Designmuseum

Chairs

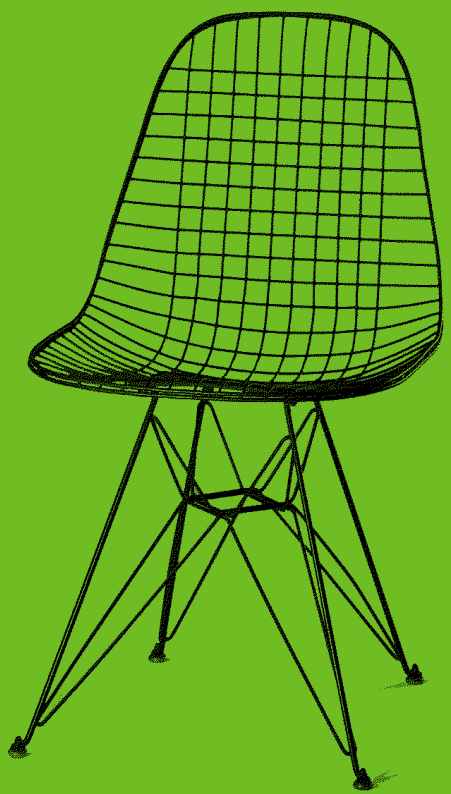
RESOURCE PACK

This Chairs resource pack aims to give students and teachers background information on the history and design of a basic product. It also provides suggestions for design-related activities. The pack is suitable for teaching students at Key Stage 1 and above. It is part of a series comprising packs on the following subjects:

Innovation
Verner Panton
Chairs
Memphis

Packs are supplied in photocopiable loose-leaf format and are designed to be interchangeable, so that common elements of each may be combined. In this way it is possible to assemble packs on:

Designing
Innovation
Manufacturing & materials
Ergonomics
Handling collection
– creating your own Design Museum
Activities



The Design Museum is the world's leading museum of 20th and 21st century design, and the UK's largest provider of design education resources. Its network of contacts in the corporate sector and the design world make it a bridge between the design community, industry and education.

To order additional packs or for further information about the Design Museum Education Programme, please contact:

Education Department
Design Museum
28 Shad Thames
London SE1 2YD

T 020 7403 6933
F 020 7378 6540
E education@designmuseum.org.uk
www.designmuseum.org

Designed by Pencil
Cover: DKR Chair by Charles and Ray Eames, 1951

T for teachers' notes

About this pack

The chair is one of the most familiar and widely used mass-produced items in the word. Certainly everyone in the West has experience of using this basic object. Chair design is something to which all students can relate, whatever their previous experience.

Aims and contents

This Design Museum Resource Pack is for teachers and students at Key Stage 1 and above.
It provides background information on the modern history of chairs and introduces important aspects of their design including ergonomics, innovation and materials and manufacturing. It aims to give teachers and students ideas for developing their own projects based on chair design.

The study of chairs gives an excellent opportunity for the examination of many other areas of design, including:

- Structures and forces
- Function
- Mechanisms
- Design history
- Culture

Suggestions for assembling a handling collection for use in the classroom complete the pack.

The different sheets directly relate to each other and the information and ideas on them sometimes overlap. Sections from other packs can also be combined with the contents of this pack to form a comprehensive resource.

A short history of chairs

The positions in which people have sat have varied from period to period, culture to culture and continent to continent. In some places sitting cross-legged has been the most common posture, in others kneeling has been the norm, and in yet others squatting is considered natural and comfortable.

With such a variety of sitting positions to choose from, why have people in the Western world chosen our traditional sitting posture as the pattern for virtually all chair design? The answer is simple – throughout the ages, society in general has imitated the higher social classes, and the modern chair evolved from the thrones used by royalty.

Following the Industrial Revolution, more and more work was carried out whilst sitting, and by the twentieth century, homes in the West were filled with chairs.

No.670
Sitzamaschine by
Josef Hoffman, 1908

Timeline: A CENTURY OF CHAIR DESIGN

1908 No.670 (Sitzamaschine)
Designer: Josef Hoffman
Materials: Bent beechwood, turned wood, plywood, brass

1918 Red/Blue Chair
Designer: Gerrit Thomas Rietveld
Materials: Varnished wood

1928 Chaise Longue à Reglage
Designers: Le Corbusier, Pierre Jeanneret, Charlotte Perriand
Materials: Chrome-plated and varnished steel, fabric, steel springs, rubber

1933 Plywood Armchair
Designer: Gerald Summers
Materials: Bent plywood

1948 DAX (Dining Armchair with X-Base)
Designers: Charles and Ray Eames
Materials: Fibreglass, round steel bars, rubber

1954 Butterfly
Designer: Sori Yanagi
Materials: Bent plywood, brass

1968 Sacco
Designers: Piero Gatti, Cesare Paolini, Franco Teodoro
Materials: Cover made of vinyl, polystyrene filling

1978 Poltrana di Proust
Designer: Alessandro Mendini
Materials: Painted wood, painted upholstery

1981 Rover
Designer: Ron Arad
Materials: Tubular-steel frame, salvaged Rover car seat

1991 Louis 20
Designer: Philippe Starck
Materials: Blown polypropylene, polished aluminium

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Structures

The primary function of a chair is to hold up and support the human body when sitting.

