FACULTAD DE CIENCIAS EXACTAS Y NATURALES

INGLÉS I

Grammar Reference & Theory

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THE NOUN

A noun tells us what someone or something is called. For example, a noun can be the name of a person(John), place (London), job title (doctor), the name of an object (chair), the name of a quality (courage), the name of an action or a sensation (laughter or sadness), etc.

Types of Nouns

There are many different types of nouns, including the proper noun, the common noun, the concrete noun, the abstract noun, the countable noun (or count noun), the non-countable noun (or mass noun), and the collective noun.

A noun can belong to more than one type: it can be proper or common, abstract or concrete, countable or non-countable or collective.

Proper Nouns

You always write a **proper noun** with a capital letter, since the noun represents the name of a specific person, place, or thing. The names of days of the week, months, historical documents, institutions, organisations, religions, their holy texts and their adherents are proper nouns. As they state an actual place or name, proper nouns are not usually plural.

- Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday
- England , Spain
- Richard , Isabelle

The word **'the'** is not normally used with a proper noun. For example, you wouldn't say "The England"; you would just say "England". However, if the country name includes the words States or Republic, then you must include the word 'the'.

- the French Republic
- the United States

Common Nouns

A **common noun** is a noun referring to a person, place, or thing in a general sense -- you should write it with a capital letter only when it begins a sentence.

Abstract Nouns

An **abstract noun** is a noun which names anything which you can *not* perceive through your five physical senses, and is the opposite of a concrete noun. For example:

- anger
- health
- progress
- love
- information
- difficult

Concrete Nouns

A **concrete noun** is a noun which names anything (or anyone) that you can perceive through your physical senses: touch, sight, taste, hearing, or smell. A concrete noun is the opposite of a concrete noun. For example:

- heart
- bone
- finger
- leg
- arm
- chest

Countable Nouns

A **countable noun** (or **count noun**) is a noun with both a singular and a plural form, and it names anything (or anyone) that you can count.

Rules for plural nouns

->Most nouns change their form to indicate number by adding *-s* or *–es.*

- bones
- lungs
- cells
- branches
- boxes
- wishes

->Some nouns that end in a consonant + *y* can be pluralised by losing the *-y* and adding *-ies*.

- ability – abilities
- study – studies
- body – bodies

->However, the nouns that end in a vowel + *y* can be pluralised by adding an *–s.*

- days
- boys

->So, what do you do if the noun ends in -s? In these circumstances, you just add -es.

- virus – viruses
- mass – masses
- loss – losses

->There are a few irregular nouns that break all of the rules above.

- one tooth – two teeth
- one foot – two feet
- child – children
- person - people

-> Words that have a Latin root follow a different rule.

- nucleus – nuclei
- vertebra – vertebrae
- datum – data

Non-Countable Nouns

A **non-countable noun** (or mass noun) is a noun which **does not have a plural form**, and which refers to something that you cannot usually count. A non-countable noun always takes a singular verb in a sentence. Here is a list of some of the most common, easy to confuse uncountable nouns.

accommodation	knowledge	progress
advice	luggage	research
equipment	money	travel
information	news	

Collective Nouns

A **collective noun** is a noun naming a group of things, animals, or persons. You can count the individual members of the group, but you usually think of the group as a whole, generally as one unit. You need to be able to recognise collective nouns in order to maintain subject-verb agreement.

wIn each of the following sentences, the **highlighted** word is a collective noun:

- The **jury** is deciding the punishment for criminal.
- The school **committee** meets every Wednesday afternoon.
- The **class** was shocked by the bursting light bulb.
- Family: a group of people usually related by blood.
- Gang: an organized group of criminals.
- Staff: the people who work in a company or place of work.
- Team: a group of individuals playing on the same side generally with the same objectives.

Groups of people in general

- Audience: spectators or listeners at a public event.
- Crowd: a group of people, gathered together.
- Mob: a large disorderly crowd.
- Movement: a group of people with similar political/musical/social ideals.
- Throng: a busy group of people or animals.

Noun Gender

Many common nouns, like "*doctor*" or "*nurse*" can refer to men or women. There are some nouns which are **gender-specific nouns**, that is, they have feminine and masculine forms. They tend to refer to occupational categories, as in the following sentences.

David Garrick was a very prominent eighteenth-century **actor**.
Sarah Siddons was at the height of her career as an **actress** in the 1780s.
The manager was trying to write a want ad, but he couldn't decide to advertise for a "**waiter**" or a "**waitress**

Common Roots in Science

Roots

bio: life
zoo: animal
geo: earth
lith/o: stone
cyt/o: cell
archae/o: old / ancient
palae/o: ancient

myc/o: fungus
phyt/a: plant
psych/o: soul or mind
gynaec/o: woman

-sect: section, cut apart

Numbers: Prefixes

uni- : one (Latin)
mono- : one (Greek)
bi- : two (Latin)
di- : two (Greek)
tri- : three
quadr- : four (Latin)
quart- : four (Latin)
tetra- : four (Greek)
quint- : five (Latin)

pent- : five (Greek)
sex- : six (Latin)
hex- : six (Greek)
sept- : seven (Latin)
hept- : seven (Greek)
oct- : eight
non- : nine (Latin)
enne- : nine (Greek)
deci- : ten

poly- : many (Latin)
multi- : many (Greek)
semi- : half (Latin)
hemi- : half (Greek)

Suffixes

-o/logy : the study of
-o/logist: one who studies

-ic: pertaining to

Colors
Many words incorporate Greek and Latin words for colors. For example, the word for a red blood cell is **erythrocyte**. *Erythro* is a Greek root meaning **red**. Here are some more color roots that you may find interesting.

melan/o: black
nigr/o: black
leuc/o: white
alb/a : white
erythr/o: red
rub/o : red
rhod/o: rosy / red
xanth/o: yellow
cyan/o: blue-green / blue
glauc/o: grey
chlor/o: green
chrom/o: color

The Body: Part 1

The word **corpus** means body, substance, or matter as perceived by the senses. We also derive the word *corpse* from it. Here are some word roots related to parts of the body.

