Technology

1-2 ESO

This book is dedicated to you.
I hope it will be your favourite book.

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Author: Gonzalo Morillo Díez

Editors: Mathew Mendoza & Ann Taylor

www.esobook.es

esobook@live.com

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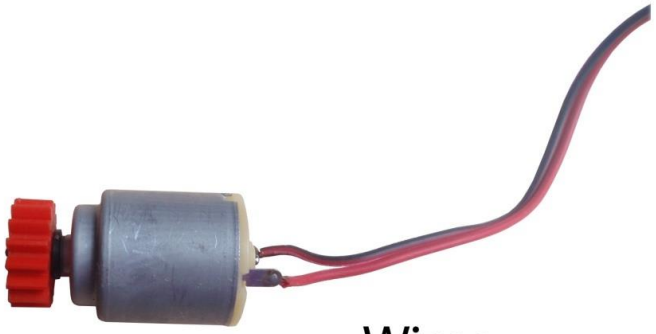


Wires

Motor

Nut

Bolt

Spanner

Chapter 1

WHAT IS TECHNOLOGY?

Technology is how we make things, things that make our lives more comfortable and our work more productive: ploughs, chairs, telephones...

In technology we use tools and knowledge to make things.

1.1 Is technology related to society?

Yes, for example, thanks to telephones, we can talk to people who are far from us. But telephones exist because we want to talk to people who are far from us.

The relation between science and technology is strong.

For example, telescopes help us understand the universe, and understanding the universe helps us to construct satellites.

Homo Habilis started technology with a technique to make fire.

This happened hundreds of thousands of years ago.

Fire was good for heating and grilling meat.

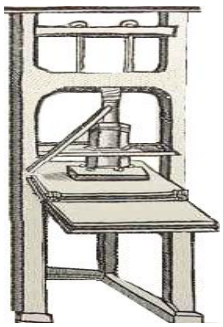
Later, people converted natural resources into simple tools, for example stone axes.

Axes are good for cutting trees.

Modern humans continue to invent things.

The wheel (invented around 2700 BC) helps us to travel and transport merchandise.

It is hard to imagine today`s world without the wheel.



Recent technological developments, the printing press, the telephone, the internet, etc. help us to communicate on a global scale.

Technology helps develop more advanced economies.

But we don't always use technology peacefully. Weapons are now more powerful.

Many technological processes produce unwanted by-products, called "pollution".

Technological activities consume natural resources.

Experts propose a change in our way of life to reduce pollution emissions.

Some new technological developments raise ethical questions, especially in biotechnology and genetic engineering.

21 Imagine the world without technology. Describe it.

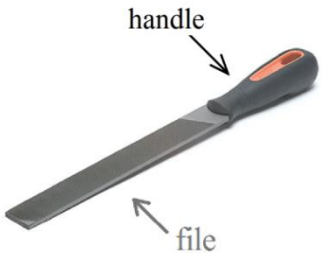
22 Which do you think that is the best invention? Why?

23 Debate the present and future of technology in society. How do you think technology will be in ten years?

24 Name three technologies that help us to communicate.

25 Which two fields of technology are rising most ethical questions?

1.2 Names of the tools in the workshop

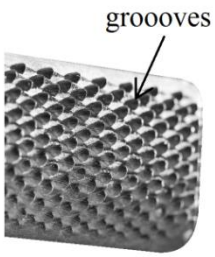


Metal File

We use the metal file to remove small amounts of metal.

You can also use it to remove small amounts of wood. We get a better finish than with the wood file.

The finish is better with the metal file than with the wood file because the grooves of the file are smaller. That is also why the metal file removes less material.



Wood File

The grooves of the wood file are large.

We use it to remove parts of the surface of the wood and to give a finish to the surface.

The wood file removes more wood than the metal file, but the finish is worse.

Hammer

You probably know how to use it, but be careful!

Hammers normally have a wooden handle; wood is light and absorbs vibrations well.

The head is metallic. Metals are heavy and resilient (resistant to fracture by impact).

Ruler

We use the ruler to draw straight lines and also to measure things.

Normally, on one side there is a scale in centimetres and millimetres and on the other there is a scale in inches and eighths of an inch.

There are ten millimetres in a centimetre. There are eight eighths of an inch in an inch.

