

KS4 Materials Chemistry Research Project

Materials chemistry involves the use of chemistry for the design and synthesis of materials with interesting or potentially useful characteristics, such as magnetic, optical, structural or catalytic properties.

Many of the things you use every day will have been produced with the help of materials chemists.

This research project allows you to delve into the different areas that have used materials chemists to develop some amazing technology and equipment. The materials could be classed as nanotechnology or just new compounds that have demonstrated different properties.

Task: For each of the areas that use materials chemistry focus on a particular material and address the following bullet points. You should use diagrams and any scientific data in your project.

- **What is the material and how is it different from what was used previously?**
- **How have chemists adapted or developed the material for use in this industry?**
- **How has the material allowed the industry to progress and achieve things that they couldn't have done without it?**
- **Have there been any disadvantages to the development of the material?**
- **Could this area be developed further? Where could this go in the future?**

Areas to research:

Sport

There are loads of ways that materials chemists have developed sports equipment from "shark skin" swimsuits to lightweight golf clubs to high tech racing bikes! I have shared a Powerpoint presentation from Royal Society of Chemistry on Olympic materials as a good starting point to use for this section.

Medicine

From prosthetic limbs to soluble stitches to replacement heart valves to nanobots there is rapidly developing technology in medicine to improve quality of life or prolong life.

Technology

There seems to be a new mobile phone that is released every few months or a new watch?! But what materials do they use to make them thinner, faster, bigger storage, longer battery life, better camerapew I could on!! This is one area where there are lots of plans on how we may be using “phones” in the future.

Transport

With lots of talk around HS2 and linking the north with London it's not just engineers who need to work on the construction, materials chemists will also have an input in the design of the trains.

Cosmetics

The beauty industry spends a phenomenal amount of money on research into new materials that will have “light reflecting technology” or some such claim! Pigments that match a consumer's skin tone or reduces the signs of aging, cosmetic firms will compete to find these “magic” materials first!

Your research project can be word processed or hand written, think about the websites you use – are they reliable? Youtube has some great videos on how different uses of nanotechnology, especially graphene which was being hailed as a game changing material for the technology industry.

This may give some of you inspiration for a future career!