

Teacher's guide

Catalytic convertor

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This module is suitable for the secondary school students. It aims at motivating students about chemistry. This module also aims to raise students awareness that chemistry helps in solving some environmental problems: one of which is air pollution by gases released from car exhausts. It is important that students know some chemical reactions, and some element symbols, and differentiate solid, liquid, gases.

The burning of oil in car engines produces some toxic gasses such as carbon monoxide and nitrogen oxides and unburned hydrocarbons. In this module, I have explained the catalytic convertor and how it works to reduce the gas pollutants produced by cars.

My suggestions for the break in between the segments are:

Break one: introduce air pollutants sources including:

Particulate pollutants: smoke, car exhausts gases, dust, pollen grains, cement, sand, pesticides.

Gases or toxic and suffocating vapors including chlorine, carbon monoxide, nitrogen oxides, sulfur dioxide, ozone.

Bacteria, germs, mold produced by decomposing plants and animals and some human waste.

Natural and artificial radiations.

You can discuss their impacts on human life, and diseases in the respiratory system as well as its impact on plants and animals.

Break two:

In the second part we have to discuss the formation of oil, which underground and under water and oceans, we will discuss one of the theories that explain the origin of oil and discuss it with the students. Components of living organisms must also be discussed.

Break three

Oil is made of organic matter that is produced from converting the living things into hydrocarbons that contains carbon and hydrogen, as well as other elements such as sulfur and nitrogen in a form of organic compounds. Where ever oil is found some sulfur is also found. Definitely some sulfur is produced from decaying of living things that forms oil, because these things are made of compounds containing sulfur such as amino acids.

Break four

In this break, students will discuss how to get rid of gases released form the car exhausts, such as improving burning conditions in car engine.

Collected the gases in a box or converting into other elements, this will be discussed in this module

Break five:

The substances used in the catalytic convertor are expensive metals such as platinum, palladium; some other metals can be used such as gold and silver. Or we can increase the effectiveness of some elements to be adequate for this purpose.

Break six

Homework

There are many solutions for car exhaust gases; we have talked about one of them in this module. Students may have a research after completion of the modules for other solutions such as

These could be:

- Use other kinds of fuel such as natural gas, ethanol, of a mixture of ethanol and gasoline;
- Use cars that operate by solar energy;
- Use hybrid cars.