Word Roots

cephal/o: head
encephal/o: brain
dactyl/o : finger
brachy/o : arm
chir/o: hand
ped/o: foot
umbilic/o: navel
patell/o: kneecap
mamm/o: breast
or/o : mouth
stomat/o: mouth
ot/o: ear
aur/i :ear
rhin/o :nose
opthalm/o: eye
ocul/o: eye

The Body: Part 2
Word Roots
Organs

cardi/o: heart
nephr/o: kidney
pneum/o: lungs
pulmin/o: lungs
laryng/o: larynx
hepat/o: liver
ren/o: kidney
hyster/o: uterus / womb
phall/o: penis
cyst/o: bladder or sac with fluid

Cells/tissues

my/o: muscle
neur/o: nerve
oo b(Greek) : egg
ovo(Latin) : egg
/cyte: cell

Special Suffixes

Action or a condition

-mania: madness
-edema: swelling
-itis: inflammation of
-lepsy: seizure
-oma: tumor
-ism: condition
-osis: abnormal condition
-emia: blood condition
-genic: forming
-algia: pain
-oid: like, resembling

Senses

-opia: vision
-opsia: vision
-acousia: hearing
-osmia: smell
-osphrensia: smell
-aphia: touch
-geustia: taste
-orexia: appetite

Quantifiers with countable and uncountable nouns

With Uncountable Nouns	With Both	With Countable Nouns
How much? Much	How much? or How many? Much / many	How many? Many
a little	no/none	a few
a bit (of)	not any	a number (of)
	some (any)	Several
a great deal of	a lot of	a large number of
a large amount of	plenty of	a great number of
a large quantity of	lots of	a majority of

Note: **much** and **many** are used in negative and question forms.

- How **much** pain have you got?
- How **many** cigarettes have you smoked?
- There's not **much** insulin in the cabinet.
- There weren't **many** people at the hospital.

THE ADJECTIVE

What are adjectives?

- Adjectives are used to clarify nouns.
- Adjectives can be one word or a group of words.
- Adjectives can also be used with certain verbs (such as the verb "to be"). Adjectives are used to clarify the subject that is doing the action, adjectives are not used to clearify the verb.
- Adjectives are used to describe color, material, shape, size, amount, price, quality, origin, personality, weight, temperature, weight, age, direction, etc.

Some common adjectve ends are -ive, -ous, -y, -ful,-ent.

Adjective Usage:

- Adjectives are placed before the noun.
- The form of the adjectives stay the same for all types of nouns.
- Adjectives can be used with all forms of nouns.

Examples:
Adjectives With Nouns:

- I've got a severe pain.
- Do you have sensitive skin?
- I had brown rice and green salad for dinner.

Adjective With Verbs:

- I'm healthy.
- This is a nutritious meal.

Using Two Or More Adjectives Together

There are general rules for using 2 or more adjectives together.
In most cases the adjectives are placed before the noun.
It is not common to use more then 3 adjectives together, but it is possible and can be grammatically correct.

- Why are you wearing those **long white** gloves?
- She's a **smart, energetic** woman.
- He was an **old American** patient.

When an article is used such as "a", "an" or "the", then the article is placed before the adverb.
The 9 different adjective groups are listed below. The order of the adjectives is as follows:

1. **Determiner**- a, an, her, five, many, much several etc.
2. **Opinion** - pretty, ugly, smart, cheap, etc.
3. **Size** - big, fat, thin, tall, large, small etc.
4. **Shape** - circle, square, tall, short etc.
5. **Age** - old, young 10 years, a year, a week, new etc.
6. **Color** - yellow, green, pink etc.
7. **Origin** - American, English, Asian, Middle Eastern, African, European, Chinese etc.
8. **Material** - cotton, wood, plastic, cloth, glass, gold etc.
9. **Purpose/Qualifier** - hat box, sleeping bag, computer table, safe island, football field.

COMPARATIVE ADJECTIVES

Expressing superiority:

Comparative adjectives are used to compare the diffrence between 2 nouns. Use *Short Adjective* + *-er.*
Use *more* + *Long Adjectives*.
Examples:

- Nowadays people tend to be **thicker** than in the past
- The board exam was **easier** than we expected.
- Studying the case was **more interesting** than I had thought.
- His illness was **more serious** than we first suspected

Expressing equality

- Eating in the hospital is **as cheap as** eating at the medical school.
- My arm is **as painful as** it was yesterday.

Expressing inferiority

- The clinical problem **is less simple** than you might think.

SUPERLATIVE ADJECTIVES

Superlative adjectives are used to compare at least 3 things or 3 groups of things. When we want to state that something is at the highest or the lowest degree, than we use superlative adjectives.

