

Resistant Materials and Control


Metals

17 slides

This presentation explains where metals come from and how they are obtained. It also offers information on ferrous metals, non-ferrous metals and alloys, and the different properties these materials have. The students will also be taught the properties of other metals and what they are most suitable for as a result.

Examples of ferrous metals

Mild Steel
 Composed of: Iron plus 0.15–0.25% carbon
 Uses: Car bodies, structural beams, nuts and bolts
 Properties: Malleable, tough, ductile, good in tension, corrodes easily
 Melts at: 1600°C



Cast Iron Mild Steel High Carbon Steel

Plastics

31 slides

This presentation explains the differences between thermoplastic and thermosetting plastics, as well as offering a brief history of crude oil and how plastics were discovered. It also goes into detail about the different industrial processes used to shape and colour plastics.

The birth of plastics

1 All waste usually burnt

Can you drag the stages in the history of oil into the right order? Clicking on each stage will tell you more about it. Press start to begin.

start

5 Internal combustion engine invented

overed
affin
umped

solve

Woods

22 slides

This presentation looks at hardwoods, softwoods and manufactured boards. It also talks about the different forms timbers come in, and the advantages and disadvantages of using them in manufacturing.

Where does wood come from?



softwood
mixture
tropical hardwood
mixture

Click on the question marks to find out which trees grow in each location.

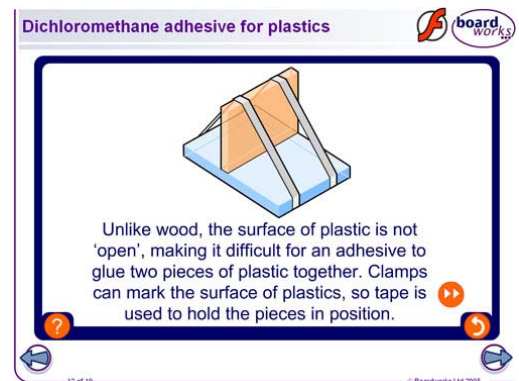
Components 23 slides

This presentation looks at fixings, nails, screws, rivets, nuts, bolts, knock-down fittings, hinges and handles. It looks at the different types of each component, and what they are all used for.



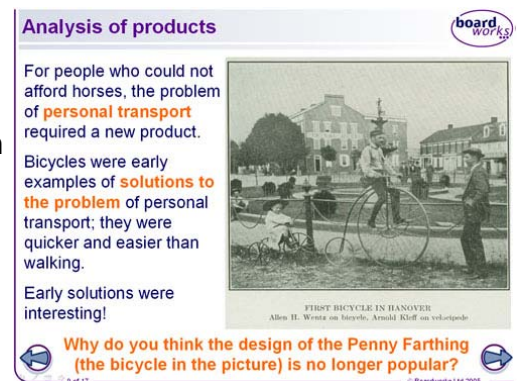
Adhesives 19 slides

This presentation discusses which adhesives are best for joining certain materials, as well as explaining the methods of applying each one.



Product Analysis 17 slides

This presentation is designed to show the importance of carrying a good product analysis when designing your own product. It also offers guidelines on the most important aspects of a product to analyse, as well as containing two case studies.



Evaluation Techniques 23 slides

The presentation focuses on the importance of evaluation at all stages of the design process. This includes evaluation of other designers work, evaluation of your own work against your design criteria and evaluation by end users.

A designer's evaluation

The colour **blue** for motorways was a good idea because it is clear and easy to recognize from a distance. The exact shade of blue took a while to decide. The signs were **tested** by getting people to drive at them at various speeds. **What would I change?**



London
Basingstoke
Reading
A33
6

Well, I designed the **men at work sign**. The first drivers said it looked like someone trying to open an umbrella. Then the **newspapers** joined in! I really wish I had **tested** this one a bit more. I wish that I had made the spade's handle longer.

Now choose another road sign to evaluate.

5 of 17

Social and Cultural Issues 23 slides

Students look at the social, cultural and physical issues which must be considered when designing and making products. This presentation also covers the importance of ergonomic considerations, and introduces the idea of ergonomics to help make products more user-friendly. The students are also told about the different agencies set up to protect the consumer.

Different physical needs

problem	disability	solution	2nd solution
stairs	in a wheelchair	someone signs what goes on	subtitles
	visually impaired	install a lift	make non-hand-specific pair
	hearing impaired	make moveable	wheelchair ramp

Which other different physical backgrounds can you think of that may make a difference to a product?

