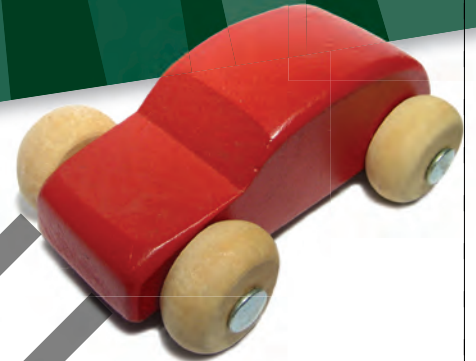


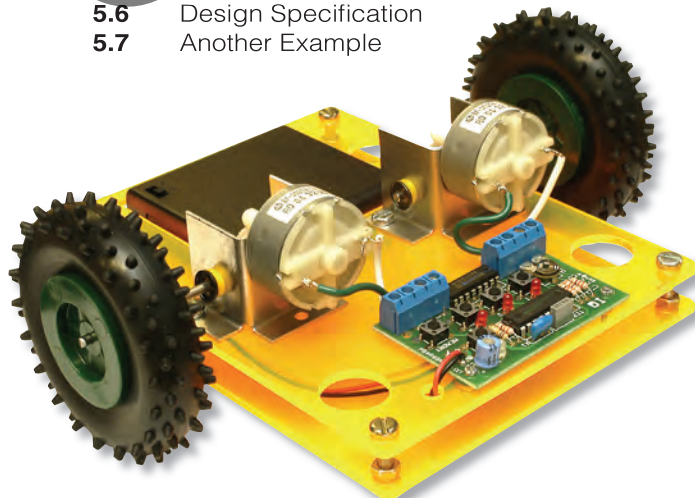
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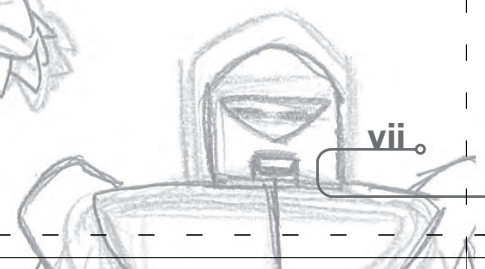
