

UNIT 1 GRAMMAR - FINITE VERBS AND VERBALS

Finite Verbs

لا بد أن تحتوي كل
جملة على فاعل وفعل.

- **Finite verbs** are basic parts of sentences.
- Every sentence must contain a **subject** and a **finite verb**.
- **Finite verbs** are **complete verbs** [including any **helping verbs** (is, are, was, were, etc.) or **modals** (can, may, could, etc.) that **may** be necessary].
- **Finite verbs** can be active or passive.
- **Finite verbs** may be singular or plural.

Examples:

The process of burning **produces** heat.
Electrical charges **produce** electrical energy.
Burning **can produce** ashes.
The scientist **has** a new theory.
Lavoisier and Einstein **are** scientists.

(simple present active singular)
(simple present active plural)
(simple present active modal)
(simple present active singular)
(simple present active plural)

Heat **is produced** by burning.
Heat and light **are produced** by electrical energy.
Heat and light **can be produced** by burning.

(simple present passive singular)
(simple present passive plural)
(simple present passive modal)

Lavoisier **produced** ashes by burning wood.*
Lavoisier's experiments **produced** ashes.*
Carbon dioxide **was produced** during his experiment.
Ashes **were produced** during his experiment.

(simple past active singular)
(simple past active plural)
(simple past passive singular)
(simple past passive plural)

Verbals

حتى لو احتوت جملة
على verbal فلا بد أن
تحتوي أيضاً على verb.

- A **verbal** is a **verb form** that is **not** used as a verb.
- **Verbals** are **not** finite verbs and do **not** act as verbs in sentences.
- **Verbals** include **gerunds** (verb+ing), **present participles** (verb+ing), **past participles** (verb+ed and other *irregular spellings***), and **infinitives** (to + verb).

Examples:

Burning produces heat.
Mechanical energy is the energy of **moving** objects.
Ashes are substances **produced** by burning.
Lavoisier used experiments **to prove** his ideas.

(gerund - used as a noun)
(present participle - used as an adjective)
(past participle - used as an adjective)
(infinitive - used as an adverb)
Infinitives may also be used as a noun or an adjective. (See Unit 2)

* **'Produced'** (without a helping verb) is a **finite verb** only in the **simple past active** tense.

** The charts on **pages 11 and 12** provide the **verb forms** most commonly used in scientific writing. **Irregular verb forms** are listed on **page 13**. Students are responsible for using these forms correctly.

لا تكمن مأساة الحياة في عدم
وصولك إلى الهدف، لكن في ألا
يكون لك هدف تحاول الوصول إليه.

A. For each of the following sentences, **circle** the word(s) that best describe(s) the underlined verb or verbal.

1. When a substance **is heated**, its molecules move faster, which causes it to feel hot.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

2. When a substance is heated, its molecules **move** faster, which causes it to feel hot.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

3. When a substance is heated, its molecules move faster, which **causes** it to feel hot.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

4. When a substance is heated, its molecules move faster, which causes it **to feel** hot.

a) finite verb b) gerund c) present participle d) past participle e) **infinitive**

5. An apple **hanging** on a tree has potential energy.

a) finite verb b) gerund c) **present participle** d) past participle e) infinitive

6. An apple hanging on a tree **has** potential energy.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

7. When energy **is transformed** from one type to another or transferred from one body to another, no energy is lost.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

8. When energy **is** transformed from one type to another or **transferred** from one body to another, no energy is lost.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

9. When energy is transformed from one type to another or transferred from one body to another, no energy **is** lost.

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

10. **Splitting** an atom releases an enormous amount of energy.

a) finite verb b) **gerund** c) present participle d) past participle e) infinitive

11. Einstein **expressed** this concept in a formula.*

a) **finite verb** b) gerund c) present participle d) past participle e) infinitive

12. The concept **expressed** by his formula was used to produce an atomic bomb.*

a) finite verb b) gerund c) present participle d) **past participle** e) infinitive

* 'Expressed' (without a helping verb) is a finite verb only in the simple past active tense.

الإحسان يَخطُّ من قدر من يتَّقونه.

Unit 1 - VERB FORMS (Finite Verbs and Verbals)

B. Box # (1) below provides correct forms of the verb **to use**. The forms provided are the most widely used verb forms in technical writing, and students are responsible for using them correctly.

*The only modal shown below is the modal **can**, but all modals follow the same rules, and students are responsible for using all modals correctly (present simple active and passive forms only). Other commonly used modals include may, might, should, could, etc. Look at the information given on page 13 before completing the following boxes.

(1) <u>to use</u> FINITE VERBS					
Present Simple Active			Present Simple Passive		
Singular	Plural	Modal	Singular	Plural	Modal
uses	use	can use	is used	are used	can be used
Past Simple Active			Past Simple Passive		
Singular and Plural		Modal	Singular	Plural	Modal
used		X	was used	were used	X
VERBALS					
Infinitive/Active		Infinitive/Passive		Present Participle/Gerund	
to use		to be used		using	
			Past Participle		
			used		

2) Complete the following boxes using correct forms of the verb **to produce**.

FINITE VERBS					
Present Simple Active			Present Simple Passive		
Singular	Plural	Modal	Singular	Plural	Modal
produces	produce	can produce	is produced	are produced	can be produced
Past Simple Active			Past Simple Passive		
Singular and Plural		Modal	Singular	Plural	Modal
produced		X	was produced	were produced	X
VERBALS					
Infinitive/Active		Infinitive/Passive		Present Participle/Gerund	
to produce		to be produced		producing	
			Past Participle		
			produced		

3) Complete the following boxes using correct forms of verb **to release**.

FINITE VERBS					
Present Simple Active			Present Simple Passive		
Singular	Plural	Modal	Singular	Plural	Modal
releases	release	can release	is released	are released	can be released
Past Simple Active			Past Simple Passive		
Singular and Plural		Modal	Singular	Plural	Modal
released		X	was released	were released	X
VERBALS					
Infinitive/Active		Infinitive/Passive		Present Participle/Gerund	
to release		to be released		releasing	
			Past Participle		
			released		

لا تستح من إعطاء القليل فإن الحرمان أقل منه.

(4) Complete the following boxes using correct forms of the irregular verb **to give**.

FINITE VERBS

Present Simple Active		
Singular	Plural	Modal
gives	give	can give

Present Simple Passive		
Singular	Plural	Modal
is given	are given	can be given

Past Simple Active	
Singular and Plural	Modal
gave	X

Past Simple Passive		
Singular	Plural	Modal
was given	were given	X

VERBALS

Infinitive/Active	Infinitive/Passive
to give	to be given

Present Participle/Gerund	Past Participle
giving	given

(5) Complete the following boxes using correct forms of the irregular verb **to take**.

FINITE VERBS

Present Simple Active		
Singular	Plural	Modal
takes	take	can take

Present Simple Passive		
Singular	Plural	Modal
is taken	are taken	can be taken

Past Simple Active	
Singular and Plural	Modal
took	X

Past Simple Passive		
Singular	Plural	Modal
was taken	were taken	X

VERBALS

Infinitive/Active	Infinitive/Passive
to take	to be taken

Present Participle/Gerund	Past Participle
taking	taken

6) Complete the following boxes using correct forms of the irregular verb **to have**.

FINITE VERBS

Present Simple Active		
Singular	Plural	Modal
has	have	can have

Present Simple Passive		
Singular	Plural	Modal
X	X	X

Past Simple Active	
Singular and Plural	Modal
had	X

Past Simple Passive		
Singular	Plural	Modal
X	X	X

VERBALS

Infinitive/Active	Infinitive/Passive
to have	X

Present Participle/Gerund	Past Participle
having	had

خلاصة الكلام: إذا أردت أن يحبك الناس، ازهد فيما بين أيديهم.

Irregular Past Participles

Most simple past finite verbs and past participles end in "ed", but some are **irregular**. The following chart lists some irregular verbs commonly used in scientific writing. Students are responsible for spelling verb forms correctly.

