

Cars of the future



What is your most favourite car in the world?

Give a description of your first car

What are the next big features for cars in the next ten years?

Hybrid Cars – Will people jump on the hybrid bus?

Match the following words on the left to the most realistic measurement on the right

Wheelbase	1.62m
Engine Power	3.5L / 100km
Battery Capacity	2.35m
Width	120 km/h
Maximum GVW (Gross Vehicle Weight)	4 people
Driver Motor Power	50 kWt.
Maxium Speed	30 kWt.
Mileage	20 kWt
Seating Capacity	700kg

Now study the diagram on page 2 and check your answers.

What comments can you make about the AvtoVAZ?

Russia's first hybrid car

Cars are due to be manufactured by Togliatti-based automotive giant AvtoVAZ in 2012

Specifications

Wheelbase:	2.35 m
Width:	1.62 m
Maximum GVW:	700 kg
Engine power:	30 kWt
Battery capacity:	20 kWt
Drive motor power, including regeneration effect:	about 50 kWt
Maximum speed:	120 km/h
Maximum range:	400 km
Mileage:	3.5 l/100 km
Seating capacity:	4 people, including driver

Electronic control system

The car ignition key is an electronic device combining a mobile cellular phone, a GPS navigator and a multimedia system

- Car was developed by a Russian auto company, Yarovit-Motors, and unveiled by ONEXIM group CEO Mikhail Prokhorov
- Production investment is to total 150 million euros
- There are plans to manufacture 10,000 hybrid cars

How does a Hybrid car work?

Write your ideas under the following headings:

How does it work:

The electric drive system:

Unique advantages:

How Do Hybrid Car Engines Work?

The hybrid design combines a high-efficiency gas motor with an electric motor on the same drivetrain. Independently, electric drive and gasoline drive vehicles have a range of advantages and disadvantages. By combining both of these in one package, a hybrid vehicle is able to garner the benefits of each option. The gasoline motor is just as functional as in a normal vehicle and runs like the engine in any comparable conventional car. Hybrid cars are often able to use motors with a smaller displacement than a conventional car, because of the addition of the electric drive system. The electric motor can function as a “helper” to the gas motor; when the vehicle needs extra power the electric motor activates and helps drive the car.

The Electric Drive System

A gasoline car actually wastes a good deal of energy when operating under normal conditions. What the hybrid system does is harvest the power that is usually lost and store it in the form of electricity. The batteries in a hybrid act like an extra gas tank that is able to fill and refill itself while the car is operating. Every car generates electricity to work, but most of that energy is wasted. The hybrid car stores that energy to be used later. The hybrid’s electric motor not only assists the gas motor with acceleration and power, but it is able to function independently as well. That means that when the vehicle is operating under conditions where the electric motor can drive the vehicle on its own, the gas engine shuts down and the car relies solely on electric power. Every second that the car’s gas motor doesn’t have to run is a second that the car doesn’t have to use gasoline.

Unique Advantages

There are quite a few benefits to using a hybrid drive system. A hybrid car is able to use electric power to operate which is much more efficient. However, it can also use gas power when necessary. One of the biggest downsides of an all-electric vehicle has to do with range; since the batteries act as the car’s “gas tank” once the power in the batteries has discharged, the car can’t be driven until they have been refilled. The recharging process can take hours, and that’s inconvenient for long trips.

The hybrid can operate on gas alone, which means the car has two “gas tanks,” the batteries that power the electric drive system, and the conventional gas that fuels the gasoline engine. Hybrids are also able to save power other ways by using systems like regenerative braking. This is one of the reasons that hybrids are able to achieve such excellent gas mileage in city driving conditions. Regenerative braking systems harvest the energy that it takes to stop the car once it is moving. In a normal car all this energy is wasted as heat, but in a hybrid it is stored in the battery as power for the electric drive system.

adapted from HowStuffWorks.com

What are some of the problems that can occur with Hybrids? Think:

Electronics

Design

Efficiency

Video: Google Cleared to Operate Driverless Vehicles

Watch the video about Google's version of the driverless car? Make notes about the advantages and disadvantages of such a system

<https://www.youtube.com/watch?v=cdgQpa1pUUE>

Advantages:

Disadvantages:

The driverless car uses the latest technology to calculate an accurate position on the road and what's around it. Imagine you were the designer of the car, where would you put the following devices to optimise the technology and safety on the car below? Can you think of any additional features the devices might need?

1. Sensors which can generate a precise 3D map of the car's surroundings
2. A camera which can detect outside movement and traffic lights.
3. A sensor that locates the position of the car on the map
4. A sensor that detects the distance of various outside objects



Now compare your ideas to the actual design in the diagram on the next page

Google's design

Autonomous Driving

Google's modified Toyota Prius uses an array of sensors to navigate public roads without a human driver. Other components, not shown, include a GPS receiver and an inertial motion sensor.

LIDAR

A rotating sensor on the roof scans more than 200 feet in all directions to generate a precise three-dimensional map of the car's surroundings.

POSITION ESTIMATOR

A sensor mounted on the left rear wheel measures small movements made by the car and helps to accurately locate its position on the map.

VIDEO CAMERA

A camera mounted near the rear-view mirror detects traffic lights and helps the car's onboard computers recognize moving obstacles like pedestrians and bicyclists.



RADAR

Four standard automotive radar sensors, three in front and one in the rear, help determine the positions of distant objects.

How does your design compare to Google's design?

Can you find any flaws in Google's design?