

Shoe Anatomy

from **Celebrating Chemistry**



When you jump, run, or play, your legs and feet can take on the pressure of up to seven times your normal weight. Modern shoes usually contain various types of polymers that absorb shock at the same time as they provide support, flexibility, and traction. Look at the picture

below to find out what materials can be found in your athletic shoe. Also remember that when you wear out or outgrow of your shoes, it is a good idea to find a place to recycle them. Who knows? They might turn up in a playground, basketball court, or running track.

Midsole

Most of a shoe's shock absorption takes place in the midsole. The most common material used today is a springy foam polymer called ethylene vinyl acetate. Some sports shoes use a denser foam polymer that chemists developed from polyurethane – the same material as skateboard wheels, just with air bubbles in it! You can also find gel or high-tech plastic materials.

Upper

The upper portion contains the laces, color, and design. It is usually made from leather or a synthetic material—depending on the sport or activity the shoe will be used. For instance, most running shoes are made from a synthetic polymer called polyester, also known as “mesh”. It is lightweight and helps with support and breathability.

Insole

The insoles also absorb shock to keep your muscles from working too hard during normal activities. Insoles come in a variety of different types, including plastic foam and silicone gel.

Laces

Most shoelaces are made of leather, cotton, or a mix of natural and synthetic polymer materials.

Toe Box

By controlling how rubber is made, chemists can change how it feels. For example, a harder type of rubber may be used to protect your toes in your soccer or baseball cleats, and a softer type may be used in jazz shoes for dancing on your tiptoes.

Outer Sole

The soles need to be long-lasting and provide good grip to a playground or gym floor. Various forms of rubber are most often used here.

