

assembly theme:

revolutionary swim suit

introduction

An assembly can raise the profile of science in your school, and help pupils recognise the roles of science in society. The aim of the Future Morph assembly series is to help pupils become more aware of the role of science in their lives and their need for scientific understanding in the world outside school.

This assembly focuses on the use of science to develop a new body suit that improves performance in competitive swimming. It introduces ideas about the global nature of scientific research, the use of science in a commercial context and ethical issues of whether sport performance should be technologically enhanced. It is most appropriate for use with students aged 11-14 as it uses some of the ideas and language used in science courses at this level. It would also be relevant to those who are studying science at GCSE or Intermediate level.

A basic speech is provided that describes how the swim suit was developed and the impact it has had on world records in swimming since its introduction. There is a link to a web based video on the development and effectiveness of the new suit. The presentation consists of a series of slides outlining how one company has developed new swim suits for each of the most recent Olympic games and the effect these suits have had on these competitions. It poses two key questions – should the use of technology be seen in a similar way as the use of drugs in sport, and is it morally acceptable to spend large sums researching sports equipment whilst there are more important questions science could be answering. The source of images and information in the presentation is a commercial website. There is also a set of role play cards for supporting a debate over the role of technology in sport.

There are three ways in which this resource could be used:

- A head teacher, head of year or science teacher could present the assembly speech, with or without the video file.
- Pupils could use the presentation as a stimulus for a discussion on the ethics of using technology in sport.
- Pupils could use the role cards as a stimulus to produce a drama or video production on the influence of science and technology on performance in sport.

assembly speech

Liam Tancock was the first British swimmer to break a world record in swimming since Adrian Moorhouse in 1990. Liam won the 50m backstroke event at the British Olympic trials. He was wearing a new full body swimsuit, manufactured by Speedo.

38 other world records have been broken by swimmers wearing the suit since it was introduced in February 2008. 'The suit makes it feel as if you are swimming downhill' commented one athlete.

The Speedo LZR racer suit took four years to develop and involved different teams of scientists in UK, Australia, New Zealand and USA. It has been designed to reduce friction with the skin, and produces 24% less drag than previous Speedo suits.

All over body suits have been used in competition swimming for 15 years, and all are designed to reduce drag. One way of doing this is to cover the suit in tiny projections ('sharks teeth') which cause a small amount of turbulence in the water. This breaks up adhesion of the suit to the water flowing over it. It works in a similar way to the dimples in a golf ball which help the ball to travel further. The LZR suit takes a different approach. It is made of two fabrics – a smooth polyurethane membrane to reduce friction with the water, and a woven fabric to act as a corset to make the body more streamlined. The suit is 70 times tighter than other suits and is uncomfortable to wear.

Speedo tested the drag of more than 60 types of fabric to see which offered the best performance using NASA's wind tunnel, which is one of the most accurate in the world. The wind tunnel has been designed to test the surface friction of space craft on re-entry to the earth's atmosphere.

Speedo's own team of researchers carried out a global 3D body scanning exercise involving some 400 elite athletes to discover more about the precise shape of their bodies. This information has been used to develop the most efficient pattern and construction for the Speedo suit.

Water flume testing on mannequins and swimmers was conducted by leading biomechanist, David Pease, at the University of Otago in New Zealand, widely regarded as the most accurate swimming flume in the world.

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The Australian Institute of Sport is where most of the physiological swimming tests have been conducted. It is one of the world's leading specialist sports educational and training institutions, providing coaching for elite athletes.

So does this suit offer swimmers an artificial advantage, or is it acceptable to use technology to support the efforts of athletes? Some have said the use of this suit is an example of 'technology doping' and is comparable to drug doping in athletes. In 2004 the British sprinter Dwain Chambers was given a two year ban for the use of performance enhancing drugs and is barred from all future Olympics. Should there be a ban on performance enhancing technology at the Olympics too?

So far most of the objections to the use of the suits at the Olympics have come from Speedo's commercial competitors. They are likely to lose a lot of money as athletes break sponsorship agreements and move over to the use of the Speedo suit. The manufacturers' arguments are scientific – they say a membrane is not a fabric, and that the suit increases buoyancy. The World Swimming authority – FIMA- have rejected these arguments and support the use of the suit, which is understandable as the suit will help to make sure that swimming is given extra media coverage.

