

Ecole Supérieure en Sciences Appliquées  
Tlemcen

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1st year Programme of English

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## **Preface**

This work presents a series of ESP (English for Specific Purposes) courses that are currently applied for 1st year engineering students. It covers texts exercises and activities related to oral as well as written skills. It tries to provide a more or less wide range of vocabulary items and grammatical structures to improve scientific in addition to technical English of the learner. Thus, a better understanding of formal scientific English and its application are expected.

These courses are primarily addressed to educators, who play a very important role in the growth and development of ESP. Hence, scientificity as one of the basic factors that influence the learner's behavior will help to provide for better means of meeting the complex needs of ESP learning with varied mental abilities and linguistic tools.

Grateful acknowledgment is here made to those who helped this researcher gather data for this paper. This work would not have reached its present form without their invaluable help.

# Unit One : Diagrams and Description of Objects /Devices

## 1.1 Computers

### Warm up : Computers

Aim : to introduce the learners to the main purpose of the unit.

### 1-Watching a video on computers :

<https://www.youtube.com/watch?v=7cXEOWAStq4>

a-A short debate follows the video about its content :

Eg : What is presented in this video ?

### 2-Vocabulary: Match each of the following word with its correct definition :

Aim : to introduce some of the vocabulary items of the computer.

- |               |   |
|---------------|---|
| a) Data       | 1 -Handling or working something.                               |
| b) Processing | 2-Pieces of information.  |
| c) Computer   | 3-A person who prepares plans to do a work.                     |
| d) Input      | 4-A step by step plan.  |
| e) Output     | 5-System of communication that consists of symbols and signals. |
| f) Programme  | 6-The result given by a computer.                               |
| h) Programmer | 7 -An electronic machine or device used for solving problems.   |
| g) Code       | 8 -Instructions or information given to a computer.             |

### Text 1:

### COMPUTERS



Computers are used nowadays for many different kinds of work, in offices, banks, factories, hospitals, universities, schools, and many other places. Their use is becoming more

widespread as cheaper and smaller computers become available. There are three main kinds of computers in use today: the mainframe, the minicomputer and the microcomputer.

What are computers and what can they be used for?

Computers are electronic machines that process information. They can accept information in the form of letters and figures, known as the input data. This can be put in by various means including keyboard, tape or cards. This data is processed according to a set of instructions called a pro-gram, and the results of this program, the output data can be printed out or shown on a screen.

All the processing is done by a series of arithmetic and logical operations, such as addition, subtraction and deciding whether one number is greater than another. The computer itself is known as the hardware, in contrast to the programs which are the software:

Computers can process large amounts of data very quickly, and this is why they are so useful. They can process different types of data, too. A scientist or engineer for example may use a computer to do numerical calculations. A businessman may want to analyze a list of customers or keep a record of how much stock he has. An engineer can produce diagrams and plans on a computer.

Computers are changing our world and civilization in the same way as the invention of the printing press did in the fifteenth century.

(Encarta, 2000)

## 1.2 Reading Comprehension :

**1-Activity one:** Choose the phrase (a, b, or c) that best expresses the main idea of the text.

- a– History of computers.
- b– The importance of computers in modern life.
- c– How to use a computer.

**2- Activity two :** Read the text again complete the table below. Write in the information in the order it appears in the text :

Computers are used in...	Computers can be used by...	Computers can...
.....	.....	.....

.....	.....	.....
.....	.....	.....

**Dialogue :** Complete the dialogue below using the information in activities 1 and 2 :

**You :** What are you reading ?

**Your friend :** A text about computers.

You : Really ! .....

Your friend : .....

**1.3 Structure Practice :**

**1.3.1 WORD FORMATION : Prefixes**

Observe.

In			
Im			
Il	+ Adjective	=	Adjective (OPPOSITE)
Ir			
un			

**Example:**

capable  $\neq$  incapable

possible  $\neq$  impossible

**Exercise A:** Form the opposites of the words below.

flexible  $\neq$     pure  $\neq$     literate     $\neq$

soluble  $\neq$     reparable  $\neq$     legible     $\neq$

skilled  $\neq$     relevant     $\neq$     identified     $\neq$

regular  $\neq$     breakable  $\neq$

**Exercise B:** From the list in Exercise A find the words that correspond to the following definitions.

1. That can be changed especially in its form or shape:
2. A person who cannot read and write:
3. That is not fragile:
4. That we can read easily:
5. Not mixed with anything:
6. Who hasn't got enough experience (eg: worker, teacher, doctor...):
7. That can be dissolved in a liquid like water:

**Exercise C:** From the list in Exercise A complete the following sentences.



1. Sand is  in water.
2. Steel is  ; it will break under high pressure.
3. Water taken directly from the river is  to drink.
4.  technicians don't usually get good salaries.
5. Doctors' prescriptions are often .

**1.4 Communication : Activity One : The World of Computers :**  
**Complete the categories in the chart below :**

browse Web sites	drag and drop	keyboard	scan photographs cut and
paste	hacker	monitor	surf the net
disk drive	highlight text	mouse	technophile
double click	geek	play games	whiz

People who are 'into' computers	Types of computer hardware	Funny things to do with a computer	Things to do with a mouse
.....	.....	.....	.....
..	..	..	..
.....	.....	.....	.....
..	..	..	..
.....	.....	.....	.....
.	..	..	..
.....	.....	.....	.....
.	..	..	..

**Dialogue : Complete the dialogue below :**

**Jenny:** Can I borrow..... to call my boss ?  
**Richard:** I can't believe you still don't have ..... Here you go.  
**Jenny:** Thanks. Now, ..... do I need to do ?  
**Richard:** First of all, be sure to.....it..... , and don't .....to ..... the area code.  
**Jenny:** Ok, I can..... the number, but I can't hear .....  
**Richard:** That's because you haven't ..... the call.....  
**Jenny:** Oh, it's ringing.  
**Richard:** Try not to get too excited. You'll probably ..... his voice mail.  
**Jenny:** You're ..... It's a recording.  
**Richard:** Make sure to hit the ..... button or else you'll leave our conversation on his voice mail.

## **1.5 Text 2:      The Light Bulb**

Thomas Edison's first successful light bulb model was used in public demonstration at Menlo Park in December 1879. Edison did not invent the first electric light bulb, but instead invented the first commercially practical incandescent light. Many earlier inventors had previously devised incandescent lamps, including Alessandro Volta's demonstration of a glowing wire in 1800 and inventions by Henry Woodward and Mathew Evans. Others who developed early and commercially impractical incandescent electric lamps included Humphry Davy, James Bowman Lindsay, Moses G. Farmer, William E. Sawyer, Joseph Swan and Heinrich Göbel. Some of these early bulbs had such flaws as an extremely short life, high expense to produce, and high electric current drawn, making them difficult to apply on a large scale commercially.

After many experiments, first with carbon filaments and then with platinum and other metals, in the end Edison returned to a carbon filament. The first successful test was on October 22, 1879; it lasted 13.5 hours. Edison continued to improve this design and by November 4, 1879, filed for U.S. patent 223,898 (granted on January 27, 1880) for an electric lamp using "a carbon filament or strip coiled and connected to platina contact wires".

Although the patent described several ways of creating the carbon filament including "cotton and linen thread, wood splints, papers coiled in various ways", it was not until several months after the patent was granted that Edison and his team discovered a carbonizedbamboo filament that could last over 1,200 hours. The idea of using this particular raw material originated from Edison's recalling his examination of a few threads from a bamboo fishing pole while relaxing on the shore of Battle Lake in the present-day state of Wyoming, where he and other members of a scientific team had traveled so that they could clearly observe a total eclipse of the sun on July 29, 1878, from the Continental Divide.

**Wikipedia.**

### **1.5.1 Reading Comprehension:**

**Activity one: Answer the questions according to the text:**

1- Was Thomas Edison the first to invent the the lamp? Why?

2- What negative properties did the early bulb have?

**Activity two: Mark the sentences as true or false:**

- 1-The first light bulb functioned for a long period of life.
- 2- The first successful test happened after the first experiment.
- 3-Edison was granted the patent before he discovered a carbon filament.
- 4-Thomas Edison was not the only scientist who worked on the invention of the bulb.

**1.6 Video Watching: Phone Conversation**

<https://www.youtube.com/watch?v=oEThDLRNtM4&t=89s>

**1.7 More Practice:**

**Activity one: Add either ic or cal suffixes to get adjectives:**

Academy, algebra, arithmetics, artist, athlete, catholicism, domest..., drama, egoist..., emphat...., energy, fantasm, geometry, strategy, linguistics, majestic, neurot....., pathet....., pedagogy, phonetics, publ....., semantics, syntax, system, tragedy.  
Alphabet....., alphanumeric....., archaeologi....., bibli....., biologi....., chemi....., chronologi....., criti....., cyni....., ethi....., grammati....., fanati....., illogi....., logic, mathematics, mechanics, medi....., music, pedagogy, physics, radi....., surgery, tactics, topi.....

**Activity two: Complete these suggestions for the problems. Use the words in the box in the correct form :**

check	increase	replace	return	use
-------	----------	---------	--------	-----

- A : I keep getting spam email in my inbox.  
B : Try ..... your security setting.  
A : I bought this printer in a shop yesterday, but the tray is damaged.  
B : Why don't you ..... it to the shop and ask for a replacement.  
A : Help ! I can't connect to the internet.  
B : You could ..... the cables first.  
A : My digital camera isn't working.  
B : I suggest you try ..... the batteries.  
A : I can't download digital photos on my computer.  
B : Try ..... a different memory card.

## **1.8 Text 3 : Global Positioning System**

The **Global Positioning System (GPS)** is a space-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

The US began the GPS project in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. The U.S. Department of Defense (DoD) developed the system, which originally used 24 satellites. It became fully operational in 1995. Roger L. Easton, Ivan A. Getting and Bradford Parkinson are credited with inventing it.

Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS and implement the next generation of GPS Block IIIA satellites and Next Generation Operational Control System (OCX). Announcements from Vice President Al Gore and the White House in 1998 initiated these changes. In 2000, the U.S. Congress authorized the modernization effort, GPS III. In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. There are also the planned European Union Galileo positioning system, India's Indian Regional Navigation Satellite System, China's BeiDou Navigation Satellite System, and the Japanese Quasi-Zenith Satellite System.