In some countries people use inches as a unit of length. One inch is approximately two and a half centimetres.

26 To file a piece of wood we first use the wood file and later the metal file. Why do we use the wood file first? Why do we use the metal file later?

27 1 inch is approximately 2.5 cm. How many centimetres are 5 inches?

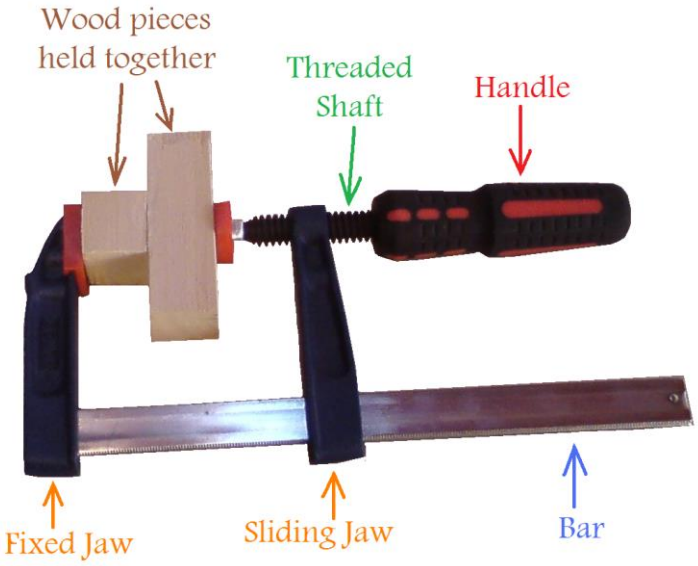
Hand Clamp

We use the hand clamp to hold together two pieces.

For example, if we want to glue two pieces of wood with a glue that takes time to set, we can use the hand clamp to keep the two pieces together while the glue sets.

The jaws are made of metal.

The sliding jaw has an inner thread for the shaft, which has a screw to tighten the wood pieces.



Handles are made of wood or plastic with rubber.

The bars are made of steel or aluminium. They have stops to keep the sliding jaw in position.

If the bars are made of aluminium they are lighter; if they are made of steel they are stronger.

Bench Clamp

We use the bench clamp to hold pieces that we want to work with.

For example, we clamp a wood board to saw it comfortably.

The bench clamp is stronger than the hand clamp and is fixed to the bench.

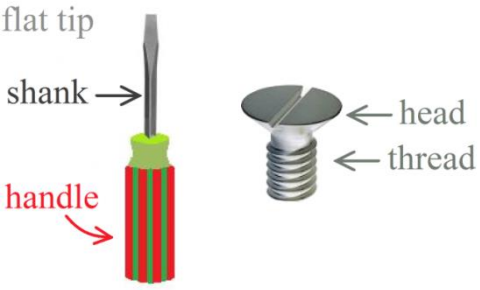
The bench is the workshop table, made of a thick board.

28 When would you use:

a) A wood file
b) A metal file
c) A ruler
d) A bench clamp

29 Name the parts of the hand clamp and explain their function.

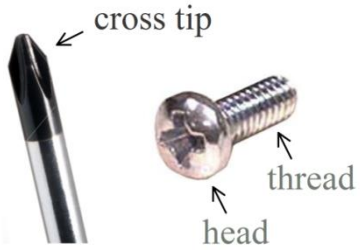
30 Why do you think that we work more comfortably with the bench clamp?



Flat screwdriver

As its name indicates, the head of the flat screwdriver is flat.

It is used to screw and unscrew screws with a single slot in their head.



Cross head screwdriver

The difference between the flat head and the cross head screwdrivers is in the tip.

The cross head screwdriver has a crossed-head tip and the flat head screwdriver has a flat tip.

Pliers

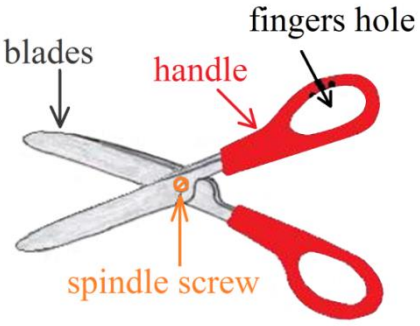
We use pliers for a variety of purposes. The most common use is to grip objects to work with them, for example to undo a bolt or to bend a wire.