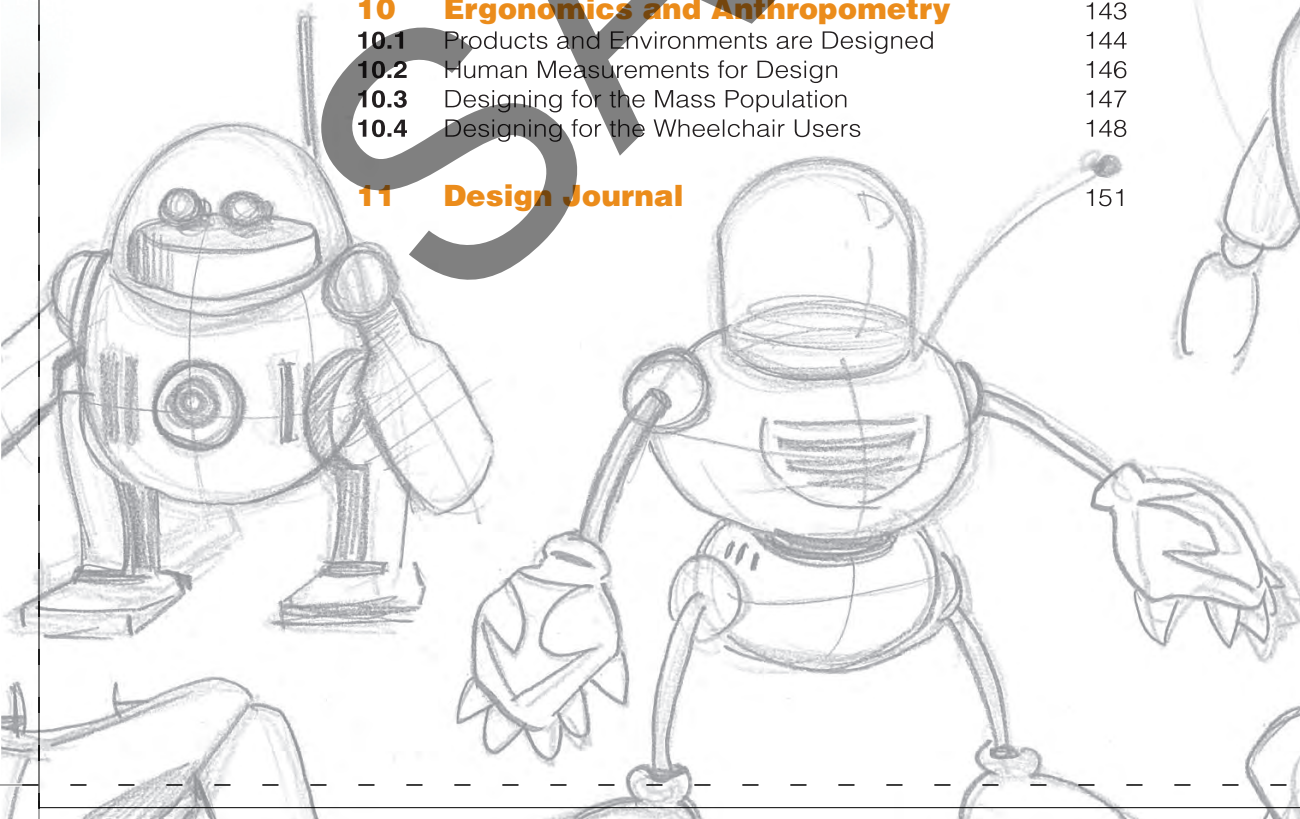
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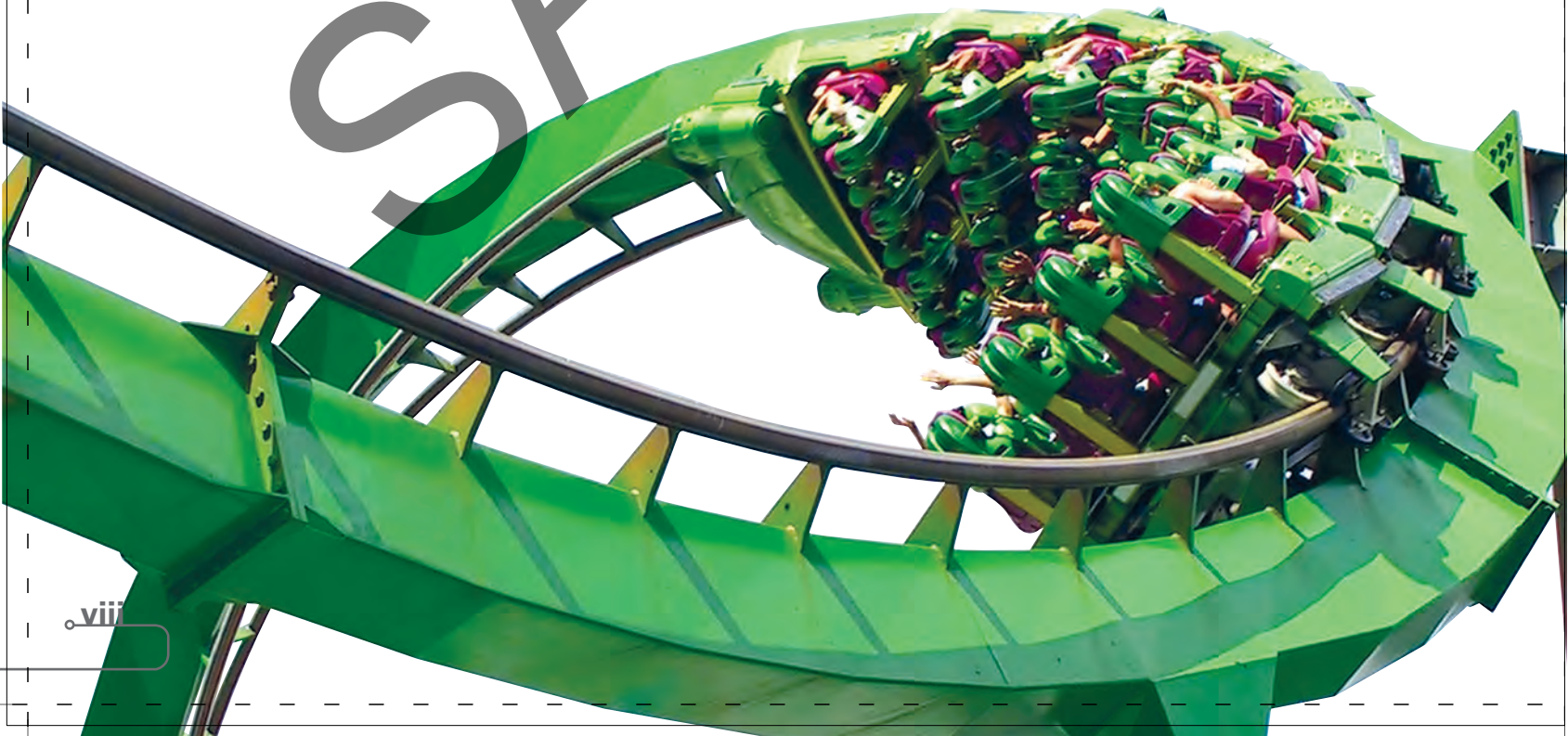




