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Thursday 24 May 2012 – Morning

**GCSE TWENTY FIRST CENTURY SCIENCE
CHEMISTRY A**

A323/02 Unit 3: Ideas in Context plus C7 (Higher Tier)

INSERT



Duration: 1 hour

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Do plasticizers make boys more feminine?

Plasticizers are added to polymers such as PVC to alter their properties. They make the PVC softer and more flexible. Several research studies have looked at the safety of one group of plasticizers called phthalates. As a result, the use of phthalates in toys for babies and young children is banned in Europe and the USA, but they are still used in products such as furniture and packaging.

Phthalates in plastics can diffuse out of these products and end up contaminating food, soil and air. Blood and urine tests show that phthalates are present in the bodies of over 90% of people in Europe and the USA. Phthalates break down quickly in the body, but they are so common that low levels are always present in the body.



Phthalates are banned from babies' toys in Europe and the USA.

Boys' play activities

In a recent study, scientists tested urine samples from pregnant women for traces of phthalates. The women gave birth to 74 boys and 71 girls. The women were interviewed when their children were aged between four and seven years old. They were asked about the toys that their children played with and the games they enjoyed. Mothers who had high levels of phthalates in their urine when pregnant reported that their boys played less with traditional boys' toys.

The scientists concluded that boys exposed to high levels of phthalates in the womb went on to be less likely to play with boys' toys or to join in rough and tumble games. However, the conclusions of this study are controversial. Other scientists say that more evidence is needed to support this conclusion.

Scientific controversy about health risks

There have been a large number of studies on the effects of phthalates on humans and animals. If phthalates were on trial, the evidence against them would be conflicting and inconclusive.

Having looked at the same data one scientist says,

"I'm convinced that phthalate plasticizers pose a substantial possibility of harm."

Another scientist says,

"The danger from phthalates is considered to be low due to their ready biodegradability and low toxicity. Few, if any, children are at risk from phthalates because the amount that they ingest does not reach a level that would be harmful."

New developments

Plasticizers slowly diffuse to the surface of plastic and escape into the environment. Not only does this present a possible health risk, but it means that PVC plastics gradually deteriorate. They become less flexible and so less durable.

Scientists recently discovered a new way to stop plasticizers escaping from PVC. This advance could lead to a new generation of PVC plastics that are safer and last longer. The scientists have found a way to chemically attach the phthalates to the PVC polymer chains. Once attached the phthalate molecules cannot diffuse through the polymer structure and escape.