



Design an environmental house of the future that needs no energy or services to be supplied. Show how energy can be generated, how water can be collected and stored.



Design a vehicle for one person useful for travelling within a city the size of Manchester. It should be safe, able to carry some shopping and use a non-polluting form of energy. Add lots of detail and present your work well



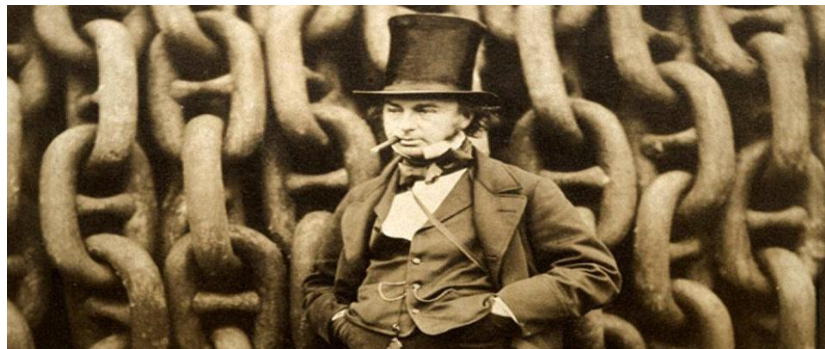
What is your favourite Dyson product? What do you think is the most innovative and why? Find out more at www.dyson.co.uk

FAMOUS ENGINEER

Find out the name of any famous Engineer or designer from the past. Write as much as you can about him or her.

Include in your account;

- when and where he or she lived,
- the name of the products they were famous for,
- any other great feats of engineering or design they achieved



Design the ultimate school chair. Think about the requirements of a school student.



A spork - spoon, fork and knife all in one. Who might the user for this product be?

Design a product that combines other existing products.

YEAR 7



A musical ruler. What other unrelated products would you combine with each other to make a new product?



A folding plastic water bottle. Think of an everyday product that could be improved and re-design it.

A WORLD WITHOUT PLASTIC 1

Look around your bedroom and try to imagine what your room would look like if plastic had never been invented.

Write a short "horror" story about what would happen to you and your room if all the plastic were to suddenly disappear without trace!

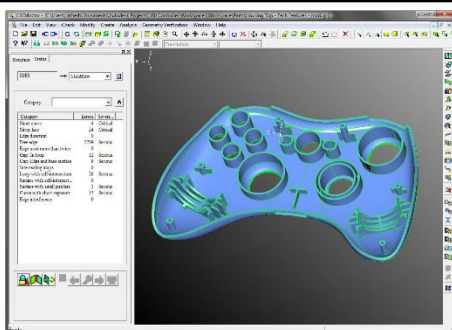


Design a form of transport for use in the future when the Earth has run out of oil.



The Swiss Army Knife is regarded as a design classic for packing lots of functions into a single tool.

Re design the Swiss Army Knife for the 21st Century

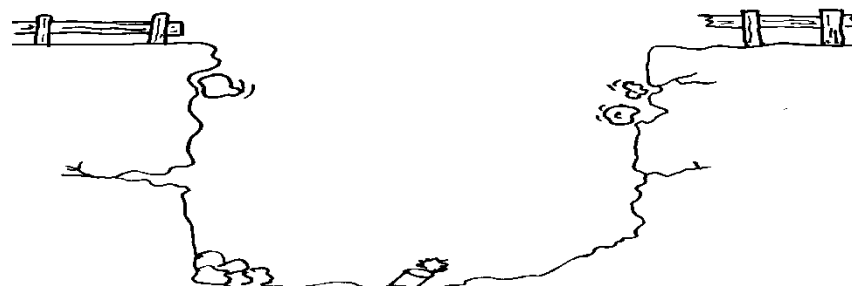


BRIDGE DESIGN

The picture below shows a cross section through a canyon that has steep cliffs on either side.

Copy this drawing and draw a bridge of your own design that spans the canyon.

Show how the ends of the bridge are supported and say what your bridge is designed to carry.



A WORLD WITHOUT PLASTIC 2

try to find out how people managed in the 1950's before plastic was in common use. Write down 3 products made from plastic which are in common use today and say what people did before they were made in plastic.

CAD (computer aided design) has revolutionised how we design & make products.

List the advantages and disadvantages of CAD compared to traditional designing.