IRREGULAR VERB FORMS

Infinitive	Simple Past	Past Participle	الترجمة
to be	was/were	been	يكون
to have	had	had	يمتلك
to do	did	done	يفعل
to make	made	made	يصنع
to see	saw	seen	يرى

to cut	cut	cut	يقطع
to put	put	put	يضع
to shut	shut	shut	يغلق
to cost	cost	cost	يكلف
to let	let	let	يدع، يسمح
to set up	set up	set up	يقف
to spread	spread	spread	ينشر، ينشر
to hit	hit	hit	يضرب

to bring	brought	brought	يحضر
to buy	bought	bought	يشترى
to catch	caught	caught	يمسك
to think	thought	thought	يفكر

to bind	bound	bound	يربط
to find	found	found	يجد
to grind	ground	ground	يطحن
to wind	wound	wound	يلف، يلوي

to feel	felt	felt	يشعر
to deal	dealt	dealt	يتعامل
to mean	meant	meant	يعني، يقصد
to lean	leant/leaned	leant/leaned	يميل
to leave	left	left	يترك
to keep	kept	kept	يحتفظ
to sweep	swept	swept	يكس
to bend	bent	bent	ينحني
to spend	spent	spent	ينفق، يقضي
to lose	lost	lost	يخسر
to burn	burnt/burned	burnt/burned	يحرق
to build	built	built	يبني

to feed	fed	fed	يغذي
to lead	led	led	يقود
to meet	met	met	يقابل
to read	read	read	يقراً
to say	said	said	يقول
to light	lit/lighted	lit/lighted	يضئ
to slide	slid	slid	ينزلق
to hold	held	held	يحمل، يمسك

Infinitive	Simple Past	Past Participle	الترجمة
to hang	hung	hung	يعلق
to swing	swung	swung	يتأرجح
to spin	span/spun	span/spun	يغزل
to stick	stuck	stuck	يلصق
to strike	struck	struck	يضرب
to dig	dug	dug	يحفر
to stand	stood	stood	يقف

to break	broke	broken	يكسر
to choose	chose	chosen	يختار
to drive	drove	driven	يقود
to fall	fell	fallen	يسقط
to freeze	froze	frozen	يتجمد
to give	gave	given	يعطي
to rise	rose	risen	يرتفع
to shake	shook	shaken	يهز
to take	took	taken	يأخذ

to blow	blew	blown	يهب، يعصف
to fly	flew	flown	يطير
to grow	grew	grown	ينمو
to know	knew	known	يعرف
to throw	threw	thrown	يقذف

to bear	bore	born	يتحمل، يلد
to tear	tore	torn	يمزق
to wear	wore	worn	يرتدي

to come	came	come	يأتي
to become	became	become	يصبح

to forget	forgot	forgotten	ينسى
to get	got	gotten/got	يحصل على
to write	wrote	written	يكتب

to begin	began	begun	يبدأ
to run	ran	run	يجري
to ring	rang	rung	يقرع، يرن

to draw	drew	drawn	يرسم
to show	showed	shown	يوضح

إذا تحفظ كل يوم تصريفات فعل واحد هيصير عندك ثروة لغوية.

إذا لم تزد على الحياة
شينا فأنت زائد عليها.

Subject-Verb Agreement

- **Subject(s)** and **finite verb(s)** must **agree in number** (singular or plural).
- **Subjects** are either nouns or pronouns.
- **Noun subjects** may be **countable** (singular or plural) or **uncountable**.
- **Singular countable subjects** and **uncountable subjects** require **singular verbs** or **modal verbs**.
In a sentence, the subject(s) generally come(s) before the verb(s) (S--V)

Examples:

A hanging apple has potential energy. (singular subject / singular verb)
 An apple can have potential energy. (singular subject / modal verb)
Water in a dam has potential energy. (uncountable subject / singular verb)
Water can have potential energy. (uncountable subject / modal verb)

- **Plural countable subjects** require **plural verbs** or **modal verbs**.

Examples:

Hanging apples have potential energy. (plural subject / plural verb)
Apples can have potential energy. (plural subject / modal verb)

Uncountable Nouns: The following chart lists some **uncountable nouns** commonly found in scientific writing. Uncountable nouns require **singular verbs** (or modal verbs).

processes	corrosion, combustion, digestion
solids	paper, wood, iron, ice
liquids	water, gasoline, tea
gases	steam, oxygen, air, smoke
fields of study	engineering, mathematics, physics
natural	energy, heat, lightning, electricity, gravity
abstractions	beauty, peace, health
particles	salt, sand, rice, sugar
groups made up of similar items	equipment, machinery, money, garbage, clothing, traffic, mail, fruit, food
groups of people	family, team, army, navy, crowd

الكلمة	المعنى
corrosion	صدأ
combustion	احتراق
digestion	هضم
lightning	برق
equipment	معدات
garbage	قمامة
navy	أسطول
machinery	مكائن

Special Problems in Agreement

When a sentence begins with **here, there, where, which, or what**, the subject will follow the verb (V-S order). In this reversed order, the subject and verb must still agree in number. To find out, what the subject is, mentally rearrange the sentence in the subject - verb order. Look at the examples below:

V S S -- V

There are many types of kinetic energy. (Types are)

Where are the plans and reports? (Plans and reports are)

Sentences often begin with a prepositional phrase (See page 26 for prepositional phrases), followed by the verb, then the subject. Again, in this V -- S order, the verb and subject must agree. Look at the examples below.

V S S -- V

To the right of the desk were three chairs. (Chairs were)

إما نختار أن نحيا حياتنا أو نترك غيرنا يحياها نيابة عنا.

B. Choose the correct form of the verb from the two choices given within parentheses by crossing out the wrong form.

- 1. On the table there (~~is~~/~~are~~) adding machines and calculators.
- 2. Here (~~is~~/~~are~~) the blueprints for the new office building.
- 3. In the lab there (~~was~~/~~were~~) two Bunsen burners.
- 4. Beside the new lab, there (~~is~~/~~are~~) a row of chairs
- 5. Which (~~is~~/~~are~~) the new men for the job?
- 6. Behind the door (~~is~~/~~are~~) the master switch to all the lights.

C. Write the correct form of the verb (singular or plural) for each of the following sentences. Use the active form of the present simple tense.

- 1. The elements oxygen and hydrogen combine to form water which
(to combine)
is a compound.
(to be)
- 2. Ice forms when water reaches 4°C.
(to form)
- 3. Exhaust gases leave a vehicle through an exhaust valve.
(to leave)
- 4. The teeth on gear wheels mesh together so that one wheel
turns the other.
(to turn)
- 5. If the number of teeth on each gear wheel is different, then the
gears change the speed and force is transmitted.
(to change)
- 6. The Geiger counter consists of a metal cylinder
(to consist)
containing gas at low pressure.
- 7. Geiger counters detect uranium and other radioactive elements.
(to detect)
- 8. Radioactive decay inside the earth continuously adds
(to add)
more heat to prevent the earth from cooling down.

الكلمة	المعنى
combine	يتحد
reach	يصل
counter	عداد
radioactive	إشعاعي
decay	يتحلل
prevent	يمنع
element	عنصر

نسيان غاية المرء هو أكثر أشكال الغباء انتشاراً.

9. Steam escapes through cracks in the ground at temperatures ranging between 140°C and 260°C.
(to escape)

10. A fuel cell is a power source which converts a chemical reaction into electricity.
(to convert)

11. Clamps are devices which hold parts tightly in position.
(to hold)

12. A transformer changes a high voltage current into a low voltage current.
(to change)

13. Thermometers which are used to measure body temperature contain mercury.
(to contain)

14. Water flows from a higher to a lower place due to gravity.
(to flow)

15. The atmosphere consists of several layers, and it
(to consist)

contains oxygen and other gases.
(to contain)

16. A carpenter uses a hammer to drive nails into wooden surfaces.
(to use)

17. Policemen control the traffic lights during rush hours.
(to control)

18. The Suez Canal connects the Red Sea and the Mediterranean Sea.
(to connect)

19. Switches turn lights on and off.
(to turn)

20. Iron melts at 1,535° C.
(to melt)

الكلمة	المعنى
escape	يهرب
cracks	شقوق، شقوق
range	يتراوح
fuel	وقود
cell	خلية
clamp	ملزمة، قابض
flow	يسيل، ينساب
carpenter	نجار
melt	ينصهر
rush hours	ساعات الذروة

يتم إنجاز الأعمال في موعدها
الصحيح في المفكرة فقط.

Action Verbs and Linking Verbs

- **Action verbs** show what the subject(s) does/do. Most verbs are action verbs.
- **Transitive [active] action verbs** are followed by **direct objects** (nouns).

Examples:

Electrical charges **produce** *electrical* energy.

↑ ↑
action verb direct object

The hammer **moved** *the* nail.

↑ ↑
action verb direct object

The apple **has** *potential* energy.

↑ ↑
action verb direct object

Action Verb

يخبر عن الفاعل:
ماذا فعل أو يفعل.

- **Linking verbs** are intransitive verbs that **link** the subject to a **noun** or an **adjective**.

Examples:

Fission **is** *a process*.

↑ ↙
linking verb noun

Einstein **became** a famous *scientist*.

↑ ↑
linking verb noun

Einstein **became** *famous*.

↑ ↙
linking verb adjective (without a noun)

Nuclear energy **seems** *dangerous*.

↑ ↙
linking verb adjective (without a noun)

Linking Verb

يخبر عن الفاعل:
من هو أو ماذا يكون.

بُعد المسافة لا يهم، الخطوة
الأولى فقط هي الأكثر صعوبة.

Note: Linking verbs, unlike action verbs, can be followed by adjectives only (without nouns). For example, 'to be' is a linking verb while 'to have' is an action verb, and therefore we can say "He is nice." but not "He ~~has~~ nice". However, we can say "He has a nice car."