Designers must make sure that chairs are not only comfortable to sit on but that they can support the different weights of all their users and that they stand up to wear and tear. When it sits down the human body exerts a force that moves the chair. The chair will not buckle or break under this force if its construction has been carefully planned, even if someone tips back on it.

> "A great chair is like a face ..., you meet thousands but few are memorable"
>
> Ross Lovegrove, designer

Barcelona Chair by Ludwig Mies van der Rohe, 1929

The scissor-shape of the legs is based on the type of folding chair used in Ancient Egypt, Greece and Rome. The designer tried various ways of joining the cross-pieces of the frame and finally used a solidly welded joint to take the user's weight.

The legs of this steel-wire chair are called 'Eiffel' and are based on the structure of the famous French tower.

DKR Chair by Charles & Ray Eames,1951

Designers constantly explore different ways of approaching the construction of chairs and some are more successful than others. The suitability or otherwise of different materials can have a drastic effect on the success of a chair design. Shown here are examples of chairs that have been designed without the traditional 'leg at each corner'.

This chair was cut from a single piece of plywood and formed into a fluid organic shape. Unfortunately the back legs could not withstand constant stress and snapped easily.

Ⓜ **See also manufacturing and materials for examples of cantilevered chairs**

Plywood Chair by Gerald Summers, 1933–4

Data **FILE:** Chair facts

- There is no known inventor of the chair.
- Originally chairs were only used as symbols of authority.
- Some of the first known chairs were used for ceremonial occasions by the Egyptian pharaohs and their queens around 2650 BC.
- In Britain, medieval lords and ladies sat on raised chairs at the head of the table.
- The term 'chairman' derives from the status given to those who sat in the chair.
- The user changes position on average every 10–15 minutes.
- Many classic chair designs have been created by architects.

Links ...

Websites:

Classic furniture retailers/manufacturers:

www.coexistence.com

www.twentytwentyone.com

www.vitra.com

Design history:

www.designmuseum.org
(Enter Flash version/click on Design at the Design Museum)

Books:

Fiona & Keith Baker, *Twentieth-Century Furniture*, Carlton Books, 2000.

Charlotte & Peter Fiell, *1000 chairs*, Taschen, 1997.

Charlotte & Peter Fiell, *Icons - Chairs*, Taschen, 2001.

Cara Greenberg, *Mid-Century Modern – Furniture of the 1950s*, Thames & Hudson, 1995.

Penny Sparke, *A Century of Design – Design Pioneers of the 20th Century*, Mitchell Beazley, 1998.

Alexander von Vegesack, Mathias Schwartz-Claus and Peter Dunas, *100 Masterpieces from the collection of the Vitra Design Museum*, Vitra Design Museum, 1996.

Buzz words

Fibreglass – a plastic reinforced by glass fibres.
Mass production – continuous production which may run into millions of items. The high initial cost of complicated tools and moulds is offset by the number of identical products which can be made.
Organic – relating to animals and plants; influenced by their actions or forms.
Plywood – a strong board consisting of two or more thin layers of wood glued and pressed together, with the direction of the grain alternating.
Polypropylene – one of a group of thermoplastics used to make moulded objects and fibres.
Posture – the position of the body or limbs.
Welded – hammered or fused (heated but not melted) into one piece.

D for designing 1

Environmental design

The need to be functional is not the only issue affecting chair design. Here we examine some other topics for creative thinking.

Sustainability

Designers can deal with concerns for the environment in several ways. Making sure that a product has durability is important from an ecological perspective. Peter Opsvik designed the Tripp Trapp Chair with this in mind: 'If materials are handled with loving care during the development and processing stages, the chances of a product being taken care of and lasting for a long time are much greater.'

The choice of materials is another important aspect of sustainability. Manufacturers Totem Italia are committed to sustainable design in a much broader context than recyclable materials. 'We choose to use eco-friendly materials because of the low impact they have on the environment as they are retrieved and processed. This is also part of our commitment to upholding ethical production processes for human and natural resources, as well as safe-guarding the health of the artisans who make our products and the customers who use them.'

Tripp Trapp chair by Peter Opsvik. The chair is designed to grow with the child.

E for ergonomics has details of other designs by Peter Opsvik

Case study: Sedia Misura

This chair by Totem Italia demonstrates their commitment to using natural, economical materials.

They use birch/beech plywood and solid wood; each structure makes best use of the flexibility and strength of the material to produce extremely lightweight yet solid, stable furniture. Clever construction means there is no need to use glues: the plywood pieces are precision-cut by laser to ensure a proper fit and held together in constant tension. The seat of the Sedia Misura is held in place by a rubber band and the surfaces can be coloured or finished with natural oil.

Totem's furniture range is sold in kits, which makes it easy to transport and store. Each kit includes the chair parts, any accessories, assembly instructions and oil for finishing. No metal or adhesive material is used in the construction of any of the products and no tools are required to assemble any of the items.

Case study: Wiggle Side Chair

In the 1960s a trend for cheap and lightweight materials resulted in the development of cardboard as a material for furniture design. Although this was more ecologically sound than plastic it did not have its durability.