YEAR 8

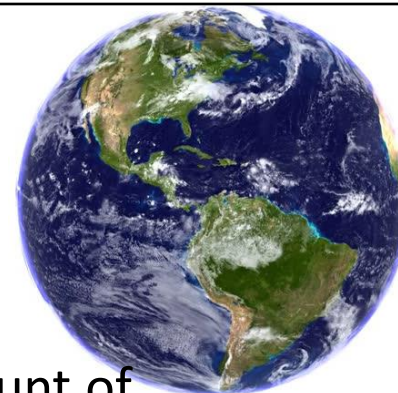
For each of these materials:

Wood

Metal

Plastic

Write a short account of how using this material might be harmful to the environment.



Find out what the FSC is and why we should always look for the FSC logo when buying paper & wood products. Check out <http://www.fsc-uk.org/en-uk/about-fsc/what-is-fsc/frequently-asked-questions>



This lamp has been inspired by natural forms. Research forms from nature and use them to inspire a design for your own lamp.



With most people now having mobile phones, the traditional phone box is becoming obsolete. Can you think of new ways to use phone boxes that would help the community?



Find out all you can about the Baygen wind up clockwork radio.

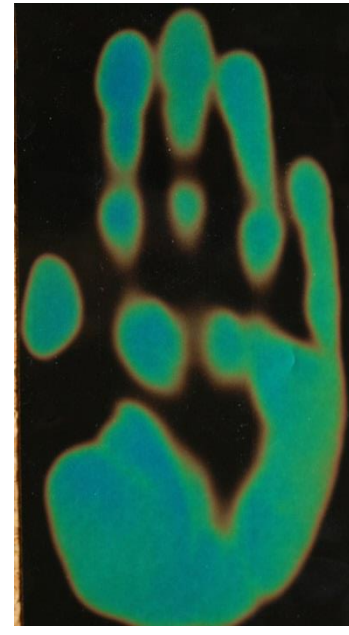
1. Who was the inventor of the clockwork radio?
2. Why did he want to invent it?
3. What is the source of power that the radio uses and how is this power converted?



Joseph Joseph describe this bin as an 'intelligent' waste system. What do you think - good design? Explain your opinion. <http://www.josephjoseph.com/product/totem>



People with disabilities need specially designed products. Design a product to help someone with a particular disability.



Find out about thermochromic liquid crystal & phase change inks via <http://bit.ly/1dX4trw>

Design a product that makes use of these materials.

YEAR 9



This shower curtain, beaker, hat & water bottle are all made out of polyester. What other products can you find made out of polyester?

Explain why the iPhone was such a revolutionary product when it was released in 2007.



ABRASIVE PAPER

Abrasive paper (sometimes called “sandpaper” or “glasspaper”) has quite a lot of uses when doing craft work. The abrasive paper we use in the school workshop comes in different grades of roughness.

- 1) What materials can abrasive paper be used on?
- 2) How is the roughness of abrasive paper measured? Give examples.
- 3) Give three grades of roughness for abrasive paper and, for each one, say what it would be used for.

SAWS & SAWING

There are many different types of saw that can be used in the school workshop and they all do.

For each of the saws in the list below give the following information....

- a) A description (or diagram) of what the saw looks like.
- b) Any special features that the saw has.
- c) The type of material it is supposed to be used on.
- d) If it is for cutting straight lines or curves.

Tenon Saw
Coping Saw
Hack Saw

WOODSCREWS

Screw fasteners can be a useful and strong way of joining types of material together.

Some common types of screw fastener are:
Countersunk woodscrew
Roundhead woodscrew
Twinfast woodscrew
Chipboard screw



1. For each of the above, give an explanation of how it can be used noting its good points and bad points.

2. What is the difference between a pozidrive head screw and a slotted head screw ?

PVA wood glue is extremely good wood glue for use indoors. However, it is important that it is used properly.

- 1) Describe what PVA glue looks like.
- 2) Give a detailed list of instructions for using this kind of glue when joining two pieces of wood.
(Use these suggestions as a guide)
 - a) Preparation of the two pieces to be joined.
 - b) How to apply the glue
 - c) How much glue to use
 - d) How to remove excess glue
 - e) How to hold the joint together while the glue dries.
 - f) How long to leave the joint to dry

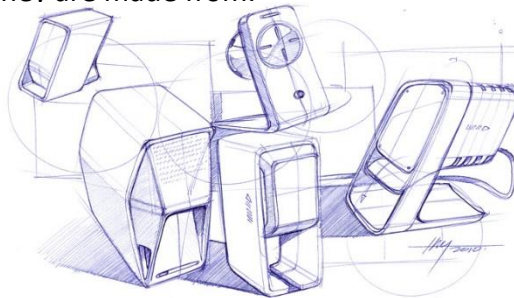
PVA Glue

DESIGN DRAWING

Think of your last project, make a clear, labelled 3D sketch of what you made.

