

Topic 2

Describing Structures

Function

- What is the structure supposed to do?

Think about a shoe - the shoe must be able to flex thousands of times without breaking, breathe, but provide support for your foot!

Aesthetics

- How a structure looks
- **Aesthetics** describes colours, shapes, patterns - anything that is pleasing to the eye



Safety

- Elevators, tall skyscrapers, and other load holding structures are designed with a small **margin of safety**
- Margin of safety - extra strength that allows the structure to withstand much larger loads than it needs to carry

Cost

- Making structures **stronger usually makes them more expensive**
- **Good design** is a compromise between **cost and safety**

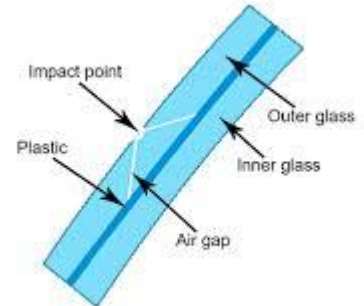
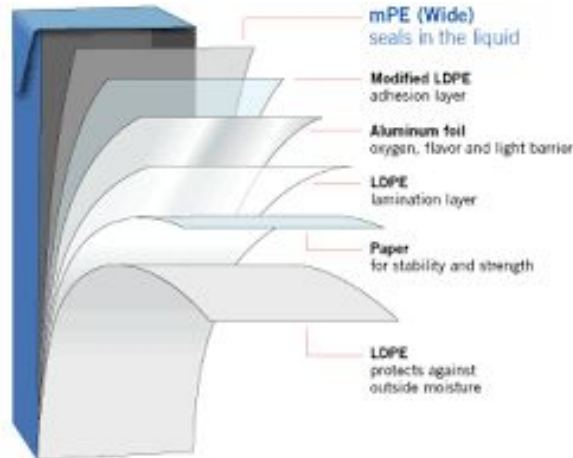
Materials

Composite materials - Made from more than one material

Ex - Pouring concrete around steel rods

Different composites have different strengths

Layered Materials - often thin layers of the same material that are pressed and glued together



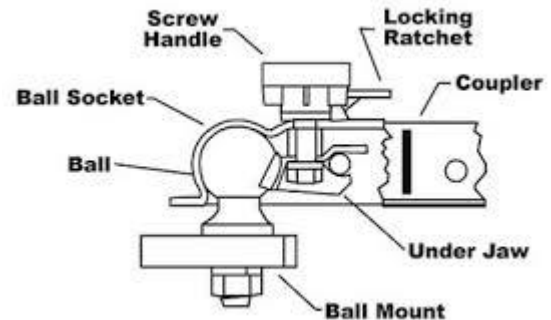
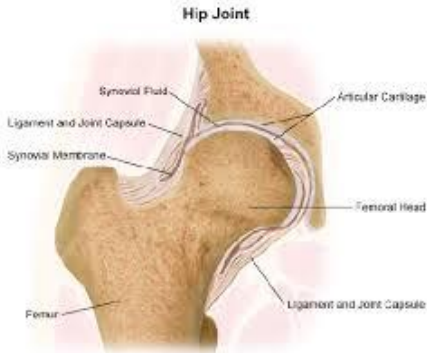
Choosing Materials

It is important to evaluate all aspects of a material when building a structure

- 1. Cost**
- 2. Appearance**
- 3. Environmental Impact**
- 4. Energy Efficiency**

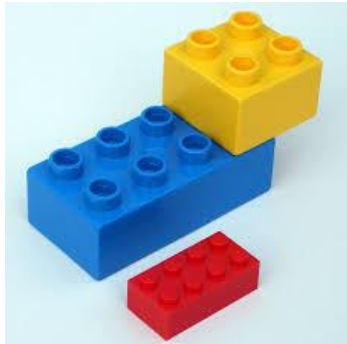
Fastening

- Structures are often **weakest** where their parts are **joined together**
- **Mobile joints** allow **movement** - door hinges, elbows, pins in a bicycle chain



Fastening

- **Interlocking shapes** can hold themselves together
- Lego bricks and some paving stones interlock and stay together



Ties

- **Thread, string and rope** can be used to fasten things together
- **Seams** are tied together with a **sewing machine**



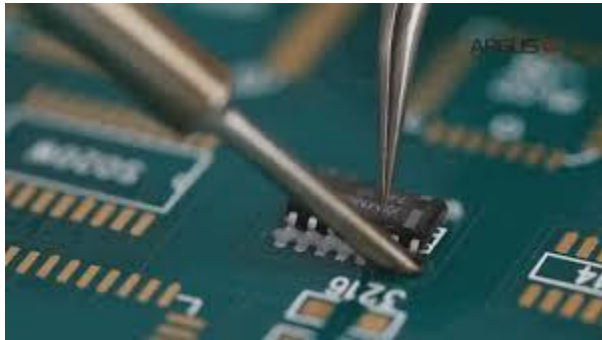
Adhesives

- **Sticky substances**, such as glue, can hold things together
- Thermosetting glues harden when they cool
- Solvent based glues harden as they dry



Melting

- Pieces of **metal or plastic** can be melted together
- **Welding melts** the pieces together
- **Soldering** surrounds pieces with a **melted material** which locks the pieces together as it cools



Questions

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