Pliers have parallel handles, a spindle where the handles join, and parallel jaws that grip the object.

There are special pliers for specific purposes, such as cutting wire or bending wire.

A special type of pliers is the “plumber's pliers”, on which we can adjust the width between the jaws.

Scissors



Scissors have two steel blades that rotate around a spindle screw.

A pair of scissors cuts better or worse depending on how sharp the blade edges are.

In the handle there are holes for the fingers so that we can move both blades at the same time with only one hand.

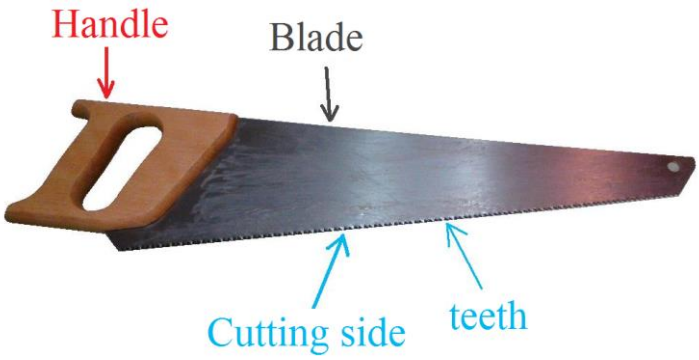
The handle is normally made of plastic glued to the steel.

31 Draw a screwdriver and label its different parts.

32 Look at the drawing of the scissors:

a) What is the function of the "spindle"?
b) What is the function of the "blades"?
c) What is the function of the "fingers hole"?
d) What is the function of the "handle"?

Wood Saw

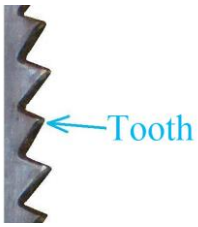


There are many types of saws, each designed for a specific purpose.

Some are rigid so that the cut is straight.

Some are good to cut curves.

Some are good to cut big things.



If the teeth are big, the cut is rougher.

If the teeth are small, the end result is smoother.

Metal Saw

There are many types of metal saws, but the most common one (and the one which you probably have in the workshop) is like the one shown here.

The difference from the wood saw is in the teeth of the blade.

The teeth of metal saws are smaller, so we remove less material with each stroke.

The teeth of metal saws are made of a much harder material.

The teeth must be harder than the material that they cut. If not, the teeth soon wear down.

33 When sawing, what kind of teeth give a smoother result?

34 Which tools have:

a) A handle
b) One blade
c) A spindle
d) A flat tip
e) Teeth
f) Two blades

35 Name two tools that have a spindle.

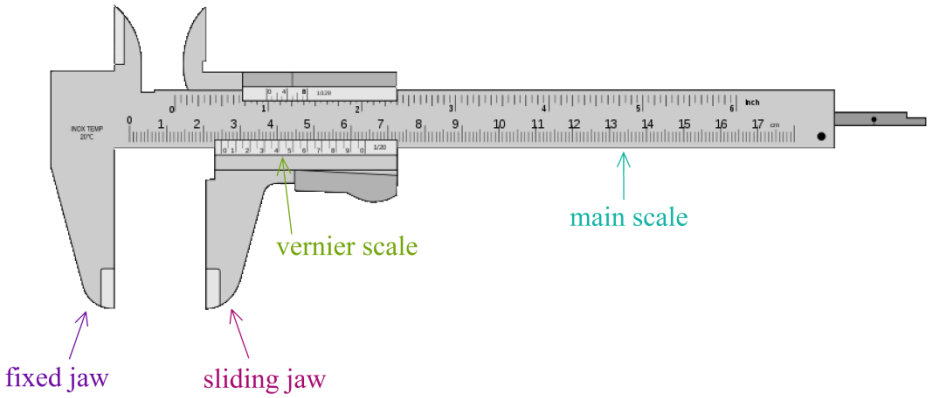
36 Describe the teeth of the metal saw.

37 Do you have tools at home? What tools? What do you do with them?

38 Imagine a new tool. Describe what it does, its shape …

Vernier calliper

We use the calliper to measure small things with precision (0.1 mm).



1st We put the object that we want to measure between the two jaws.

2nd We slide the sliding jaw until both jaws gently enclose the object.

