GCSE Design & Technology

Developments in new materials: **technical textiles**

Technical textiles are enhanced fabrics. They have been engineered to have specific functional properties such as fire-resistance or additional strength. Here are some examples from MoDiP's collections.

The Alpinestars racing gloves are made of Nomex®, a flame-resistant material consisting of an aromatic nylon developed by DuPont™. Although first marketed in 1967, it is still used today in clothing for racing drivers and firefighters. Normally light and flexible, Nomex® carbonises and thickens on exposure to intense heat forming a protective barrier between the heat and the skin. It has low flammability and a high melting point. The fire resistance is built into the gloves (as opposed to a surface coating) so it cannot be worn away or washed out.

The Lasting Sport TKO socks are made predominantly from Outlast®, an intelligent, acrylic fibre which uses phase-change technology (originally developed by NASA) for optimum thermal comfort. Integrated micro-capsules, called Thermocules™, absorb, store and release heat: as the foot gets hots the heat is absorbed; as it cools the heat is released. As opposed to wicking technology which draws moisture away from the skin, Outlast® proactively manages excess body heat to prevent the production of moisture.

The knee/shin guards from TSG, are reinforced with Kevlar®, a high strength fibre developed by DuPont™ in 1965. Weight for weight Kevlar® is five times stronger than steel but light and flexible. It can be woven into a fabric by itself or combined with another material as a composite. Here, for protection in mountain biking, it provides abrasion resistance in the shin padding. The ergonomic, articulated hard shell knee panel is polyethylene.

The UltraCORE top by Kathmandu is designed to be used as a base layer under garment, and is made of 95% polyester and 5% elastane. It provides permanent moisture control using wicking technology via vertical capillary action within the nano-sized pores in the yarn from which the fabric is constructed. The yarn is also infused with minerals and tiny silver particles giving the garment permanent anti-bacterial and deodorising properties.