- What is the longest cell in the body?
- The strongest bone in the body is the femur bone.

It is common that "the" is used before the superlative adjective.

- **The smallest** muscle in the body is the stapedius.
- Hypertension is one of **the most common** problems in clinical practice.

FORMATION OF SUPERLATIVE ADJECTIVES

There are two ways to form superlative adjectives, depending on the length of the adjective.
The number of syllables the adjectives contain determines if *-est is added to the end of the adjective*, or if *"most" or "least" is added before the adjective*.

Derivative Adjectives.

Adjectives can be identified using a number of formal criteria. However, we may begin by saying that they typically describe an attribute of a noun:

cold weather
large windows
violent storms

Some adjectives can be identified by their endings. Typical adjective endings include:

-able/-ible	*achievable, capable, illegible, remarkable*
-al	*biographical, functional, internal, logical*
-ful	*beautiful, careful, grateful, harmful*
-ic	*cubic, manic, rustic, terrific*
-ive	*attractive, dismissive, inventive, persuasive*
-less	*breathless, careless, groundless, restless*
-ous	*courageous, dangerous, disastrous, fabulous*

Participial Adjectives

We saw in an earlier section that many adjectives can be identified by their endings. Another major subclass of adjectives can also be formally distinguished by endings, this time by *-ed* or *-ing* endings:

***-ed* form**	*computerized, determined, excited, misunderstood, renowned, self-centred, talented, unknown*
***-ing* form**	*annoying, exasperating, frightening, gratifying, misleading, thrilling, time-consuming, worrying*

.

- Her weight loss from the diet was **encouraging.**
- I felt **pleased** after getting a **pleasing** massage.
- The nurse's big needle was **frightening.** I **felt frightened** when she looked at me!

THE ADVERB I always put on sun block cream before I go outside.

Adverbs are used to define verbs.

- The treatment **partly** finished.
- Dr Johnson will be with you **immediately**. Please take a seat.
- The patient is walking **slowly** today.

Adverbs can be used to define adjectives.

- This case is **extremely** difficult.
- There are a lot of people in the world that are **shockingly** materialistic.

Adverbs are used to clarify other adverbs.

- The test was **really** hard today.
- The ambulance came **incredibly** quickly, I was so lucky.

Adverbs can answer questions such as How? What? When? Where? and What?

- In the crowded cities of the 19th-century Britain, cholera spread **easily.**
- I'm not feeling well **today**.
- People should exercise **carefully**.
- The doctors are working **closely** together on the project.

Adverbs can come before the subject.

- **Unfortunately,** until the mid 19th. century, people believed that cholera travelled trough the air.
- **Sometimes**, our teacher doesn't give us homework.

Adverbs can be placed between the subject and the main verb.

- I **always** put on sun block cream before I go outside.
- Night Cramp is something from which a great many people **occasionally** suffer.

Adverbs can come after the verb.

- Acute injuries occur **suddenly** when playing or exercising.
- You should exercise at a rate at which you can speak **comfortably.**

FREQUENCY ADVERBS

Frequency adverbs are adverbs that state the frequency of an action.

Frequency usally come before the main verb. Frequency adverbs come after the verb "to be".

Adverbs are usuually not used with negative sentences, and questions, but there are excptions.

Below is a chart a frequency adverbs, the numbers after the adverbs will give you an idea of the how often an event would take place.

Frequency Adverbs	
Always	100%
nearly/almost always	90%
Usually	80%
Very Often/Frequently	70%
Often	60%
Sometimes	50%
Occasionally	40%
Almost never/ever	20%
Seldom/Almost never	10%
Never	0%

- When you are exercising, doing housework or chores, rest **frequently** and change positions **regularly.**
- Surgery is **usually** done only in severe cases.

TENSES

The most common tenses in English

Tense	Signal words	Use	Form	Examples
Simple Present	**every day** **sometimes** **always** **often** **usually** **seldom** **never** **first ... then**	something happens repeatedly how often something happens one action follows another things in general after the following verbs (to love, to hate, to think, etc.) future meaning: timetables, programmes	**infinitive** **he/she/it** + **-s**	I **work** he **works** I **go** he **goes**
Present Progressive	**now** **at the moment** **Look!** **Listen!**	something is happening at the same time of speaking or around it	**to be (am/are/is)** + **infinitive** + **-ing**	I'm **working** he's **working** I'm **going** he's **going**

		future meaning: when you have already **decided and arranged** to do it (a fixed plan, date)		
Simple Past	**last ...** **... ago** **in 1990** **yesterday**	action took place in the past, mostly connected with an expression of time (no connection to the present)	regelmäßig: **infinitive** + -ed unregelmäßig: **2. Spalte**	I **worked** he **worked** I **went** he **went**
Past Progressive		an action happened in the middle of another action - someone was doing sth. at a certain time (in the past) - you don't know whether it was finished or not	**was/were** + **infinitive** + **-ing**	I **was working** he **was working** I **was going** he **was going**
Simple Present Perfect	**yet** **never** **ever** **already** **so far,** **up to now,** **zum Teil:** **since** **for** **recently**	you say that sth. has happened or is finished in the past and it has a connection to the present action started in the past and continues up to the present	**have/has** + **past participle (infinitive + -ed)** **oder** **(3. Spalte)**	I**'ve worked** he**'s worked** I**'ve gone** he**'s gone**
Present Perfect Progressive		**emphasis: length of time of an action** action began in the past and has just stopped how long the action has been happening	**have/has** + **been** + **infinitive** + **-ing**	I**'ve** been **working** he**'s been working** I**'ve been going** he**'s been going**
Past Perfect Simple		mostly when two actions in a story are related to each other: the action which had already happened is put into Past Perfect, the other action into Simple Past the past of the Present Perfect	**had** + **past participle** (**infinitive** + **-ed**) oder **(3. Spalte)**	I **had worked** he **had worked** I **had gone** he **had gone**
will - future		predictions about the future (you think that sth. will happen) you decide to do sth. spontaneously at the time of speaking, you haven't made a decision before main clause in if clause type I	**will** + **infinitive**	I**'ll work** he**'ll work** I**'ll go** he**'ll go**
going to - future		when you have already decided to do sth. in the	**be (am/are/is)** + **going to** + **infinitive**	I**'m going to work** he**'s going to work**

