Atoms and Elements

The nucleus

- Middle of atom
- Contains protons and neutrons
- Protons positively charged
- Neutrons no charge
- Nucleus is positively charged

The electrons

- Move around the nucleus
- Negatively charged
- Occupy shells around the nucleus

No. of protons = No. of electrons

- Atoms have no charge overall
- If some electrons are added or removed the atom becomes charged and is an ion

Elements consist of one type of atom only

- No. of protons decides what type of atom
- Around 100 different elements

Using Limestone

Making things from limestone causes pollution too

- Cement factories make lots of dust which causes breathing problems
- Energy is needed which likely comes from burning fossil fuels which creates pollution

But on the plus side

- Limestone provides materials for houses, roads, dyes, paints, medicines
- Neutralise acidic soils
- Neutralise sulphur dioxide preventing acid rain
- Quarry's provide jobs and bring more money into the local economy which leads to local improvements in transport, roads, facilities etc
- Restoration is required as part of planning permission

Limestone products have advantages and disadvantages

- Limestone is widely available
- Limestone is easy to cut
- Limestone is more hardwearing than marble and still looks nice
- Concrete can be formed to shape in moulds
- Concrete is quick and cheap way of construction
- Limestone and cement don't rot and are fire resistant
- Concrete doesn't corrode but has low tensile strength but is reinforced with steel bars

Warm up Questions

What Is an ore?

an ore is a rock that contains enough metal to make it economically worthwhile extracting

Name a metal extracted by reduction with carbon

copper

Why is electrolysis expensive?

Because it uses a lot of energy

Name the process used to purify copper

electrolysis

Explain how phytomining is used to extract copper

plants are grown in copper rich soils. Plants take up copper and can't use it so it builds up in leaves. Plants are dried and burnt and copper collected from ash.

Using crude oil as a fuel

Provides important fuel for modern life

- Fractions that burn cleanly make good fuels
- Modern transport fuelled by crude oil
- Used in homes and power stations
- Massive industry finding oil reserves
- Crude oil provides raw material for making chemicals and plastics
- There are alternatives to crude oil e.g. nuclear and ethanol and solar
- Cars designed for petrol and diesel
- Crude oil is the easiest and cheapest and most reliable

Crude oil will run out

- Non-renewable fuel
- No one knows exactly when it will run out
- Gone in 25 years in worst case scenario
- Some say we should stop using crude oil for transport and only for essentials like medicine
- New fuels need to be developed
- Could use renewable energy resources like solar, wind and tidal power

Crude oil is not good for the environment

- Oil spills poison sea birds
- Burning fossil fuels releases greenhouse gases and contributes to global warming global dimming and acid rain

Plant Oils

Oils extracted from plants

- Fruits and seeds contain lots of oil. These oils can be extracted for food and fuel
- Plant material is crushed and pressed between two metal plates
- Oil separated from crushed plant material by centrifuge or solvents
- Distillation refines oil and removes water solvents and impurities.

Vegetable oils are used in food

- High energy content
- Nutrients like vitamin E
- Essential fatty acids

Vegetable oils have benefits for cooking

- Higher boiling points cook food quicker
- Different flavour
- Increases energy we get from food

Vegetable oils used to produce fuel

- Processed and turned into fuels as oil contains high energy
- Used to make biodiesel