[www.civilsimplified.com/resources/what-is-gps](http://www.civilsimplified.com/resources/what-is-gps)

### **1.8.1 Reading Comprehension :**

#### **Activity one : Reorder the following sentences according to the text :**

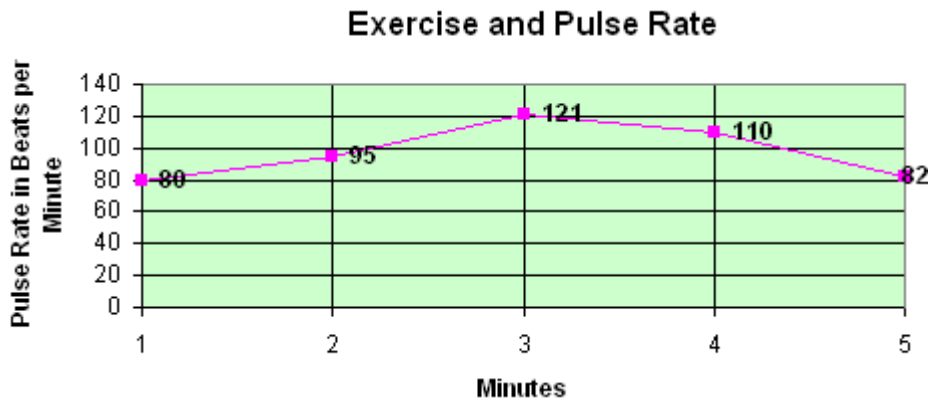
- A- The beginning of the use of the GPS.
- B- Other countries participate in the development of the positioning system.
- C- The information that GPS can provide.
- D- New systems are being developed.
- E- The GPS is being sophisticated.

#### **Activity two : Answer the following questions according to the text :**

- 1- How do GPS work ?

- 2- What new systems are being developed ?
- 3- Which system, better than GPS, can you suggest ? Describe it : aim- how it functions- shape- volume –energy that it functions with. How would you call it ?

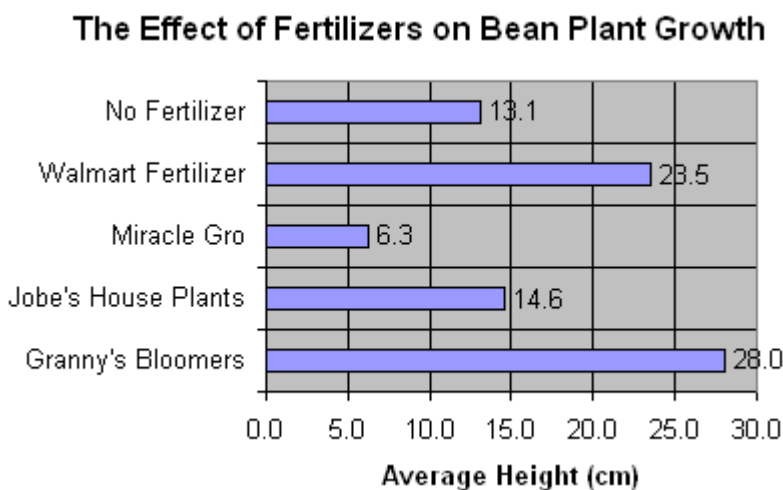
## 1.9 Practice Exercises: Data and Graphs



### a-Graph :

- 1-What is the largest number on the vertical scale?
- 2-What pulse rate was recorded at 2 minutes?
- 3-A pulse rate of 121 beats per minute was recorded at how many minutes?

### b-Refer to the bar graph below for Exercises 4 to 6.



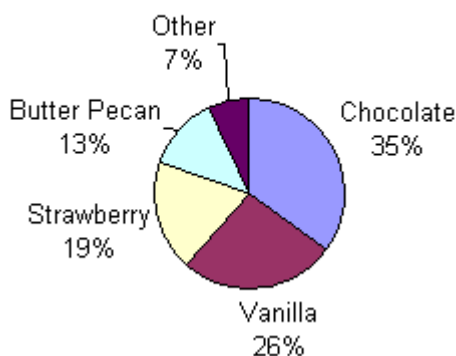
- 4-How many items are being compared in the graph?

5-What was the average height in cm for Granny's Bloomers?

6-What was the average height in cm for No Fertilizer?

c-Refer to the circle graph below for Exercises 7 to 10.

### Shrub Oak Ice Cream Survey



7- How many sectors are in this circle graph?

8- What percentage of people in Shrub Oak preferred chocolate ice cream?

9-If a total of 50 people were surveyed, then how many people preferred vanilla ice cream?

## 1.10 Present Tense: Present simple vs Present Continuous

### 1. Present simple

Present simple is used to talk about

- Permanent situations - situations that are generally or permanently true
- Routines and frequency - routines and things we do regularly
- Scientific or other facts
- Programmes and timetables - in this case present simple can refer to the future  
There are two flights from Minneapolis to Seattle. One **leaves** at 11.15 and **arrives** at approx. 13.30, and another one **leaves** at 17.15 and **arrives** at 18.40

### 2. Present continuous

Present continuous is used to talk about

- Moment of speaking - activity taking place at the moment of speaking
- Current projects - actions or activities and current projects that are taking place over a period of time (even if they not taking place at the moment of speaking)  
Holiday Travel Company has moved into the health and leisure business. It **is setting**

up new fitness club in the city and hopes to expand to other places.

- **Temporary situation** - indicates that actions or activity is temporary rather than permanent.  
Nicola organises our conferences and booklets publishing.  
(The present simple is used because this permanent responsibility.)  
Nicola is away on her vacation, so I am arranging all relations with publishing company.
- Slow changes - current trends and slow changes that are taking place  
The latest market statistics show that American economy **is strengthening**, and that the dollar **is rising**.

### 3. Present simple vs Present continuous

When considering use of Present simple or Present continuous use the following rules

#### A. Routine vs moment of speaking

1. John works for computer magazine. Every month he writes a computer market review.
2. Send this information to John. He needs it for a current review he's writing now.

In 1, we are talking about John's usual responsibility that he does as routine.  
In 2, we are talking about something he is doing at the moment of speaking.

#### B. General activity vs current projects

1. I work for Open University. We provide Internet based education courses.
2. At the moment we are preparing a videoconferencing course on mathematics.

In 1, we are talking about a general activity.  
In 2, we are talking about a specific current project.

#### C. Permanent vs temporary situation

1. Peter deals with enquiries about our book sales.
2. I am dealing with enquiries about our last published book while Peter is away on training courses.

#### D. Facts vs slow changes

1. As a rule, cheap imports lead to greater competition.
2. Cheap imports are leading to the closure of a number of inefficient factories.

#### E. Stative verbs

There are a number of verbs which describe states rather than actions. They are not normally used in the continuous form.

**e.g :** I'm sorry, I don't **understand** what you mean. (**thinking**)

Verbs of thinking	<b>believe, doubt, guess, imagine, know, realise, suppose, understand</b>
Verbs of the senses	<b>hear, smell, sound, taste</b>
Verbs of possession	<b>belong to, have</b> (meaning <b>possess</b> ), <b>own, possess</b>
Verbs of emotion	<b>dislike, hate, like, love, prefer, regret, want, wish</b>
Verbs of appearance	<b>appear, seem</b>
Other	<b>contain, depend on, include, involve, mean measure, weigh, figure</b>

**Exercise : Write the verbs either in the present simple or present continuous and give the grammatical aim:**

1. María (to work) for a TV station.
2. At the moment she (to travel) in the Sahara Desert.
3. Dan (to love) wild animals.
4. He (not to visit) Alaska at the moment.
5. Marta (not to live) in Africa.
6. She (to stay) in Africa at the moment.
7. Dad usually (to cook) dinner.
8. My parents (go) to Italy every year.
9. My sister (to walk) to school every day.
10. We (to have) lunch now.
11. I never (to stay) in on Saturday evening.
12. I (to go) to the cinema now.
13. My mum (to work) today.
14. Peter (not to like) rap music.
15. He (to listen) to pop music at the moment.



16. Donna usually (to go) shopping on Saturdays.
17. Let's go out. It (not to rain) now.
18. Hurry up! Everybody (to wait) for you!
19. The sun (to rise) in the east.
20. Water (to boil) at 100 degrees.
21. The water (to boil). Can you turn it off?
22. I must (to go) now. It is getting late.
23. I usually (to go) to work by car.
24. It (not to rain) very much in the summer.
25. The moon (to go) round the earth.
26. Stainless steel (to contain) chromium.
27. We all (to get) old one day.
28. The sun (to rise) at East.
29. The network (not to work) – the IT department  
(to try) to remove a virus.
30. The problem of global warming (to get) worse.
31. The population of Japan (to get) older.
32. River Thames (to flow) through London.
33. I usually drive to work, but I (to walk) while the  
weather is so nice.
34. They (to work) hard to earn money.
35. I (to train) to become a professional footballer.
36. Mike (to study) hard to become a doctor.
37. Elizabeth currently (to write) a children's book titled *I am the World*.

**1.11 Written Expression : 1-Choose a piece of equipment and use the information in the table to describe it in a paragraph :**

Name of invention (date) Name of inventor/country	.....
Firm/designer/engineer	.....
It is made up of	.....
It is consists of zoom, memory stick, battery and buttons.	.....
Describe the parts of the object	.....
it is a device	.....
it is used for	.....
you can use it for	.....
it is used to	.....
you use it to	.....
Function or purpose Need / aim	.....
Specifications e.g dimensions,shape,weight speed	.....
Materials & Properties Operation	.....
How it works Cost Innovation	.....
Safety features Advantages/Strengths	.....
Drawbacks/ weaknesses	.....
Suggestions for improvement	.....
	.....
	.....

**2- Use the notes in the table to write a paragraph :**

The instrument	It is used for	Its components
1- A mixer	Mixing food	<ul style="list-style-type: none"> <li>-Made of metal and plastic</li> <li>-5 parts</li> <li>-a base, a stand, a motor housing, beaters and a bowl</li> <li>-base /retangular/12cmwide and 15cm long</li> <li>-stand /supported/ the base/30 cm in height</li> <li>-the motor housing /joined to the standard</li> <li>-steel beaters/hard and tough</li> <li>-fitted in the gearbox</li> <li>-edge of the bowl /circular</li> <li>-glass bowl/detached from the base</li> </ul>

2- Now describe the object given above :

A kettle

Start like this :

A kettle is a metal container which is used for.....

### 1.12 Conversation

**Work in pairs : Write a dialogue using the notes below :**

#### Scientists

Who is the most famous scientist from your country? What did he/she do? In what ways has science most advanced society? In what ways has science had a negative impact on society? What do you think about evolution and other theories of natural selection? Do you like studying science? Why or why not? What natural disasters occur in your country? Explain why they happen. How do you feel about cloning? Do you think it's ethical for scientist to clone animals? What about human organs? In your opinion, what's the greatest medical advancement of the past century? Why? How has science influenced the way detectives investigate crimes? Do you think there is life on other planets? If so, how close is it and what does it look like? What's your favorite branch of science? (For example, biology, physics, astronomy.) Do you know how your computer works? If so, explain how. How have you personally benefitted from developments in modern medicine? What do you think will be the greatest medical breakthrough in the next ten years? What scientist do you respect the most and why? If you could contribute something to science or medicine, what would you do and why? In your opinion what has been the most important scientific discovery ever? Why? How would society be different if scientists hadn't discovered and developed electricity? How has science helped people to have children? What do you think of this? When do you think scientists will develop a cure for AIDS?