		future what you think what will happen		I**'m going to go** he**'s going to** go

Examples

- Most scientists work with computers.
- I'm working on my science project.
- As a young man Lois Pasteur studied in Paris.
- When did the symptoms begin?
- Alexander Fleming was not hoping to discover penicillin.
- Scientists have recently found more than 30 unknown insects.
- Physicists have been studying the origin of the universe for many years.
- On the morning of the accident Dr. Jansen had just finished his night-shift at the local hospital.
- You can't play with the Bunsen burner! You will burn yourself.
- We're holding a science fair next weekend.
- By the end of the 21st. century doctors will have discovered a cure for cancer.

THE PASSIVE VOICE

Tradition and the Passive Voice

More than a century ago, scientists typically wrote in an active style that included the **first-person pronouns *I* and *we***. Beginning in about the 1920s, however, these pronouns became less common as scientists adopted a passive writing style.

Considered to be objective, impersonal, and well suited to science writing, the passive voice became the standard style for medical and scientific journal publications for decades.
There were exceptions, however. For instance, in 1953, one elegantly written paper began:

We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.).[1]

The opening sentence of Watson and Crick's classic article is **simple, direct, and clear.** But suppose the authors had taken the passive point of view:

In this paper, a structure is suggested for the salt of deoxyribose nucleic acid (D.N.A.).

The emphasis is now on the receiver of the action (the structure), but at a price—the sentence has lost its clarity (*who suggested?*), energy (*passive verb*), and overall impact.

Emphasize the Active Voice

Nowadays, most medical and scientific style manuals support the active over the passive voice.
For example, the American Medical Association's ***AMA Manual of Style*** recommends that "in general, authors should use the active voice, except in instances in which the author is unknown or the interest focuses on what is acted upon."[2]

What Is Active Voice?

An author may write a sentence in one of two "voices"—active or passive.
The **active voice** emphasizes the **performer** (or agent) of the action:

Wind disperses plant seeds.
Smith et al. investigated the relationship.
We have analyzed the results.

The active voice is **direct** (performer–verb–receiver), vigorous, clear, and concise. The reader **knows** who is responsible for the action.

What Is Passive Voice?

The **passive voice,** in contrast, emphasizes the **receiver** (or product) of the action:

Plant seeds are dispersed [by wind].
The relationship was investigated [by Smith et al].
The results have been analyzed [by us].

Using the Passive Voice in Scientific Writing

Developed by Dr. Charlene Sorenson, Gallaudet University Department of Chemistry and Dr. Tonya Johnson, Gallaudet University English Department.

When to use passive voice?

1. **Science fields: chemistry**, biology, physics, math, computer science.
2. **Medical fields:** patient records, medical journals.
3. **Legal fields:** client records, proceedings, notes.

Why use passive voice?

1. **Let the facts stand on their own!**
2. **Removes some accusations of bias (who did it, how many did it.)**
3. **Presents an "air" or feeling of logic.**

Unscientific

I did this experiment several times. Each time I got the same results. After the last time, I was convinced that I was right. The new bacteria must have caused all the problems we found in our patients**.**

Scientific

The procedure was repeated until there was certainty regarding the results. The problems encountered by the patients were caused by the bacteria.

Form

to be + past participle

How to form a passive sentence when an active sentence is given:
- object of the "active" sentence becomes subject in the "passive" sentence
- subject of the "active" sentence becomes "object" in the "passive" sentence" (or is left out)

We only use the passive when we are interested in the object or when we do not know who caused the action.

Example: ***Appointments are required in such cases***.

We can only form a passive sentence from an active sentence when there is an object in the active sentence.

Simple Present:	The physician **examines** the patient. The patient **is examined** by the physician.
Present Progressive:	The physician **is examining** the patient. The patient **is being examined.**
Simple Past:	The physician **examined** the patient. The patient **was examined** by the physician.
Present Perfect:	The physician **has examined** the patient. The patient **has been examined** by the physician.
Past Perfect:	The physician **had examined** the patient. The patient **had been examined** by the physician.
Will-future:	The physician **will examine** the patient. The patient **will be examined** by the physician.
Going to-future:	The physician **is going to examine** the patient. The patient **is going to be examined** by the physician.
Modals:	The physician **can examine** the patient. The patient **can be examined** by the physician.

MODAL VERBS

The modal verbs are: can, could, may, might, will, would, shall, should and must.

- We use a modal verb with a main verb to express ability, obligation, etc.
- After modal verbs, we use **the infinitive without to**:

I **can** speak English.