The following chart lists some of the linking verbs commonly used in scientific writing.

<p>Linking Verbs</p> <p><i>Verbs of Being</i></p> <p>to be, to become, to remain, to act, to seem, to appear, to stay, to grow</p> <p><i>Verbs of the Senses*</i></p> <p>to look, to feel, to smell, to taste, to sound</p>



Note: Linking verbs can be replaced with “ = ” in sentences and still make sense. To test whether or not a verb is a linking verb, substitute “ = ” for the verb. If the sentence still makes sense, then the verb is a linking verb. *Verbs of the senses are linking verbs only when they can be replaced with “ = ” and still make sense.

Examples:

Einstein was a scientist.	Einstein = a scientist (still makes sense)
Einstein is famous.	Einstein = a famous (still makes sense)
The apple tasted sweet.*	apple = sweet (still makes sense)
The engineer tasted the apple	engineer ≠ apple (does not make sense / not a linking verb)

D. Underline the **finite verbs** in the following sentences and then indicate if they are action verbs or linking verbs. Both action verbs and linking verbs can be followed by nouns, but only linking verbs can be followed by adjectives only (without nouns).

- Burning substances feel hot.
a) action verb b) **linking verb**
- Apples hang on trees.
a) **action verb** b) linking verb
- Lavoisier studied matter.
a) **action verb** b) linking verb
- The apples look beautiful.
a) action verb b) **linking verb**
- Hydrogen atoms combine to form helium atoms.
a) **action verb** b) linking verb
- Enzymes are substances found in the body.
a) action verb b) **linking verb**
- Fusion can be used to produce energy.
a) **action verb** b) linking verb
- The amount of energy remains intact.
a) action verb b) **linking verb**

الكلمة	المعنى
substance	مادة
combine	يتحد
remain	يظل، يبقى
intact	سليم، كامل

البعض ينتظر الظروف المثالية كي يبدأ، وغالبا يطول انتظارهم.

E. For each of the following sentences, underline the **linking verbs** and circle the **words that they are linked to**. Then indicate whether they are linked to nouns or adjectives.

1. The amount of energy released was **enormous**.
(a) noun (b) **adjective**
2. Oxygen and carbon dioxide are **gases**.
(a) **noun** (b) adjective
3. Some of the wood became **ashes**.
(a) **noun** (b) adjective
4. During fission, matter becomes **energy**.
(a) **noun** (b) adjective
5. Einstein and Lavoisier are **famous**.
(a) noun (b) **adjective**
6. Einstein and Lavoisier are famous **scientists**.
(a) **noun** (b) adjective
7. Some substances smell **nice** while burning.
(a) noun (b) **adjective**
8. Potential energy is stored **energy**.
(a) **noun** (b) adjective
9. A steel spoon inserted in a pot of tea becomes **hot**.
(a) noun (b) **adjective**
10. The ratio of hydrogen to oxygen remains **constant**.
(a) noun (b) **adjective**
11. Lavoisier was **French**.
(a) noun (b) **adjective**
12. Lavoisier was a French **chemist**.
(a) **noun** (b) adjective
13. Fuels are useful **substances**.
(a) **noun** (b) adjective
14. A substance feels **cold** when its molecules are moving very slowly.
(a) noun (b) **adjective**
15. This reaction is very **rapid** and releases a huge amount of energy.
(a) noun (b) **adjective**
16. The center of the sun is extremely **hot**, allowing fusion to occur.
(a) noun (b) **adjective**
17. Water in a dam is an **example** of potential energy.
(a) **noun** (b) adjective

الكلمة	المعنى
enormous	كبير، ضخيم
ashes	رماد
substance	مادة
rapid	سريع
occur	يحدث

الحاجة الملحة هو نقطة
بداية كل الإنجازات.

The Verbs **To Be** and **To Have**

Two frequently used verbs in this course are the verbs **to be** and **to have**. The verb **to be** (*is/are*) is a **linking verb** and may therefore be followed by an **adjective without a noun**.

Petrol **is** expensive in Europe, (adjective)

The roads in Kuwait **are** very modern, (adjective)

The verb **to be** (*is/are*) may also be followed by a **noun** if the verb **to be** can be replaced with “=” and still make sense.

The red car **is** a Mercedes.

The red car = Mercedes (still makes sense)

Metals **are** usually good conductors of heat.

Metals = good conductors (still makes sense)

The verb **to have** (*has/have*) is an **action verb** and is therefore followed by a **noun**.

Moving objects **have** energy, (noun)

This bridge **has** a length of 100m. (noun)

الكلمة	المعنى
frequently	بصفة متكررة
adjective	صفة
metal	معادن
conductor	موصل
replace	يستبدل

However, the verb **to have** (*has/have*) **cannot** be replaced with “=”.

Moving object "≠" energy (does not make sense)

In addition, the verb **to have** **cannot** be followed by an **adjective** without a **noun**. (Look at the **note** at the end of page 17 for examples.)

F. Use the correct form of the verb to be (is/are) or the verb to have (has/ have) in the sentences below.

1. An atom is the smallest unit of matter.
2. Triangles have three sides and three angles.
3. A nuclear change is similar to a chemical change.
4. The properties of metals are different from the properties of gases.
5. Each metal has its own properties.
6. Bases are substances which will neutralize acids.
7. Water has no smell, taste, or color.
8. The most volatile fuel is gasoline.
9. Petroleum has different uses.
10. Lubricating oils are useful because they make machines run smoothly.
11. Acids have a burning effect on substances.
12. Both oxygen and hydrogen are gases.
13. The computers in the lab are capable of accessing the internet.
14. Our solar system has nine planets.
15. A saw is a tool which is used for cutting wood or metal.
16. The door has a metal handle and a wooden frame.
17. A bicycle is a vehicle which has two wheels.
18. Kinetic energy is the energy of motion.

الكلمة	المعنى
matter	مادة
similar	مشابه
neutralize	يعادل
bases	القواعد
acids	الأحماض

الرغبة الواهنة لا ينتج عنها إنجازات عظيمة.

Active and Passive Finite Verbs

المبني للمعلوم والمبني للمجهول

Active Verbs

- **Active verbs** are finite verbs that tell **what the subject does or is**.
- **Active verbs** may be **transitive** or **intransitive**. (أفعال متعدية أو أفعال لازمة)
- **Active verbs** that are **intransitive** are **not** followed by **direct objects** and **cannot** be changed to **passive**. (الأفعال اللازمة غير متبوعة بمفعول مباشر ولا يمكن بناؤها للمجهول)

Examples:

Apples **hang** on trees. (active **intransitive** verb / no direct object)
Apples **are** nice. (active **intransitive** verb / no direct object)

- **Active verbs** that are **transitive** are followed by **direct objects** and can generally be changed to passive. The **direct object** of the **active** sentence becomes the **subject** of the **passive** sentence. (الأفعال المتعدية متبوعة بمفعول مباشر ويمكن بناؤها للمجهول)

Examples:

Food **stores** **energy**. (active **transitive** verb / with **direct object** 'energy')
*changed to passive: **Energy is stored** in food.* (passive **transitive** verb / with **subject** 'energy')

- Some **active sentences** that contain **transitive verbs** with **direct objects** **cannot** be changed to **passive**.

Examples:

Moving objects **have** kinetic **energy**. (active **transitive** verb / with **direct object** 'kinetic energy')
Kinetic energy is had by moving objects. (no passive / **to have** is always **active**)

Direct Object Test

- To find out if a verb has a direct object, ask “**what?**” or “**whom?**” after the verb.
- If there is an answer, then the answer is the direct object of the verb.
- If there is **no** answer, then the verb does **not** have a direct object and is **intransitive**.

Examples:

Food molecules **store** **energy**.
(store what? *energy* - *energy* is the direct object)
Einstein **expressed** **this concept** in a formula.
(expressed what? *this concept* - *concept* is the direct object)
It **gives up** **neutrons** when it splits.
(gives up what? *neutrons* - *neutrons* is the direct object)
Fusion **takes place** in the sun.
(takes place what? There is no answer, so there is no direct object.)

الكلمة	المعنى
molecules	جزيئات
formula	صيغة
take place	يحدث
rise	يرتفع
happen	يستبدل

The following chart lists commonly used **intransitive verbs**. Intransitive verbs must always be **active** and **cannot** be changed to **passive** because they do not take direct objects.

Intransitive Verbs		
Always Intransitive		Sometimes Intransitive
to be	to occur	to continue
to become	to remain	to leave
to consist	to result in	to return
to flow	to rise	
to go	to sleep	
to happen	to stay	

الطريق إلى القمة نادراً ما يكون مزدحماً.

- **Passive verbs** are finite verbs that tell what is/was done to the subject. The subject of a passive sentence receives the action of the verb.
- **Passive verbs** are commonly used in scientific writing because the actor of the action is frequently not important in science.

