Different Ways to Join Materials Together

KS4 DESIGN & TECHNOLOGY Ages 13-16 ⏰ 3 min read

Why Do We Need to Join Materials?

Every day, you use objects made from multiple materials stuck, bolted, or glued together. Your chair has a seat joined to legs. Your phone has a screen attached to a case. Engineers and designers must choose the best method to join materials depending on what the product needs to do.

Some joints need to be permanent—they should never come apart. Others need to be temporary, so you can take things apart for repairs or recycling. The choice matters a lot.

Mechanical Joining Methods

Mechanical joining uses physical fasteners like **screws, bolts, nails, and rivets** to hold materials together. This is one of the oldest and most reliable ways.

Think of it like threading a string through beads and tying a knot—the string holds the beads together physically, and you can remove it later if you want.

Screws twist into materials and create a strong hold. **Bolts** pass through holes and use nuts to secure materials from both sides. **Rivets** are metal pins that are hammered flat on both ends to create a permanent, very strong joint used in aircraft. **Nails** are quick and simple but less reliable than screws.

Adhesive Joining

Adhesives (glues) bond materials by sticking their surfaces together chemically. Common types include **wood glue, super glue, epoxy resin, and contact cement**.

Think of it like smearing peanut butter between two slices of bread—the glue fills tiny gaps and hardens to create one solid object.

Different glues work best on different materials. **Wood glue** is perfect for furniture but won't work on plastic. **Epoxy** is very strong and can bond almost anything. Most adhesive joints are permanent, though some can be softened by heat or solvents.

Thermal and Pressure Joining

Welding uses extreme heat to melt two metal pieces so they fuse together. It creates extremely strong permanent joints, essential in cars, bridges, and ships.

Soldering is similar but uses a lower temperature and a metal filler. It's common in electronics.

Plastic welding works the same way but melts plastic instead. **Pressing and heat** can also join some materials—like how plastic sheets are fused together under pressure.

Choosing the Right Method

Designers consider: Does it need to stay together forever? Will it need to flex or move? What materials are being joined? How quickly does it need to be made? The best choice depends on the job ahead.