Carbon fibre car of the future

The use of fuel in cars produces a significant amount of carbon dioxide, a greenhouse gas that traps heat in the atmosphere and has been implicated in global climate change. Cars that are designed to be more efficient—able to travel farther per unit of fuel—could help to reduce greenhouse emissions. For example, if cars were lighter, the efficiency of the cars could be greatly increased. As technologies improve, the future holds promise for building lighter cars using a material known as a carbon fiber composite.

Composite materials are made from two or more component materials: a "matrix" material surrounds a "reinforcement" material to form a new material with special properties. In the case of carbon fiber composites (often referred to simply as carbon fiber), a matrix material of resin (a substance that hardens with treatment) surrounds threads of carbon to produce a material that is incredibly strong and light. Because of its high ratio of strength to weight—carbon fiber is just as strong, or stronger, than steel at about one-fifth the weight—carbon fiber is used in a variety of products including tennis rackets, bicycles, airplanes, boats, and race cars.

There are a number of ways to produce filaments of carbon; however, the current raw materials and methods used to synthesize the fibers are costly. As a result, carbon fiber is expensive, about $8–10 per pound; comparatively, steel costs less than $1 per pound. In addition, the process of fashioning carbon fibers into a product is relatively complicated and difficult to mass-produce. Consequently, products made from carbon fiber composites are more expensive than similar products made from more traditional materials. The cost of building a car from carbon fiber composites is still too high to be practical, but researchers are investigating new methods to produce carbon fibers in the hopes of reducing the cost of the material. Researchers are also developing new techniques for molding parts out of carbon fibers so that they can be mass-produced at an affordable price.

The development of new manufacturing processes is not the only challenge; the recycling of carbon fiber is a more complex process than that of recycling steel. Carbon fiber composites are recycled by breaking them down and reclaiming the shortened fibers; new carbon fiber composites made from recycled carbon fiber are generally less strong than the original material, but they are still useful for many applications.

**Watch the** [**video**](https://www.pbslearningmedia.org/resource/oer08.sci.engin.design.futurecar/carbon-fiber-car-of-the-future/support-materials/) about carbon fibre cars and answer the questions. Use Word Reference online [dictionary](https://www.wordreference.com/engr/) for any unknown words.

**Discussion Questions**

* What are the environmental effects of so many cars on the roads, as seen in the beginning of the video? Brainstorm ways to address some of these issues.
* Describe carbon fiber. What are the pros and cons of using it to make cars?
* What environmental impact would this technology have on our lives if it were available today? How would the production of this prototype impact car manufacturing? What other options are presently available to reduce the problems presented in the video?

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Now do this matching exercise to practise some of the vocabulary presented on the video.

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| 1. bumper 2. consume 3. accelerate 4. efficiency 5. resistance 6. replace 7. conventional 8. reinforced 9. streamlined 10. suspension 11. composite | * 1. opposition   2. elegant, smooth for best possible performance   3. use up   4. combination   5. typical, ordinary, usual   6. increase speed   7. good capability /performance,adequacy   8. supported, strengthened   9. protective part of a car   10. put in something else’s place, exchange   11. the arrangement of springs, shock absorbers in a car |