

The 2017 Tour de France - the World Series of bicycle racing - starts July 1st. Bicycle Racing seems like a simple sport: go fast, cross the finish line first, win the day.

But winning a bike race is actually all about saving energy, not riding fast. The techniques to save energy in a bike race are complex, and often surprising. They result in tactics that make bike racing one of the most strategic of all sports. Like a chess game on wheels.

In terms of bike racing, the human body is just a big battery storing energy. Bike racing is a contest to see who has the biggest battery.



This is Major Taylor. One of the most important athletes you've never heard of. Go look him up!

To ride a bike faster, a racer uses more of the energy in the battery. When the battery runs out, the racer is done for the day, and has to pedal to the finish line slowly.



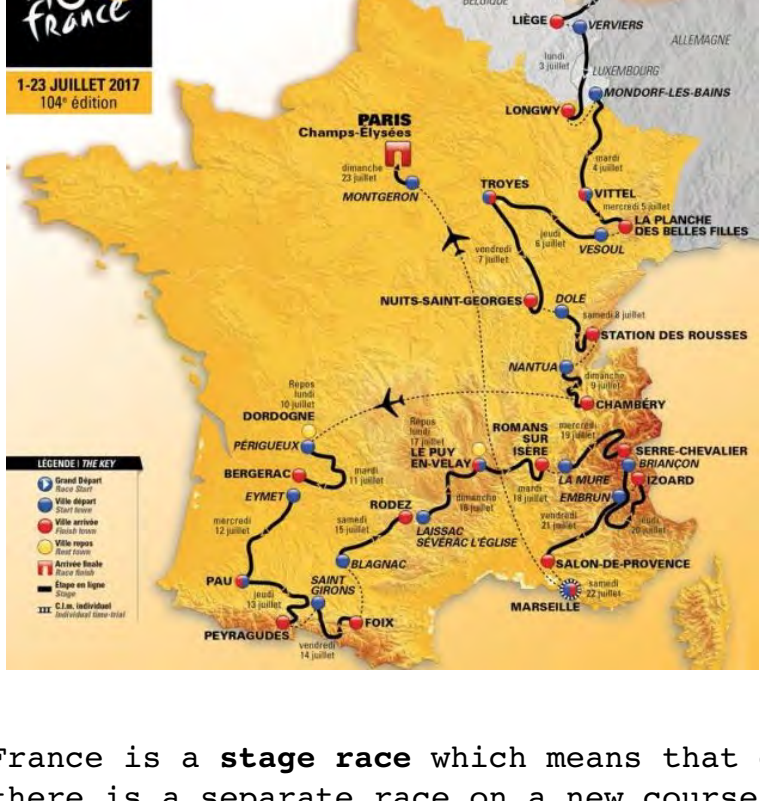
Recharging the battery is done by eating food and resting.



Riding into the wind drains a racer's battery faster. So a racer always wants to be BEHIND another racer. It's about 40% easier to ride behind someone (depending on who you ask). A racer never wants to be in first place - until he's crossing the finish line.

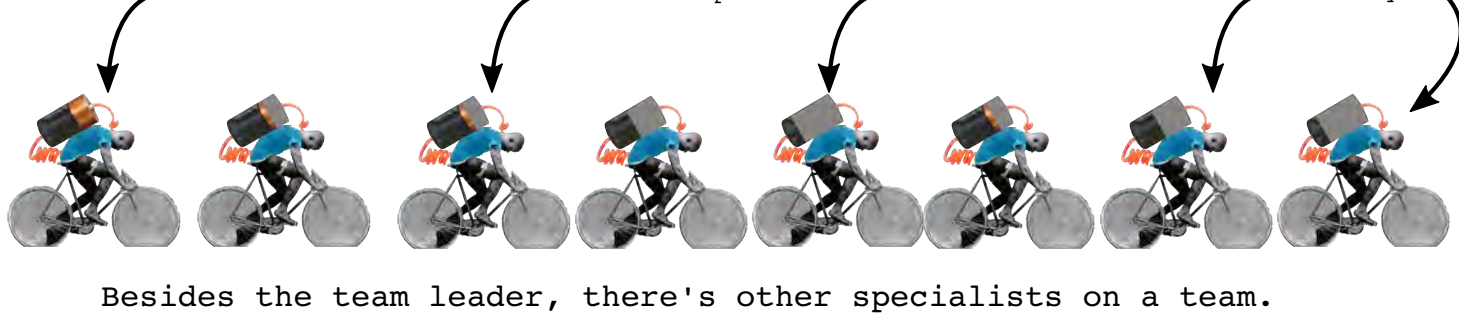
Because a racer never really knows how much energy another rider has, this simple principle of **drafting**, as it is known, creates an amazing array of complex strategy. Kind of like the way the ancient board game Go derives infinite complexity from a few simple rules.

