

## Olympic Materials – Teachers' Notes

These resources allow students to explore how changes in materials technology can bring about changes to sporting equipment.

There are two main themes to the resources:

- Natural and synthetic resources; properties of materials; and
- Applications and implications of science – exploring how the creative application of scientific ideas can bring about technological developments and consequent changes in the way people think and behave. Examining the ethical and moral implications of using and applying science.

The resource can be easily adapted to emphasise one or the other theme.

### PowerPoint presentations

#### Olympic Materials

This presentation introduces the idea that there have been major changes in the materials used for sporting equipment over the last century – and even more when compared to the ancient Olympics. Students could complete the worksheet about materials either while they are watching the presentation or afterwards. The presentation looks at some of the modern materials which have been introduced and the properties that these materials have. A more detailed look at the impact on track cycling and the controversial impact on swimming are also included.

#### The role of Technology in Sporting Performance

This presentation is aimed at older or more able students. It looks at the differences between sports which are technology driven and those which include very little technology. It could be used together with the segment on cycling and swimming from the Olympic Materials presentation to stimulate debate about whether technological advances are a good thing in sport and whether they should be allowed.

#### Video material

There are a number of video clips which can be used to show the materials used for equipment at London 2012.

The official London 2012 website<sup>1</sup> contains video clips introducing each sport. The cycling one is particularly interesting as if you look closely you can observe differences in the bikes used for the different disciplines.

This clip shows Shanaze Reade's guide to the BMX bike.<sup>2</sup> It shows how the bike has been adapted for BMX and she talks about the different materials which are used in constructing the bike and why they are chosen.

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<sup>1</sup> The official London 2012 website, <http://www.london2012.com/sport>

<sup>2</sup> BMX bike guide, BBC, <http://www.bbc.co.uk/learningzone/clips/bmx-bike-guide/6662.html>

This is Chris Hoy's introduction to track cycling.<sup>3</sup> The first 2 minutes are about the bike and how it has been adapted for track cycling.

This is a section of the BBC news website about the controversial polyurethane swimsuits which were banned from 2010.<sup>4</sup> There are a video clips on the site showing how the suit is different from other suits and the effects on swimmers. The most useful clips are 'Hi-tech swimsuits explained' and 'Parry and Pickering roadtest swimsuits'.

### Answers to Questions

1. Natural includes: wood (gymnastics), metal (weight lifting), cotton, water (swimming), clay (shooting), leather

Synthetic includes: lycra (gymnastics), carbon fibre (cycling), fibreglass (canoe), carbon nanotube composites (tennis), Teflon (canoeing), polyurethane

- 2.

Sport	Old material	New material	Properties of new material which make it suitable for this use
Canoeing	Canoe made of wood	Canoe made of carbon fibre	Light and strong
Cycling	Wheel made of metal	Carbon fibre	Light and strong
Tennis	Racket made of wood	Racket made of carbon fibre	Light and strong so the racket can be bigger
Archery	Bow made of wood	Bow made of fibreglass or carbon composites	Flexible and light
Pole vaulting	Pole made of wood	Metal and then fibreglass composites	Light, strong, flexible
(Almost any) Gymnastics	Cotton	Lycra	Very stretchy, lightweight, comfortable

It is worth noting that the weight of the modern composite is almost always one of the reasons for choosing it over the natural materials.

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<sup>3</sup> Chris Hoy's track cycling basics, BBC, <http://www.bbc.co.uk/learningzone/clips/chris-hoys-track-cycling-basics/5652.html>

<sup>4</sup> Hi-tech suits banned from January, BBC, [http://news.bbc.co.uk/sport1/hi/other\\_sports/swimming/8161867.stm](http://news.bbc.co.uk/sport1/hi/other_sports/swimming/8161867.stm)