The Future of the Car

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THE CONTEXT

In 1800, people in the US traveled 50 meters a day; they now travel 50 kilometers a day. It is estimated that over 600 million passenger cars travel the streets and roads of the world today. More than 50 million passenger cars are produced every year. The number of cars in China will increase from the 21 million recorded in 2005 to an estimated 573 million in 2050.

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The Future of the Car

We are concerned by the future of our planet. We want to minimize risks of injury to ourselves and others, limit the unnecessary consumption of resources and reduce waste and pollution. We also wish for more mobility not less. New automobiles are being produced – smart city cars – that make use of new technologies to provide more information and assistance to the driver, they are also built in a different way – new architecture – and are motorized differently, with electricity. This car is no longer a car of the future but one of the tools to make the future more sustainable.

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Key concepts
The car is the symbol of personal mobility and freedom:

1 A significant part of our lives revolves around the time we spend in our cars. In the US an average of 15 hours per week is spent in car, representing nearly 14% of waking hours. (The Arbitron National In-Car study)

2 The car's impact can be measured in terms of personal mobility but also in terms of noise, pollution, traffic jams, road accidents, excessive urban sprawl, etc.

3 The relationship between the car and the city will have to change.

4 The car of the future will be much more than a transportation device.

In depth

The automobile is the symbol of personal freedom. With a car, one can move wherever and whenever he or she wants. Our landscapes have been shaped by the use of cars; the city has evolved and changed to adapt itself to a growing number of vehicles.

Motorized vehicles in cities will increase by a factor of four by 2050[1]. In addition, economic development will enable a rapid growth in the number of families that can afford a private car or motorcycle.

Cities have grown out of control and one needs to travel a long way to go to work or simply to go shopping. Living together as a community turns out being very difficult in today's cities. Noise, pollution, traffic jams, excessive fuel consumption, and road accidents make life more difficult for hundreds of millions of citizens worldwide.

But this evolution is likely to have reached a new limit. Our mobility in a safe and clean environment is at the core of the public debate all over the world. We want people everywhere to be, at the same time, more mobile and more responsible for their own life, the life of others and their surrounding environment.

Can we improve automobile efficiency and safety? In the last decades, a lot of technological improvements were made to create more fuel efficient and safer cars. Innovations are continuous but this is not enough.

Can we ban cars from our lives? Are we ready to live a in a world with no cars? While people are claiming everywhere for more mobility, the demand for cars is increasing especially in the emerging world. We have to change the relationship of the car and of the city.

[1] World Bank statistics

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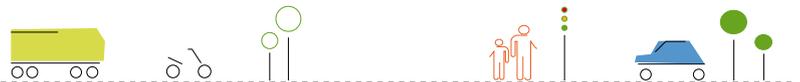
Cities have already turned to mass transit as a way to reduce congestion and traffic. What we call "sustainable mobility" includes not only public transport but also intelligent traffic management and congestion avoidance, information and communication, freight distribution, walking and cycling. (See key unit 5)

Car manufacturers and drivers are also part of the solution. They should aim to minimize risks of accidents to themselves and others, be aware of their impact on the environment, and minimize the consumption of resources.

What type of cars will car drivers need in the future? The objective seems like a dream: develop accident-proof "ecocars" with non-polluting engines that can clean the air around them and run on open roads that are free of congestion.

The future of cars is linked to a new conception of "smart cars", i.e. intelligent transportation devices that assist, advise and protect the drivers thanks to new communication interfaces, new propulsion systems and new vehicle architectures.

■ Energy efficient cars: Harmful greenhouse gas emissions can be significantly reduced with alternative fuel engines. The large deployment of alternative fuel vehicles, from road public transport and municipal fleets to private passenger vehicles (electric vehicles, hydrogen and fuel cells, low consumption vehicles, natural gas vehicles, biofuels, etc.) is already planned in many cities around the world.

■ Lighter and recycled cars: Steel is no longer an efficient material from which to produce cars. The objective is reducing weight without reducing safety. Cars should also be part of a recyclable system. The European Union, for instance, proposes recycling 85% of vehicle components and converting 5% into energy.

■ Smaller cars: Car occupancy – especially in the emerging countries – is under 2 people per car. It is common to see drivers alone in their car. Thus one of the proposed changes is to shift towards smaller micro-cars rather than 4-person family-sized cars.

■ Shared cars: As cities in Europe, North America and Asia face increasing residential parking problems and associated congestion, car-sharing schemes are developed. Car sharing offers the flexibility of a car without the need to own one and is a natural complement to public transit.