### 1.13 Keys :

#### Vocabulary:

a.....2      b.....1      c.....7      d.....8      e.....6      f.....4      g.....5      h.....3

#### Reading Comprehension :

Act 1: a

Act 2 :

Computers are used in...	Computers can be used by...	Computers can...
--------------------------	-----------------------------	------------------

work, in offices, banks, factories, hospitals, universities, schools,.....	A scientist or engineer A businessman	can accept information in the form of letters and figures, output data can be printed out or shown on a screen. can process large amounts of data very quickly, and this is why they are so useful. They can process different types of data, too. A scientist or engineer for example may use a computer to do numerical calculations. A businessman may want to analyze a list of customers or keep a record of how much stock he has. An engineer can produce diagrams and plans on a computer.
--	--	--

**2-Structure Practice :**

**Exercise A:**

inflexible    impure        illiterate  
insoluble    irreparable    illegible  
unskilled    irrelevant       unidentified  
irregular    unbreakable    inexperienced

**Exercise B:**

1. flexible
2. illetirate
3. breakable
4. legible
5. pure
6. inexperienced
7. soluble

**Exercise C:**

1. insoluble
2. unbreakable
3. impure.
4. unskilled.
5. illegible.

**Exercise:**

People who are "into" computers	Types of computer hardware	Funny things to do with a computer	Things to do with a mouse
.hacker..... whiz..... geek..... technophile.....	disk drive..... keyboard..... monitor..... moouse.....	browse web sites..... play games..... surf the net..... scan photo.....	cut and paste..... double click..... highlight text..... drag and drop.....

Jenny : Can I borrow your phone to call my boss ?  
Richard : I can't believe you still don't have a cell phone. Here you go.  
Jenny : Thanks. Now, what do I need to do ?

Richard : First of all, be sure to turn it on , and don't forget to dial the area code.

Jenny : Ok, I can see the number, but I can't hear anything .

Richard : That's because you haven't pressed the call button.

Jenny : Oh, it's ringing.

Richard : Try not to get too excited. You'll probably hear his voice mail.

Jenny : You're right . It's a recording.

Richard : Make sure to hit the end button or else you'll leave our conversation on his voice mail.

### **Activity one:**

1-No. Many earlier inventors had previously devised incandescent lamps, including Alessandro Volta's demonstration of a glowing wire in 1800 and inventions by Henry Woodward and Mathew Evans.

2-....early bulbs had such flaws as an extremely short life, high expense to produce, and high electric current drawn, making them difficult to apply on a large scale commercially.

### **Activity two:**

1-False. 2-False. 3-True. 4-True.

## **More Practice:**

### **Activity one:**

Academic, algebraic, arithmetic, artistic, athletic, catholic, domestic, dramatic, egoistic, emphatic....., energetic, fantasmic, geometric, strategic, linguistic, majestic, neurotic, pathetic....., pedagogic, phonetic, public....., semantic, syntactic, systemic, tragicomic.

Alphabetical....., alphanumeric....., archaeological....., biblical....., biological....., chemical....., chronological....., critical....., cynical....., ethical....., grammatical....., fanatical....., illogical....., logical, mathematical, mechanic, medical....., musical, pedagogical, physical, radical....., surgical, tactical, topical.....

### **Activity two: Complete these suggestions for the problems. Use the words in the box in the correct form :**

**A :** I keep getting spam email in my inbox.

**B :** Try to **increase** your security setting.

**A :** I bought this printer in a shop yesterday, but the tray is damaged.

**B :** Why don't you **return** it to the shop and ask for a replacement.

**A :** Help ! I can't connect to the internet.

**B :** You could **check** the cables first.

**A :** My digital camera isn't working.

**B :** I suggest you try to **replace** the batteries.

**A :** I can't download digital photos on my computer.

**B :** Try **use** a different memory card.

### **Text 3 : Activity one :**

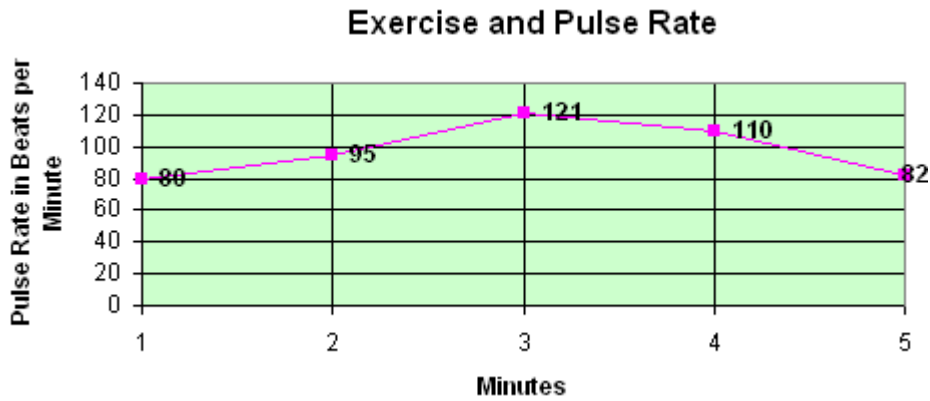
A-2    -B- 5    -C-1    D- 4    E-3

### **Activity two :**

1-§1 lines 1 and 2

2- §3 lines 2,3 and 6,7.

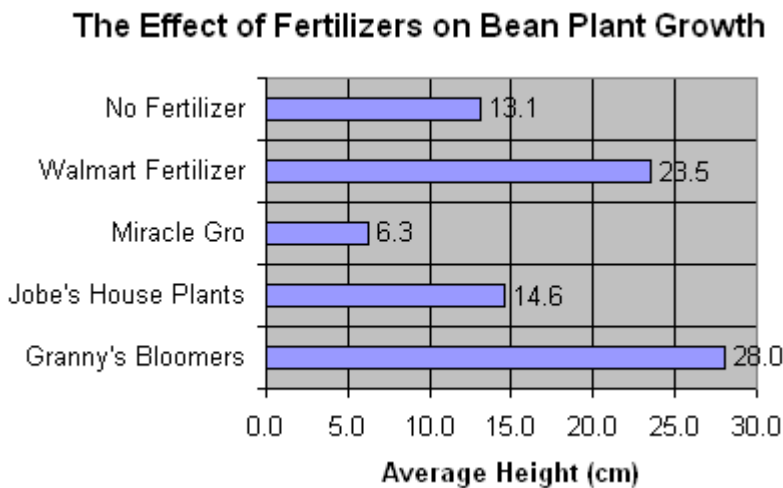
**Practice Exercises: Data and Graphs**



a-Graph :

1- 121    2- 95    3-120

b-Refer to the bar graph below for Exercises 4 to 6.



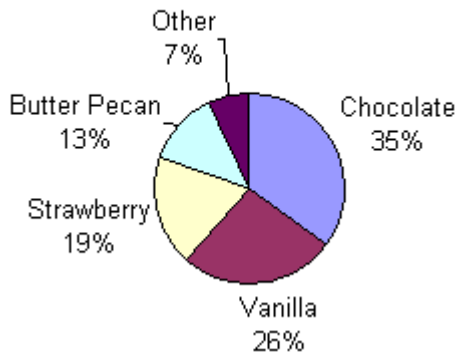
4- 4 items.

5-What was the average height in cm for Granny's Bloomers?25. 55

6- 15. 50

c-Refer to the circle graph below for Exercises 7 to 10.

## Shrub Oak Ice Cream Survey



7- How many sectors are in this circle graph? 5

8- What percentage of people in Shrub Oak preferred chocolate ice cream? 35%

9- If a total of 50 people were surveyed, then how many people preferred vanilla ice cream?  
26%

### 3-Present Tense: Present simple vs Present Continuous

1. works 2. travelling 3. Dan loves wild animals. 4. is not visiting 5. does not live 6. is staying 7. cooks 8. goes 9. walks 10. having 11. stay 12. am going 13. is working 14. does not like 15. is listening 16. goes 17. is not raining 18. is waiting 19. rises 20. boils 21. is boiling 22. go 23. not raining 25. goes 26. contains 27. get 28. rises 29. is not working ----- is trying 30. is getting 31. is getting 32. flows 33. drive-----am walking 34. are working 35. am training 36- is studying 37. is writing

# Unit Two : Describing a Process

## 2.1 Video Watching :

<https://www.youtube.com/watch?v=0lTaTM9fbXA>

**Warm up :** a short debate about the video

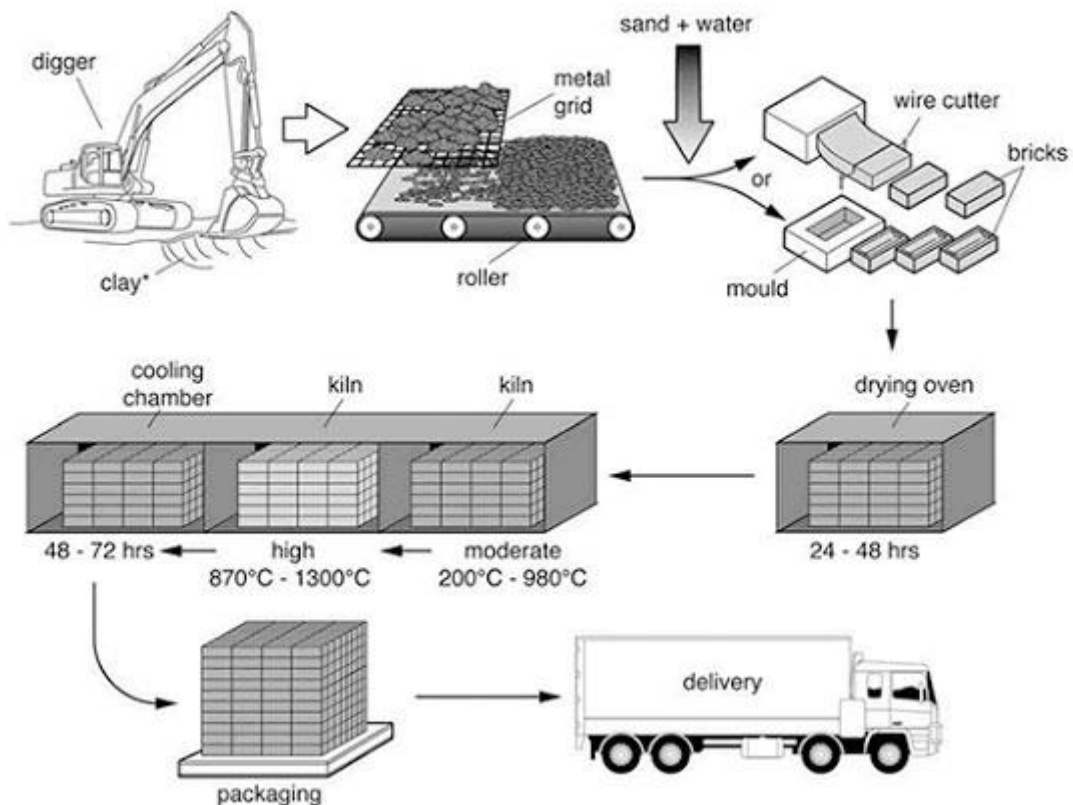
**Aim :** to introduce the learners to the main purpose of the unit :

- Following steps
- Using Sequencers
- Passive voice in present simple and present continuous

## 2.2 Describing a Process

The diagram illustrates the process that is used to manufacture bricks for the building industry.