In 1972 North American architect Frank O. Gehry developed a cardboard material that he named 'Edge Board'. The material was constructed by gluing layers of corrugated cardboard in alternate directions, a similar construction to plywood, and it was suitable for creating both sculptures and furniture.

Although the furniture range was immediately popular Gehry discontinued production because he wanted to concentrate on architecture. The chair is manufactured today by Vitra AG.

Case study: Louis 20

This armchair by Philippe Starck can be used both inside and outside for domestic or public seating and is recyclable.

The springy back section and the curvy hollow front legs are manufactured from one piece of blown polypropylene the arm rests and back legs from over 99% pure aluminium. It is held together with a minimum number of screws and can be disassembled very quickly by unscrewing the back legs from the body, thus making it easy to recycle the two materials separately.

The aluminium frame is joined to the body by a plate that enables the chair to be tilted on the back legs without causing damage.

Using new materials

The designer Jane Atfield used recycled plastic sheet for her child's chair, the RCP2. Small pieces of waste plastic detergent bottles were heated and then compressed to form a sheet of the material. In some places the original printed text from the bottles can be seen, and changes in the colour of the detergent bottles result in instant changes in the colour of the material. The chair has been produced by manufacturers Made of Waste since 1992.

Buzz words

Adhesive – a substance that is used to stick objects together.
Aluminium – a lightweight silvery metal that resists discolouration in air and can be shaped without breaking.
Artisan – a skilled crafts person.
Assemble – to join together.
Compressed – squeezed together.
Construct – to make by fitting parts together.
Corrugated – formed into alternate ridges and grooves.
Durability – the ability to last, be hard-wearing.
Ecological – concerned with the relationship of living things to their environment.
Ethical – correct.
Functional – designed for an intended purpose.
Polypropylene – one of a group of thermoplastics used to make moulded objects and fibres.
Precision – great accuracy.
Recyclable – able to be reused.
Sustainability – the ability to be maintained or prolonged; protecting an ecological balance by avoiding using up natural resources.

Links ...

Websites:

Sustainability:
www.biothinking.com
www.designmuseum.org/designsense
www.totemitalia.com

D for designing 2

Making connections

The way designers interact with each other and with creative people from different disciplines can also result in innovative products. Designers may work within different areas of design, such as product design, graphics, textiles and architecture, or they may be influenced by people who are breaking new boundaries in art.

Working in teams

Designers often work collaboratively. The architect Le Corbusier and his cousin Pierre Jeanneret worked with designer Charlotte Perriand on a number of projects including the famous Grand Confort and Chaise Longue chairs, which are still in production today.

Designing together during the 1920s this team worked following Modernist principles and the Chaise Longue formed part of a collection of chairs that were designed to complement the architecture of Le Corbusier.

The materials were carefully chosen to follow the clean lines of his buildings whilst also providing comfort for the user.

Chaise Longue à Reglage by Charlotte Perriand with Le Corbusier and Pierre Jeanneret, 1928

Ant Chair

Although many products are attributed to just one designer they are often the outcome of a team working together. The Ant Chair was the result of the collaboration in 1952 of architect Arne Jacobsen's in-house design team which included the designer Verner Panton.

Influenced by designers Charles and Ray Eames and Eero Saarinen who were also producing chairs from moulded plywood, the first model of the Ant Chair was the first mass-produced chair to have the seat and back formed from a single piece.

The chair has been in production since the 1950s and has been modified to include seats in a variety of colours; a four-legged version has also been produced.

Biography: CHARLOTTE PERRIAND

Born 1903, Paris.
Education Studied interior design at the Ecole des Arts Décoratifs, Paris.
Career 1926 Showed metal furniture at the Société des Artistes Décorateurs.
1927–37 Worked with architects Le Corbusier and Pierre Jeanneret, designing furniture.
1940–50 Lived in Japan and Indo-China.
1950–70 Worked as a furniture and interior designer in Europe, Japan and Brazil.

Charlotte Perriand (right) with Le Corbusier (left)

Ant Chair by Arne Jacobsen, 1952

Poltrana di Proust by
Alessandro Mendini, 1978

Inspiration

Designers take inspiration for their creations from many different sources, including the work of other artists. For example, Italian designer Alessandro Mendini created the Poltrana di Proust (Proust's Armchair) as part of his series of 'redesigns' in 1978.

He was attempting to create a feel for the work of late nineteenth-century author Marcel Proust and used a style of chair of the period. He took the design for the surface pattern from a Pointillist painting, *Balise Rouge*, by the Post-Impressionist painter Paul Signac, an artist whom Proust allegedly admired.

Case study: Roodblauwe Stoel (Red/Blue Chair)

The famous colour scheme of this chair was influenced by its designer's membership of a modern art movement.

The architect Gerrit Thomas Rietveld originally designed the chair for his own use in 1918, but he believed that it should be possible to produce it on an industrial scale. The construction of the chair lent itself to mass-production from standard-sized pieces of wood. Its simplicity meant that it could be machined easily using basic tools and assembled by the customer.

The chair was initially left in unfinished wood but was coloured in red, blue and yellow in 1923. Rietveld was influenced by De Stijl, a movement that believed art should be based on basic shapes and colours.

The chair has been likened to a 3D interpretation of a painting by Piet Mondrian, whose most famous works use only straight lines and primary colours with black, white and grey.