■ Smarter cars: Collision avoidance systems, human-machine driver interface for more secure driving, etc. The intelligent car will be connected in real time to events and changes in its environment.
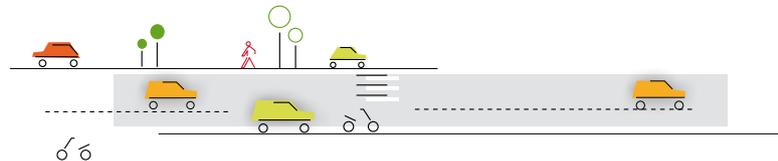
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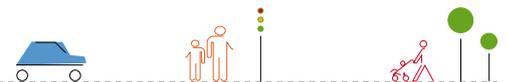
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Is there any limit to technology?

■ **Objectives**
To recognize the need for technological changes in the automobile industry that will have a direct influence on the environment and our safety in mobility.

■ **Materials**
Pens, paper, projector, computer, internet

Steps
Someday, our cars will all be connected to each other, sharing traffic information, and swapping position info so that collisions can be avoided. But even if new cars came equipped with such networking tools tomorrow, it would be decades before every car on the road was wired into the system.

So MIT researchers are taking a different tack, modeling human driving behavior to create algorithms that can help computerized cars predict what human drivers are going to do next.

Driverless cars are part of the innovation (DARPA grand challenge)

Students watch the video on "smart cars" and discuss the advantages and disadvantages of having such cars in our cities.

http://news.bbc.co.uk/2/hi/programmes/click_online/8118874.stm

Robots and cars for the future

By Ian Hardy
Reporter, Click

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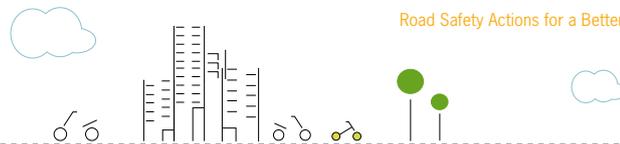
The Solar Challenge

The Solar Challenge is a race across Australia, from Darwin to Adelaide (3000km), in cars that only take their energy from the sun. This journey should take around 50 hours to complete which means that competitors must stop and sleep where they can once the sun goes down, which can mean in the middle of the outback. People, who have constructed cars free of carbon emissions, participate in the race from all over the world.

Following the initial discussion the students then discuss in groups other technological advances that cars need to have in order to provide safer streets and cities. They should write down their ideas and draw up a basic design for future "smart cars".

In addition, this can be linked to the Ellen MacArthur redesign project where students have to design a car using the theories behind the idea of circular economy.

http://www.ellenmacarthurfoundation. org/education/project-re- design?title=Project+ReDesign

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■ **Objectives**
Educating others on the benefit of car-sharing.

■ **Materials**
Pens, A2 paper, crayons, paints, projector, computer, internet

■ **Steps**
Students design an awareness campaign for educating people on the advantages of car sharing. The campaign will be in the form of a poster which the student can design using any type of materials from digital formats to be published on line or an A2 size paper designed with paints or crayons.

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■ Brief

The car has gradually become the main mode of transport in developed countries for the movement of people and goods. It revolutionized transport and led to profound social changes, particularly in the relationship of individuals to space. A flashback is needed to understand the history of the automobile, its milestones, its uses, and the changes they have made to our lifestyles.

■ Objective

To understand the evolution of the automobile, its use and its representations in recent decades.

■ Materials

Internet, pen and paper

■ Steps

Students will conduct individual research - particularly on the Internet - on the main stages in the history of the automobile and how it has shaped our contemporary society.

They should focus their research around these three key questions:

1. Why has civilization become dependent on the car?

2. How did the car change our societies and our lifestyles?

3. What are the implications of these changes?

They should all produce a timeline of photographs that will see major changes in the car and its uses over time. Once they have gathered their research information together they should present their findings to the rest of the class, who should be prepared to ask any questions about the research.
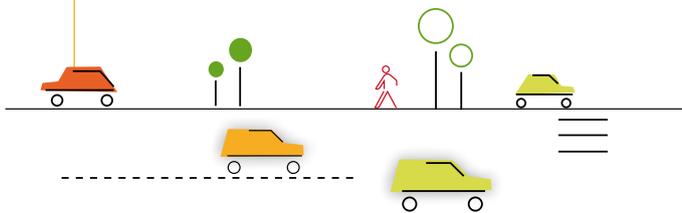
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■ **Brief**
Given current developments in car technology, what will the car look like on the streets tomorrow? And what purpose will it have?