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1 What is Design & Technology?

Design & Technology is an exciting subject in which you will discover more about the made world we live in. You will find out why things are designed in a certain way, understand how they work and learn to appreciate the work of good designers. With the knowledge and practical experience you gain, you will be better equipped to influence the made world of tomorrow.



1.1 DESIGN & TECHNOLOGY AROUND US

Take a look at some of the many things around you. You may see buildings, cars, furniture, computers, telephones, jewellery sets, etc. They have all been designed to make life easier, more comfortable or enjoyable to us. But how do designers actually go about designing these things? What are the stages they go through from the initial idea to the final product? This book will guide you through the process of designing your very own products.



bracelet



phone handset



car



chair and leg rest



Eiffel tower

▲ 1.1 Some things in our made world.

1.2 MAKING THINGS WORK WELL AND LOOK GOOD

Some products look good but do not function well. Others may work well but look bad. To put it simply, Design & Technology is about how things can be made to work well and look good together. It describes a range of areas including invention, innovation and creativity.



▲ 1.2 Design & Technology is about how things work and look.

Making Things Work Well

An important part of a designer's job is to make sure a design not only looks good, but works well too. Designers must therefore have some knowledge of how people use things and technology to make products that are efficient and safe for use.

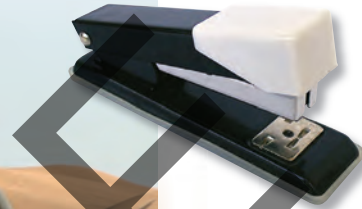
An understanding of **structures** will help you when designing products such as furniture, packaging, models of buildings and bridges, brackets for heavy loads and chassis for vehicles.



▲▶ 1.3 Products that make use of structures.



An understanding of **mechanisms** will help you when designing products such as automata, moving display systems, buggies, tools, mechanical robots and other machines.



▲ 1.4 Products that make use of mechanisms.

An understanding of **electricity and electronics** will help you when designing products such as alarms, robots, timing devices, lights and electronic toys.

You can find out more about Technology in Chapters 12, 13 and 14.



▲ 1.5 Products that make use of electricity and electronics.

The choice of materials is an important consideration in Design & Technology. There is a wide range of materials to choose from, each type having a unique set of properties. An increasing number of products today are made from smart materials that respond to environmental changes in useful ways. Some change colour, some change from being an electric conductor to an insulator and some have a memory. You can find out more about materials in Chapter 15.



▲ 1.6 A group of smart materials.

Making Things Look Good

Besides designing things to work well, it is also important to design things that look good.

In Figure 1.7, the designer of this popular hotel in Dubai came up with the idea of using a sail form to match the surrounding beach environment. This aesthetically-pleasing design helps to enhance the otherwise plain-looking environment.



▲ 1.7 A new building should blend well with its surroundings.



▲ 1.8 Different types of watches to suit different users.

A product should appeal to the users in terms of appearance and feel so that people will want to buy it. All watches tell time, but the factors that attract users to make a decision could be the look of the design including shape, form, colour, texture, pattern, proportion and balance. These factors determine the **aesthetics** of a product. You can find out more about aesthetics in Chapter 9.