Buzz words

Collaborate – to work with others on a joint project.
Discipline – a branch of learning or skill.
Innovative – bringing in new methods, ideas.
Inspiration – a sudden brilliant, creative or timely idea.
Interpretation – an individual view of a work of art.
Modernist – relating to the style of architecture and design popular from the late 1920s and 30s.
Perspective – point of view.
Pointillism – a painting technique placing tiny dots of colour side by side so that from a distance they suggest further colours.
Post-Impressionism – a movement in painting in France in the late 19th century.

Links ...

Websites:

Artists and designers:
www.acmestudio.com
www.artnet.com
www.arttech.about.com
www.classicdesignitalia.com
www.iserv.net/~plucas/classics.htm
www.scandinaviandesign.com
www.skandium.com

A For a Chair design brief inspired by a favourite painting, see activities sheet

for innovation

New perspectives in chair design

The function of all chairs is the same: to support the human body in a sitting position. How then can designers be innovative with such a basic product? Innovation in chair design can arise from the identification of a need, the development of new materials or new manufacturing processes.

Many innovative chairs have been designed over the last century. This section showcases some of them.

> “Every truly original idea – every innovation in design, every new application of materials, every technical invention for furniture – seems to find its most important expression in a chair.”
>
> George Nelson, designer

Understanding the user

In 1972 the designer Peter Opsvik's oldest son was two and had outgrown his high chair. Opsvik discovered that there were no chairs that would allow his child to sit at a comfortable height at the grown-ups' table. He says, 'my first reaction was that this was a pity, but as a designer this discovery was a challenge.' Opsvik's aim was to design a single chair that could seat people of all sizes in a natural way at the same table.

He started by drawing people sitting with their elbows at tabletop level. When he superimposed the various drawings on top of one another, it became clear that the chair's seat and footrest would need to be adjustable in and out, as well as up and down.

The result is the Tripp Trapp Chair. Small children sit on a higher seat than adults, and this equalisation of height difference improves interaction between them. The broad, solid support for the feet makes it easy for children to change their sitting position, get up, reach for things and so on. This can improve a child's concentration on what is going on around the table.

In Scandinavia, most kindergartens now have areas with adult-sized tables and Tripp Trapp Chairs. This improves the relationship between teachers and children of different sizes and means that teachers do not have to bend down to low tables all the time.

Tripp Trapp Chair by Peter Opsvik, 1972

Manufacturing developments

In 1907 an American, Marshall Burns Lloyd, invented a special loom that could weave twisted paper into a woven fabric similar to wicker. The process, which was patented in 1917, meant that a Lloyd Loom Chair could be produced in a quarter of the time it took to make a rattan or wicker version.

The chairs have been constructed ever since from the woven paper – partly reinforced with steel wire – over a wooden frame. The British company which manufactures the chairs still uses these traditional methods and patterns but contemporary designers have also been commissioned to create furniture for them.

Case study: Gitta Chair

The Gitta Chair was designed by Gitta Gschwendtner when she was a student at the Royal College of Arts. The manufacturers, Lloyd Loom of Spalding sponsored a competition at the RCA in 1997 and this design won the first prize. The chair subsequently won a Merit Award at the Singapore Furniture Fair in 1999.

The under-frame of the chair is constructed from steel tubes that are powder coated with silver colour and the body uses the traditional Lloyd Loom fabric.

Case study: Sacco

Numerous imitators have based their own designs on Sacco.

It was created in 1968 by Italian designers Piero Gatti, Cesare Paolini and Franco Teodoro as a responce to the trend for more flexible seating. Initially they wanted to use transparent, non-rigid PVC filled with fluid for the shell of the 'chair', but this material proved not to be strong enough and the contents were too heavy.

As a result of modifications to the design, the now familiar fabric bag filled with polystyrene balls was born. The 'chair' can be used in many different ways and is light and easily transportable. It is particularly popular with children and young adults.

Identifying a trend

The 'redesign' of an existing product or the idea for a new one often comes about as a response to fashion, in activities or lifestyle. For example, the development of computer games and their popularity with young adults has given rise to several new design opportunities.

The idea for the Playstation® Armchair by Jerzsy Seymour was to make a comfortable, multi-functional 'armchair'. Manufactured by BRF in Italy from polyurethane foam cut with the aid of computers, it has no internal structure and so is both economical and easy to manufacture and light enough to be picked up and moved around.

Footrest can also be used as a work table or as a seat for a friend

Playstation® Armchair by Jerzsy Seymour, 2000

Links ...

Websites:

Sissel:
www.sissel.com

Lloyd-Loom:
www.lloydloom.com

Buzz words

Ergonomic – created on the basis of studying humans in relation to their environment.
Function – the intended purpose of a thing or person.
Interact – to act upon or influencing each other.
Loom – a machine for weaving thread into fabric.
Rattan – bendable palm stems used as a woven material.
Reinforced – strengthened.
Superimpose – to place over or on top of.
Trend – a general direction or fashion.
Wicker – bendable twigs that can be plaited into a material for chairs, baskets, mats, and so on.

M for manufacturing & materials

How new technologies influence chair design

Until the start of the twentieth century, few chairs were made in anything but the traditional shape, relying on decoration as a means of differentiation, but designers were quick to apply new materials and manufacturing processes developed throughout the century to this basic product.