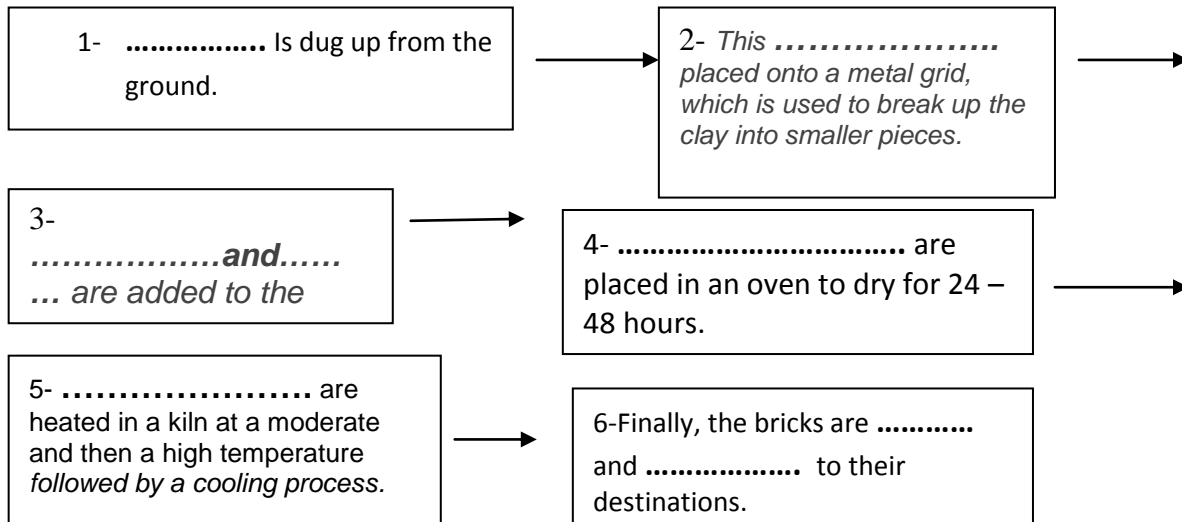
### Activity one :





## 2.2.1 Reading Comprehension

**Activity one** :Look at the diagram above and complete the boxes below :



**Activity two** : Reorder the sentences to get a coherent paragraph :

They are heated in a kiln at a moderate and then a high temperature (ranging from 200c to 1300c)Next, these bricks are placed in an oven to dry for 24 – 48 hours. The bricks are packed and delivered to their destinations.A roller assists in this process.

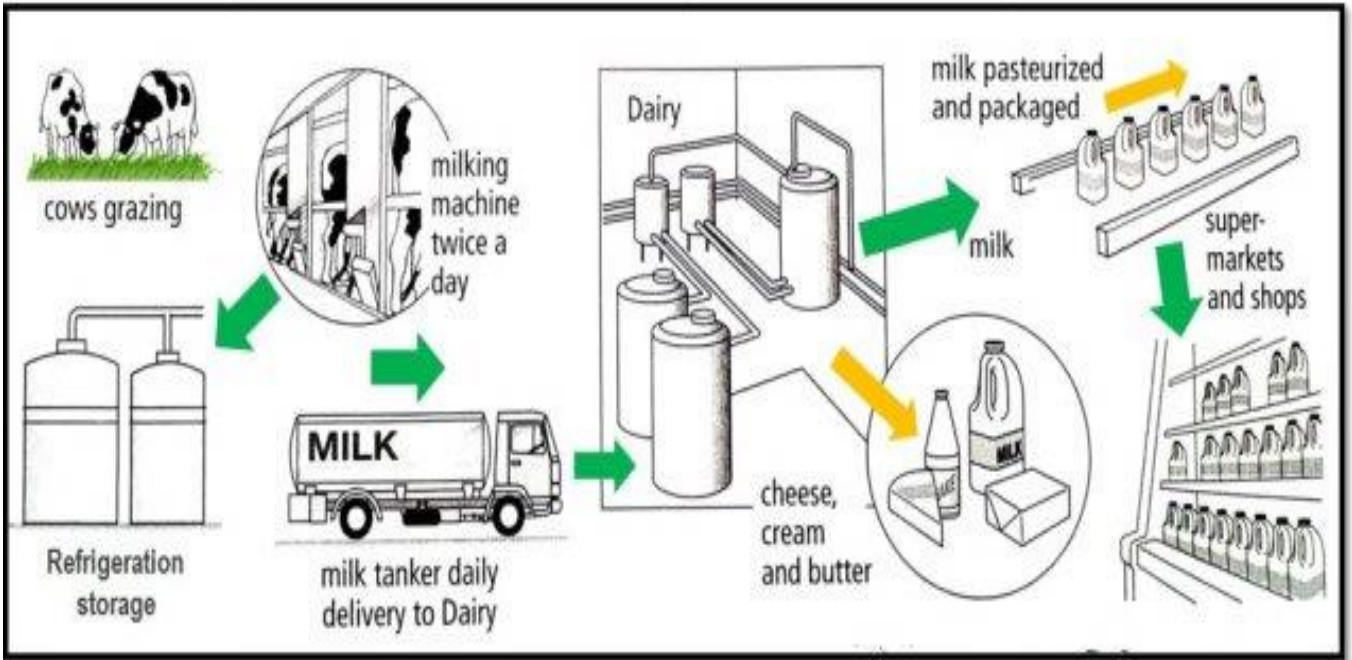
Following this, sand and water are added to the clay, and this mixture is turned into bricks by either placing it into a mould or using a wire cutter. This clay is then placed onto a metal grid, which is used to break up the clay into smaller pieces. The clay used to make the bricks is dug up from the ground by a large digger

In the subsequent stage, the bricks go through a heating and cooling process., followed by a cooling process in a chamber for 2 – 3 days.

## 2.3 More Practice :

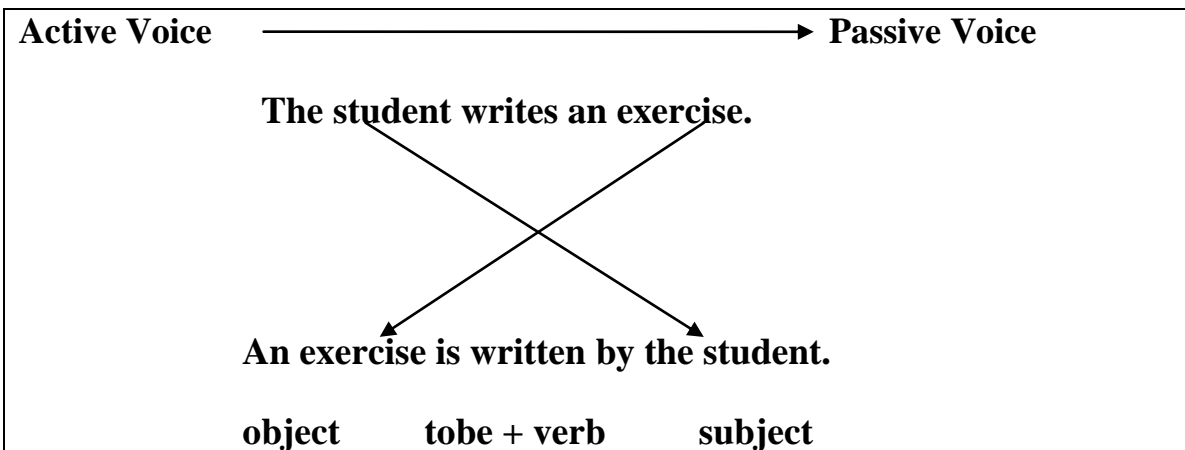
The diagram below shows the production and processing of milk and dairy products for commercial sale.

Summarise the information by selecting and reporting the main features.



### 2.3.1 Active vs. Passive Voice Rules :

Move the active sentence's direct object into the sentence's subject slot :



#### 1- Present Simple :

writes

is/are written

#### 2- Present Continuous :

is writing

is /are being written

#### 2- Past Simple :

wrote

was / were written

#### 3- Past Continuous :

was writing

was/were being written

#### 4- Present Perfect :

has written

has/have written

**5- Past Perfect :**

had written

had been written

**6- Modal Auxiliaries :**

Will/would/shall/should/may/might write

to be written

ought to write Must/had to/need to

**Exercise 1 :** Use the verb in brackets in the right Passive Voice tense:

- 1) The alternating-current motors \_\_\_\_\_ to operate on alternating-current circuits. ( to design)
- 2) Electricity may \_\_\_\_\_ to produce a magnetic field. (to use)
- 3) If a current \_\_\_\_\_ through a conductor located in a magnetic field, the field exerts a mechanical force on it. (to pass)
- 4) New electric machines \_\_\_\_\_ in the future. (to develop)
- 5) The generators which produce electricity for our daily use \_\_\_\_\_ to send out alternating-current. (to make)
- 6) Some generators \_\_\_\_\_ so that the current produced always flows in the same direction; this \_\_\_\_\_ direct-current. (to build/ to call)

**Exercise 2 :** Write either in the active or passive voice :

- 1) In 1983, a century after the invention of the telephone, mobile telephones **were developed** by two AT&T Labs researchers, Richard H. Frenkiel and Joel S. Engel.
- 2) The physical problems that **are caused** by the beach cruiser are problems that happen with all types of bikes.
- 3) The teachers **required** her to speak English all the time.
- 4) Apple, Samsung, and Nokia **are known** by almost every individual as three well-

known companies in the smartphone market.

- 5) People **consider** having corn in their diet a blessing because of the values it has.
- 6) The Wright brothers **invented** the first airplanes.
- 7) More recently, people **have used** mobile phones to send a text message.
- 8) The college student **will be forced** to practice the language.

### **Exercise 3 :**

**Use both passive and active verbs to describe one of the following processes. Your partner should repeat the stages back to you, and you should correct anything they get wrong or miss out.**

- ◇ Operating a video recorder, alarm clock, dishwasher or microwave
- ◇ Cooking something ◇ Mending something (e.g. changing a light bulb or bicycle tyre)
- ◇ Doing something on a computer ◇ A natural process (e.g. the nitrogen cycle or the life cycle of an animal)
- ◇ A manufacturing or construction process
- ◇ Cleaning something ◇ An administrative system
- ◇ A political or legal system
- ◇ How something is selected, e.g. an American Idol winner
- ◇ Making, altering or mending clothes ◇ Entering a competition
- ◇ Doing a sport or exercise ◇ Buying something ◇ Using public transport
- ◇ Safety checks ◇ First aid or other medical treatments

## **2.4 Expressing Purpose**

To+ infinitive / in order (not)to + infinitive / so as (not) to + infinitive

so that + Subject + verb

in order that + Subject + verb

### **Exercise 1 : Use one of the structure above in the right gap :**

1. I'm studying very hard at the moment..... pass my exams next month.
2. I bought a dictionary .....help with my vocabulary.
3. I went to bed early..... I wouldn't be tired in the morning.
4. I have to get up early. I set the alarm for five o'clock .....oversleep.
5. I waited for an hour ..... I could meet her.
6. Some people do not eat before exercise..... feel nauseated.
7. Do exercise regularly ..... have excellent health and well-being.
8. My sister gave English .....earn some pin money.
9. Jenny is a very nice person. She is always prompt..... help her friends.
10. They took the taxi ..... waste time.
11. I'm going to Australia ..... forget my English.
12. Make sure your bags are tagged .....you can identify them later.
13. We built a pool in the garden ..... the children can / could swim in hot weather.
14. He bought his wife a car ..... she doesn't / didn't have to take the bus so often.