Examples:

When a piece of wood is burned, ashes remain.
(Who burns the wood? Anyone! The actor is not important.)

- **Passive sentences** can only be changed to active sentences when the actor is understood.

Examples:

The ancient city was destroyed around the year 200 B.C.
(Who or what destroyed the city? People? Fire? An earthquake? Unknown! / cannot be changed to active)

The following chart lists verbs that are always (or generally) active or passive.

Active and Passive Verbs	
Always Active or Generally Active Verbs	Always Passive or Generally Passive Verbs
<u>intransitive verbs</u> (to be, to fall, to occur, etc.) to have to get to contain (meaning to have)	verbs with actors that are <u>not understood</u> is / are composed of is / are located (meaning occur)

- **passive verb forms** are used more frequently than the **active form** by **scientists** and **engineers**. This is because for them references to people are **unnecessary** and the **results** of the action(s) performed by people are more important than the people performing the action(s).

The different forms of the passive are given below:

- All **finite passives** are formed by some part of the verb **be** plus the **past participle**.

Present passive { is are } + past participle

*The gas **is heated**.*
*The bridge **is made** of concrete.*

الكلمة	المعنى
receive	يستلم
destroy	يهدم
transitive	فعل متعدي
intransitive	فعل لازم
generate	يولد، يتولد

- The **modal passive** is formed as follows:

The modal passive { will can may should etc. } + be + past participle

*The survey **will be completed** next year.*
*The survey **may be completed** next year.*
*Acids **should be handled** with great care.*
*Heat **can be generated** in several ways*

- The **position** of **adverbs** in **passive** sentences is **just before the past participle** as shown in the sentences below:

*The gas **is carefully** heated.*
*Bridges **are usually** made of reinforced concrete.*

الناجحون لا يفعلون أشياء مختلفة، بل يفعلون الأشياء بطريقة مختلفة.

- **Negative statements** are formed in the passive in the following way:

Litmus paper is **not** used in this experiment.
 His research will **not** be completed this year.
 Agriculture ***cannot** be developed without sufficient water.

* Notice that **cannot** is written as one word and is a part of the modal can.

However in the other sentences above, '**not**' is **not a part of the verb** and is considered to be an **adverb**.

- **Questions** are formed in the passive in the following way:

Is litmus paper used in the experiment?
Will his research be completed this year?
Can agriculture **be developed** without sufficient water?

- The following are the **spelling rules** for forming the **past participles**:

- (a) The **past participle** of **regular** verbs is formed by adding **-ed** to the base form, or by adding only **-d** to the base form if the verb ends in **e**.

heat → heated cause → caused
 boil → boiled close → closed

- (b) Verbs endings in **consonant** + y change to **i**

apply → applied
 carry → carried
 occupy → occupied

- (c) Verbs ending in vowel + y follow the normal rule of adding -ed/d.

delay → delayed employ → employed

- However, many of the commonest and most useful verbs in scientific English have **irregular past participles**. A list of **irregular past participles forms** is given on page 13.

G. Complete the following sentences by selecting the correct **active** or **passive** form of the finite verbs provided.

1. Apples _____ on trees.

- a) hang b) are hanged

2. Energy _____ to do work.

- a) can use b) can be used

3. Fusion and fission _____ huge amounts of energy.

- a) can produce b) can be produced

4. Scientists _____ that matter and energy cannot be destroyed.

- a) know b) are known

5. Atomic bombs _____ in 1945.

- a) use b) were used

6. The energy stored in food molecules _____ by enzymes.

- a) can release b) can be released

7. Chain reactions _____ explosions to occur.

- a) may cause b) may be caused

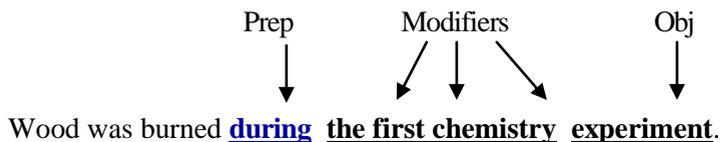
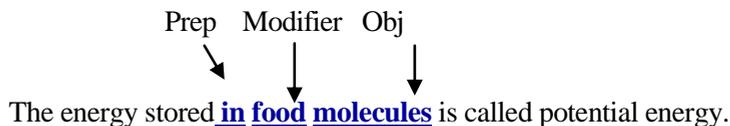
8. Energy _____ in food molecules and gasoline.

- a) stores b) is stored

إنسان لم يرتكب أخطاء
 بالأغلب لم يحاول أبداً.

A prepositional phrase is a group of words that contains (1) a preposition, (2) the object of the preposition, which is usually a noun or pronoun, and (3) all modifiers of that object (if any).

Examples:



- Like all phrases, it is only part of a sentence, not a sentence in itself.
- In technical English, prepositional phrases do not act as sentence subjects and do not contain sentence subjects.

Object Test

- A word must have an object to be used as a preposition in a sentence.
- To find out if a word has an object, ask “**what?**” or “**whom?**” after the word.
- If there is an answer, then the answer is the object of the preposition.
- If there is no answer, then the word does not have an object and is not a preposition.*

Examples:

on the table

(on what? on the *table* - *table* is the object)

for the engineers

(for whom? *for the engineers* - *engineers* is the object)

during our class

(during what? *during class* - *class* is the object)

He looked **above**.*

(above what? There is no answer, so there is no object.)

Above is used as an adverb in this sentence (not as a preposition).

Study the following list of some common prepositions. Students must remember that prepositional phrases do not contain subjects, which are found only in sentences.

ONE-WORD PREPOSITIONS			
about	beneath	in	to
above	beside	inside	toward
across	besides	into	under
after	between	like	underneath
against	beyond	near	unlike
along	but (meaning of		until
among	"except")	off	up
around	by	on	upon
as	down	outside	with
at	during	over	within
before	except	since	without
behind	for	through	
below	from	throughout	

الكلمة	المعنى
across	عبر، خلال
against	مقابل، تجاه
beneath	تحت، أسفل
toward	نحو، اتجاه
underneath	نحو الأسفل

إنهم يستطيعون لأنهم يعتقدون أنهم يستطيعون.

Some prepositions consist of two or more words. The following list contains just a few of these multiple-word prepositions.

MULTIPLE-WORD PREPOSITIONS

according to	in back of
along with	in front of
as well as	next to
because of	such as
by means of	together with
in addition to	

J. Underline the prepositional phrases in the sentences below and then circle the objects. Some Sentences contain more than one prepositional phrase.

1. This concept was expressed in his famous equation.
2. At the same time, it gains kinetic energy.
3. An apple hanging on a tree has potential energy.
4. It exerts a force on the nail.
5. Electrical energy is produced by electrical charges.
6. When a piece of wood is burned, ashes remain.
7. Water in a dam is another example of potential energy.
8. The energy stored in gasoline must be released by the spark plug.
9. The transfer of energy may involve a transfer from one body to another.
10. The principle of fusion can be used to produce energy for peaceful purposes.

الكلمة	المعنى
by means of	بواسطة
equation	معادلة
plug	سدادة
spark	شرارة
purpose	غرض

K. Complete the following sentences by selecting the adverb **because** or the preposition **because of**.*

1. This chain reaction begins _____ neutrons are given up.
a) **because** b) because of
2. _____ its position, water in a dam has potential energy.
a) because b) **because of**
3. _____ uranium atoms can be split, they are used to make atomic bombs.
a) **because** b) because of
4. Einstein is famous _____ his theory was correct.
a) **because** b) because of
5. Einstein is famous _____ his theory about matter and energy.
a) because b) **because of**

***Because** is an adverb that is followed by a subject and a finite verb. **Because** begins a **dependent clause** (For more information on clauses refer page 29).

***Because of** is a **two-worded preposition** that is followed by a noun (the object of the preposition). **Because of** begins a **prepositional phrase**

أغلب الناس لديهم الرغبة في الفوز،
لكن قليلون من يرغب ببذل الثمن.

Verbal Phrases (Infinitive Phrases, Participial Phrases, and Gerund Phrases)

- A verbal phrase is a group of words that begins with a verbal. Verbal phrases are not verbs.
- A verbal phrase is only part of a sentence, not a sentence itself.
- A verbal phrase consists of a verbal, its objects, and its modifiers (if any).
- There are three types of verbal phrases: (1) **infinitive phrases**, (2) **participial phrases**, and (3) **gerund phrases**.

Examples:

- Energy is the ability to do work. (infinitive phrase)
- Substances containing one type of atom are called elements. (present participial phrase)
- The energy stored in gasoline is called chemical energy. (past participial phrase)
- Splitting uranium atoms is difficult and dangerous. (gerund phrase)

L. Underline the verbal phrases in the following sentences and then circle the words which best describe the verbal phrase.

