerobic).

It's these two points that shape effective training programs for distance runners: you need to focus on building your aerobic engine throughout the year because races ranging from 1,600m to 5,000m are primarily powered aerobically.

Put another way, if you do the right aerobic workouts, you can transform a four-cylinder engine into a V-6.

***Distance
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Beyond the car analogy, it's worth knowing a little more about the terms "aerobic" and "anaerobic." The most basic definitions are "with oxygen" and "without oxygen," respectively. Once you gain some level of fitness, you can hold a conversation while running at a steady pace, whereas before maybe you could only manage a few words here and there. This difference in fitness points to where you're getting your energy—increasingly via aerobic metabolism.

Now picture running 200m as fast as you can. Your body has different types of muscles, and you use both your fast-twitch muscles and your slow-twitch muscles to run all out. Your fast-twitch muscles are special, in that they can produce a lot of force without oxygen. But however powerful, they need a bit of help from their slow-twitch counterparts.

Take another moment and think about how you feel when you're barreling down the track for 200m. Can you feel a burning sensation in your chest or in your legs? Maybe a metallic taste in your mouth? That's because your body is producing lactate, a byproduct of those fast-twitch muscles at work—muscles that weren't using oxygen. So they're special muscles, yes, but there's a tradeoff when you put them to work!

At this point, most running books would include several pages about exercise physiology—going into detail about lactate production and the associated H⁺ ions, and how the body can buffer these ions while keeping blood pH from

dropping dramatically. (If you want to learn more about the science of running, I have plenty of resources for you at CoachJayJohnson.com/CIKbook.) But to be an excellent high school runner, you only need to know the two key points I mentioned above, and to trust that your aerobic training is supported by science.

To build your aerobic engine, you need to do the correct types of workouts that enhance this system. Later in the book, in "How to Train," I'll explain why long runs, fartlek runs, progression runs, and threshold runs are four great options (but by no means are they the only options). Each of these teach you to run by feel, which is a crucial part of becoming a better runner. Running by feel, as compared to training at a predetermined pace, allows you to execute a workout as it was intended. Plus, it prevents you from overextending yourself, which can start a cascade of overly hard training days that lead to deep fatigue and possibly injury. But first, let's talk about the structure that holds your aerobic engine—your chassis.

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12. Prepare for Running Fast, Faster, Fastest

One of the keys to realizing your potential is the ability to speed up at the end of a race. While there may be a time or two in your junior or senior year where you run a great race by grinding out a hard pace right from the start, most often you'll perform your best when you complete the last half of the race faster than the first. This is what's known as running a negative split. You want to have the ability to "switch gears," whether that be moving up through the pack in cross country or passing a runner with 200m to go on the track.

You don't need to speed up in the middle of a race to run negative splits: you just need to run the last 400m, 200m, or even 100m faster than you were previously going. Most world records for distances a mile and up—and most high school personal records 1,600 and up—have been set through negative splits. In almost every race you run, you'll have competitors capable of running negative splits, and you need to be ready to do the same.

One way to ensure that you run negative splits is to speed up three times during a race. In the majority of races, your goal should be to run a given pace, then go fast, then go faster, and then go your fastest. This is a simple strategy,

Fast, faster, fastest.

yet it's a hard one to execute. You'll need to practice it in workouts to properly execute it when it counts. There are two basic ways you can approach "fast, faster, fastest" in workouts.

Let's say you have a workout of 10 x 400m with 45 to 60 seconds recovery. Ideally, you'll run similar splits for the first seven repetitions, but on the eighth, ninth, and tenth, you successively increase your speed—going fast, faster, fastest. You don't want to run slow on the first seven 400s, but you'll need to find that edge between discomfort and control, so that you can confidently accelerate over the last three sets. If your workout is something like 6 x 1,000m, you can apply the same principle: maintain a relatively even pace over the first three repetitions, and then go fast, faster, fastest to finish the workout.

You can even apply this same principle to your last repeat. Ideally, as you cover the last 100m to 200m of your final repetition, you will practice switching gears. Yes, you'll be tired, but this is exactly what you have to do in a race. You want the experience of switching gears when tired, so it is more manageable, almost instinctive, on race day.