15. They guarded the prisoner well ..... he didn't / wouldn't escape.
16. I've bought a dictionary ..... I can learn more.
17. We arrived at the theatre early .....we would have time to eat before the show.
18. I'm going shopping this evening .....I don't / won't have to go tomorrow.
19. I go shopping on Friday evenings ..... I don't have to go at the weekends.
20. He turned down the music .....he wouldn't disturb the neighbors.
21. He got a visa ..... he can travel to the USA.
22. He decided to stay in England for a while ..... he could practice his English.
23. He is looking for a part time job ..... save some pocket money.
24. She wakes up early ..... to be on time to work.
25. They visited him ..... to offer their condolences for the death of his wife.
26. They woke up early ..... be late.
27. She exercises regularly ..... get fat.
29. He helped the new police woman ..... fail in her first mission.

## 2.5 The -ing Form

**The -ing form can be used like a noun, like an adjective or like a verb.**

Smoking is forbidden.

I have a long working day.

I don't like dancing.

**When it is used like a noun it may or may not have an article before it.**

Marketing is a very inexact science.

The marketing of the product will continue for a few months yet.

**It can also be part of a 'noun phrase'.**

Speaking to an audience is always stressful.

Swimming after work is very relaxing.

**In formal English, we would use a possessive with the -ing form. In informal English, many people do not.**

I'm angry about his missing the meeting.

Do you mind my coming?

### 2.5.1 ADJECTIVES -ED -ING : a-Choose the right adjective :

- Sally has been running for three hours and now she is exhausted /exhausting
- My brother had an accident and his situation is quite worried /worrying
- When we visited that abandoned house it was reallydepressed/depressing
- I think he was confused/confusing because he called me Mary and my name is Rose

- That film is not amused/amusing despite being a comedy
- Your bathroom is disgusted/disgusting! Couldn't you clean it a little?
- Are you interested/interesting in reading one of my novels?
- What is the most frightened/frightening story you've ever heard?
- It was the most boring/bored meeting I have ever attended.
- When we broke the vase, we felt very embarrassed/embarassing.

**b- Use either ing or ed**

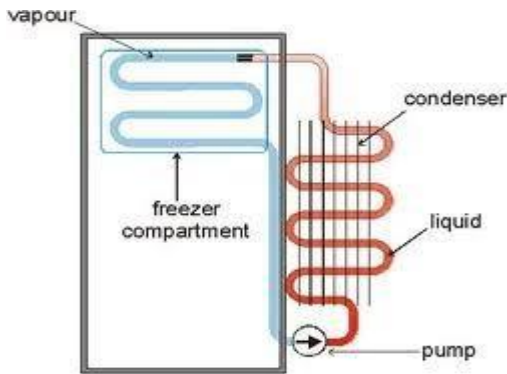
- Is the book you are reading very ? Interest
- The new James Bond film is really . Thrill
- We were both  that she hadn't heard the news. Surprise
- The images of the war were very . Depress
- I nearly fell asleep in the cinema. The film was so . Bore
- She had such good marks that she was very . Encourage
- Can you tell me where that  noise comes from? Annoy
- They were  the weather wasn't good yesterday. Disappoint
- My sister was  by my old toys. Fascinate
- When you are not in good spirits, it is  to stay in bed all day. Tempt

**2.5.2 How Does it Work (Oral Practice)**

**Look at the diagram and choose the correct word :**

- a-** a refrigerator
- b-** an electric fan
- c-** a television
- d-** an oven

**Activity : 1-Read the work process of a refrigerator and complete the process :**



**2- Add the words first, then, and , next, after that, finally in the appropriate space.**

**3- Write the verbs in the parenthesis into their correct grammatical form :**

Modern refrigerators use ammonia gas. Ammonia gas turns into a liquid when it is cooled to -27 degree Fahrenheit (-6.5 degree Celisius).

....., a motor and compressor squeezes the ammonia gas. When the ammonia gas.....(compress), the gas heats up as it is pressurized. Then, the compressed gas passes through the coils on the back or bottom of a refrigerator where the hot ammonia gas can ..... (lose) its heat to the air in the room, according to the law of thermodynamics. As it cools, the ammonia gas can change into ammonia liquid because it is under a high pressure. ...., the ammonia liquid ..... (flow) through what is called an expansion valve, a tiny small hole that the liquid has to squeeze through. Between the valve and the compressor, there is a low-pressure area because the compressor is pulling the ammonia gas out of that side. When the liquid ammonia hits a low pressure area, it boils and changes into a gas. This ..... (call) vaporizing. The coils .....go through the freezer and regular part of the refrigerator where the colder ammonia in the coil.....(pull) heat out of the compartment. This makes the inside of the freezer and entire refrigerator..... (cold). ...., the compressor sucks up the cold ammonia gas, and the gas goes back through the same process over and over.

**2.5.3 Common suffixes — noun to adjective word form**

## **SUFFIX**

- AL relating to : accidental
- ARY relating to quality or place : customary
- FUL full of : fruitful
- IC having the nature of; caused by : athletic
- ICAL having the nature of : magical
- ISH origin, nature : foolish
- LESS without : careless
- LIKE like : lifelike
- LY like : lively
- OUS quality, nature : poisonous
- Y like : funny

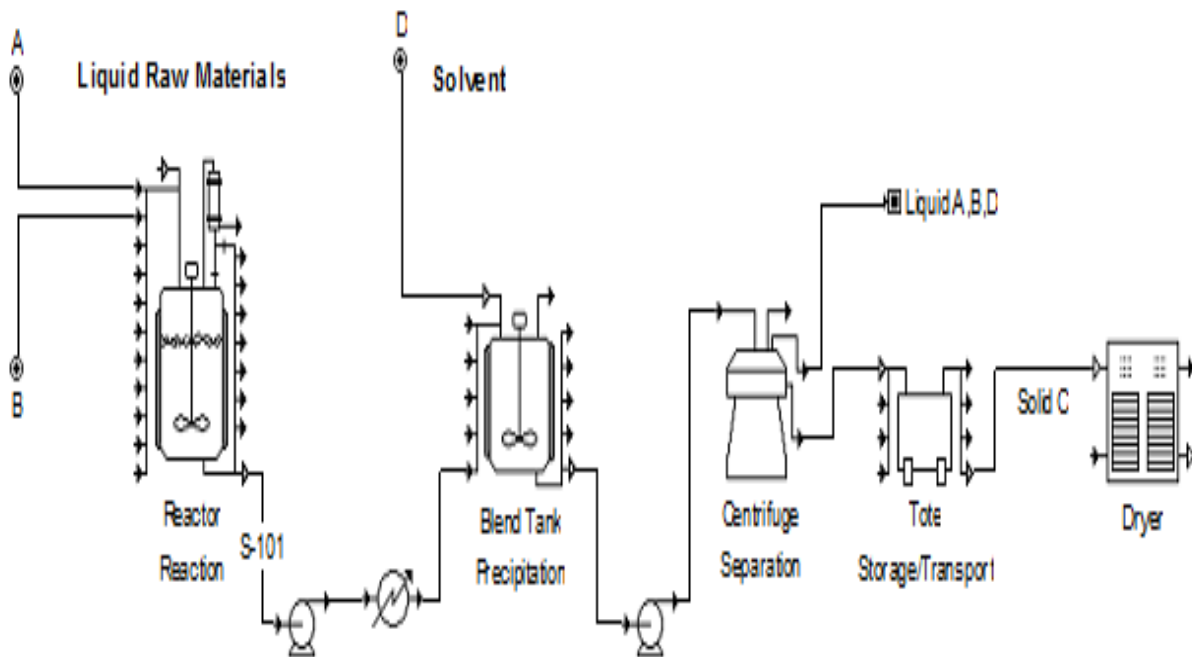
### **Exercise : add one of the suffix above to these words :**

accident – brute - region – custom - moment - caution – beauty - wonder - awe – fantasm - base  
history – magi - logic - history – fool - child - self – power - friend - worth – like - lady - war – friend  
cost - month – poison – danger - nerve – rain - fun - dirt

## **2.6 Writing**

**Write a paragraph using the information in the diagram below :**





## 2.7 Conversation questions about technology

**Work in pairs: Write a dialogue using the notes blow:**

- What are some of the greatest technological achievements of all-time?
- Overall, do you think technology is a good or bad thing?
- What is your favourite piece of technology?
- What are the main ways in which technology has changed society?
- What are the main technological changes you have seen in your life?
- Do you think technology has made us more impatient and lazy?
- What new technology do you think will be introduced in the future?
- Do you think modern society has become obsessed with technology?
- Do you always trust technology?
- Are there any examples where you have experienced something going wrong with technology?
- What technology is dangerous?
- What do you think elderly people think of modern technology?
- How have technological advances affected your life?
- Do you think modern technology reduces or increases stress? Why?
- Does the potential that technology has to change the world scare you?
- How do you think technology will change the world in the next 100 years?
- How has technology changed education?
- How has technology changed business?
- How has technology changed communication?
- How has technology changed medicine?

- How has technology changed the way wars are fought?
- How has technology changed society and everyday life?
- What are the main advantages of technology?
- What are the main disadvantages of technology?
- Do you think mobile/cell phones are bad for our health?
- What do you think robots should be used for?
- Do you think robots will cause unemployment (loss of jobs) in the future or make more work? Why?
- How do you think face to face communication differs from communication using computers?
- What social changes have cell phones made?
- What are good and bad points of using computers?
- Do you think money should be spent to explore space or is it better spent helping people on earth? Why?

## 2.8 Keys :

### Reading Comprehension :

#### Activity one :

1- clay      2- clay      3-sand and water      4- These bricks      5- The bricks      6- packed and delivered

#### Activity two :

**To begin**, the clay... **This** clay ...**Following this**, sand ... **Next**, these brick... **In the subsequent stage**, the brick...**Finally**, the bricks...

#### More Practice

The first step of the process involves cows which are sent to grass fields. After the stage of grazing, cows will produce milk twice a day thanks to the use of a special milking machine.

Raw milk from cows is then stored in refrigeration facilities to ensure that its best quality is maintained. A milk tanker is then used to deliver stored milk to Dairy on a daily basis.

The Dairy is where industrial and manufacturing techniques are required to create finished milk. After this step, finished milk will be delivered in two ways. It can be processed one more time to produce cheese, cream and butter.