7 of 23

Moral and Environmental Issues 23 slides

In this presentation, students learn the importance of considering other people and the environment when designing and making a product. They also learn about advertising and the significance of living in a throwaway society.

Moral issues

When people buy some things, they want them to last as long as possible. These things have **long product lifecycles**. Examples of these kinds of products are below:



Why are these products the ones with the longest lifecycles?

8 of 23

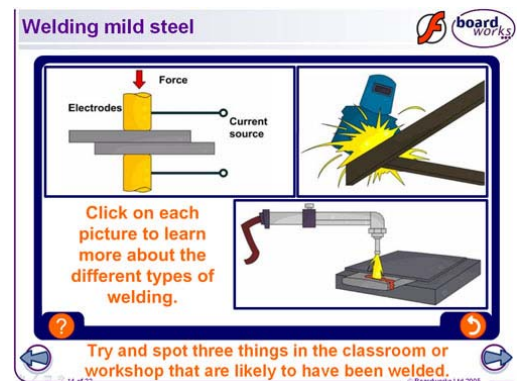
Health and Safety *22 slides*

This presentation covers the need for health and safety laws in school and the workplace, to ensure that products are safe to use. It highlights the need for proper risk assessment and the importance of using tools correctly and safely.



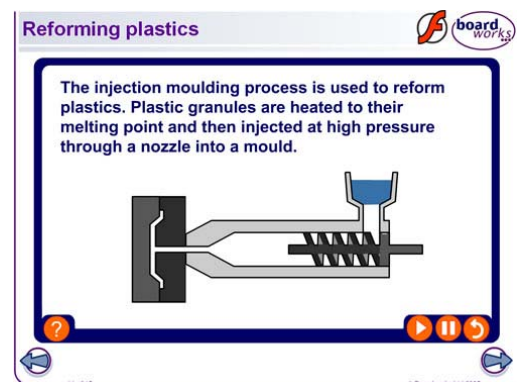
Tools and Techniques *22 slides*

In this presentation, students learn how to recognize and use a range of hand and machine tools, as well as being taught the various welding and soldering techniques.



Manufacturing Processes *15 slides*

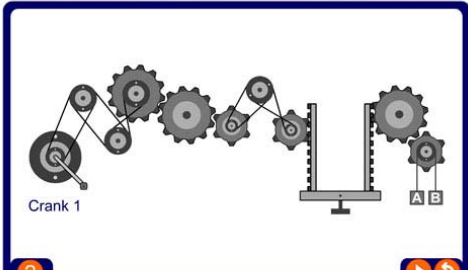
This presentation looks at the different reforming and deforming processes with regard to woods, metals and plastics.



Systems and Control *23 slides*

This presentation explains what a system is, and teaches the students how to portray one in a systems diagram. It also applies systems to structures, transport and machines, as well as showing the students how to draw flow charts.

Mixed mechanisms



Crank 1

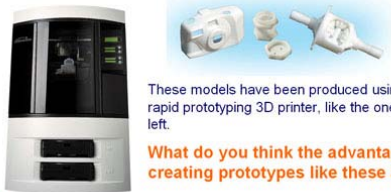
If crank 1 is turned in a clockwise direction, does weight A rise or fall? Press play to find out.

ICT in Resistant Materials *20 slides*

This presentation introduces the idea of using ICT to research, design, manufacture, present and market resistant materials products, both in the classroom and in industry. It also discusses the advantages and disadvantages of using CAD and CAM.

Rapid prototyping

- Rapid prototyping works as if printing in three dimensions.
- The 3D model that is produced by CAD software is rapidly built up by extruding molten ABS plastic.
- The process is fully computer controlled.



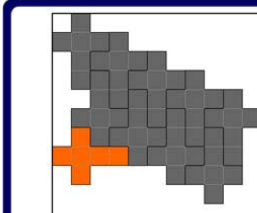
These models have been produced using a rapid prototyping 3D printer, like the one on the left.

What do you think the advantages of creating prototypes like these are?

Industrial Practices *22 slides*

Here, the students learn the significance of the roles of the client, designer and manufacturer when developing products. They are also taught the different scales of production and the different systems used in each case.

Planning to avoid waste



new shape

delete

Number of shapes: 10

solve