

# Materials used in the sport of Football

# Football and science

Football is a team game played by both men and women. Versions of the game can be traced back as far as the 8<sup>th</sup> century.

The game was formalised into what we recognise as football today in 1863 with the creation of the British Football Federation.

One of the links between football and science can be seen in the materials used in the game.

Materials can be found in:

- The clothing the players wear
- The ball that they kick
- The goal they score into
- The pitch they play on

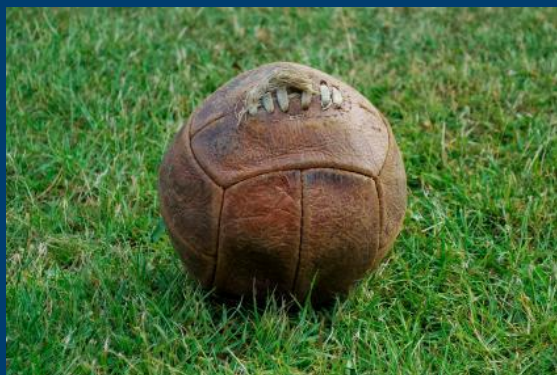


# The football (historic)

Footballs are made from two layers, an outer layer and an inner layer.

Old footballs were made from:

- Outer layer – leather. This would have been the skin or hide of an animal, normally a cow.



- Inner layer or 'bladder' – this was actually made out of a bladder, normally from a pig.

# The football (modern day)

Modern day footballs are made from manmade materials:

- Outer layer – Synthetic (manmade) leather or plastic
- Inner layer or ‘bladder’ - Latex or butyl – to hold air in.

Properties of synthetic leather include it being durable and resistant to abrasion (does not get scratched, scuffed or torn easily), which make it more appealing than natural leather.

Properties of latex include it being flexible, stretchy; it has elastic characteristics and feels rubbery.



# Goalkeeper's Gloves

Another example of where modern manmade materials have replaced traditional natural materials.

Historically, the gloves would have been made from natural fabrics and leather.

Modern manmade gloves are now made from synthetic leather, rubber, neoprene and cloth.



The properties of rubber include it having elastic characteristics and being, strong, hard to tear and durable.

Neoprene traps water between its layers, keeping a goalie's hands warm and can be used in all weather conditions.

# Goal Posts – Materials made from metal

Most materials found on the football pitch are synthetic or manmade. Metal can also be found on the pitch as steel tubing, a form of metal that is used to make the goal posts.

Properties of metals include;

- Strong
- Inflexible
- Durable
- Shiny when cut
- Conducts heat and electricity



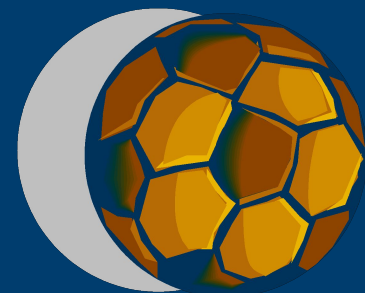
One problem with metal is that it can be damaged (corroded) by water and other liquids. To stop this happening metals are often coated in a layer which keeps the water away from the metal. With goal posts, white paint is used which gives the posts their colour.

# Re-cap - types of materials

**Manmade materials** – These are sometimes called synthetic materials and are made from combining chemicals, or through processes such as fractional distillation of crude oil. Plastics are a common type of synthetic material.

**Natural materials** – These are materials which come from living things such as hides of animals for leather or wood from trees.

**Metals** – These are normally shiny when cut and greyish in colour, Inflexible, very strong and will conduct heat and electricity.



# Worksheet answers Q1 (a, b & c)

1. Footballs are made up of two layers, an outer layer and an inner layer. Answer the following questions on the inner layer of a football.

a) What is the inner layer of a football often called?

The inner layer of a football is often called the 'bladder'.

b) What natural material did the inner layer of a football used to be made from?

A pig's bladder was the natural material the inner layer of a football used to be made from.

c) What material is the inner layer of a football made from in modern day footballs?

Modern day footballs' inner layers are now made from manmade latex or butyl.



# Worksheet answers Q2

2. What are the common properties or characteristics of a metal?

A metal is:

- Strong
- Durable
- Inflexible, or rigid
- Shiny when cut

Other answers could include; greyish in colour (if not coated or painted), conducts heat and electricity.

# Worksheet answers Q3

3. Why have modern manmade materials replaced traditional materials in a goalkeeper's gloves?

Manmade materials replaced natural materials because their characteristics or properties are better for the chosen task than the natural equivalents. The materials used in goalies' gloves are more weather proof and more robust to abrasion (getting scratched, scuffed or torn) than the old natural materials that used to be used. The modern day materials are often combined to add further benefits such as grip.