Case study: Chair No.14

This was probably the first mass-produced chair and was designed and first manufactured by Michael Thonet & Sons in 1865. It is still in production today.

The original method of production involved boiling beechwood strips in glue and then bending them using iron moulds. Thonet had set up sales offices in major cities which enabled the chair to be sold worldwide but the high humidity in tropical areas caused the glue to dissolve. In response to this problem Thonet developed a new method of bending solid wood with steam and replaced the glued wooden peg joints with screws. One advantage of this method of production meant that the chairs could be shipped and sold 'flatpacked'. A crate measuring 1 cubic metre could hold 36 dismantled chairs.

The Design Museum's Memphis resource pack, has more information on flatpack furniture

Mass-production

Some designers experimented with new processes in order to meet the need for mass-produced furniture. Others looked at the materials used for the mass-production of other items and applied them for the first time to making chairs.

Case study: B3, or Wassily Chair

Although tubular steel had been used for public furniture – in hospitals, cars and aeroplanes – since the late nineteenth century, Marcel Breuer's B3 Club armchair of 1925 was the first of its kind.

At the time Breuer was the director of the wood workshop at the Bauhaus art school in Dessau. He took his idea from the tubular frame of his bicycle but the bike's manufacturer was not interested, so Breuer worked with a plumber to produce the initial prototypes from cold-bent nickel-plated tubular steel. In 1926 he founded a manufacturing company, Standard Mobel, in order to market the designs and after some initial changes the chair went into production. It could be shipped and sold disassembled: more than 50 chairs could be packed into a crate measuring 1 cubic metre. The chair was named 'Wassily' in honour of Breuer's colleague at the Bauhaus, the painter Wassily Kandinsky.

Materials and structures

In the early 1920s many designers were experimenting with alternative structures for chairs. The production of a cantilevered chair was a challenge that inspired many of them. The Dutch architect Mart Stam was probably the first to achieve this but it was the B64 Chair designed by Marcel Breuer in 1928 that became the most famous example: it is still in production today.

In the 1950s Verner Panton worked on a cantilevered chair to be constructed from a single piece of material. He achieved this in 1955 with his S-Chair, which was made from moulded laminated wood. This was a forerunner of his most famous cantilevered chair, the Panton Chair, which is mass-produced today in polypropylene. (See the Design Museum's Verner Panton resource pack for detailed information.)

Contemporary designers are still exploring the possibilities of creating a cantilevered chair in different materials. The Aluminium Flange Chair is manufactured to order by Foundation 33. It is made from two continuous strips of 4mm-thick aluminium that are bent and welded to create a central structural flange. This is then bent in three different directions to form the chair. As the material is weak the central flange is essential to provide strength. Although the chair will support the weight of the body, even a simple sideways push will result in the structure wobbling.

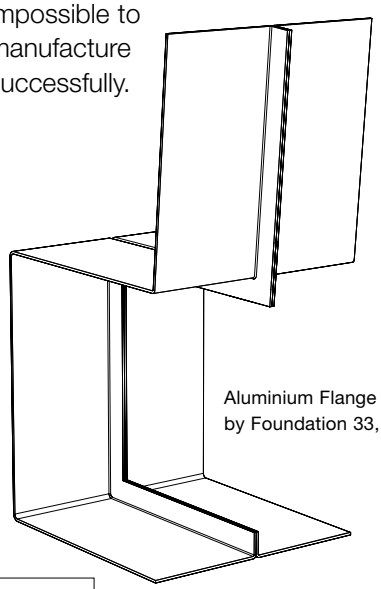
T See teachers' notes for more about structures

B64 Chair by Marcel Breuer, 1928

The Panton Chair by Verner Panton, 1959–60

Computers

The development of computer-aided design and manufacture (CAD/CAM) has opened up many new design opportunities. As a result, designers are now creating chairs that in the past would have been completely impossible to manufacture successfully.



Aluminium Flange Chair by Foundation 33, 2001

Case study: Slice Chair

The designer of this chair, Mathias Bengtsson, was inspired to create an organic piece that explored and made obvious the actual process of manufacture.

Bengtsson was born in Denmark and, following his graduation from the Danish Design School in Copenhagen, joined the Royal College of Art furniture course in 1998. The first version of this chair made its debut at his final year show at the RCA, London.

The chair form is modelled in 3D on a computer, then sliced into layers by the software. Each slice has a unique size and profile, much like a giant butterfly, which is cut out of a sheet of material. These 2-D pieces are stacked one on top of the other to create the 3D form. The cutting pattern of the sheets has been researched carefully to reduce waste to a minimum.

Links ...

Websites:

Foundation 33:
www.foundation33.com

Design Laboratory:
www.designlaboratory.com

Buzz words

Flange – a flat rib that sticks out from an object and strengthens it.
Nickel – a silver-white metal which can be worked without breaking and is used for strengthening steels.
Prototype – a trial model, made so that a design can be tested before it is produced.

for ergonomics

Designing for comfort

How many times have you sat on a chair and, after a very short while, found yourself suffering from backache or constantly moving your body into different positions to get comfortable? Obviously no single chair can meet everyone's needs and this why chairs have been developed that are targeted at different people and for different uses.