■ **Objective**
Imagine a car that will meet the new challenges of urban travel.

■ **Materials**
Drawing paper and felt pens.
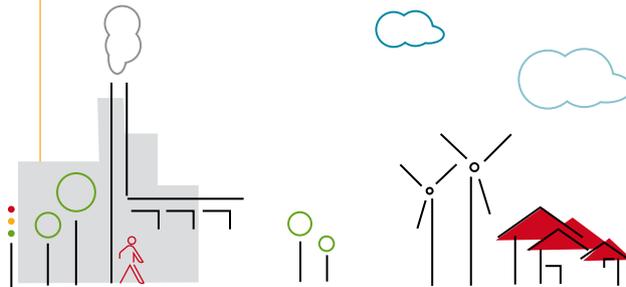
■ **Steps**
Students begin by summarizing the challenges that will arise in future urban spaces (CO_2 emissions, availability of fuels, parking) to assess what might be the place of the car and draw up a list of 10 essential features and innovations (e.g., non-fossil fuel energy, internet, etc.). Each student will reinvent the automobile by drawing his own car from these ideal specifications, common uses and features, explaining in a small fact sheet the technical specifications of the vehicle. The designs will be compared in class and one prototype will be developed by merging the common traits most commonly found on cars designed by students.

All designs should be displayed on the school grounds, once they have been finished.

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New designs for cars

The Massachusetts Institute of Technology - MIT - is a breeding ground for boffins - the next generation of gadget creators. They are also working to re-design cars:

- **http://news.bbc.co.uk/2/hi/programmes/click_online/8118874.stm**

To design and build a car capable of crossing Australia on the silent power of nature brings together the most innovative research and development trends in alternative transport technologies.

The World Solar Challenge is one the most prestigious events of its kind and attracts the world's best Technical Universities and Colleges.

- **http://www.worldsolarchallenge.org/**

Renault eco²

Renault launched the Renault eco² signature in May 2007 to identify its most efficient and economical vehicles. The signature reflects Renault's aim to inform customers of the environmental progress it has made across the vehicle life cycle in the last 10 years.

Renault eco² vehicles fulfill three ecological criteria in Production, CO_2 emissions and Recycling. Taking action for the environment means looking ahead. Renault will apply stricter conditions to its eco² label to keep pace with the major progress made by future generations of vehicles.

- **http://www.renault.co.uk/cars/environment/**

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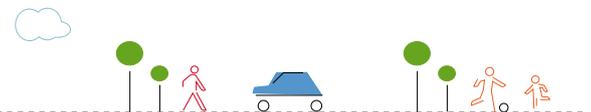
Sustainable mobility

A genuine resource centre for sustainable mobility, this website is dedicated to actions aiming to reconcile means of transport, economic progress and sustainable development.

Renault conceived this platform in order to offer web users a comprehensive panorama of all thoughts and initiatives concerning sustainable mobility around the world.

In order to apprehend this global challenge, sustainable-mobility.org will keep you informed through various means and will offer the best of articles published on the web, expert testimonies, reference documents, and an interactive map showing initiatives taking place all over the world.

- **http://www.sustainable-mobility.org/**

Eco-mobility

Eco-Mobility.tv is a social media WebTV portal launched by Alternative Channel, in collaboration with Renault Eco², to promote green mobility solutions. We often look to the future to see what new technologies will offer our planet, but our primary focus is sustainable mobility that is practical and accessible to all. Organizations, associations, businesses and private citizens all come together on this site to discuss, share, and promote green alternatives.

About one third of all CO_2 emissions on the planet are caused by transportation. Knowing about the various ways we all commute and understanding the implications our decisions have on the environment is the first step to promoting a healthy world. That is why Alternative Channel and Renault Eco² created a site devoted entirely to issues concerning mobility. We believe that if the right ideas are shared, positive things happen.

- **http://ecomobilite.tv/**

Education for Sustainable development

The site Education for Sustainable Development.com is an education al resource for people actively working with the development and implementation of ESD in schools and other educational institutions – and related educational research. ESD is also relevant for general school development and for linking schools with their local communities.

Education for Sustainable Development

- **http://educationforsustainabledevelopment.com**

Environment and School Initiatives network

- **http://www.ensi.org**

Environmental Education net

- **http://www.environmental-education.net**

A Quality Criteria for ESD-Schools.

- **http://seed.schule.at/uploads/QC_eng_2web.pdf**

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