

High-tech clothing to improve speed

In recent years, the world of fashion and sportswear has embraced new technological advancements, creating high-tech clothing designed to improve athletic performance. These innovations are focused on enhancing speed, comfort, and efficiency, offering athletes and active people an **edge** in their physical activities. High-tech clothing is revolutionising the world of sports by providing athletes with tools to improve speed, endurance, and performance. From aerodynamic designs to smart textiles that track data, these innovations are changing how athletes train and compete. As technology continues to advance, we can expect even more exciting developments in clothing that will help people reach their full potential in their sports and physical activities.

■ Aerodynamic apparel for speed

One of the key features of high-tech clothing is its ability to reduce **drag** and improve aerodynamics. Specially designed **garments**, like the *Nike VaporFly* running shoes or **skinsuits** used in cycling, are made with fabrics that decrease air resistance. The smooth, tight-fitting nature of these clothes helps athletes move faster by minimising friction with the air. These garments are usually made from materials like Lycra or other stretchable fibres that conform closely to the body, allowing for better movement and reducing the energy lost during high-speed actions.



■ Smart clothing with wearable technology

Another innovation in high-tech clothing is the integration of wearable technology that



tracks performance in real-time. For example, *Under Armour's HOVR* running shoes are equipped with sensors that monitor an athlete's **stride**, cadence, and distance. These sensors connect to an app, providing detailed feedback to improve running techniques and efficiency. Similarly, some high-tech sportswear includes built-in heart rate monitors, body temperature sensors, and GPS, helping athletes optimise their training and recovery periods.

■ Performance-enhancing fabrics

High-tech clothing also utilises advanced fabrics designed to enhance performance through features like **moisture-wicking**, compression, and temperature regulation. For instance, compression garments, such as skins and compression tights, apply pressure to muscles during exercise, improving blood circulation and reducing fatigue. Additionally, some fabrics have built-in properties to keep athletes cool during intense workouts or warm during cold-weather activities. This ensures that athletes can maintain peak performance without worrying about discomfort or external conditions that might affect their speed.




drag: resistenza
edge: margine di vantaggio
evenly: uniformemente
garment: indumento

honeycomb: nido d'ape
moisture-wicking: traspirante
skinsuit: tuta aderente
stride: falcata

1  Say if the sentences are true, false, or not given. Correct the false ones.

- | | T | F | NG | | T | F | NG |
|--|--------------------------|--------------------------|--------------------------|--|--------------------------|--------------------------|--------------------------|
| 1. High-tech clothing was originally created for fashion models rather than athletes. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. High-tech clothing helps improve speed, endurance, and overall performance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Aerodynamic garments such as the Nike VaporFly shoes and skinsuits reduce air resistance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. High-tech clothing is cheaper than traditional sportswear. | | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Under Armour's HOVR shoes are made of a special leather that facilitates speed. | | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Compression garments can improve blood circulation and reduce fatigue. | | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2  Read the text and answer the questions.



Graphene-enhanced Fabrics

Graphene-enhanced fabrics represent one of the most exciting innovations in advanced textiles. At the heart of this development is graphene, a single layer of carbon atoms arranged in a two-dimensional honeycomb lattice. Known for its exceptional strength, light weight, flexibility, and high electrical and thermal conductivity, graphene brings a unique combination of properties to modern fabrics. When integrated into fibres or applied as a coating, graphene can significantly improve durability and performance. Graphene-enhanced fabrics are stronger and more resistant to wear and tear than conventional materials, yet they remain soft and flexible. This makes them suitable for demanding applications such as sportswear, military uniforms, and protective clothing. One of the most notable advantages is thermal regulation. Because graphene conducts heat

efficiently, fabrics containing it can help distribute body heat evenly, keeping the wearer warm in cold conditions while preventing overheating in warmer environments. Additionally, graphene's natural antibacterial properties help reduce odour by limiting the growth of microbes, making these fabrics ideal for active lifestyles. Beyond clothing, graphene-enhanced textiles are being explored for smart wearables. Their conductivity allows sensors and electronic components to be integrated directly into garments, enabling health monitoring and performance tracking. As research and production methods continue to advance, graphene-enhanced fabrics are poised to transform the textile industry, combining comfort, resilience, and intelligent functionality in ways previously unimaginable.

Adapted from: <https://graphene-flagship.eu/materials/news/materials-of-the-future-graphene-and-textile>

1. What is graphene?
2. Why is graphene used in fabrics?
3. How do graphene-enhanced fabrics improve durability?
4. What role does graphene play in thermal regulation?
5. Why are graphene fabrics suitable for sportswear?
6. How can graphene-enhanced fabrics be used in smart wearables?

3   **GROUP WORK** Search the web for information about smart fabrics used in a specific sport (football, athletics, skiing, etc.) and create a presentation to show to the class.