3rd We look at the main scale of the caliper. The value of the main scale that coincides with the zero mark of the Vernier scale is the length of the object in millimetres, for example, 135mm.

4th If the zero mark of the Vernier scale does not coincide exactly with a millimetre mark on the main scale, we take the smaller value.

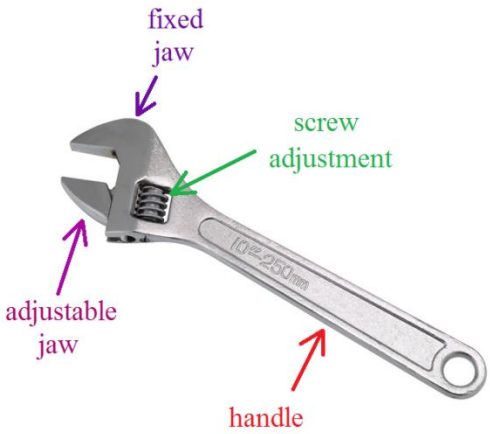
5th To know the decimals of millimetre we look at the Vernier scale.

There is a mark on the Vernier scale that coincides with a mark on the main scale, it is the value of decimals of millimetre.

For example, if the mark that coincides is the "7", then it is 0.7mm.

Adding both numbers gives the dimension: 135.7mm.

Spanner



Spanners are the tool to tighten and loosen nuts and bolts.

There are several types: the open spanner, the ring spanner and the adjustable spanner.

The story of the adjustable spanner started in Sweden in 1886, in the mechanical workshop of Johan Petter Johansson.

There was no standardisation of the sizes of nuts and bolts and it was necessary to have many different spanners.

Johan thought of having only one spanner with an adjustable width and so he designed, patented and made the first adjustable spanner.

39 What is the function of the spanner?

40 What problem solved Johan by inventing the adjustable spanner?

Activities

21 What is technology?

22 Write six examples of the relation between technology and society.

23 Name three inventions that help us to communicate.

24 Which was the first technological development?

25 Search for information about the origins of paper. Write down a 20 lines summary.

26 Order chronologically these inventions: Printing press, stone axe, the wheel, internet

27 Technological objects are useful. For example, the drill is useful to make holes. Explain why these technological objects are useful:

a) A Plough.
b) Chair.
c) Telephone.

28 Which type of file has smaller grooves? Why?

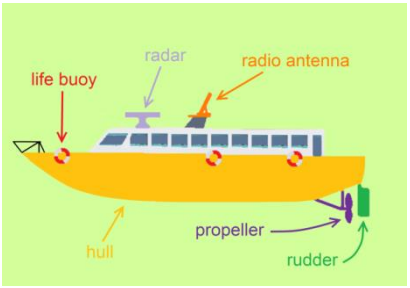
29 Why do you think that hammers have a:

a) Wooden handle b) Metallic head

30 Using a ruler with two scales, one in centimetres and one in inches, draw a line of ten centimetres and then measure it with the inches scale.

a) How many inches long is it?
b) Now, using the inches scale, draw a line two inches long and another six inches long. How many centimetres long are they?

31 Technology sometimes has a specific vocabulary. For example, technological items are often made of parts with specific names.



For example a boat has several parts.

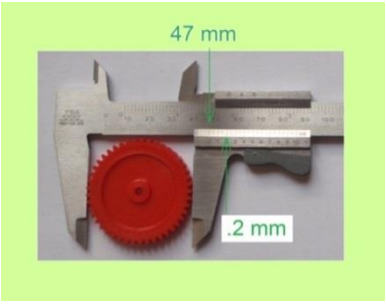
Choose another object, for example a lamp, a bicycle, a tap … draw it and write the names of its different parts.

32 What happens if you saw with a saw that has:

a) Large teeth
b) Small teeth

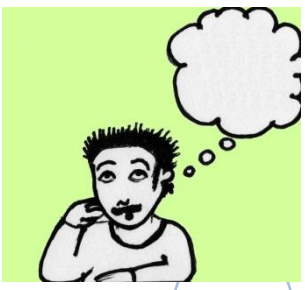
33 What do we use the calliper for?

34 With the calliper, measure the width of an object.



Write down your reading. In the example the reading is 47.2 mm.

Compare your readings with the readings of other students.

35 Why did Johan invent the adjustable spanner?

36 Can you think of a new invention for the future?