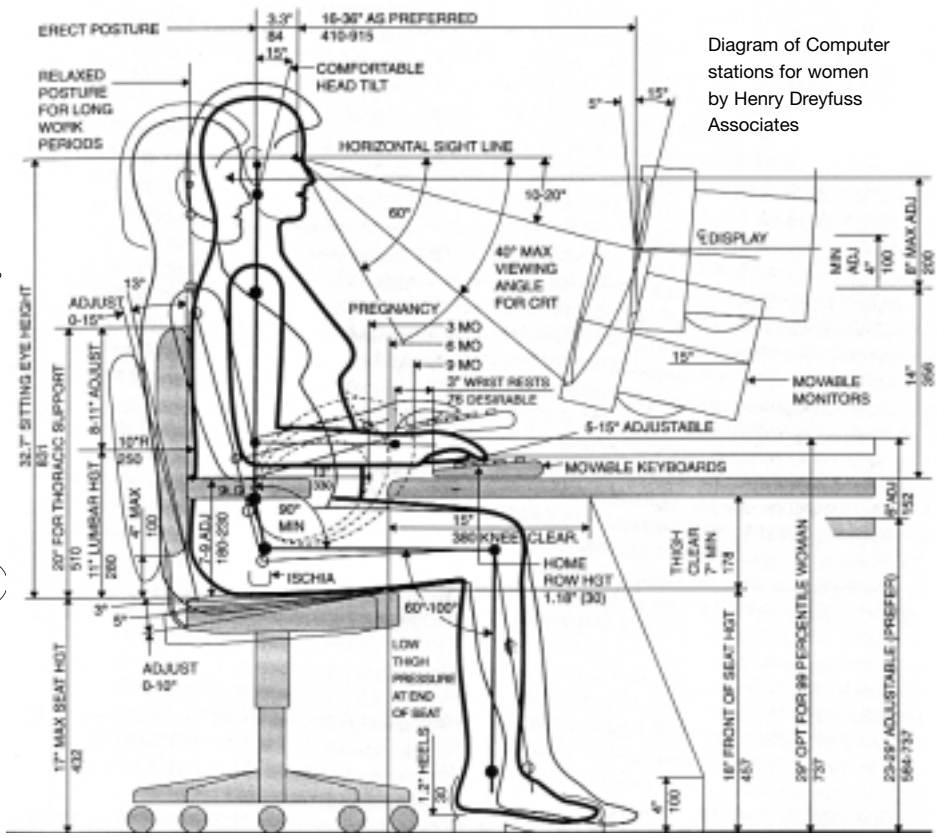


Diagram of Computer stations for women by Henry Dreyfuss Associates

Measuring man

Henry Dreyfuss (1904–72) was an American industrial designer whose work was based on its suitability to 'fit' the human body. He used ergonomes – models of the human figure – called Joe and Josephine to help him create functional designs for telephones, aircraft seats and interiors for an ocean liner, amongst other projects.

Henry Dreyfuss Associates still provides diagrams such as these to help designers and manufacturers produce items that are the right size for the user.

A See A for activities for instructions on making a Dreyfuss ergonome

See the Design Museum's Innovation resource pack for more information on Henry Dreyfuss Associates

Case study: Pallone Chair

The Swedish health and exercise equipment company Sissel have produced this innovative 'work' chair. The aim of the ergonomic design is to promote relaxed and healthy sitting.

The seat is manufactured for both children and adults and consists of an air-filled ball on a frame that has a padded, height-adjustable back. The ball is designed to reduce the pressure on the seat area, relieve tension and strengthen the back, and cause the upper body and spine to assume a natural position. The comfortable ball encourages the user to change sitting position frequently and this prevents strain on individual muscle areas.

Balans Variable Chair by
Peter Opsvik, 1997

Case study: Credo Chair

Credo's 'chair for every position' motto makes reference not only to individual body postures but also to 'positions' within a company. Early in the twentieth century it was primarily those in a position of authority within a business who were privileged to have a chair that tilted.

Peter Opsvik's Credo Chair moves freely from an active, seated posture with the chair body tilted forwards to a backward-leaning rest posture. The sitter's body is balanced and his or her feet regulate the movement. As Opsvik says, 'our feet are experts in moving us, so let them control our movement in the chair as well'.

Movement and variation: Peter Opsvik's chairs

In the 1970s many experts on ergonomics were fighting to define the correct and only sitting posture. Since the late 70s Peter Opsvik, one of Norway's leading designers, has believed that it is important to try to break down our stereotypical sitting habits and has devoted his career to designing chairs that initiate a greater degree of movement and variation of posture.

He explains that such a chair 'is of little use if people from the Western world are to comply with the conventions of sitting nicely and sitting still. We constantly receive signals from the body, most of which signal the desire for change. If we listened to more of these signals and acted on them to a greater extent, we would move more freely and use postures that are more natural to us, not least while sitting.'

Opsvik was one of three designers who were asked by Hans Christian Mengshoel to develop a piece of furniture designed for kneeling on. The resulting Balans stools are recommended for people with back problems by Norwegian doctors.

By shifting the user's weight forward and allowing the knees to support the body they let the back muscles soften and relieve tension.

