$2H_20+2e = H_21+CLC$ P=PoP/RT H3 - HC (0-CH) 0+2ē $m + O_2 + 2H_2O + 4e + 4OH + 5m2$ $2H_2O$ $Cu^2 - z^2 + Cu$ HN 02+2th0+4e >40 $m CH_3 - O - CH_3$ ze Cu2- a+ Cup, U, - P2 U2 H-C X+Cu C2H, NO, + H2O2H. M/BTi $0 + 2\hat{e} = H_2 O H$ H20+ Ag CH2-0-CH2 C 0ft OH2 $Ti = 22i \frac{P_1}{P_2} = \frac{V_2}{V_1}$





Approximately 7.8 billion people live on planet Earth (data projected for 2021).



Atmospheric pollution is produced in order to supply 7.8 billion people with energy.





 What mass of carbon dioxide gas is released into the Earth's atmosphere every time you search for something on GOOGLE?



Atmospheric pollution is produced in order to supply 7.8 billion people with consumer products.



Atmospheric pollution is produced in as 7.8 billion people travel around.



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- Atmospheric pollution in China kills
 4000 people each day.
- Air quality in Beijing is equivalent to smoking 1.5 cigarettes per hour.
 - Exposure to Beijing's air for one hour reduces an individual's life expectancy by 20 minutes.





• The release of greenhouse gases, such as carbon dioxide (produced by the combustion of fuels that contain carbon) and methane (produced by the decomposition of organic compounds), are causing a gradual increase in the Earth's temperature – often referred to as global warming.



Consequences of global warming include:

- A gradual change in global weather conditions.
 - → Extinction of certain species of plants and animals.

→ Melting of polar ice caps, flooding low lying areas of land.



Some regions of the world experience drought.





Other regions of the world experience flooding.





• Chlorofluorocarbons (CFCs) released into the Earth's atmosphere cause destruction of the *ozone layer*.

 The chlorofluorocarbons originate from air conditioning units, refrigerators and aerosol propellants.



 The ozone layer is very important because it absorbs *ultraviolet* radiation from the sun, thus reducing the amount of ultraviolet radiation that reaches the Earth's surface.

 Exposure to high levels of ultraviolet radiation can cause sunburn, cataracts and skin cancer.





 The combustion of fossil fuels, such as coal and oil, releases sulfur dioxide gas into the Earth's atmosphere.

 When sulfur dioxide dissolves in rainwater, it makes the rainwater acidic.

• This reduces the pH of lakes, rivers and soil, killing marine life and plants.



Oil spillages cause sever harm to marine life and sea birds.



Non-biodegradable plastics litter the Earth's seas and oceans.





 In 1960, 5% of sea birds had ingested plastic and had plastic in their digestive tracts.

 In 2015, 90% of sea birds had ingested plastic and had plastic in their digestive tracts.



 Animals ingest and become entangled in the plastics.

 Burning the plastics can release toxic gases, such as hydrogen cyanide, into the atmosphere.





Environmental Science
 Only 2.5% of the water on Earth is fresh water.

 Of this, 1.5% is present in the polar ice-caps, meaning that only 1% of the water on Earth is drinkable.

 The Earth's drinking water is in danger of becoming polluted.



<u><u><u></u></u></u>

Industrial accidents can pollute the air, land and waterways around factories. The land may be contaminated for many years, even decades.



 April 1986 – a catastrophic accident at the Chernobyl nuclear power plant in Russia released a massive amount of *radioactive material* into the Earth's atmosphere.





 December 1984 – a major industrial accident at a factory owned by Union Carbide at Bhopal in India released the toxic chemical methyl isocyanate into the environment. An estimated 8000 people were killed within two weeks and another 8000 people have died since then.





August 2015 – two massive explosions at Tianjin in China killed over 150 people and left hundreds more injured.



 Warehouses at the site are believed to have stored at least 40 different types of dangerous chemicals, including 700 tonnes of highly toxic sodium cyanide which have been released into the environment.



 Between 1932 and 1968, a factory owned by Chisso Corporation polluted Minamata Bay in Japan with highly toxic methyl mercury.

 Mercury is a central nervous system toxin. Symptoms of mercury poisoning include paralysis, insanity, coma and death.



 A congenital form of mercury poisoning can also adversely affect development of the foetus in the womb.

 Now known as *Minamata Disease*, the mercury poisoning has claimed 2,265 victims, of whom 1,784 have died.





 Mother Nature also contributes pollutants to the environment, for example, sulfur dioxide (which contributes to acid rain) from volcanic eruptions.



But it doesn't have to be like that.



 Burning biodiesel made from oil seed rape is less environmentally polluting than burning petrol and diesel extracted from crude oil.

 Burning biodiesel made from oil seed rape still releases CO₂(g) into the Earth's atmosphere. However, the plant also removes CO₂(g) from the atmosphere during photosynthesis.





- Refuse
- Reduce
 - Reuse
 - Repair
- Recycle





 Solar cells produce electricity from sunlight, reducing the need to generate electricity by burning coal and oil.





 Hydroelectric dams produce electricity from the flow of water, reducing the need to burn coal and oil.





 Turbines produce electricity from the movement of the wind, reducing the need to burn coal and oil.





• The Toyota Mirai – the world's first commercial hydrogen fuel cell car.

 The fuel cell produces electricity by reacting hydrogen and oxygen together. The only chemical product is water.





Care for the world that you live in (you only have one).