There are many kinds of bicycle races, but drafting is at the heart of (almost) every race. Drafting strategy plays the biggest role in the biggest type of race: Grand Tours - like the Tour de France.



The Tour de France is a **stage race** which means that every day for three weeks there is a separate race on a new course. Winning on any day of the Tour de France is a big deal. After reaching the finish line for the day, the riders rest, eat, and recharge their batteries to begin at a new starting line the next day. The rider who has the shortest **overall** time for all three weeks of racing days combined, is the winner of the Tour de France.

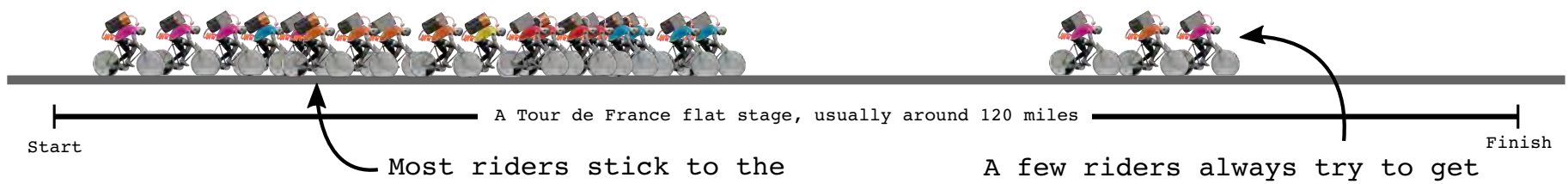
In the Tour de France, every rider is on a team. Every team chooses a **team leader** - the rider with the biggest battery, and the best chance of winning the overall race. Every other rider on the team stays in front of that rider, using their own energy so the team leader can save his for the hardest days of the race. Winning the Tour de France depends on team tactics - even if the team leader gets most of the glory.



Besides the team leader, there's other specialists on a team. There's big **sprinters** who use their heavy load of muscles to burn up lots of energy in the last few hundred feet towards the finish line, and there's lightweight mountain **climbers** who leave the bigger riders struggling up steep slopes. There's other riders who are just there to block the wind and fetch water from the cars that follow behind. They are called **domestiques**.

Most Tour de France stages are either **flat stages** or **mountain stages**. On a flat stage everything is nice and orderly...

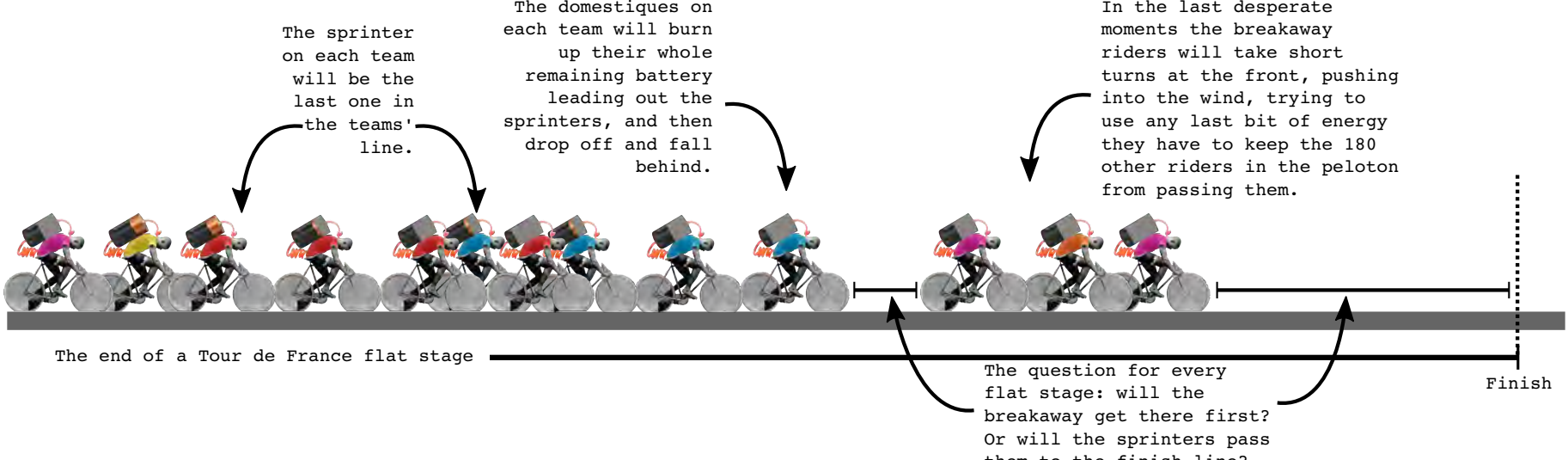
The rider who currently has the shortest time overall, wears a yellow jersey for the day, no matter what team he is on.



Most riders stick to the **peloton**, a big group of all the teams in the race, trying to hide from the wind. The teams in the peloton with strong sprinters will move to the front of the pack, and accelerate the peloton with the goal of passing the breakaway just before the finish line. Sprinters are faster than all other riders over very short distances. They usually have to be within sight of the finish line before they come out from behind their domestiques.