Let's assume you're preparing for a 1,600m race. Your coach might want you to go fast, faster, fastest in the final 500m. In the first 100m to 200m of this hypothetical race, he or she might encourage you to establish a position

within the pack. This may be on the shoulder of the leader or near the back of the lead group. You'll likely get a 200m split from one of your coaches or teammates, or perhaps you'll hear feedback on your position. From there, you may be aiming for certain splits at 400m and 800m, or you may be going for a certain position. Either way, your coach wants you to approach the final 500m with fast, faster, fastest in mind, specifically fast for 200m, faster for 200m, and fastest for the last 100m of the race.

Envision this: You're coming into the homestretch before the bell lap. Rather than wait for the final 400m, you start to move up. This is the start of your 200m fast section. When you hit the backstretch, with 300m to the finish, you speed up again—initiating your faster segment. At this point, you're running hard, and you're uncomfortable. But because you've practiced switching gears, you're confident you can endure the discomfort a bit longer. You and your legs both know you can do this! When you come off the final turn and into the homestretch, you have one last gear. You run your fastest 100m right at the end. Executing such a race plan—where you run a challenging pace for 1,100m and then go fast, faster, fastest in the last 500m—will more often than not lead to a great race. It's also how you can set yourself up for PR performances.

The 1,600m scenario we just walked through does not necessarily mean you'll win, but there are many ways to measure a great performance. If you

***Practice
switching gears
when tired,
so you will be
ready to do it
on race day.***

consistently incorporate fast, faster, fastest, you'll consistently beat quite a few competitors and consistently turn in races you can be proud of.

Of course, you may be running against someone who has also read the last several paragraphs, and who is trying to execute a very similar strategy. Put another way, you should expect your competition to speed up alongside you. If that's the case, and even if you don't find yourself passing competitors on the backstretch, keep focused on shifting gears. Sometimes you may not beat someone ahead of you, but you end up beating your previous personal record. Don't get frustrated!

In a 3,200m race, you might follow a similar plan over the last 500m. Or the plan might focus on fast, faster, fastest with 800m to go: speeding up for 400m, then again for 200m, and finally once more over the last 200m. Taking a simple 100m/100m/100m approach with the last 300m of a 1,600m or 3,200m is another useful strategy—especially if you're new to track and don't have much experience changing gears when you're fatigued. In cross country, you might shift gears in the final 1,000m of a race, running fast, faster, fastest for 600m, 200m, and another 200m, respectively. No matter the distance, the key is that you and your coach have a general plan, with the caveat that you may need to move up in the pack before you execute your fast, faster, fastest segments—so that you're in contact with your target group.

There is an exception to running negatives splits: Most of the time for high school runners, negative splits are not ideal in the 800m. You and your competition will run the vast majority of your PRs with even or positive splits (where the first half of the race is slightly faster than the second). For 800m specialists, the first 200m is often the fastest. If you're reading this and your best event is the 800m, you'll still benefit from the fast, faster, fastest pattern in workouts. But when you're racing two laps, don't expect your last 200m to be your fastest.

There's one simple thing worth remembering: you can't execute a fast, faster, fastest finish to a race if you haven't practiced switching gears throughout the year. Your coach should design workouts that put you in a position to rehearse this skill over and over, so that when the gun goes off you're ready.



13. Remember to Sleep

What's the least exciting ingredient in the recipe to becoming an excellent high school runner? Sleep. You want to train hard so that you can race fast—that's the fun stuff! To absorb your training gains and recover from racing, however, you have to sleep. This is how you will gain fitness over the course of the season.

***Sleep is like a
secret ingredient
in the recipe of
running success.***

As a high school runner, you need enough sleep to support the training your coach assigns you, to support the physical growth of adolescence, and to support academic performance. Because you’re making demands on your body every day in practice, you’re going to need more sleep than your non-running classmates. Your job is to find another 20 or 30 or 45 minutes in your already hectic schedule for sleep.

Paul Vandersteen coaches the boy’s team at Neuqua Valley High School, in Naperville, Illinois. He is a great coach with a number of useful resources for his athletes, including an approach to “championship sleep.”

