

MARVELS OF TECHNOLOGY

VEHICLE & TRANSPORT TECH



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Vehicle Tech

At its most basic, technology is simple. It's the application of scientific knowledge to create products that solve problems and make our lives easier. But what technology can do is pretty amazing.

Meeting Our Needs

New technologies are developed to meet our ever-evolving needs. For example, seat belts alone are not always an effective enough defense against high speed vehicle collisions. Inflatable air bags were developed to be used along with seat belts for extra protection. They deploy instantly during a crash and cushion the passengers' upper bodies and heads from potentially harmful impacts.



Most airbags can deploy in only 20 to 30 milliseconds. That's faster than the blink of an eye!

Solving Problems

Technology can change as our needs change. We want to get places fast. Passenger trains can travel more than 100 miles per hour (160 kph). But speed is not always safe. Trains have derailed going too fast around tight curves. So, engineers have developed new onboard computer systems that monitor speed for both efficiency and safety. These systems can automatically turn on the brakes if trains are moving too fast.



The advancement of technology allows engineers and designers to create vehicles that have never been seen before.

Designing Tomorrow's Vehicles

Every day, designers are working to innovate the performance of cars, buses, trucks, trains, ships, planes, and spacecraft. They are trying to improve the way our current vehicles function and solve the problems they have. Designers are working hard to develop vehicles that not only function well and are reliable, but also are comfortable, safe, and stylish.

Bicycles

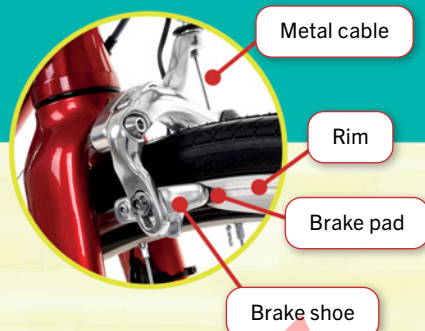
A bicycle uses pedals to drive a chain, which moves wheels and propels the bike forward. Gears change the distance the bicycle moves with each pedal stroke. They enable the rider to maintain a comfortable pedaling speed, whether cycling uphill, downhill, or on a level surface.

Gears

Gears are a set of toothed wheels that hold the bike's chain. They are attached to the axle of the bike's rear wheel. The largest gear is farthest from the frame and needs the least pedaling force to turn. This is often used when riding uphill. The smallest gear needs the most pedaling force to turn it, but it allows the bicycle to travel farther with each rotation. It is useful for riders going downhill.



When a rider changes gear, the chain moves to the selected gear.



Metal cable

Rim

Brake pad

Brake shoe

Brakes

Thin metal cables run from the brake levers on the handlebars to the front and back wheels. When the rider squeezes the levers, the cables pull on the brake shoes, forcing the brake pads to press against the rims of the wheels. This friction slows the bicycle down.



INVENTION

Inventor: John Kemp Starley

Invention: Rover Safety Bicycle

Date: 1885

The story: British inventor John Kemp Starley developed the modern design for a bicycle. It had equal-sized wheels, a chain to turn the rear wheel, and a steerable front wheel. His bicycle was more stable than previous designs.



The gear shifters are the controls that change the gears. They are attached to the derailleurs by gear cables.

Brake lever

Handlebars

Most bicycles have a diamond frame created with two triangles of hollow tube. The strong triangle shape positions the rider's weight between the back and front wheels.

Frame

Saddle

The back derailleur changes the gear by moving the bottom of the chain from side to side. It contains a spring to keep a constant tension on the chain.

Pedal

The front derailleur shifts the chain between the front gears.

Chain

Gears

Wheel

Electric Bikes

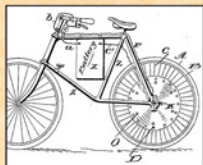
Riding a bike can be a lot of fun . . . until you come across a steep hill. But in recent years, electric bikes, or e-bikes, have made going uphill a breeze. These bikes have electric motors that boost propulsion, reaching speeds of almost 30 mph (48 kph)—with very little effort from the rider.

There are two kinds of e-bikes: pedal-assist and power-on-demand. With pedal-assist, the electric motor helps move the bike forward only while the rider is pedaling.

Meanwhile, the motor on a power-on-demand bike is activated by a handlebar throttle similar to one found on a moped. The throttle powers the bike forward even when the rider is not pedaling. Some e-bikes have both pedal-assist and power-on-demand throttles.



E-bike motors are powered by rechargeable batteries. Most are charged by being plugged into an outlet, but some get small amounts of energy every time the rider uses the brakes. Depending on the type of bike, terrain, speed, and battery size, most e-bikes can travel 20–30 miles (32–48 km) on a single charge. Some bigger batteries can power an e-bike for 100 miles (160 km).



INVENTION

Inventor: Ogden Bolton Jr.

Invention: Battery-powered bicycle

Date: 1895

The story: Ogden Bolton Jr. installed a motor on the rear wheel hub of a bike. The motor was powered by a 10-volt battery. This design earned him the very first patent for a battery-powered bicycle.