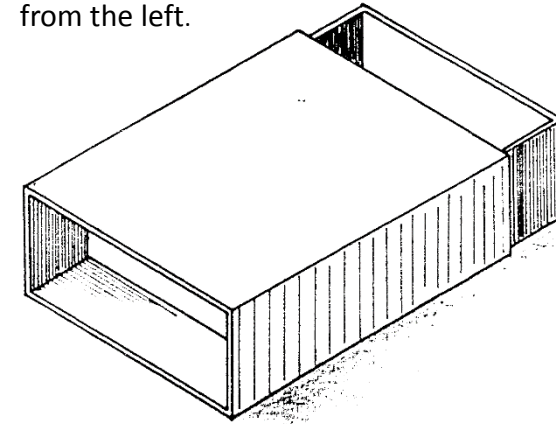
Include notes and information about:-

- a) the main sizes,
- b) how the parts fit together,
- c) what they do,
- d) what they are made from.



MATCHBOX

Copy this drawing of a matchbox. When you do the shading, imagine that the light is coming from the left.



YEAR 10



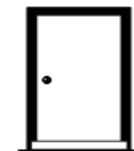
This headlight panel on an Alfa Romeo 4C is made of carbon fibre composite material. What is a composite? What are the advantages of making products in carbon fibre?

MANUFACTURED BOARDS

Manufactured boards are sometimes a useful substitute in place of using real wood.

Find out what material the following items are made from. In each case, say why you think the material you have named has been used.

- a) Your bedroom door



- b) The hull of a small boat

- c) The kitchen worktop



TYPES OF PLASTIC

1. Plastics can be divided into two main groups. These are called **Thermosets** and **Thermoplastics**. Describe the main differences between these two kinds of plastic.

2. Name two uses for acrylic plastic giving reasons why this plastic is suitable for the uses you have suggested.

Name the kind of plastic that garden patio furniture is usually made from.

1) On the underside of the trike the letters **HDPE** are moulded. What do these letters stand for?

2) Name another type of plastic that would be suitable for a toy of this sort.

3) Name a suitable moulding process by which the seat of the trike could be made.



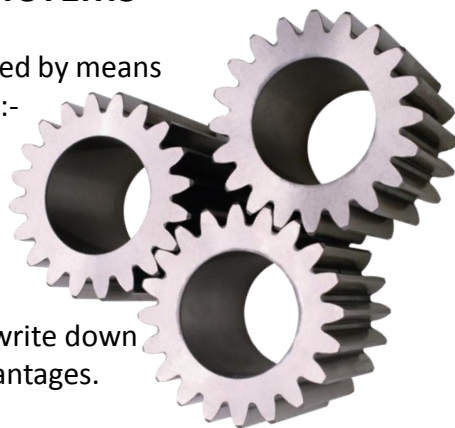
Name an object that could be made from each of the following materials and say why the material is suitable.

- a) Copper
- b) Polypropylene
- c) Oak
- d) Stainless steel
- e) Polystyrene

COMPARING DRIVE SYSTEMS

Rotary motion may be transmitted by means of one of the following methods:-

- Pulleys and belts
- Sprockets and chains
- Gears (and teeth)



For each one of these systems, write down two advantages and two disadvantages.

Use examples to help explain your answer.

USING FILES

Shaping metal is sometimes done using a file to remove the waste. There are lots of different shapes of files for doing different jobs.

1) Draw and name the four common shapes of file.

2) On which stroke does a file do the cutting? Give a reason for this.



Select an item of furniture such as a coffee table or a dining chair and study carefully how any two of its parts have been joined together.

Write down a description of how these parts have been assembled. Give details of any special screws or brackets used. Say whether the joint can be disassembled (taken apart) or not.



SCALES OF PRODUCTION

1) What is 'mass production'?

2) Why should mass produced items be very carefully designed?

3) What is meant by the term 'batch production'?



Sketch the following fixing devices and say whether they are considered temporary or permanent.

- (a) An oval nail.
- (b) A countersunk woodscrew.
- (c) A round head woodscrew.
- (d) A pop rivet.



YEAR 11