1.3 SAFETY AND ENVIRONMENTAL ISSUES

For a design to work well, it should be comfortable and safe to use. A design that causes discomfort or possible injury is not ideal for use. Designing for comfort and safety is called **ergonomics**. You can find out more about ergonomics in Chapter 10.

Designers are responsible for the impact their designs have on individuals and on our society. If a design leads to undesirable consequences, or is likely to offend a particular group of people, then one has to reconsider the necessity for that design.

Designers are also responsible for the impact their designs have on the environment. Wherever possible, products should be made from recycled materials and be designed in such a way that they can be easily recycled in turn.



▲ 1.9 Products that people use, should be ergonomically designed.

1.4 IMPACT OF DESIGN & TECHNOLOGY

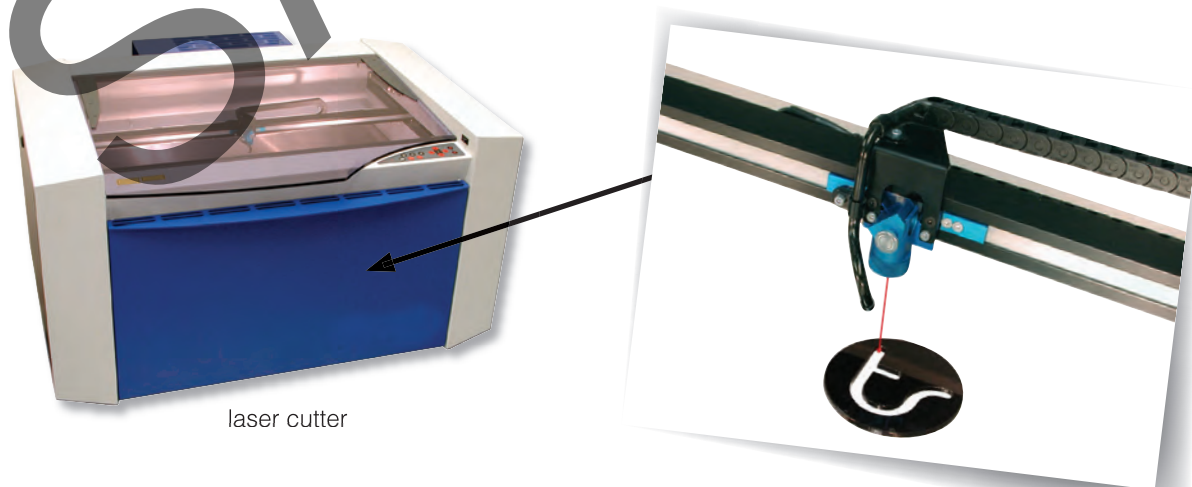
The products we use today are very different from what they used to be. Some have been re-designed many times in the course of their development, with each new design having a new look, or new technology. Telephones today, for example, look very different and work differently from the first telephone invented by Alexander Graham Bell in 1876. Today's phones use digital technology and slip easily into a pocket.

The changes in the design of a product in the course of its development are described as the design evolution of the product. Some factors influencing the design evolution include:

- the development of new materials, processes and technologies;
- the consumer demand;
- the government legislation; and
- the designer factors such as motivation, creativity, determination and resourcefulness.

New designs are often the result of new technology, but new technology can also be driven by new designs.

New technology may also allow a manufacturer to produce products at lower costs or with greater efficiency. Many modern manufacturing processes are controlled by computers. Designs are prepared using Computer-Aided Design (CAD) software and the computer subsequently activates the machine to make parts of the whole design. Some of the machines you have at school might be computer-controlled, like the milling machine or the laser cutter in Figure 1.11. A laser cutter uses a laser beam to cut through material quickly and easily, leaving a perfect finish.



laser cutter

▲ 1.11 Computer-controlled machines used in schools.



▲ 1.10 Telephones old and new.

Design & Technology affects us and our society in many ways. Look at the following examples:

Communications

Mobile phones let us communicate from anywhere in the world at the touch of a few buttons. However, irresponsible use of this technology can sometimes be a nuisance to others.



▲ 1.12 Individual using a mobile phone.