Otherwise, processed milk from the Dairy will be automatically pasteurised and packaged in an assembly line. This stage is followed by the delivery of packaged milk to supermarkets and shops where customers normally purchase their milk.

## 1-Active vs.Passive Voice Rules :

### Exercise 1 :

- 1) The alternating-current motors **are designed** to operate...
- 2) Electricity **may be used** to produce...
- 3) If a current **is passed** through a conductor ...

- 4) New electric machines **are developed** in the future.
- 5) The generators which produce electricity for our daily use **are made** to send out...
- 6) Some generators **are built** so that... **called** direct-current...

**Exercise 2 : Write either in the active or passive voice :**

- 1) Two AT&T Labs researchers **developed**, Richard H. Frenkiel and Joel S....
- 2) The beach cruiser **causes** physical problems...
- 3) She was **required** to speak English....
- 4) Almost every individual **knows** that ....
- 5) Having corn in people's diet **is considered** a blessing...
- 6) The first airplanes **were invented**...
- 7) More recently, mobile phones **have been used** to send
- 8) The college **will force** students to practice the language.

## 1-Expressing Purpose

**Exercise : Use one of the structure above in the right gap :**

1. ...in order to... 2. ...to... 3. ...so that... 4. ...in order not to... 5. ...so that... 6. ...in order not to... 7. ...to 8. ...in order to... 9. ...to... 10. ...in order not to... 11. ...in order not to... 12. ...so that... 13. ...so that... 14. ...so that... 15. ...in order that... 16. ...so that ... 17. ...so that... 18. ...so that... 19. ...so that... 20. ...so that... 21. ...so that... 22. ...so that... 23. ...to... 24. ...in order to...
25. ...in order to... 26. ....in order not to... 27. ....in order not to... 29. ...in order not...

### 2.5.1 ADJECTIVES -ED -ING

- exhausted- worrying- depressing- confused - amusing - disgusting- interested- frightening- boring- embarrassed

**b- Use either ing or ed**

- Interesting - Thrilling - Surprised - Depressing - Boring - Encourage - Annoying
- Disappointed - Fascinated - Tempting

### 2.5.2 How Does it Work

**Look at the diagram and choose the correct word :**

a- a refrigerator

**Activity : 1-**

...**First**..., a motor ... gas...**is compressed**, the gas ... gas can ...**be lost** its heat ... pressure.  
**After that**..., the ammonia liquid ...**is flown** through..... This ...**is called** vaporizing. The  
coils ...**then**...go through .....coil...**is pulled** heat ...refrigerator...**colder**. **Next**..., the  
compressor ...

### 2.5.3 Common suffixes — noun to adjective word form

**Exercise : add one of the suffixes above to these words :**

accidental – brutal - regional – customary - momentary - cautionary – beautiful –  
wonderful - awful –fantastic – basic - historical – magical - logical - historical –  
foolish - childish - selfish – powerful - friendly – worthy – likely - ladilike - warlike –  
costly - monthly – poisonous – dangerous - nervous – rainy - funny - dirty

# Unit Three : Classifying

**Aim :** to introduce the learners to the main purpose of the unit :

- Categorizing& sorting out
- Following stages of classification
- Affixation

## 3.1 Video Watching :

[https://www.youtube.com/watch?v=RQ98\\_ksHwgY](https://www.youtube.com/watch?v=RQ98_ksHwgY)

### Activity one : Reorder the sentences :

improve that knowledge, and, through gaining knowledge, attempt to explain why and/or how things occur. doing an experiment, analyzing the data, and forming a conclusion. The scientific method is a series of processes that people can use to gather knowledge about the world around them, Every scientific experiment performed is an example of the scientific method in action, This method involves making observations, forming questions, making hypotheses, but it is also used by non-scientists in everyday situations.

## 3.2 Classifying & Sorting, Metals

### 3.2.1 Language Study: (Oral Practice)

Low carbon steels	Mild Steels	Medium carbon steels	High carbon steels
-------------------	-------------	----------------------	--------------------

(X) can be  
classified  
grouped  
divided  
sorted  
several  
into different  
many  
groups  
categories  
types  
sorts

**Example :** Metals can be classified into several / different groups.

### 3.2.2 Vocabulary I: Word Formation

#### Observe:

Noun + ic = Adjective

The suffix "ic" is added to a noun to form an adjective which describes the “quality” of something.

Example: period ► periodic - base ► basic

Exercise A: Form the adjectives of the nouns below.

-Magnet	►	<input type="text"/>	-Meter	►	<input type="text"/>
-Graph	►	<input type="text"/>	-Atom	►	<input type="text"/>
-Photograph	►	<input type="text"/>	-Automate	►	<input type="text"/>
-Cone	►	<input type="text"/>	-Cube	►	<input type="text"/>
-Metal	►	<input type="text"/>	-Sulphur	►	<input type="text"/>

**Exercise B:** From the list in Exercise A find the words (noun or adjective) that correspond to the following definitions.

1. A  attracts iron and is normally made of steel or iron; one of its ends is called the North Pole and the other is called the South Pole.
2. Even though Great Britain has officially adopted the  system, most people still continue to use the old measuring units: inches, feet, yards and miles.
3. Scientists believe that everything is formed of small particles called . This is known as the  theory.
4. Data is stored in computers on a  tape or disc.
5. Various machines used to be operated manually but now most of them are fully .

### 3.2.3 Vocabulary II: Word Formation

Observe:

adjective +  $\begin{cases} \text{ity} \\ \text{ness} \end{cases}$  = noun

We can form a noun expressing the idea of state or quality or property by adding the suffixes "ity" or "ness" to an adjective.

Example: Elastic ► elasticity , Hard ► Hardness

**Exercise A:** Give the corresponding names of the state/quality/ property.

- |                                    |                                   |
|------------------------------------|-----------------------------------|
| 1. Fluid ► <input type="text"/>    | 2. Ductile ► <input type="text"/> |
| 3. Brittle ► <input type="text"/>  | 4. Mobile ► <input type="text"/>  |
| 5. Tough ► <input type="text"/>    | 6. Thick ► <input type="text"/>   |
| 7. Flexible ► <input type="text"/> | 8. Rough ► <input type="text"/>   |

**Exercise B:** What qualities/properties are defined in the following?

1. The property of flowing easily (like water, oil...):
2. The quality of moving freely:
3. The state of being not smooth but irregular and unclear:
4. The dimension through an object as opposed to its length or width:
5. The property of being firm but easily broken:

### 3.2.4 Structure I: Classifying/Sorting

Observe:

There are two groups  
+ several + (different) + sorts + of (X)  
We can distinguish many

kinds

types

**Example:**

1. There are several different grades of steels.
2. We can distinguish two groups of metals.

**Exercise A:** Refer to the diagrams below and complete the sentences using the language forms in the table above.

Things classified	Criteria	Categories/groups
1. Machines	source of power	mechanical / electrical / manual
2. Electronic apparatus	use	communication / computing / measuring
3. Natural elements	state	solid / liquid / gas
4. Shapes	perspective	bi-dimensional / tri-dimensional
5. Computers	design	desktop / portable

1.  can be sorted according to their : mechanical, electrical and manual.
2.  apparatus  classified according  use: communication ,  apparatus,  measuring apparatus.
3. Natural  can be classified  to their . They  be solid,  or gas.
4.  can sort  according to their ; either bi-dimensional  tri-dimensional.
5. We can   according to their . We can  desktop or  computers.

**3.3 Text : Classification Of Metals**

Before indicating the chemical principles upon which each special process of metallurgy is based, it will be desirable to arrange the metals in classes, according to the several characteristics which they present. Great specific gravity is so prominent a characteristic of metallic bodies, viewed in the aggregate, that are anterior to the discovery of potassium, sodium, and the other alkaline and terrigenous metals, the quality was thought to be inseparable from the metallic condition. So far, however, is this from the truth, that lithium - the metal of the alkali or alkaline earth lithia: it may be said to be intermediate between the two - is the lightest known solid, metallic or non-metallic, in all nature.



Based on a consideration of the quality of specific gravity, then, we arrive at a division of metallic bodies into the light and the heavy. In a purely chemical sense, such a division has no value. But it is otherwise to the metallurgist. Inasmuch as the metals of the alkalis and alkaline earths - that is to say, the light metals - are only produced by complex and refined chemical processes, they may be considered as lying without the domains of metallurgy. It is only with the remaining class (the heavy metals), therefore, that the metallurgist has to concern himself. Contemplating the heavy metallic bodies, in a practical or metal-lurgic sense, with reference to their subdivision, their various demeanor with regard to oxygen, and their general relations to that extensively diffused non-metallic element, we have a natural as well as a ready means of classification.

It has been calculated that almost two-thirds by weight of our globe's constituents - solid, liquid, and gaseous; its vegetables, and its animals and minerals - consist of oxygen. The chemist need not to be reminded of the powerful tendency to combustion which oxygen manifests, especially with metals. Unquestionably the most considerable and the most important metallic ores are oxides, or combinations with oxygen. It is natural, therefore, that the metallurgist should seek, in an examination of the relations of metals to oxygen, the basis of their practical subdivision.

[www.britannica.com](http://www.britannica.com)

### 3.3.1 Reading Comprehension :

#### A. Mark the sentences as true or false :

- 1-The chemical criteria are not the only principles of metal classification.
- 2- Only Potassium and Sodium are characterised with gravity prominence.
- 3- Gravity has a chemical meaning.
- 4- Oxygen and metals are related to each other.

#### B. In which paragraph is it mentioned that :

- a- The relation of gravity with metallurgy. § .....
- b- The most important element that creatures need. § .....
- c- The principles of metal classification. § .....

#### C . Ask questions that the underlined words answer :

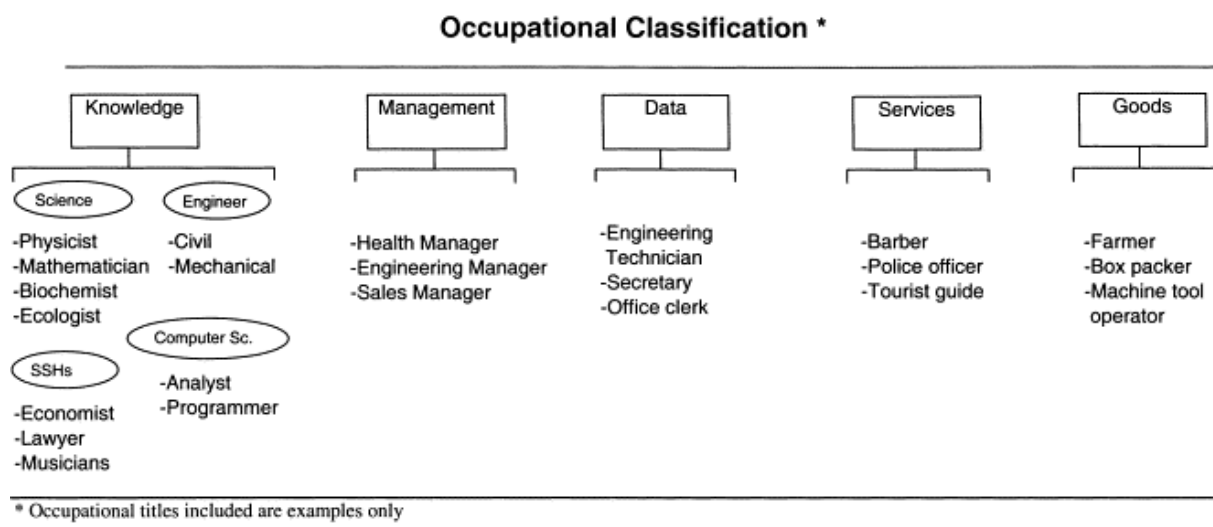
- 1-Metallurgy is based on chemical principles.  
..... ?
- 2-The quality is inseparable from the metallic condition.  
..... ?
- 3-Metals are produced by chemical processes.  
..... ?
- 4-We contemplate the heavy metallic bodies.  
..... ?
- 5-The metallurgist should seek the basis of the subdivision .  
..... ?