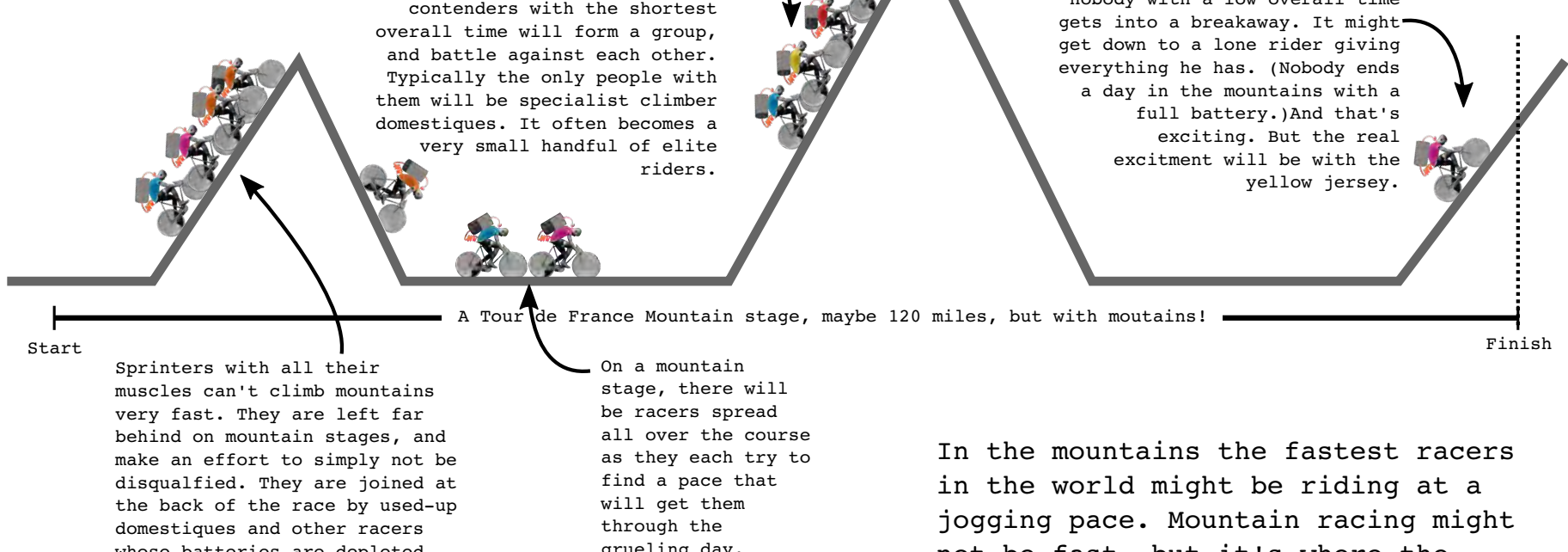
A few riders always try to get into the **breakaway**, a small group of riders, usually from different teams, working together to try to hold off the peloton. One special characteristic of bicycle racing is that your enemy today might be your partner tomorrow. Breakaways rarely make it to the finish line - but sometimes they do. They are the one chance for someone who isn't a sprinter or a climber to win a stage. Always root for the breakaway.

In the last quarter mile of a flat stage, things get intense...



Sometimes the sprinter's teams don't time the catch of the breakaway correctly. Then, if they are strategic and cooperative, the breakaway has a chance to reach the finish line before the peloton comes charging down on them. In most cases it ends in heartbreak for the breakaway, and turns into a **bunch sprint**. The domestiques of each of the sprinter's teams peel off one-by-one as they use up their battery until all that's left are sprinters racing in at over 40 mph. The run-up to the finish line on a flat stage in the Tour de France is one of the most tense moments in all of sports.

And on mountain stages, all hell breaks loose...



The Tour de France is won in the mountains. On a vicious mountain stage, all the contenders with the shortest overall time will form a group, and battle against each other. Typically the only people with them will be specialist climber domestiques. It often becomes a very small handful of elite riders.

In the mountains, there might be a breakaway too. But teams watch carefully to make sure nobody with a low overall time gets into a breakaway. It might get down to a lone rider giving everything he has. (Nobody ends a day in the mountains with a full battery.) And that's exciting. But the real excitement will be with the yellow jersey.

Sprinters with all their muscles can't climb mountains very fast. They are left far behind on mountain stages, and make an effort to simply not be disqualified. They are joined at the back of the race by used-up domestiques and other racers whose batteries are depleted.

On a mountain stage, there will be racers spread all over the course as they each try to find a pace that will get them through the grueling day.

In the mountains the fastest racers in the world might be riding at a jogging pace. Mountain racing might not be fast, but it's where the racers with the biggest batteries get to shine.