1. It will do the work of moving the hands of the watch. [object of a preposition]
 a) infinitive phrase b) present participial phrase c) past participial phrase **d) gerund phrase**
2. They can be used to produce fuel.
a) infinitive phrase b) present participial phrase c) past participial phrase d) gerund phrase
3. It has a form of energy called kinetic energy.
 a) infinitive phrase b) present participial phrase **c) past participial phrase** d) gerund phrase
4. There are many types of energy, including chemical, thermal, and mechanical energy.
 a) infinitive phrase **b) present participial phrase** c) past participial phrase d) gerund phrase
5. The spark plug can do the work of propelling the car forward.
 a) infinitive phrase b) present participial phrase c) past participial phrase **d) gerund phrase**
6. The molecules then move faster, which causes that substance to feel hot.
a) infinitive phrase b) present participial phrase c) past participial phrase d) gerund phrase
7. Fuels formed millions of years ago are called natural fuels.
 a) infinitive phrase b) present participial phrase **c) past participial phrase** d) gerund phrase
8. Transforming hydrogen into helium requires intense heat.
 a) infinitive phrase b) present participial phrase c) past participial phrase **d) gerund phrase**
9. Many fuels including coal and gas occur naturally.
 a) infinitive phrase **b) present participial phrase** c) past participial phrase d) gerund phrase
10. Wood, garbage, and manure are used to produce fuel.
a) infinitive phrase b) present participial phrase c) past participial phrase d) gerund phrase

أن يحسدك الناس أفضل من أن يشفقوا عليك.

Clauses (Independent and Dependent)

الفقرات نوعان: (مستقلة وثنائية)

Clauses are groups of related words that contain both a subject and a finite verb. Clauses may be independent or dependent.

An independent clause:

- contains both a subject and a finite verb
(The finite verbs found in independent clauses are called main verbs.)
- is a complete thought
- can stand alone as a sentence (when correctly capitalized and punctuated)

M. Circle the subjects and underline the finite verbs (main verbs) in the following clauses and sentences.

independent clausessentences

1a) energy has many forms

1b) Energy has many forms.

2a) potential energy is stored energy

2b) Potential energy is stored energy.

3a) some uranium atoms can be split

3b) Some uranium atoms can be split.

4a) he was a scientist

4b) He was a scientist.

5a) burning does not destroy matter

5b) Burning does not destroy matter.

6a) this process is called fusion

6b) This process is called fusion.

A dependent clause:

- contains both a subject and a finite verb (The finite verbs in dependent clauses are not main verbs)
- is not a complete thought
- cannot stand alone as a sentence
- begins with a relative pronoun or an adverb

N. Circle the subjects and underline the finite verbs in the following dependent clauses. Note that subjects may sometimes be relative pronouns. The finite verbs in dependent clauses are not main verbs.

- which may be potential or kinetic.
- that results in an explosion.
- who is still famous.
- whose nuclei may be split.
- where it is located.
- when it strikes the nail.
- as it releases the energy.
- that scientists call potential energy.

تسمح الفرص فقط
عندما نطلبها.

Independent clauses:

- may sometimes have a compound subject or a compound main verb
- may sometimes have both a compound subject and a compound main verb

Examples:

Oxygen and carbon dioxide are gases. (compound subject)

The food was prepared, cooked and eaten. (compound main verb)

Fission and fusion release energy and are dangerous. (compound subject and compound main verb)

O. Circle the subjects and underline the finite verbs in the following independent clauses. Write S1 above the first subject in each independent clause and S2 above the second subject (if any). Write V1 above the first main verb in each independent clause and V2 above the second main verb (if any).

1. Thermal ^{S1}energy and mechanical ^{S2}energy ^{V1}are forms of kinetic energy.

2. ^{S1}energy ^{V1}cannot be created and ^{V2}cannot be destroyed.

3. ^{S1}Einstein and ^{S2}Lavoisier ^{V1}were scientists and ^{V2}had theories.

4. ^{S1}gasoline and ^{S2}food ^{V1}store chemical energy.

Dependent clauses: العبارات المستقلة نوعان

- may begin with a relative pronoun
- may begin with an adverb (when, as, because, if, although, just as, where etc.)

Relative clauses: العبارات الموصولة

- begin with a relative pronoun (that, which, who, whose, in which, when, where, etc.)
- are also called “**adjective clauses**”
- modify nouns

Examples:

Apples that hang on trees have potential energy. (relative clause modifying *apples*)

Einstein was the scientist who wrote that formula. (relative clause modifying *scientist*)

Saturday is the day when the homework is due. (relative clause modifying *day*)

Room 110 is the place where the exam will be given. (relative clause modifying *place*)

Adverb clauses: عبارات الحال

- begin with an adverb clause word *(when, as, because, if, although, just as, where etc.)
- explain how the dependent clause is related to the independent clause
- do not modify nouns

Examples:

It loses potential energy because its height decreases. (adverb clause explaining *why* it loses)

Mass changes into energy when fusion takes place. (adverb clause explaining *when* it changes)

Fusion takes place where there is intense heat. (adverb clause explaining *where* it takes place)

- Not all adverbs can be used to begin a clause. For example, **in order to** is an adverb, but it is **not** a clause word because it cannot be used to begin a clause.

لا تنافس إلا على القمة.

P. Underline the relative pronouns and adverbs that begin the following dependent clauses. On the line provided, write **RP** for relative pronoun and **AV** for adverb.

RP 1. which may be potential or kinetic.

AV 2. because its velocity increases.

AV 3. If we measure carefully.

RP 4. Who expressed his concepts in the equation $E = mc^2$.

AV 5. although it may seem strange.

AV 6. just as it is released from food.

RP 7. That we call potential energy.

AV 8. Because it has potential energy.

Q. Underline the dependent clauses in the following sentences and then choose the words that best describe the types of clauses found. For each relative clause, circle the noun that is modified by the clause.

1. For example, when a piece of wood is burned, ashes remain.

- a) relative clause **b) adverb clause**
 [modifying example] [explaining *when*]

2. The process that transforms helium into hydrogen is called fusion.

- a) **relative clause** b) adverb clause

3. Einstein and Lavoisier were the only scientists whose names were mentioned in the reading.

- a) **relative clause** b) adverb clause

4. Fuels that were formed millions of years ago are called natural fuels.

- a) **relative clause** b) adverb clause

5. Fusion is the process by which hydrogen atoms combine to form helium atoms.

- a) **relative clause** b) adverb clause

6. When a substance is heated, its molecules move faster.

- a) relative clause **b) adverb clause**

7. Fission and fusion are dangerous because they can cause explosions.

- a) relative clause **b) adverb clause**

8. Wood, garbage, and manure are substances that are used to produce fuel.

- a) **relative clause** b) adverb clause

9. It loses potential energy as it falls.

- a) relative clause **b) adverb clause**

الكلمة	المعنى
carefully	بعناية
mention	يذكر
process	عملية
garbage	قمامة
manure	سماد

فرق كبير بين العزم على النجاح،
والعزم على عدم الفشل.

Sentences (Simple, Compound, and Complex) (الجملة ثلاثة أنواع – ونوع رابع مقرر صفحة 103)

Simple Sentences: الجمل البسيطة

- consist of one independent clause (and may contain a compound subject or a compound verb)
- must be capitalized and punctuated correctly

R. Circle the subjects and underline the main verbs in the following simple sentences. Write S1 above the first subject in each simple sentence and S2 above the second subject (if any). Write V1 above the first main verb in each simple sentence and V2 above the second main verb (if any).

1. An apple hanging on a tree has potential energy.
S1 V1
2. Matter and energy can be converted but not destroyed.
S1 S2 V1 V2
3. An object may have potential energy because of its shape or position.
S1 V1
4. A huge amount of energy can be released by splitting atoms.
S1 V1
5. The process of burning does not create or destroy matter.
S1 V1 V2
6. Potential energy can be transformed into kinetic energy.
S1 V1

Compound Sentences: الجمل المركبة

- consist of two (or more) independent clauses تتكون من جملتين أو أكثر كل واحدة منها مستقلة
- are joined by a comma and a conjunction (and, but, or, nor, for, so, and yet)

S. Circle the commas and conjunctions in the following compound sentences. Underline the main verbs in the following independent clauses. For the first independent clause, write S1 above each subject and V1 above each main verb. For the second independent clause, write S2 above each subject and V2 above each main verb.

1. Thermal energy is one form of kinetic energy, and chemical energy is one form of potential energy.
S1 V1 S2 V2
2. Energy can be changed from one form to another, but it cannot be created or destroyed.
S1 V1 S2 V1 V2
3. Kinetic energy takes many forms, and mechanical energy is just one of its forms.
S1 V1 S2 V2
4. Food energy can be called potential energy, or it can be called chemical energy.
S1 V1 S2 V2
5. Burning does not destroy matter, for it does not change total mass.
S1 V1 S2 V2
6. Some energy can be released by enzymes, and other energy can be released by spark plugs.
S1 V1 S2 V2

كل إنسان يستطيع أن يبدأ من جديد، تماما من جديد.