Neuqua Valley Men’s Cross Country & Track and Field							
WHAT TIME SHOULD YOU GO TO BED?							
Wake-up Time							
	5:30am	6:00am	6:30am	7:00am	7:30am	8:00am	8:30am
Bed Time							
Awful	10:30pm	11:00pm	11:30pm	12:00am	12:30am	1:00am	1:30am
Bad	10:00pm	10:30pm	11:00pm	11:30pm	12:00am	12:30am	1:00am
Minimal	9:30pm	10:00pm	10:30pm	11:00pm	11:30pm	12:00am	12:30am
Mediocre	9:00pm	9:30pm	10:00pm	10:30pm	11:00pm	11:30pm	12:00am
Good	8:30pm	9:00pm	9:30pm	10:00pm	10:30pm	11:00pm	11:30pm
Champion	8:15pm	8:30pm	9:00pm	9:30pm	10:00pm	10:30pm	11:00pm

This table is brutally honest with the numbers. You know when you need to wake up, so you can work backwards and see what time you need to go to bed. And the lesson is a clear one: you can’t expect to be a good or champion runner if you’re getting an awful or minimal amount of sleep week after week. If you have a day or two where you get mediocre or even bad sleep, just don’t let it become a habit. With sleep, you can get back on track and string together several good nights of consistency-building rest.

You’re in high school. Of course, you will have a night here or there where you either go to bed late or sleep poorly. You might have to study late for an important test. You might get home late from a track meet. There are days when you have to get up much earlier than normal. The key with sleep is that you’re as consistent as possible, and that you get enough rest to support your training, your physical growth, and your academic workload.

Sleep may not be all that exciting, but it is like a secret ingredient in the recipe of running success. It does wonders. And no, you can’t make up for a week’s worth of bad sleep by sleeping in really late on Saturday or Sunday morning.

Think of running and then think of lifting weights. Which one builds you up? Lifting weights, of course. The term “anabolic” literally means “building up.” The chassis-building work we’ve covered is anabolic. After an hour of sleep, your body releases signaling molecules that also build you up—

testosterone and human growth hormone, or HGH, that all athletes, regardless of age or gender, need to strengthen their chassis. The more sleep, the more your body releases these important substances that basically say, time to repair yourself!

The opposite of anabolic is catabolic, which means “breaking down.” Running is a catabolic activity. On the micro-level, it literally tears your muscles down. If you get ample sleep, however, your body can rebuild itself. Most athletes—from middle school runners all the way to professional runners—find that they need more sleep as they train harder. This is because they have more and more rebuilding that needs to be done each day.

You might be thinking, “Got it. I need to sleep. If I’m honest, I need more sleep. But sometimes, I have a hard time sleeping. What do I do then?” If that’s the case, you want to maximize the quality of the sleep you do get.

That’s where the concept of sleep hygiene comes in. The first time I heard this term, I thought “like dental hygiene,” and that’s not too far off the mark. In the same way you have a routine for taking care of your teeth, you need a routine to allow your body to fall asleep. High school student-athletes need sleep hygiene to support their training, their physical growth during adolescence, and the significant challenges of high school academics.

Admittedly, sleep hygiene is a little bit like flossing. You may not like it at first, but it can have a dramatic impact. So it’s best to establish the routine and stick to it.

What’s not to like about sleep hygiene? Well, you need to stay off your phone at night. That’s because your phone emits light—so-called blue light—that is different than the light in your bedroom. Your tablet, your computer, and your TV also emit it. Blue light throws off your body’s internal clock, or circadian rhythm. And this is very disruptive to your ability to fall asleep and to the quality of the sleep you do get. Compromise either of those, and you won’t be rebuilding your muscles fully.

As with many things related to running, the solution to a disrupted circadian rhythm is simple but not easy. Choose to make the 60 to 90 minutes before bed screen-free. I know you’re thinking, “How the heck am I going to be able to do that?” At first, it’ll be a hard habit to establish. But like flossing, it’ll be good for you—and good for your running. Putting your phone away an hour or so before bed is a small choice, but one that will have a big impact on your training and racing—regardless of your genetic ability.

Sleep more. Sleep better.

And each night will lead to solid training and faster racing.