Opsvik collaborates closely with the manufacturers HÅG, Stokke Fabrikker and Cylindra, all of whom have received numerous Norwegian and international design awards. He has his own studio in Oslo and is assisted by six colleagues.

Buzz words

Convention – the most widely accepted view about correct behaviour, good taste, and so on.
Ergonome – a cut-out pattern of the human body.
Initiate – to begin or to set going.
Posture – the position of the body or limbs.
Stereotype – a person or thing that matches a standard mental picture, or lacks originality.

Sitting in a rocking chair like this gives the impression of sitting in a wheel, which easily generates movement.

This is no ordinary rocking chair: flattened sections of the runners allow it to rest in several positions.

Balans Chair by
Peter Opsvik, 1983

H for handling collection

Create your own Design Museum

The development of a variety of handling collections that enable product evaluation and stimulate inspiration is of enormous value. Product analysis can be a vehicle for the discussion of many issues in the classroom: the research and design of like products, inspiration and creativity, evaluation and the need for modification. It is also an excellent way of increasing knowledge of materials, manufacturing techniques and function.

Creating a Chairs handling collection

For a permanent collection, we have suggested concentrating on folding chairs, which are relatively inexpensive to buy, light enough to bring in from outside school, and easier to store than other chairs when not in use. Assemble a collection of folding chairs from second-hand furniture sales, relatives and friends. Many high street stores sell inexpensive contemporary folding chairs: examples in the style of the Hardoy Chair featured overleaf can be bought for between £10 and £20.

The main collection can also be expanded for temporary projects: bring together a variety of chairs from around the school; students could bring in small folding chairs from home; add a folding pushchair and a collapsible high chair to give a different perspective.

Case study: Slimline Folding Chair

The folding mechanism and structure of this contemporary chair by designer Tony O'Neill have been very carefully considered and planned.

The seat and back are hinged along the centre and are made of reinforced plastic. When the metal side frames are pulled apart the seat and back fold flat, forming right angles with the chair's frame. The chair is then locked into position by the weight of the seated person. The central hinge is encased in a cylinder to prevent the folding mechanism catching the skin or clothing of the user.

The Slimline Folding Chair is currently in production.

Using a Chairs handling collection

Folding chairs can be used to demonstrate a variety of design issues:

- function: dining, camping, occasional use
- mechanisms and structures: broken folding chairs allow students to study structures and to analyse why they have broken
- materials: light, strong, cheap, new materials
- ergonomics: comfort, safety
- portability: how carried, weight, awkwardness
- storage: compactness, collapsibility, size
- target groups: domestic (gardens, small flats), public, leisure (fishing, camping)
- needs of society: changing perceptions of furniture, changing lifestyles
- design history: reasons for folding furniture

The handling collection can also provide a very effective introduction to a specific project. Different collections of chairs can be used to highlight a particular design focus.

Designing for small children could require a temporary collection of chairs for the under-fives; designing for the office/working environment could mean assembling a variety of computer or office chairs.

The larger and heavier the chairs, the more difficult it is to do this, but the temporary collection could include chairs taken from around the school and the students could compare and contrast these with classroom chairs. This could lead to a project designing and modelling a new classroom chair.

A collection of just six chairs can allow students working in small groups to analyse the chairs and then present their findings to the rest of the class, giving 5-minute presentations. Information on the design of the chairs can then be recorded and used to inform the students' own design work.

Buzz words

Analysis – a detailed examination; a method to work out how individual parts of a thing or idea relate to the whole.
Copyright – the right to control or produce an original idea or product.
Evaluate – to judge or set the worth of something.
Mechanism – a set of moving parts that perform a function, especially in a machine.
Portability – the ability to be carried or moved easily.
Stimulate – to provoke or increase (a sense, an activity, etc.).

A See A for activities for guidelines on product analysis.

Links ...

Websites:

Folding chairs:

www.argos.co.uk
www.everywherechair.com
www.gcioutdoor.com
www.habitat.com
www.plasticfoldingchair.com
www.trannon.com

Case study: BKF Hardoy Chair

This design, commonly known as the Butterfly Chair, was probably based on an English folding chair that was first patented in 1877.

In 1938 a team of three designers – Antonio Bonet, Jorge Ferrari-Hardoy and Juan Kurchan – called Grupo Austral re-worked the chair so that two loops of bent steel rod were welded together to form a seemingly continuous frame. The tubular steel frame was enamelled and the seat was leather.

The chair was originally mass-produced by Artek-Pascoe and used predominantly as a lounge chair. In 1945 Knoll took over production and unsuccessfully fought a copyright lawsuit that resulted in the chair being copied by many other manufacturers.

In Britain today a version with a metal frame and canvas seat is available from high street stores.

A for activities

Making an ergonome

Using a maquette or an ergonome – a model of the human figure – will help you apply the right proportions to your chair designs.