### 3.3.2 Classification of Industries : Write a paragraph using the notes below :

#### 1. Raw material

- *Agro-based industries:* These industries use plants and animal-based products as their raw materials. Examples, food processing, vegetable oil, cotton textile, dairy products, and leather industries.
- *Mineral based industries:* Mineral-based industries are based on mining and use ‘mineral ore’ as raw material. These industries also provide to other industries. They are used for heavy machinery and building materials.
- *Marine-based industries:* Marine-based industries use raw materials from sea or ocean. Examples, fish oil.
- *Forest-based industries:* These industries use raw materials from the forest like wood. The industries connected with forest are paper, pharmaceutical, and furniture.

#### 2. Use the following diagram to write a paragraph



### 3.4 Keys :

#### Activity one :

The scientific method is a series of processes that people can use to gather knowledge about the world around them, improve that knowledge, and, through gaining knowledge, attempt to explain why and/or how things occur. This method involves making observations, forming questions, making hypotheses, doing an experiment, analyzing the data, and forming a conclusion. Every scientific experiment performed is an example of the scientific method in action, but it is also used by non-scientists in everyday situations.

### **1-Vocabulary I:**

-Magnetic -Metric -Graphic -Atomic -Photographic -Automatic -Conic -  
Cubic -Metalic -Sulpheric

**Exercise B:** From the list in Exercise A find the words (noun or adjective) that correspond to the following definitions.

1. A magnet 2. ...the metric 3. atom...atomic 4. graphic 5. automatic .

### **2-Vocabulary II:**

**Exercise A:** Give the corresponding names of the state/quality/ property.

1. Fluidity 2. Ductility 3. Brittleness 4. Mobility 5. Toughness  
6. Thickness 7. Flexibility 8. Roughness

### **Exercise B:**

1. fluidity 2. mobility 3. toughness 4. thickness 5. brittleness

### **3-Structure I:**

**Exercise A:**

<b>Things classified</b>	<b>Criteria</b>	<b>Categories/groups</b>
1. Machines	source of power	mechanical / electrical / manual
2. Electronic apparatus	use	communication / computing / measuring
3. Natural elements	state	solid / liquid / gas
4. Shapes	perspective	bi-dimensional / tri-dimensional
5. Computers	design	desktop / portable

1. Machines can be sorted according to their source of power: mechanical, electrical and manual.

2. Electronic apparatus use is classified according to different uses: communication apparatus, computing apparatus, and measuring apparatus.

3. Natural elements can be classified according to their state. They can be solid, liquid or gas.

4. Shapes can be sorted according to their state; either bi-dimensional or tri-dimensional.

5. We can classify computers according to their design. We can have desktop or portable computers.

**Text : Classification Of Metals**

**1.Comprehension :**

**A. 1-True 2- False 3-False 4- True**

**B. a- § 2 b- § 3 c- § 1**

**C . 1-What is metallurgy based on? 2-What is inseparable from the metallic condition ?**

**3- What produces metals? 4-What do we do with the heavy metallic bodies?**

**5- Who should seek the basis of the subdivision ?**

# Unit Four : Inventions & Discoveries

**Aim** : to introduce the learners to the main purpose of the unit :

- Describing inventions and discoveries
- Following scientific and technical procedures
- Prefixes

## **4.1 Video Watching**

**[https://www.youtube.com/watch?v=bNUfZ3\\_VkuE](https://www.youtube.com/watch?v=bNUfZ3_VkuE)**

## **4.2 Text1: Invention: Radar**

Radar is simply an abbreviation of the words "radio detection and ranging" which means finding the direction of an object and how far it is away. Its development depended on the measurement of a very high speed and a very short time.

Nearly a hundred years ago a Frenchman - Fizeau, measured the speed of light. He found it to be 186,000 miles per second or a distance equal to seven times around the earth.

In 1886 Heinrich Hertz demonstrated that what we call radio waves had the same speed as light and could be reflected in the same manner. Three years later Nikola Tesla stated in an article that "By the use of these waves we may produce an electrical effect from a sending station and determine the position of a moving object, such as a vessel at "sea."

In the year 1922 Dr. A. H. Taylor and his associate L. C. Young, while conducting some communication experiments at the Naval Research Laboratory near Washington noticed a steamer in the Potomac interfered with their signals. In 1930, as a result of these experiments, the Director of the Naval Research Laboratory submitted a report to the Navy Department titled "Radio - Echo Signals from Moving Objects."

Radio waves were first used to find the direction of the object, but in 1925 Drs. Breit and Tuve of the Carnegie Institution of Washington measured the distance to the radio sky reflecting ceiling. They sent out a series of short radio pulses and measured the time it took for them to go out and be reflected back to Earth. Knowing the speed it is possible to determine distance as well as direction.

**[www.sciencedirect.com](http://www.sciencedirect.com)**

### **4.2.1 Reading Comprehension:**

**Activity One**: Read the text and say whether these sentences are true (T) or false

(F).

- a) Radio waves and light have the same speed.
- b) Reflection is a characteristic of both radio waves and light.
- c) The position of a moving object cannot be determined thanks to radio waves.

d) The speed of light was measured during the last decade.

**Activity two:** Answer the following questions according to the text.

1. What did Fizeau and Hertz discover?
2. What were radio waves first used for?
3. What have they been used for later on?

### 4.3 Text 2: Discovery : The Nature of Light

The scientific study of the behavior of light is called optics and covers reflection of light by a mirror or other object, refraction by a lens or prism, diffraction of light as it passes by the edge of an opaque object, and interference patterns resulting from diffraction. Also studied is the polarization of light. Any successful theory of the nature of light must be able to explain these and other optical phenomena.

### The Wave, Particle, and Electromagnetic Theories of Light

The earliest scientific theories of the nature of light were proposed around the end of the 17th cent. In 1690, Christian Huygens proposed a theory that explained light as a wave phenomenon. However, a rival theory was offered by Sir Isaac Newton in 1704. Newton, who had discovered the visible spectrum in 1666, held that light is composed of tiny particles, or corpuscles, emitted by luminous bodies. By combining this corpuscular theory with his laws of mechanics, he was able to explain many optical phenomena.

For more than 100 years, Newton's corpuscular theory of light was favored over the wave theory, partly because of Newton's great prestige and partly because not enough experimental evidence existed to provide an adequate basis of comparison between the two theories. Finally, important experiments were done on the diffraction and interference of light by Thomas Young (1801) and A. J. Fresnel (1814–15) that could only be interpreted in terms of the wave theory. The polarization of light was still another phenomenon that could only be explained by the wave theory. Thus, in the 19th cent. the wave theory became the dominant theory of the nature of light.

[www.infoplease.com](http://www.infoplease.com)

### Vocabulary :

**optics** :is the branch of science concerned with vision and light

**reflection** :is an image that you can see in a mirror, glass or water

**refraction** : when a ray of light enters water or a glass

**lens** : a lens is a thin curved piece of glass

**prism** :a block of clear glass or plastic which separates the light passing through it

**interference** :unwanted or unnecessary involvement in something

**polarization of light** : two separate groups are formed with opposite

### 4.3.1 Reading Comprehension

**Activity one : Choose the right answer :**

- 1-Light is a discovery
- 2-Light is an invention

**Activity two : Read the first paragraph and choose the sentence that best summarises it :**

- 1-What light deals with .
- 2-The role of light
- 3-The importance of light

**Activity three : Read the second paragraph and fill in the gaps :**

The first theories of light was suggested in the .....century . .....claimed that light was a wave . During the same period sir.....said that light consists of very small.....emitted by luminous .....

**Activity four : Read the third paragraph and answer the following questions :**

- 1- Whose theory was prominent in the past ?
- 2- How did Thomas Young help to know more about light ?
- 3- What was the final result ?

### 4.4 Text 3 : AUTOMOTIVE

Do you have a car? What make do you have? What would be your ideal vehicle?

#### VEHICLES IN GENERAL

A vehicle is a mechanical means of conveyance, a carriage or transport. Most often they are manufactured (e.g. bicycles, cars, motorcycles, trains, ships, boats, and aircrafts). Vehicles may be propelled or pulled. Vehicles that do not travel on land are called crafts, such as watercraft, sail craft, aircraft, hovercraft, and spacecraft. Land vehicles are classified broadly by what is used to apply steering and drive forces against the ground.

**a-** What' s the difference between a craft and a vehicle ?

**b-** Choose the correct expression from the possibilities in brackets:

Most big cities were built long before the heyday of the private car. As a result they rarely have enough space for moving traffic or parked vehicles and long queues of *stationary* (standing, settled, stationary, static) vehicles are a common sight. Indeed some cities end up being almost permanently \_\_\_\_\_ (stuffed, saturated, crammed, suggested) during the day. Those that have a relatively free \_\_\_\_\_

(flow, current, tide, flood) of traffic at non-peak periods of the day do not escape either. The \_\_\_\_\_ (push, rush, hasty, hurry) hour of early morning or early evening can easily see traffic brought to a \_\_\_\_\_ (standstill, hold-up, jam, freeze). The effects of exhaust \_\_\_\_\_ (smells, odours, fumes, stinks) on air pollution in cities has been well documented. Buses might be seen as the solution, but they move slowly because of the shear \_\_\_\_\_ (size, volume, breadth, depth) of other traffic, thus encouraging more commuters to abandon \_\_\_\_\_ (civic, mass, public, popular) transport.

#### 4.5 Vocabulary:

**Choose the right words: addiction- age - tools - experiments - information - digital**

1-The ethical implications of laboratory scientific ..... on animals is an issue discussed world wide.

2-The dependency to computers displayed in the behavior of certain people is called computer .....

3-Technological and scientific ..... such as computers, cell phones, satellites ... may boost the development of the third world countries.

4-The less people have access to ..... technology the larger the..... divide is.

5-Computer .....is the era in which computer technology has transformed our lives.