- Modal verbs don't add -s after he/she/it:

He **can** drive.
She **might** come.

- In questions and negative sentences, we don't use the auxiliary do:

***May** I come in?*

- Modal verbs don't have past, perfect or future forms, or participle forms. We use other verbs instead:

*They **had to** leave early yesterday.*

*Many animals **are able to** see clearly in the dark.*

- These verbs and expressions have similar meanings to modal verbs: be able to, manage to, have (got) to, need to, be allowed to and ought to.

Can

We use 'can' to talk about **'possibility'.**

- Malnutrition can produce chronic diseases such as marasmus.
- Rapid population growth can cause problems.
- Can I call you if the pain persists?

Notice that there are two negative forms: 'can't' and 'cannot'. These mean exactly the same thing. When we are speaking, we usually say 'can't'. It expresses '**Prohibition'**

- You can't smoke in here.
- You cannot eat between meals.
- You cannot eat or drink anything 4 to 8 hours before the test.

We use 'can' to talk about **'ability'.**

- Birds can fly.
- I can't drive.

We use 'can' to ask for and give **permission.** (We also use 'may' for this but is more formal and much less common.)

- Can I speak to you or are you too busy?
- You can look at the animals in the zoo but you can't touch them,

We use 'can' in **offers, requests and instructions.**

- Can you give me a hand?
- Can I help you?

We use 'can' with 'see' 'hear' 'feel' 'smell' 'taste' to talk about something which is happening now . (Where you would use the present continuous with most other verbs.)

- I can smell something burning.
- Can you hear that noise?
- I can't see anything.

We can use 'can't' for **deduction.** The opposite of 'can't' in this context is 'must'.

- You can't be hungry. You've just eaten.
- You must be hungry. You haven't eaten anything all day.
- He was in London one hour ago when I spoke to him. He can't be here yet.

Could

'Could' can be used to talk about the past, the present or the future.
'Could' is a past form of 'can'

- He phoned to say he couldn't come.
- I could see him clearly but I couldn't hear him and then the video conference line went dead.

'Could' is used to make polite requests. We can also use 'can' for these but 'could' is more polite.

- Could you help me, please?
- Could I have a lift?
- Could I bother you for a moment?

If we use 'could' in reply to these requests, it suggests that we do not really want to do it. If you agree to the request, it is better to say 'can'.

- Of course I can.
- I could help you if it's really necessary but I'm really busy right now.
- I could lend you some money but I'd need it back tomorrow without fail.

'Could' is used to talk about theoretical possibility and is similar in meaning to 'might'.

- It could rain later. Take an umbrella.
- He could be there by now.
- This symptom could go away and then come back.

May / might

may

We can use 'may' to ask for permission. However this is rather formal and not used very often in modern spoken English

- May I borrow your pen?
- May I go now?

We use 'may' to suggest something is possible

- If you heat the solution too quickly, it may explode.
- You may feel discomfort or pain in the stomach.

might

We use 'might' to suggest a small possibility of something. Often we read that 'might' suggests a smaller possibility that 'may', there is in fact little difference and 'might is more usual than 'may' in spoken English.

- She might be at home by now but it's not sure at all.
- It might rain this afternoon.

For the past, we use 'might have'.

- He might have tried to call while I was out.
- I might have dropped it in the street.

Should

We use 'should' for giving advice.

- Physical activity should be moderate to vigorous.
- Certain medicines should be kept at room temperature.
- We should give the victim a pain killer.

'Should' expresses a personal opinion and is much weaker and more personal than 'must' or 'have to'. It is often introduced by ' I think'.

- I think they should study the case more deeply.
- I think you should find your balance between food and physical activity..
- Do you think we should tell the patient ?

Must or have to

We can use 'must' to show that we are certain something is true. We are making a logical deduction based upon some clear evidence or reason.

- There must be something wrong.
- John didn't come to school today. He must be sick.

We also use 'must' to express a strong obligation. When we use 'must' this usually means that some personal circumstance makes the obligation necessary (and the speaker almost certainly agrees with the obligation.)

- My tooth really hurts! I must go to the dentist's.
- You must remain still to prevent the images from blurring.
- All medications must be safely discarded when it is outdated.

We can also use 'have to' to express a strong obligation. When we use 'have to' this usually means that some external circumstance makes the obligation necessary.

- I have to arrive at work at 9 sharp. My boss is very strict.
- We have to finish this report for Monday.
- You have to wear a white coat at the hospital.

As you can see, the differences between the present forms are sometimes very small and very subtle. However, there is a huge difference in the negative forms.

- We use 'mustn't' to express strong obligations NOT to do something.
- We mustn't work so many hours a day.
- I mustn't eat chocolate. It's bad for me.
- You mustn't eat so many sweets. They aren't good for you..

We use 'don't have to' (or 'haven't got to' in British English) to state that there is NO obligation or necessity.

- You don't have to come back if you feel ok.
- You don't have to take vitamin tablets if you eat fruit and vegetables.

SENTENCE STRUCTURE
THE SIMPLE SENTENCE

A simple sentence is one that contains subject and a verb and no other independent or dependent clause.

- *There are basically two types of stethoscopes.*
- *Carbohydrates provide the body with energy.*
- *Einstein's general theory of relativity has been subjected to many tests of validity over the years.*

THE COMPLEX SENTENCE. A complex sentence contains at least one dependent clause (a noun, adjective, or adverb clause) and no more than one independent clause:

A- Coordination:

Coordination is the process of combining ideas of equal importance by means of coordination conjunctions or correlatives.