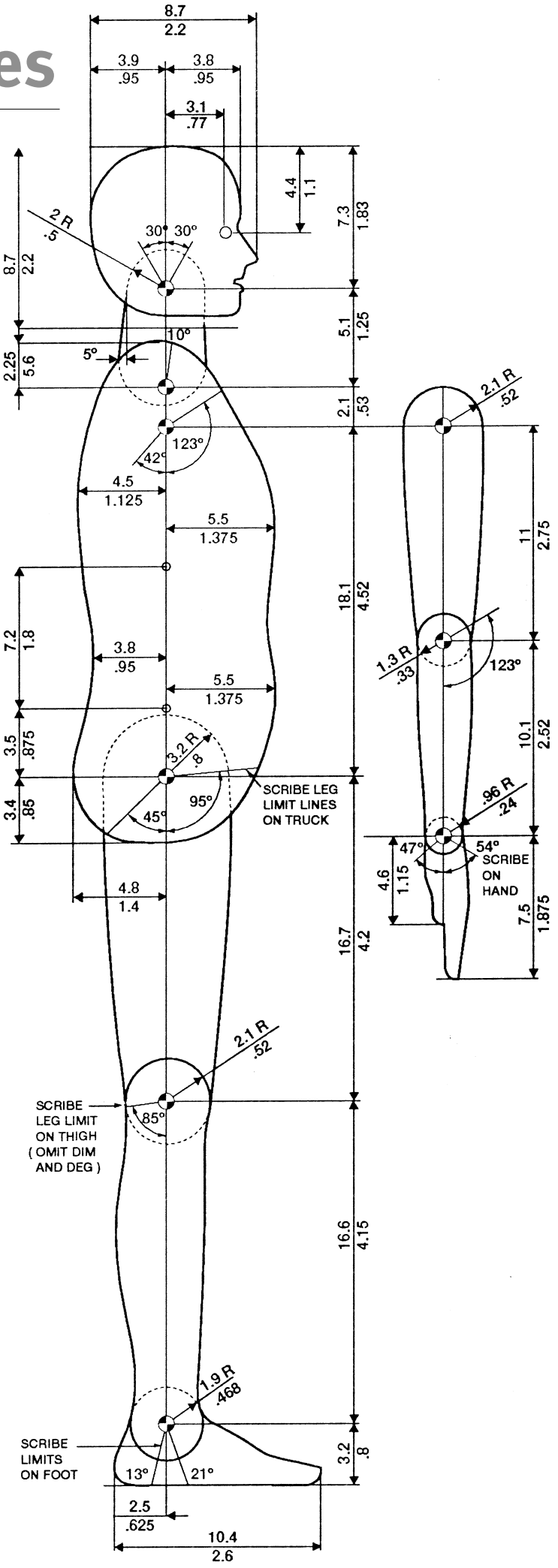
1. Trace the different parts of the diagram so that you have: 1 head, 1 neck, 1 body, 1 upper leg, 1 lower leg, 1 foot, 1 upper arm, 1 lower arm and 1 hand. (Make sure that you follow the dotted lines when tracing neck and other parts.)
2. Cut out each of the traced pieces.
3. Stick the individual body parts onto stiff paper or thin card.
4. Cut out each piece of card.
5. Join the body parts at the places indicated on the diagram with split pins.

Use the ergonome you have made to check your chair design:

- Is the seat the correct size and height from the ground?
- Is the back the correct height?
- If you are designing a workstation, are the table and equipment set at the correct height for the user?

Buzz words

Ergonome – a cut-out pattern of the human body.
Maquette – a small sketch or model.
Proportion – the size of different things or parts in comparison to each other.



Maquette of the human body by Henry Dreyfuss.
This diagram can be enlarged or reduced on a photocopier so that you can use it at the size needed.

A Product analysis 1

Choose a chair and evaluate its design.

Use these questions to help you. It is important to use sketches to illustrate your observations.

- What materials has the chair been made from?
- How has the chair been constructed?
- Does the chair have moving parts? If so, describe how they work.
- What is the chair's function?
- Is it used to perform a particular task?
- Where would it be used?
- Who is the target group?
- Look at the ergonomics of the chair. Is the design successful?
- What improvements could be made to the chair's design? Sketch your ideas.

Buzz words

Analysis – a detailed examination; a method to work out how individual parts of a thing or idea relate to the whole.
Ergonomics – the study of humans in relation to their environment.
Evaluate – to judge the worth or price of something.
Function – the intended purpose of a thing or person.

A Product analysis 2

Draw the chair that you are looking at. Circle the areas that describe the chair that you are studying:

Size: large/small tall/short high/low wide/narrow

Use: dining/relaxing working/playing indoor/outdoor

Shape: upright/reclining angular/curved

Materials: soft/hard warm/cold wood/metal/plastic/fabric

Now write down three different ways that you could improve the chair.

Buzz words

Angular – having angles or sharp corners.
Curved – bent.
Reclining – leaning back.
Relaxing – resting.
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A Chair design brief

Design a chair that has been inspired by a favourite painting or image.

Study the chairs by Rietveld and Mendini seen here and on the D for designing sheets. Research the two paintings that inspired them.

Choose an image/painting that you like and use it to influence your designs. The shape, surface pattern or materials could be the focus of your creation.

Use the ergonome you have made to check your design.

Buzz words

Inspire – to give a sudden brilliant, creative or timely idea.
Influence – to have an effect on.
Research – to investigate into; study.

Poltrana di Proust by Alessandro Mendini, 1978

Red/Blue Chair by Gerrit Reitveld, 1918