Complex Sentences: الجمل المعقدة

- consist of one independent clause and at least one dependent clause.
- may be written with the dependent clauses before (see Sent. 3 below), after (see Sent. 7 below), or within (see Sent. 8 below) the independent clauses
- may be written with the independent clause between two dependent clauses (see Sent. 1 below)

Although dependent clauses must contain finite verbs (not verbals), these verbs are not the main verbs of the sentences. The main finite verbs of sentences are only found in independent clauses.

T. Circle the independent clauses and underline the dependent clauses in the following complex sentences. Write MV above each main verb after underlining it with two lines. Remember that only independent clauses contain main verbs.

1. When a hammer strikes a nail, ^{MV} it exerts a force on the nail that causes it to move.
2. ^{MV1} The movement of the hammer has the ability to do work and therefore ^{MV2} has a form of energy that we call kinetic energy.
3. Just as a watch spring needs to be released, ^{MV} the energy stored in food needs to be released.
4. If we measure carefully, ^{MV} we will find the exact amount of energy that we started with.
5. Although it may seem strange, ^{MV} fusion can also release great amounts of energy.
6. When the process of fusion takes place, ^{MV} hydrogen atoms lose a small amount of their mass,
which is transferred into energy.
7. ^M It causes an explosion because it releases an enormous amount of energy very quickly.*
8. Because of its position, an apple that hangs on a tree ^{MV} has potential energy.**
9. As it falls, ^{MV} it loses potential energy because its height decreases.*
10. ^{MV} Lavoisier was a scientist who is famous because of his experiments with matter.**

*Because is an adverb that is followed by a subject and a finite verb. Because begins a dependent clause.

**Because of is a two-word preposition that is followed by a noun (the object of the preposition).

Because of begins a prepositional phrase.

تصرف كما لو أنه من المستحيل أن تفشل.

Grammar Review - Clauses, Sentences, and Verb Forms

A. Find the **subjects** (not including any modifiers) and the **main verbs** of the following sentences. Remember that the subjects and main verbs of sentences are found only in independent clauses.

1. For example, potential energy is stored energy. [simple]

- a) potential / is
- b) **energy / is**
- c) energy / is stored
- d) none of the above

2. When you lift a rock, your muscle energy changes into the rock's potential energy. [complex]

- a) you / lift
- b) your / changes
- c) **energy / changes**
- d) none of the above

3. For example, this energy can do the work of moving the hands of the watch. [simple]

- a) example / work
- b) **energy / can do**
- c) example - energy / can do - work
- d) none of the above

4. Lavoisier demonstrated the law of the conservation of matter, and Einstein theorized that $E = mc^2$. [compound]

- a) Lavoisier / demonstrated
- b) Einstein / theorized
- c) **Lavoisier - Einstein / demonstrated - theorized**
- d) none of the above

5. At the same time, the wood combines with oxygen in the air to form carbon dioxide and water vapor, which pass into the air. [complex]

- a) **wood / combines**
- b) wood - oxygen / combines - to form
- c) wood - oxygen - carbon dioxide - water vapor / combines - to form - pass
- d) none of the above

6. Wood and oxygen can be transformed into other forms of matter. [simple]

- a) wood / can be transformed
- b) **wood - oxygen / can be transformed**
- c) wood - oxygen - matter / can be transformed
- d) none of the above

7. The remaining substances can be added together and weighed. [simple]

- a) remaining / can be added
- b) substances / can be added
- c) **substances / can be added - (can be) weighed**
- d) none of the above

8. This chain reaction takes place very rapidly, and it results in the explosion of an atomic bomb. [compound]

- a) reaction / takes place
- b) it / results
- c) **reaction - it / takes place - results**
- d) none of the above

لعله من عجائب الحياة أنك إذا
رفضت كل ما هو دون مستوى
القمة، فإنك غالباً ستحصل عليه.

B. Complete the following sentences by selecting the correct **verb** or **verbal** forms. Remember that independent and dependent **clauses** must contain **finite verbs** and that **verbals** do **not** function as **verbs**.

1. Wood is a substance that produces ashes when it _____.
a) **burns** b) burned
2. When wood _____, it produces ashes.
a) **burns** b) burned
3. The substances that _____ include carbon dioxide.
a) **remain** b) remaining
4. The _____ substances include carbon dioxide.
a) remain b) **remaining**
5. The heat and light _____ by the sun must pass through a vacuum to reach the earth.
a) radiate b) **radiated**
6. Wood is called an insulator because it _____ heat very slowly.
a) **transfers** b) transferring
7. A silver spoon is an object that readily _____ heat.
a) **conducts** b) conducting
8. The organisms _____ in milk are killed by pasteurization.
a) live b) **living**

C. For each of the following sentences, choose the answer that best describes the type of sentence provided.

1. One law is called the law of the conservation of matter, and another law is called the law of the conservation of energy.
a) simple b) **compound** c) complex with a relative clause d) complex with an adverb clause
2. It is the type of energy that scientists call mechanical energy.
a) simple b) compound c) **complex with a relative clause** d) complex with an adverb clause
3. Before the wood is burned, it must be weighed.
a) simple b) compound c) complex with a relative clause d) **complex with an adverb clause**
4. France was the country where Lavoisier lived and worked.
a) simple b) compound c) **complex with a relative clause** d) complex with an adverb clause
5. One of the first atomic bombs exploded where people lived.
a) simple b) compound c) complex with a relative clause d) **complex with an adverb clause**
6. His theory was proved correct in 1939, the year when the first atomic bomb exploded.
a) simple b) compound c) **complex with a relative clause** d) complex with an adverb clause
7. Neutrons are given up when uranium atoms split.
a) simple b) compound c) complex with a relative clause d) **complex with an adverb clause**
8. This chain reaction takes place very rapidly and releases a huge amount of energy, resulting in the explosion of an atomic bomb.
a) **simple** b) compound c) complex with a relative clause d) complex with an adverb clause

الشر الذي تسببه لنفسك أضعاف ما يسببه لك الآخرون، كفاك تردداً وخوفاً!

D. Complete the following sentences by selecting the correct **verb** or **verbal** forms. Remember that independent and dependent clauses must contain finite verbs and that verbals do not function as verbs.

1. Chlorine _____ a poisonous gas.
a) is b) are c) to be d) none of the above
2. Heat causes most alloys _____.
a) expand b) expanded c) **to expand** d) none of the above
3. Bacteria _____ by pasteurization.
a) can kill b) **can be killed** c) killed d) none of the above
4. Pasteurization _____ bacteria.
a) **can kill** b) can be killed c) killing d) none of the above
5. Fusion is the process by which hydrogen atoms _____ into helium atoms.
a) is transformed b) **are transformed** c) were transformed d) none of the above
6. The process of fission _____ energy from nuclear fuels.
a) **can release** b) can be released c) to release d) none of the above
7. Some fuels need oxidizers in order _____.
a) burn b) can burn c) can be burned d) **none of the above**
8. Artificially _____ fuels include the chemical fuels used in rockets.
a) create b) **created** c) creating d) none of the above
9. Machines _____ by excess electrical movement.
a) can damage b) **can be damaged** c) damaged d) none of the above
10. Compounds _____ definite chemical compositions that do not vary from sample to sample.
a) has b) **have** c) having d) none of the above
11. Coal is a fossil fuel _____ from underground deposits.
a) obtains b) **obtained** c) is obtained d) none of the above
12. Fossil fuels are substances that _____ millions of years ago.
a) are formed b) was formed c) **were formed** d) none of the above
13. When the rays _____ the earth, they provide heat and light.
a) reaches b) **reach** c) reaching d) none of the above
14. Oxidizers do not prevent rocket fuels from _____. Oxidizers are used to help them burn.
a) burn b) burned c) **burning** d) none of the above
15. Substances _____ just one type of atom are called elements.
a) contain b) contained c) **containing** d) none of the above
16. Sodium chloride _____ of two elements.
a) composes b) **is composed** c) are composed d) none of the above
17. Sodium chloride _____ two types of atoms.
a) **contains** b) is contained c) can be contained d) none of the above
18. Biomass is a substance that _____ to produce synthetic fuels.
a) used b) **is used** c) are used d) none of the above

الحاجة أرخص
ما تكون حين
يستغنى عنها.

Commas provide punctuation for more reasons than any other punctuation mark. Students will not be asked to learn all of the comma rules. The following comma rules explain the only commas that students will be responsible for producing or using correctly in their writing.

[1] **Introductory commas** are needed after introductory words, phrases, and clauses. In English, correct word order is S - V - O (subject - verb - object). When a word, phrase, or clause comes **first** (before the main subject), a comma is used to show that the subject will follow. Remember that only **independent clause** contain **main subjects**.