It allows a series of words, phrases, subordinate clauses or main clauses to occupy the same level of importance in a sentence.

- The sphygmomanometer is usually covered with cloth and has two rubber tubes attached to it.
- Some cuffs hook together; others wrap or snap into place.
-The body does not need to take in most fats, but the fatty acids omega-3 and omega-6 are necessary.

B- Subordination: Signals

a) That:	I hope **(that)** you'll like this place.
b) a subordinating conjunction:	I'll be surprised **if** he can do it.
c) a wh-word:	We asked him **where** he'd been all night.
d) inversion:	**Had I** known, I wouldn't have come.
e) lack of a finite verb:	I hope **to see** you tonight.

Other conjunctions: after, before, until, while, because, since, as, so that, in order that, if, unless, whether, though, although, even though, where

Examples:
- If *water is not consumed, the body will dehydrate.*
- That point at which you stop hearing heart sounds through the stethoscope is the most reliable measure of diastolic pressure, ***although*** *it is usually somewhat above that found by intra-arterial meaurements.*
- It is advisable ***that*** *you should have a balanced diet, taking in food from each of the food groups, in proportion.*
- He didn't go to work ***because*** **he was sick**. *-* ***Although*** *John was unhappy, he still smiled.*

DEFINING RELATIVE CLAUSES

As the name suggests, these clauses give essential information to define or identify the person or thing we are talking about. Obviously, this is only necessary if there is more than one person or thing involved. Commas are not used in defining relative clauses.

Example
The man who had a nervous breakdown is my father.

The following relative pronouns are used in defining relative clauses:

	Person	**Thing**	**Place**	**Time**	**Reason**
Subject	who/that	which/that			
Object	who/whom/that/	which/that/	where	when	why
Possessive	*whose*	*whose*			

Notes:
1- The noun usually appears earlier in the sentence:

The woman **who/that** **spoke at the meeting** **was very knowledgeable.**

Noun, subject of main clause	relative pronoun referring to 'the woman', subject of 'spoke'	verb + rest of relative clause	verb + rest of main clause

2- ***Who, whom* and *which*** can be replaced by ***that.*** This is very common in spoken English.

3- The relative pronoun can be omitted when it is the *object* of the clause. (You can usually decide whether a relative pronoun is an object because it is normally followed by another subject + verb.)

4. ***Whose*** is used for things as well as for people.

Examples

- *The man **whose** prescription the doctor needs.*
- *Make a list of countries **whose** population is grater than 20 million.*

5**. *Whom*** is very formal and is only used in written English. You can use *who/that*, or omit the pronoun completely :

- The doctor ***whom/who/that/ I was hoping to see*** wasn't on duty.

Examples

- There's something ***that you should know****.*
- The genetic information ***which/that you get*** *.from your parents makes you the person you are.*
- An elephant is an animal **which**/***that lives in hot countries***.
-
- That's the hospital ***where my father used to work.***.
- They live in the house ***whose roof is full of holes***.
- Because the blood moves in waves, there are two blood pressure measures: the systolic pressure**, which** is the pressure of the blood as a result of the contraction of the ventricles, and the diastolic pressure, **which** is the pressure when the ventricles are at rest.

NON-DEFINING RELATIVE CLAUSES

The information in these clauses is not essential. It tells us more about someone or something, but it does not help us to identify them or it.

- Gorillas, **which are large and originate in Africa**, can sometimes be found in zoos. (This gives us some extra information about gorillas - we are talking about all gorillas.
- John's mother, **who lives in Scotland**, has 6 grandchildren. (We know who John's mother is, and he only has one. The important information is the number of grandchildren.

1- Non-defining relative clauses are always separated from the rest of the sentence by commas. The commas have a similar function to brackets:

- My friend John has just written a best-selling novel. (He went to the same school as me)
- My friend John, **who went to the same school as me**, has just written a best-selling novel.

Relative pronouns in non-defining clauses

	Person	**Thing**	**Place**
Subject	who	which	

Object	who/whom	which	where
Possessive	whose		

Notes

In non-defining clauses, you cannot use *'that'* instead of *who, whom* or *which*.

You cannot leave out the relative pronoun, even when it is the object of the verb in the relative clause:

Examples

- My grandmother, ***who is dead now***, came from the North of England.
- Louis Pasteur was a French scientist ***who studied microbes.***
- She's studying Math, ***which many people hate***.
- Dr. Gibson, the scientist **whose research the article is bases on**, agreed.

Organizational Patterns of Paragraphs

The basic unit of thought

Perhaps one of the best ways to improve your reading ability is to learn to read paragraphs effectively. Many experts believe the paragraph, not the sentence, is the basic unit of thought of a selection. If one can quickly grasp the meaning of each of these though units while reading, then comprehension will be heightened.

It is important to identify with the author's perspective by discovering the way the message is being sent. Every writer has a purpose for writing and some plan of action for getting a message across. This plan of action is the order in which the material will be presented in the text. This order, often called a pattern of organization, should be present in acceptable writing from the smallest to the largest unit of writing: the paragraph, groups of paragraphs, subchapters, chapters, groups of chapters, whole books, and even series of books. Each of these, then, contains a certain pattern of organization.