There is another question besides whether the use of such technology is fair in sport. The suit cost huge amounts of money to develop and occupied some of the best scientific brains and equipment for several years. Would the time and money have been better spent producing something of greater benefit to people, such as food production, medicine or even sustainable energy?

Link to video clip of news report on the development of Speedo's LZR racer suit
<http://www.youtube.com/watch?v=dvMdqvO3R9g>



Tip: we advise that you set this video up as full screen before showing to your class to avoid any unwanted content.

Alternatively clips from the swimming events at Beijing Olympics feature the use of this and similar swimsuits.



role play cards (x4)

Swimmer from Estonia

You intend to compete in the next Olympics. In recent years Estonia has won medals in Olympic swimming, but you feel that it is getting harder for you to compete as other swim teams have adopted new technologically advanced swim suits.

There is some political pressure on your swimming federation to only use equipment produced locally. You feel this puts you at a strong disadvantage. You do not have access to the latest swim suits.

You would like to see a return to the equipment used in the 1970's so that world records represent only an improvement in athletic performance and are not influenced by changes in technology. This would make it possible to compare the performance of athletes across different periods of time. If all swimmers were restricted to using the type of swim suits used in the 1970's it would enable athletes from poorer backgrounds to compete on equal terms. In recent years the Olympic swimming events have been dominated by a small number of technologically advanced nations.

Swimmer from Australia

You intend to compete in the next Olympics. In recent years Australia has won a large number of medals but you feel you have to use all available means to stay ahead as swimmers from the United States and a few other countries are threatening your country's superiority in the sport.

You have some excellent resources in Australia for the development of swimmers, and for research into performance. You use the most technologically advanced equipment, including the new swim suit your country helped to develop, and see this as part of the business of improving standards. Without constantly improving performance you believe the public would lose interest in the sport and this would cause your funding to be reduced. The funding is necessary for supporting coaches, the training centres and to help finance travel to different events around the globe.

You would like to see all athletes being given the chance to improve their performance by making research findings freely available worldwide. You would like to see a reduction in the number of rules that govern sport at the top levels, and believe that there is too much political interference with sport.

Representative of Speedo UK

Your company invests a lot of money in the development of swimming gear. You have an international reputation for the effectiveness of your products, and this helps you to secure a high price when selling. You are currently the global market leader for swim suits but you have a lot of competition from international sportswear manufacturers.

The Olympics is used as your company's major showcase – all your products are developed to coincide with the next Olympic Games. You use the media to inform the world of any new records broken when using your products and this is your main advertising strategy. Using the world's best scientists to develop your products also ensures that news of your products reaches the widest possible audience. You help educate the public about the science in your products by placing them on display in interactive science museums. This also helps to make the public aware of your brand which helps with sales of leisure wear.

Without constant improvements in world records you would not be able to keep a high profile and you would lose your market share to other companies like Adidas, Nike and Puma.

You would like to see more technological development put into sport to help improve performances. You see advances in sports equipment as being similar to advances in training techniques and advances in the diets of athletes. You would like to see the world governing bodies of different sports investing in research and development establishments for each sport. Companies like Speedo would be pleased to sponsor these research establishments. The scientific research from these establishments would be made available throughout the world through scientific journals.

Representative from FINA – the world swimming federation

Each sport has a governing body to implement a series of rules to ensure that competitions are fair to all athletes, and also that countries organise their competitions so that they do not favour better performances in one country than another.

In swimming you specify the size and construction of swimming pools as different depths of water or different lane markings can have an influence on swimming speed.

Recently you were approached by a competitor company to Speedo. Their case was that the new LZR racer swim suit was not made of a fabric as it was not woven material and therefore it broke FINA rules. You rejected their claim and will allow the new suit to be used in Olympic events.

You wish to see companies investing in your sport and you wish to see improved performance in athletes as this raises public interest which in the long term can secure extra funding. You need to avoid confrontations over the sport of swimming as these damage your reputation. For this reason you need to constantly update your rules and regulations to take account of technical advances.