U. Add **introductory commas** to the following sentences and then circle the subject(s) of each sentence.

1. Thus, the total (mass) does not change.
2. Many years later, (Einstein) predicted that matter could be changed into energy.
3. When a substance is heated, its (molecules) move faster.
4. Frequently, the (transfer) of energy involves a transfer from one body to another.
5. For example, a watch (spring) can store potential energy.
6. If the remaining substances are added together, their total (weight) will equal the original weight.
7. At the same time, a huge (amount) of energy is released.
8. As the rock is lifted higher, muscle (energy) is changing to potential energy.
9. However, Einstein's (theory) was not proven until 1939.
10. Although burning changes the form of matter, (it) does not destroy matter.

[2] **Compound sentence commas** are used to separate the **two** independent clauses joined by conjunctions (and, but, or, nor, for, so, and yet) in compound sentences.

V. Add **compound sentence commas** to the following compound sentences.

1. Energy can be transformed, but it cannot be destroyed.
2. Einstein is a famous scientist, and his theory was proved correct.
3. Wood can be burned, and the remaining matter can then be weighed.
4. Matter cannot be destroyed, so the weight of the remaining matter will equal the original weight.
5. Energy can be stored, or it can be released to do work.
6. Energy can be changed into matter, and matter can be changed into energy.

[3] **Reversible adjective commas** are used when the positions of adjectives modifying a noun can be interchanged. For example, "Uranium is a **useful, silvery-white, radioactive** metal" may also be correctly re-written as "Uranium is a **radioactive, silvery-white, useful** metal."

However, a comma is **not** used if the adjectives cannot be interchanged. For example, in the sentence "Fusion produced on the earth results in a **powerful atomic**-bomb" a comma is **not** used between the two adjectives **powerful** and **atomic** because they **cannot** be re-written as "**atomic** powerful bomb".

Note: Students are not responsible for producing and using reversible adjective commas in their writing. However, students must identify and copy reversible adjective commas correctly when such commas are provided.

يولد الطفل واثقاً، لكن
الخوف يأتي بالتعلم.

[4] **Series commas** are used to separate items (words, phrases, or clauses) in a list or series when there are at least **three** items in the list or series. Note that the comma is sometimes omitted between the last two items in the series in informal or non-technical writing, but in **technical writing** it should always be used. Be sure to include a comma **between all of the items** in the series.

Examples:

- (i) **Words in a list or series:**
There are many types of energy, including chemical, thermal, mechanical, electrical, and nuclear energy.
- (ii) **Phrases in a list or series:**
Fuels may be used to heat and cool buildings, cook food, power engines, and produce electricity.
- (iii) **Clauses in a list or series:**
When a substance is heated, the molecules move faster, and the substance feels hot.

W. Add **series** commas to the following sentences.

1. Examples of kinetic energy include thermal energy, mechanical energy, and electrical energy.
2. Einstein, Lavoisier, and many other scientists studied energy and matter.
3. Water in a dam, an apple hanging on a tree, and a rock lifted up high all have potential energy.
4. The weight of the remaining carbon dioxide, water vapor, and ashes can be added together.
5. Oxygen, hydrogen, and helium are all elements.

Grammar Review - Commas

E. For each of the following sentences, choose the answer that best describes the type of comma(s) used. Note that students will be responsible for using introductory, compound sentence, and series commas in their writing. They will also be responsible for correctly copying reversible adjective commas that have been provided.

1. Fission splits atoms, and this results in an explosion.
a) introductory **b) compound sentence** c) series d) reversible adjective
2. After the wood burns, the weight of the remaining matter can be weighed.
a) introductory b) compound sentence c) series d) reversible adjective
3. A macronucleus is a large, dense nucleus.
a) introductory b) compound sentence c) series **d) reversible adjective**
4. Food can be prepared, cooked, and eaten.
a) introductory b) compound sentence **c) series** d) reversible adjective
5. When a uranium atom is split apart, it gives up neutrons.
a) introductory b) compound sentence c) series d) reversible adjective
6. Lavoisier and Einstein both studied matter, but they did not live and work at the same time.
a) introductory **b) compound sentence** c) series d) reversible adjective
7. The atoms split, give up neutrons, and thus cause other atoms to split.
a) introductory b) compound sentence **c) series** d) reversible adjective

المصيبة إذا نزلت فهي واحدة،
فإن جزع صاحبها كانت اثنين.

F: Punctuation - Error Analysis

This exercise tests understanding of **introductory commas**, **compound sentence commas**, and **series commas**.

Circle the letters that correspond to the **correctly punctuated** sentences.

1. Which of the following sentences is punctuated correctly?

- a) When the atoms split a chain reaction takes place.
- b) When the atoms, split a chain reaction takes place.
- c) **When the atoms split, a chain reaction takes place.**
- d) none of the above

2. Which of the following sentences is punctuated correctly?

- a) **A chain reaction begins after the first atom splits.**
- b) A chain reaction, begins after the first atom splits.
- c) A chain reaction begins, after the first atom splits.
- d) none of the above

3. Which of the following sentences is punctuated correctly?

- a) Fusion can be used to produce a bomb or it can be used for peaceful purposes.
- b) **Fusion can be used to produce a bomb, or it can be used for peaceful purposes.**
- c) Fusion can be used to produce a bomb or, it can be used for peaceful purposes.
- d) none of the above.

4. Which of the following sentences is punctuated correctly?

- a) Food molecules watch springs and gasoline all store energy.
- b) **Food molecules, watch springs, and gasoline all store energy.**
- c) Food molecules, watch springs, and, gasoline all store energy.
- d) none of the above

5. Which of the following sentences is punctuated correctly?

- a) A chain reaction begins, when a uranium atom or a plutonium atom is split apart.
- b) A chain reaction begins when a uranium atom, or a plutonium atom is split apart.
- c) A chain reaction begins, when a uranium atom, or a plutonium atom is split apart.
- d) **none of the above**

6. Which of the following sentences is punctuated correctly?

- a) Moving objects can do work and this type of energy is called mechanical energy.
- b) **Moving objects can do work, and this type of energy is called mechanical energy.**
- c) Moving, objects can do work and, this type of energy is called mechanical, energy.
- d) none of the above

7. Which of the following sentences is punctuated correctly?

- a) Einstein's theory, concerns, energy, matter, and, the speed, of light.
- b) Einstein's theory concerns energy, matter and, the speed of light.
- c) **Einstein's theory concerns energy, matter, and the speed of light.**
- d) none of the above

الكلمة	المعنى
chain	سلسلة
spring	زنبرك
concern	يتعلق بـ
punctuation	علامات ترقيم

8. Which of the following sentences is punctuated correctly?

- a) **During fusion, hydrogen atoms lose a small amount of mass.**
- b) During, fusion hydrogen atoms, lose a small amount of mass.
- c) During fusion, hydrogen atoms, lose a small amount of mass.
- d) none of the above

9. Which of the following sentences is punctuated correctly?

- a) **Gasoline stores chemical energy, but it can be released to do work.**
- b) Gasoline stores chemical energy but, it can be released to do work.
- c) Gasoline stores chemical energy, but, it can be released to do work.
- d) none of the above

أن يغضب المرء يعني أن يثار من نفسه لأخطاء ارتكبها الآخرون.

Articles

Nouns are usually names of people, places, or things. They may be **countable** ([singular](#) or [plural](#)) or **uncountable**. Articles (a, an, the) [modify](#) nouns and help to explain if nouns are **general**, **indefinite**, or **definite** in meaning.

General

GENERAL ARTICLES: **a/an** (singular) **θ** (plural and uncountable)

- The meaning of a noun is **general** when it refers to **all** (or almost all).
- General articles should always modify defined terms because **definitions** are **general statements** that refer to **all**.

Examples:

Countable Singular General: A **dog** is an animal that barks.

[In this example, [singular](#) is used to mean [all](#) (in general). This statement means that [all](#) dogs (in general) are animals and [all](#) dogs (in general) bark.]

Plural General: **θ Dogs** are animals that bark.

[No article (θ) is used when the statement means all dogs in general]

Uncountable General: **θ Water** is a compound composed of hydrogen and oxygen.

[No article (θ) is used when uncountable nouns are used in general. Refer Page 14 of this handout for list of uncountable nouns]

Indefinite: some, General: All.

Indefinite (not specific)

INDEFINITE ARTICLES: **a/an** (singular) **θ** (plural and uncountable)

- The meaning of a noun is **indefinite** when it refers to **some or less than all** [and](#) is **not specified or known**.

Examples:

Singular Indefinite: I saw a **dog**.

[In this example, singular is used to mean a singular non-specified dog, i.e., any dog, not a specific dog like (your dog or my friend's dog) and not all dogs in general.]

Plural Indefinite: There are **dogs** working at Heathrow airport.

[In this example, no article (**θ**) is used, and it means that there is more than one dog working at Heathrow airport, and they are not specific dogs (like your dogs or my friend's dogs). Also, the exact number of dogs (five dogs, hundred dogs) is not important, and it only means an indefinite number of dogs]

Uncountable Indefinite: I gave him **θ water**, but he wanted **θ tea**.