Anticipating the order in which the material will be presented helps you put the facts into perspective and to see how the parts fit into the whole. For example, if the selection begins by indicating that there are four important components of management, you are alert to look for four key phrases to mark and remember. Likewise, if a comparison is suggested, you want to note the points that are similar in nature. For material that shows cause and effect, you need to anticipate the linkage and note the relationship.

The importance of these patterns is that they signal how the facts will be presented. They are blueprints for you to use.
In textbook reading the number of details can be overwhelming. The mind responds to logical patterns; relating the small parts to the whole simplifies complexities of the material and makes remembering easier.

Although key signal words help in identifying the particular type of pattern, a single paragraph can be a mixture of different patterns. Your aim is to anticipate the overall pattern and then place the facts into a broad perspective.
The following six examples are the patterns of organization that are most frequently found in textbooks.

Simple Listing

Items are randomly listed in a series of supporting facts or details. These supporting elements are of equal value, and the order in which they are presented is of no importance. Changing the order of the items does not change the meaning of the paragraph.
Signal words often used for simple listing are:

- in addition

- several
- also
- for example
- another
- a number of

Description

Description is like listing; the characters that make up a description are no more than a simple listing of details.

Definition

Frequently in textbook reading an entire paragraph is devoted to defining a complex term or idea. The concept is initially defined and then further expanded with examples and restatements.
Signal words used for definition are:

- is defined as
- is called
- means
- refers to
- is described as
- term or concept

Chronological (Time) Order or Sequence

Items are listed in the order in which they occurred or in a specifically planned order in which they must develop. In this case, the order is important and changing it would change the meaning.
Signal words often used for chronological order or sequence are:

- first, second, third
- until etc.
- al last
- before, after
- next
- when
- later

Comparison - Contrast

Items are related by the comparisons (similarities) that are made or by the contrasts (differences) that are presented. The author's purpose is to show similarities and differences.
Signal words often used for comparison-contrast are:

- similar, different
- bigger than, smaller
- on the other hand
- than
- but
- in the same way
- however
- parallels

Cause and Effect

In this pattern, one item is showed as having produced another element. An event (effect) is said to have happened because of some situation or circumstance (cause). The cause (the action) stimulates the event, or effect (the outcome).
Signal words often used for cause and effect are:

- for this reason

- hence
- consequently
- because
- on that account
- made

Conclusion

- in conclusion
- to sum up
- taking everything into account
- all things considered
- in brief
- in short
- in a word

SCIENTIFIC COMMUNICATION: Understanding Scientific Journals and Articles

by Anthony Carpi, Ph.D., Anne E. Egger, Ph.D., Natalie H. Kuldell

- Scientists make their research available to the community by publishing it in scientific journals.
- In scientific papers, scientists explain the research that they are building on, their research methods, data and data analysis techniques, and their interpretation of the data.
- Understanding how to read scientific papers is a critical skill for scientists and students of science.

Scientists publish their original research in scientific journals, which are fundamentally different from news magazines. The articles in scientific journals are not written by journalists – they are written by scientists. Scientists write articles to describe their findings to the community in a transparent manner. Within a scientific article, scientists present their research questions, the methods by which the question was approached, and the results they achieved using those methods. In addition, they present their analysis of the data and describe some of the interpretations and implications of their work. Because these articles report new work for the first time, they are called primary literature. In contrast, articles or news stories that review or report on scientific research already published elsewhere are referred to as secondary.

The articles in scientific journals are different from news articles in another way – they must undergo a process called peer review in which other scientists (the professional peers of the authors) evaluate the quality and merit of research before recommending whether or not it should be published.

SCIENTIFIC JOURNALS

There are thousands of scientific journals that publish research articles. These journals are diverse and can be distinguished according to their field of specialization. Among the most broadly targeted and competitive are journals like *Cell*, the *New England Journal of Medicine* (NEJM), *Nature*, and *Science* that all publish a wide variety of research articles. *Cell* focuses on all areas of biology, NEJM on medicine, and both *Science* and *Nature* publish articles in all areas of science. Scientists submit manuscripts for publication in these journals when they feel their work deserves the broadest possible audience.

All of these journals play a critical role in the advancement of science and dissemination of information. However, to understand how science is disseminated through these journals, you must first understand how the articles themselves are formatted and what information they contain. There are broad characteristics that all scientific journal articles share:

FORMAT FOR THE PAPER

Scientific research articles provide a method for scientists to communicate with other scientists about the results of their research. A standard format is used for these articles, in which the author presents the research in an orderly, logical manner. This format is:

| Title | Authors | Introduction | Materials and Methods | Results (with Tables and Figures) | Discussion | Acknowledgments | Literature Cited |

TITLE

1. The title should be specific enough to describe the contents of the paper.
2. The title should be appropriate for the intended audience.
3. The title usually describes the subject matter of the article: Effect of Smoking on Academic Performance"
4. Sometimes a title that summarizes the results is more effective: Students Who Smoke Get Lower Grades"

AUTHORS

1. The person who did the work and wrote the paper is generally listed as the first author of a research paper.

2. For published articles, other people who made substantial contributions to the work are also listed as authors. Ask your mentor's permission before including his/her name as co-author.

ABSTRACT

1. An abstract, or summary, is published together with a research article, giving the reader a "preview" of what's to come. Such abstracts may also be published separately in bibliographical sources, such as Biological Abstracts. They allow other scientists to quickly scan the large scientific literature, and decide which articles they want to read in depth. The abstract should be a little less technical than the article itself; you don't want to dissuade your potential audience from reading your paper.