#### 4.6 Prefixes

**We use prefixes to change meaning. They never change the part of speech. (Most suffixes change the part of speech.)**

- Many prefixes give a word a meaning which is the opposite or negative of the original. For example, we can use the prefixes dis or un:  
dis + appear - disappear  
un + tie - untie

prefix	meaning / use	example
<i>anti</i> + adjective/noun	<i>opposite</i>	anti- clockwise/ anti-climax
<b>anti</b> + noun / adjective	against	anti-theft device / anti-European



<b>co</b> + noun / verb	together	cohabit
<b>dis</b> + verb	negative/opposite	dislike / disembark
<b>il</b> + adjective	opposite	illegal
<b>im</b> + adjective	opposite	impossible
<b>in</b> +adjective	opposite	indirect
<b>inter</b> + adjective	between	intercontinental
<b>ir</b> + adjective	opposite	irregular
<b>mis</b> + verb	wrongly/ badly	mistook / mishandle
<b>over</b> + verb	too much	overwork
<b>out</b> + verb	more	outnumber
<b>post</b> + noun / verb	after	postgraduate
<b>pre</b> + noun / verb	before	pre- arrangement
<b>pro</b> + noun / adjective	in favour of	pro-Unions / pro-European
<b>sub</b> + adjective	below	substandard
<b>super</b> + noun/ adjective	greater than	superhuman
<b>trans</b> + noun / verb /	across	transplant /transcontinental
<b>un</b> + verb / adjective	negative / opposite	unlock / unhappy
<b>under</b> + verb	not enough/too little	undercook / undercharge

**Exercise : Supply the right prefix :**

- 1-Tennis umpires often .....pronounced Martina Navratilova's name during matches at Wimbledon.
- 2- The Queen .....veiled a memorial statue to over 55,000 airmen yesterday.
- 3- People who can neither read nor write are termed ....literate.
- 4- Smoking while pregnant is ..... responsible and puts the child at risk of illness.
- 5- In Japan it's considered very .....polite to blow your nose in public.
- 6- The cyclist was .....qualified from the race after failing a drugs test.
- 7- Food which cannot be eaten is .....edible.
- 8- The electrical appliance should be .....connected from the mains supply before the back is removed.
- 9- If we prove that a theory is wrong, we say that we have .....proved it.
- 10- Stealing and lying are .....honest things to do.

**4.7 More Practice :**

**Activity one :** Match the beginnings and endings of the sentences to create facts about some of the things included in the word cloud.

Beginning of sentence	Ending of sentence
1. 19 per cent of the world's topselling medicines were developed in Britain...	a. ...from design through to assembly and manufacture.
2. With world-leading innovation in life	b. ...and the UK attracts almost 10 per

sciences, Britain has the largest life sciences sector in Europe, ...	cent of the world's pharmaceutical Research and Development funding.
3. The UK has won 76 Nobel Prizes for science and technology, ...	c. ...which is second in the world and more than anywhere else in Europe.
4. Many of the most life-changing innovations over the last 25 years have had key parts made, designed or developed in the UK, ...	d. ...with over 750 medical biotechnology companies and 2,750 medical technology firms.
5. Every part of a Formula One car has some input from the UK, ...	e. ... from the World Wide Web to the cell phone with GSM services, General Packet Radio Services (GPRS) and dual-mode~3G

**Activity two : Discussion .In pairs, talk about innovation. Consider the following:**

1- What does the word 'innovation' mean to you? As a pair, write your own definition.

.....  
 .....

2- Can you think of any innovative people? Who are they, and in which ways are they innovative?

.....  
 .....

**Activity three : Vocabulary. Match the words with their definitions :**


Word	Definition
1. vaccine	a. to copy or make something exactly like another thing
2. pneumatic	b. a circular shaped sports track which starts and ends in the same place
3. suspension bridge	c. a type of antibiotic medicine which kills bacteria
4. circuit	d. a tube which carries blood from the heart around the body
5. smallpox	e. able to continue over a period of time because little or no damage is caused to the environment
6. penicillin	f. containing air
7. supersonic	m. a substance which contains a form of a bacteria or virus, which is injected into a person to prevent them from developing an illness or disease
8. artery	g. a bridge which is supported at each end by strong metal ropes which are connected to towers
9. sustainable	h. to be the first person/ people to do

	something
10. to pioneer	i. faster than the speed of sound
11. to shrink	j. to make something smaller in size
12. ubiquitous	k. seeming to be everywhere
13. to replicate	l. an infectious and dangerous illness which causes a fever and spots on the skin

**Activity four :** Match the beginning with the right ending :


### Inventions and discoveries...

#### Eureka!...

1-The planet Uranus was discovered   
 \_The Airbus A 380



The Mona Lisa was  
 2-The first cinema was opened

3-The chemical element radium 

4-Do you know that the first tv was  
 5-The radio was

6-Was the compact disc player 

7-The first space telescope  
 8-The first dog was sent

- a-painted by Leonardo Da Vinci.
- b-was discovered by M Curie in 1902.
- c-was launched by the USA in 1990.
- d-into orbit by the Russians in 1957.
- e-invented by a Scotsman?
- f-was built by the Europeans.
- g-invented by Guglielmo Marconi.
- h-by the Lumiere brothers.
- developed by Sony or Philips?.
- by William Herschel in 1781.

**Activity five :** a-Science Verbs : Match the right word with the its corresponding meaning:

Verb	Meaning
1-Predict	a-To learn about something
2-Prove	b-To find something for the first time
3-Invent	c-To make an educated guess
4-Observe	d-To look at something carefully
5-Hypothesize	e-To make something for the first time
6-Solve problems	f-To investigate something
7-Collect data	g-To gather facts
8-Research	h-To make a guess about the future
9-Study	i-To find solutions or answers
10-Discover	j-To show that something is correct or true

**b-Fields of Science: Match the words correctly:**

Field	Name of Scientist	Studies
a-Anthropology	1-Chemist	A-Ancient societies
b-Archaeology	2-Geographer	B-People and their societies
c-Biology	3-Psychologist	C-The mind
d-Chemistry	4-Anthropologist	D-Substances and chemicals
e-Geography	5-Physicist	E-Physical objects and natural forces
f-Psychology	6-Biologist	F-Living things
g-Physics	7-Archaeologist	G-Land and water

**4.8 Conversation :**

**Write a dialogue using the information below :**

Who is the most famous scientist from your country? What did he/she do? In what ways has science most advanced society? In what ways has science had a negative impact on society? What do you think about evolution and other theories of natural selection? Do you like studying science? Why or why not? What natural disasters occur in your country? Explain why they happen. How do you feel about cloning? Do you think it's ethical for scientist to clone animals? What about human organs? In your opinion, what's the greatest medical advancement of the past century? Why? How has science influenced the way detectives investigate crimes? Do you think there is life on other planets? If so, how close is it and what does it look like? What's your favorite branch of science? (For example, biology, physics, astronomy.) Do you know how your computer works? If so, explain how. How have you personally benefitted from

developments in modern medicine?What do you think will be the greatest medical breakthrough in the next ten years?What scientist do you respect the most and why?If you could contribute something to science or medicine, what would you do and why?In your opinion what has been the most important scientific discovery ever? Why?How would society be different if scientists hadn't discovered and developed electricity?How has science helped people to have children? What do you think of this?When do you think scientists will develop a cure for AIDS?

## **Conversation about Energy:**

**Use the information below to write a dialogue:**

- 1) How much energy do you use every day?
- 2) Do you try to save energy?
- 3) What do you think of the world's hugely increasing energy needs?
- 4) Do you think solar cells, wind farms, tidal power, hydropower and thermal energy will solve our future energy needs?
- 5) How would the world be a better place if we used only clean energies?
- 6) What have you done today that has used your country's energy
- 7) Do you think it's possible for there to be energy wars, started by countries who have run out of energy?
- 8) What do you think low energy houses of the future will be like?
- 9) Does your government have/need an energy conservation policy?
- 10) Do you think our energy demands are sustainable?

## 4.9 Keys :

**Text 1: Activity One:** a) True b) True c) True d) False

**Activity two:**

1. Fizeau, measured the speed of light. Hertz demonstrated that what we call radio waves had  
the same speed as light and could be reflected in the same manner.
2. Radio waves were first used to find the direction of the object.
3. to determine distance as well as direction.

**Text 2: Activity one : 1-Light is a discovery**

**Activity two : 1-What light deals with .**

**Activity three : Read the second paragraph and fill in the gaps :**

The first theories of light was suggested in the ...17th.....century . .....  
Christian Huygens .....claimed that light was a wave . During the same period  
sir..... Isaac Newton.....said that light consists of very  
small.....particles...emitted .....by luminous .....bodies.....

**Activity four : Read the third paragraph and answer the following questions :**

- 1- In 1690, Christian Huygens proposed a theory that explained light as  
a wave phenomenon.
- 2- important experiments were done on the diffraction and interference of light by Thomas  
Young  
(1801).
- 3- Thus, in the 19th cent. the wave theory became the dominant theory of the nature of light.

**Text 3 :**

- a- Vehicles that do not travel on land are called crafts, such as watercraft, sail craft,  
aircraft, hovercraft, and spacecraft.
- b- 1-stationary 2- stuffed 3- flow 4- rush 5- jam 6- fumes 7- volume 8- public

## 4.5 Vocabulary :

1-The ethical implications of laboratory scientific **experiments** on animals is an issue  
discussed world wide.

2-The dependency to computers displayed in the behavior of certain people is called  
computer **addiction** .

3-Technological and scientific **tools** such as computers, cell phones, satellites ... may boost  
the development of the third world countries.

4-The less people have access to **information** technology the larger the **digital** divide is.

**5-Computer age** is the era in which computer technology has transformed our lives. .

**Exercise : Supply the right prefix :**

1- mispronounced 2- unveiled 3-illiterate 4- irresponsible 5- impolite 6-disqualified 7-  
inedible 8-disconnected 9- disproved 10- dishonest

**More Practice :**

**Activity one :** 1....d 2.... c 3.....b 4.... e  
5....a

**Activity two : Vocabulary**

1....m 2...f 3.....g 4...b 5....l 6...c 7....i 8....d 9....e  
10....h 11....j 12...k 13....a

**Science Verbs**

<b>Verb</b>	<b>Meaning</b>
Study	To learn about something
Discover	To find something for the first time
Hypothesize	To make an educated guess
Observe	To look at something carefully
Invent	To make something for the first time
Research	To investigate something
Collect data	To gather facts
Predict	To make a guess about the future
Solve problems	To find solutions or answers
Prove	To show that something is correct or true

**Fields of Science**

<b>Field</b>	<b>Name of Scientist</b>	<b>Studies</b>
Anthropology	Anthropologist	People and their societies
Archaeology	Archaeologist	Ancient societies
Biology	Biologist	Living things
Chemistry	Chemist	Substances and chemicals
Geography	Geographer	Land and water
Psychology	Psychologist	The mind
Physics	Physicist	Physical objects and natural forces

**More practice :**

1...h      2...a      3...j      4...b      5...e      6...g      7...i  
8...f  
9...d      10...c



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