[No article (**θ**) is used with uncountable nouns when they are not specified. The above statement uses no article (**θ**) with water because it does not refer to water from any specific source (e.g. the water in a bottle), and the exact amount is not known - it refers to an indefinite amount of water.]

ما رأيت ظالماً أشبه بمظلوم من الحاسد.

Definite (specific) DEFINITE ARTICLES: **the** (singular, plural, and uncountable)

- The definite article is used with **singular** or **plural** countable nouns and with **uncountable** nouns when the meaning of the nouns is definite.
- The meaning of a noun is **definite** when it refers to **some** or **less than all** and is specified or known.
- Both speaker and listeners or writers and readers **must know** which one(s) from all or which part of all.

The definite article is commonly used in the following four cases. Study the examples below to understand when it is necessary to use the definite article.

Definite # 1 The noun(s) is/are the **only one(s)** that exist
[the sun, the moon, the planets, the environment, the air, the ground, the sea, the oceans, etc.]

Examples:

- The **world** is not flat. [our world - the only one]
- The **planets** revolve around the sun. [our planets - only nine]
- The **tallest student** was absent. [only one can be the tallest]
- The **best students** passed the quiz. [only one group can be the best]

Definite # 2 The noun(s) has/have already been mentioned. (**2nd mention**)

Examples:

- I saw a dog and a cat. The **dog** was quite large.
- We gave him water and tea, but he did not want the **water**.

Definite # 3 The noun is **explained** by other words in the sentence.

Examples:

- The **information** that you gave me was incorrect.
- The **students** who failed the quiz must come to my office.
- The **manager** of our department is in Paris.

Definite Cases

1 : **only one.**

2 : **second mentioned.**

3 : **explained.**

Definite # 4 The noun is understood from the **situation**.
[This is not common informal scientific English. It is common among friends and in casual situations. Students will **not** be tested on this.]

Examples:

- They are in the **cafeteria**.
- Where is the **library**?
- You should study for the **quiz**.

Note: “*The*” is not commonly used in technical writing to modify defined terms, and students will not use “*the*” to modify defined terms. However, “*the*” is sometimes used to modify nouns that are general in meaning. For example, the direct object ‘elephant’ in the following sentence is general in meaning. “The lesson today is about **the** elephant.” This means that the lesson will be about all elephants (in general). Students are not responsible for using “*the*” to modify general object nouns in their writing.

لا تلم نفسك على قرار اتخذته قط، فقد كان هو قرارك الأمثل وقت اختياره.

Review of Articles

nouns	general (all)	indefinite (not all / unknown)	definite (not all / known)
singular	a / an	a / an	the
plural	∅	∅	the
uncountable	∅	∅	the

Notes:

- (1) When writing definitions, students should use “a” or “an” for terms (words) that are general in meaning. “The” is **not** commonly used in formal scientific writing for terms that are general in meaning.
- (2) Some nouns follow other **special rules** for the use of articles. Special articles rules will **not** be taught in English 123.

X. Underline the noun that is modified by each of the following underlined articles. (When no article is used, the symbol ∅ is used.) Then circle the answer that best describes the noun.

- A fuel is a material that provides ∅ useful energy.
a) general singular b) general uncountable
- A fuel is a material that provides ∅ useful energy.
a) general singular b) indefinite singular
- A fuel is a material that provides ∅ useful energy.
a) indefinite plural b) indefinite uncountable
- ∅ Natural fuels are obtained from ∅ underground deposits that were formed millions of years ago from the remains of plants and animals.
a) general plural b) general uncountable
- ∅ Natural fuels are obtained from ∅ underground deposits that were formed millions of years ago from the remains of plants and animals.
a) indefinite plural b) specific plural
- ∅ Natural fuels are obtained from ∅ underground deposits that were formed millions of years ago from the remains of plants and animals.
a) indefinite plural b) specific plural
- Most fuels release ∅ energy by burning with ∅ oxygen in the air.
a) indefinite uncountable b) specific uncountable
- Most fuels release ∅ energy by burning with ∅ oxygen in the air.
a) indefinite plural b) indefinite uncountable
- Most fuels release ∅ energy by burning with ∅ oxygen in the air.
a) specific plural b) specific uncountable

الكلمة	المعنى
provide	يمد بـ
fuels	وقود
remains	بقايا
deposits	رواسب
obtain	يحصل على

يموت الجبناء مرات عديدة قبل أن يأتي أجلهم، أما الشجعان فيذوقون الموت مرة واحدة.

Y. For each of the underlined definite articles, circle word(s) that made the meaning definite, and then choose the answer that best describes the underlined definite article.

1. The bottom of the box was damaged, but the top of the box was fine.

- (1) only one(s) (2) 2nd mention (3) explained

2. The sun is a yellow star.

- (1) only one(s) (2) 2nd mention (3) explained

3. Do you know the answer to this question?

- (1) only one(s) (2) 2nd mention (3) explained

4. Nokia makes the best mobile phones.

- (1) only one(s) (2) 2nd mention (3) explained

5. He found a bottle of water, but the water was dirty.

- (1) only one(s) (2) 2nd mention (3) explained

6. An airplane crashed here last night, but the pilot survived.

- (1) only one(s) (2) 2nd mention (3) explained

7. Most fuels release energy by burning with oxygen in the air.

- (1) only one(s) (2) 2nd mention (3) explained .

Z. Fill in the blanks in the following exercise using “a”, “an”, “the”, or “θ”. Give a reason for each “the” answer [#1 only one(s), #2 2nd mention, or #3 explained].

θ⁽¹⁾ Matter, like θ⁽¹⁾ energy, can be converted from one form to another but neither be created nor destroyed. In 1785, the⁽³⁾ French chemist Antoine Lavoisier demonstrated that there is no gain or loss of mass in a⁽¹⁾ chemical change. For example, when a⁽¹⁾ piece of wood is burned, θ⁽¹⁾ ashes remain. At the same time, the⁽²⁾ wood combines with θ⁽¹⁾ oxygen in the⁽¹⁾ air to form θ⁽¹⁾ carbon dioxide and water vapor, which pass into the⁽²⁾ air. If the⁽²⁾ carbon dioxide, water vapor, and ashes are added together, the⁽³⁾ total weight will equal the⁽³⁾ original weight of the⁽²⁾ wood plus the⁽²⁾ oxygen in the air.

يدرك الإنسان أهمية الوقت عندما تحين اللحظات الأخيرة لأمر ما، أغلبنا ينتظر هذا الوقت كي يندم.

GRAMMAR REVIEW

1. In the following sentence, the underlined words are best described as a/an _____.

When a piece of wood is burned, ashes remain.

- a. independent clause
- b. dependent relative clause
- c. dependent adverb clause**
- d. past participial phrase

2. The following sentence is best described as a _____ sentence.

Energy can be converted from one form to another but never created or destroyed.

- a. simple**
- b. compound
- c. complex with an adverb clause
- d. complex with a relative clause

3. The following sentence is best described as a _____ sentence.

A process that is the exact opposite of fission can also release great quantities of energy.

- a. simple
- b. compound
- c. complex with an adverb clause
- d. complex with a relative clause**

4. The subject(s) and main verb(s) in the following sentence are _____.

This chain reaction takes place very rapidly and releases a huge amount of energy, resulting in the explosion of an atom bomb.

- a. reaction / takes place
- b. explosion / releases
- c. reaction / takes place - releases**
- d. reaction - amount / takes place - releases

5. To complete the following formal definition sentence, the correct clause word(s) is/are _____.

A geophysicist is a scientist _____ studies the earth's physical activities such as its atmosphere, climate, and oceans.

- a. whose
- b. which
- c. by which
- d. who**

لا يمكنك أن تبني سمعة
على ما ستفعله لاحقاً.

6. In the following sentence, the underlined article is definite because it is _____.

The movement of a hammer has the ability to do work.

- a. the only one (s)
- b. 2nd mention
- c. explained**
- d. none of the above

7. To complete the following sentence the correct article is _____.

The principle of fusion can also be used to produce _____ energy for peaceful purposes.

- a. a
- b. Ø**
- c. the
- d. an

8. The subject(s) and the main verb(s) in the following sentence are _____.

Oxidation is a chemical reaction which involves the loss of one or more electrons by an atom or ion.

- a. oxidation / is - involves
- b. reaction / involves
- c. oxidation - loss / is - involves
- d. oxidation / is**

9. Circle the answer that best describes the type of comma(s) in the following sentence.

Frequently, the transfer of energy involves a transfer from one body to another.

- a. introductory**
- b. compound sentence
- c. series
- d. reversible adjective

10. To complete the following sentence the correct verb / verbal is _____.

Wood, garbage, and manure are substances _____ to produce fuel.

- a. using
- b. are used
- c. used**
- d. to use

لا يوجد سبب يحبك الناس من أجله
أفضل من عدم التطلع لما في أيديهم.