2.The abstract should be one paragraph, of 100-250 words, which summarizes the purpose, methods, results and conclusions of the paper.

3. It is not easy to include all this information in just a few words while still retaining the necessary concepts.

3. The abstract does not contain abbreviations or citations in the abstract. It should be able to stand alone without any footnotes.

INTRODUCTION

What question did you ask in your experiment? Why is it interesting? The introduction summarizes the relevant literature so that the reader will understand why you were interested in the question you asked. One to four paragraphs should be enough. It usually ends with a sentence explaining the specific question you asked in this experiment.

MATERIALS AND METHODS

1. How did you answer this question? There should be enough information here to allow another scientist to repeat your experiment.

2. If you had a complicated protocol, it may helpful to include a diagram, table or flowchart to explain the methods you used.

3. Results are not included in this section. However, preliminary results that were used to design the main experiment may be included. ("In a preliminary study, I observed the owls for one week, and found that 73 % of their locomotor activity occurred during the night, and so I conducted all subsequent experiments between 11 pm and 6 am.")

4. Relevant ethical considerations are usually mentioned. If you used human subjects, did they consent to participate. If you used animals, what measures did you take to minimize pain?

RESULTS

1. This is the section where the authors present the results by means of graphs and tables if appropriate, but also summarizing their main findings in the text.

2. Use appropriate methods of showing data.

"The drug cured 1/3 of the infected mice, another 1/3 were not affected, and the third mouse got away."

TABLES AND GRAPHS

1. When data is presented in a table or graph, it should include a title describing what's in the table ("Enzyme activity at various temperatures", not "My results".)

2. If you can summarize the information in one sentence, then a table or graph is not necessary.

DISCUSSION

1. The author highlights the most significant results, not just repeating what has been written in the Results section, but trying to answer some of these questions: how do these results relate to the original question? Do the data support the original hypothesis? Are the results consistent with what other investigators have reported? If results were unexpected, is there any kind of explanation? Is there another way to interpret the results? What further research would be necessary to answer the questions raised by the results?

2. It usually ends with a one-sentence summary of the author's conclusion, emphasizing why it is relevant.

ACKNOWLEDGMENTS

This section is optional. The authors can thank those who either helped with the experiments, or made other important contributions, such as discussing the protocol, commenting on the manuscript, etc.

REFERENCES (LITERATURE CITED)

There are several possible ways to organize this section. Here is one commonly used way:
1. In the text, the author cites the literature in the appropriate places:
2. In the References section the author lists citations in alphabetical order.

EVALUATING A PAPER

A thorough understanding and evaluation of a paper involves answering several questions:
a. What questions does the paper address?
b. What are the main conclusions of the paper?
c. What evidence supports those conclusions?
d. Do the data actually support the conclusions?
e. What is the quality of the evidence?
f. Why are the conclusions important?

a. What questions does the paper address?
Before addressing this question, we need to be aware that the research can be of several different types:

Type of research	Question asked:
Descriptive	What is there? What do we see?
Comparative	How does it compare to other organisms? Are our findings general?
Analytical	How does it work? What is the mechanism?

Descriptive research often takes place in the early stages of our understanding of a system. We can't formulate hypotheses about how a system works, or what its interconnections are, until we know what is there.

Comparative research often takes place when we are asking how general a finding is. Is it specific to my particular organism, or is it broadly applicable?

Analytical research generally takes place when we know enough to begin formulating hypotheses about how a system works, about how the parts are interconnected, and what the causal connections are. A typical analytical approach would be to devise two (or more) alternative hypotheses about how a system operates. Being aware that not all papers have the same approach can orient you towards recognizing the major questions that a paper addresses.

Identifying structure
Five common types of structure used in scientific texts are:

- **Generalization**: the extension or clarification of main ideas through explanations or examples
- **Enumeration**: listing of facts
- **Sequence**: a connecting series of events or steps
- **Classification**: grouping items into classes
- **Comparison / contrast**: examining the relationships between two or more things

ANALYSING A SCIENTIFIC PAPER **Prof. Elizabeth Balliro**
Question Guide

- What is the title of the paper?
- Who is the author?
- Has the work been published? Where? When?
- What is the structure of the paper?
- What is the Purpose/s of publication?
- What audience may be interested in reading this paper?
- Refer to the contents of the abstract
- What is the major theory that frames the work being done?
- What research question is under investigation?
- What specific hypothesis (or hypotheses) is being tested?
- What relevant information for the rest of the work is included in the introduction section?
- Define the part of the paper in which there are tables, graphs or diagrams.
- Is the methods section detailed enough for a competent reader to repeat the study and reproduce its results? Is there any reference to:

- Equipment and materials
- Observations and measurements
- Methods of data analysis
- Experimental design

- Define the part or section in which the author makes a description, analyses or makes a comparison
- Are there abbreviations? Are they defined as being used by the first time?
- How is the experimental data presented in the Results section?
- Has the author included any of these items in the discussion section?:
  (1) tested hypotheses,
  (2) limitations,
  (3) similar results of other authors,
  (4) predictions that follow the result. Does the discussion include conclusions or recommendations?

- State the way the citations were made.
- What are the main conclusions of the paper?
- What evidence supports those conclusions?
- Do the data actually support the conclusions?
- What is the quality of the evidence?
- Why are the conclusions important?