

# Additional Resources – Reading Comprehension

## Elite Equipment

Read the text on the following pages then answer the questions below.

1. What does the word 'cousins' mean in the context of the first paragraph?

2. Why do you think the author chose to compare the weight of Tour bicycles to a housecat? Is it an effective comparison?

3. Define the word 'aerodynamic'.

4. Choose three words which summarise what top-level riders look for in a bicycle frame.

5. What does the writer mean when they say that 'carbon fibre is king here as well'?

6. List three special design features you might find in a Tour de France bicycle wheel.

7. What is 'jargon'?

**8. What is a derailleur?**

**9. To whom or what do the words 'whole Tour' refer to at the end of the first paragraph about the groupset?**

**10. Of the three parts of a bicycle discussed in the text, which two have the most similarities when it comes to the special features developed for Tour de France bikes? Explain your answer.**

**11. Summarise why a Tour de France bike is more expensive than a 'normal' bicycle.**

# Additional Resources – Guided Reading

## Elite Equipment

Just as the racing cars in motorsport are the most finely tuned versions of the vehicles we drive every day, so too are the bicycles ridden in the Tour de France cutting-edge cousins of the bikes you might have at home. While on the surface they might look similar, with their pedals, chains, brakes and wheels, the top-level bikes used in the Tour are precisely designed and engineered to produce the best possible performances when it is time to race.

Perhaps the simplest difference to understand is the price. A Tour bicycle can cost anywhere between eight and twelve thousand pounds. The high-tech materials and production methods, as well as the costs of research and development, drive up the price of each part of the bicycle. Put all of these things together, and you have to spend *a lot* of extra money!

Then, there's the weight. The UCI (Union Cycliste Internationale) which runs the Tour de France has set a limit on just how light a competition bicycle can be. Modern technology has made bikes lighter and lighter, but a Tour bike cannot be lighter than 6.8kg. However, that is still *extremely* light! Have you ever picked up a pet cat? If you consider that a normal, healthy housecat weighs four to five kilograms, just under seven kilograms for a *whole bicycle* is very impressive!

So, in what ways are the parts of a Tour de France bicycle special? What are they made from? What makes them so expensive? Read on to find out about some specific features of the world's best bikes!

### The Frame

The frame is perhaps the most crucial part of a bike. It gives the bike its shape, its rigidity and its strength. Every other part of the bike is attached in some way to the frame and as the largest part of any racing bike, huge amounts of research have been done to make frames as light and strong as possible.

Modern racing bike frames are made from carbon fibre. Carbon fibre is a very expensive material made by weaving strands (or fibres) of carbon together and bonding them with special resin. It is very strong and stiff but is incredibly light. This makes it perfect for bicycle designers, who are looking for exactly those qualities in a material for racing bike frames.

Racing bike frames are also slightly different in their shape to the frames of everyday bikes you might have seen. Designers use wind tunnels and sophisticated computer programmes to work out how to make their frames as aerodynamic as possible. The more aerodynamic a bicycle is, the easier it 'cuts' through the air, enabling riders to go faster with less effort. As you can imagine, spending hours inside special laboratories and wind tunnels is not cheap!

## The Wheels

Just like frame designers, wheel designers seek to create wheels which are strong, light and highly aerodynamic. As a result, carbon fibre is king here as well. Wheel rims are often much 'deeper' (they stretch closer to the centre of the wheel) than those found on 'normal' bikes, and are carefully shaped to ensure they generate as little air resistance as possible. Sometimes, wheels are asymmetrical (not symmetrical), or different shaped rims are used at the front and back of a bike. Different teams experiment with multiple wheel options to try and find the fastest set-up.

## The Groupset

The word 'groupset' is simply bicycle riders' jargon for 'any part of the bike to do with pedalling, gears and brakes'. As with all the other parts we have looked at already, these elements of racing bikes are more finely tuned versions of the gears, brakes and pedals found on bicycles all over the world. For example, most 'normal' bikes use mechanical parts to change gears. A 'normal' rider pushes a lever or twists a handle, pulling a cable and moving the derailleur (the little 'arm' holding the chain away from the gear cogs) and chain into a new position. On top-level racing bikes, this process is done electronically. Buttons on the handlebars send signals through wires (or sometimes wirelessly) to the gear systems to change up or down a cog. Many professional riders sing the praises of electronic systems, claiming that they make gear shifts smoother, easier in all circumstances and more predictable on different road surfaces. A few riders still use mechanical systems, perhaps because they fear the failure of new technology. However, electronic systems are now always weatherproof, so soon it may be that the whole Tour is using them.

Of course, there are many other features of elite-level cycling equipment which have not been covered in these brief paragraphs. The internet is full of product descriptions, explanatory diagrams and reviews of the incredible machines of the Tour de France. Perhaps one day you might be a rider or a mechanic on the Tour? We will have to wait and see what amazing new technology the riders of tomorrow will use!