Transportation

Motor cars enable us to travel conveniently from one place to another. Modern cars are much more efficient than older cars. Environment-friendly electric vehicles are gaining popularity.

Flights are also getting cheaper as more people travel, but more flights would generate more pollution and contribute to global warming.

Have a **Go!**

The Sinclair C5 electric vehicle was invented some years ago as an alternative to the motor car. Do a search on the Internet, gather the information and discuss whether it was a success or a failure.

A photograph of a white, three-wheeled electric vehicle (Sinclair C5) with a black interior and a black seat. It has a small red light on the back and is shown from a side profile against a light blue background.

▲ 1.13 Sinclair C5 electric vehicle.



▲ 1.14 Transportation systems like this aircraft can contribute to global warming.



▲ 1.15 Computer game controller.

Entertainment

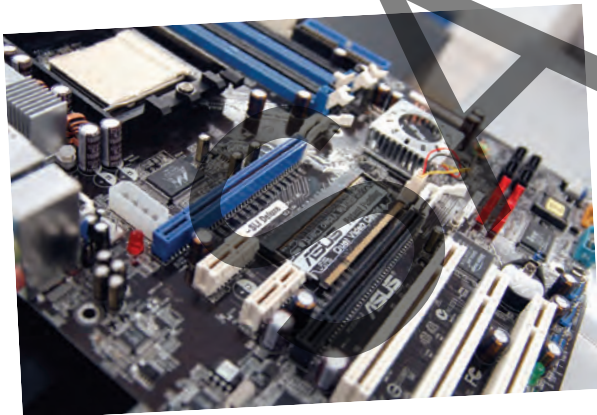
Computers have transformed the way we entertain ourselves. Computer graphics are widely used in the film industry and computer games are highly popular. One consequence of computer games is that players spend hours playing them. What are the problems that might result from this?

Sports

Developments in clothing and footwear have significantly improved athletes' performances in recent years. New materials that are light but strong are used for making sports attire, rackets, bicycle frames, sailboards and a wide range of other sports equipment. An example of new material is the elastic Titanium used in the frames of some badminton racquets.

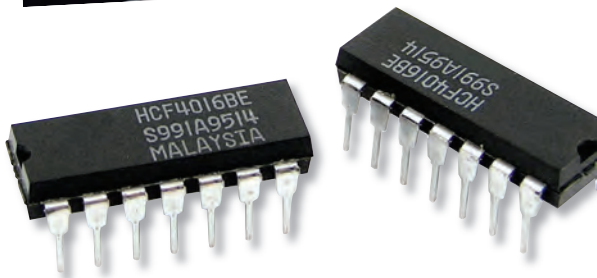


▲ 1.16 Modern sports equipment use state-of-the-art materials.



Electronics

Since the invention of the transistor in 1947, electronic technology has developed faster than any other form of technology. By 1959, the first microchips were in production, containing a handful of transistors. Some of today's microchips contain millions of electronic components, and are used in a wide variety of products – from kettles and watches to aircraft and computers. Microchips are made from very thin wafers of silicon using highly specialised equipment. They can cost millions of dollars to develop.

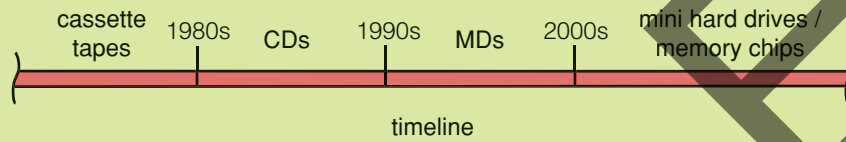


▲ 1.17 Microchips are used in different electronic products.

'Smartcards' such as ez-link cards, identity cards and credit cards contain microchips for storing personal information. Unscrupulous people have been known to swipe other people's information from credit cards for their own benefit.

You may like to **know**

The first personal stereo, introduced by Sony in 1979, was designed to play cassette tapes. In 1980s, compact discs (CDs) replaced cassette tapes and a new range of personal CD players was developed. In the 1990s, yet another range was developed for the mini-disc, which could record with CD quality. Today's personal stereos which incorporate mini hard drives or memory chips are much more compact than the original Sony Walkman.



compact disc player



mini disc player



walkman



▲ 1.18 Evolution of the personal stereo system.