Writing definitions

In science writing, the very first task you should do is to write definitions. Sometimes you are required define a person, in other cases, you are asked to define an instrument, a noun, a technical term etc.

A definition answers the question, "What is it?" Sometimes a definition is necessary because a word or concept has more than one meaning. For example, whether carbon is a metal or nonmetal depends on how you define carbon. At other times, a definition is required because a term is being used in a special way. For example, physicists use the terms *work* and *energy* in ways that are more specific than their common meanings. A definition should be complete enough to include all the items in the category yet narrow enough to eliminate items that do not belong. Communication between researchers is dependent on precise definitions of substances, concepts, processes, and ideas.

A good definition should include the general classification of a term plus the specific characteristics that differentiate the term from other members of its class. For example, a definition of a giraffe should include a classification, such as, a giraffe is an animal and specific characteristic, such as, a giraffe is a tall, African animal with a very long neck.

To write a definition, you often use a relative clause to clarify the noun/pronoun defined. Frequently, the characteristics appear as a relative clause beginning with which, that, who, or where.

Definition formula:

Term = Class + Characteristics

Example:

Chemical energy is potential energy that is stored in gasoline, food, and oil.

TERM	CLASS	CHARACTERISTICS

Energy is the ability to do work..... kinetic energy is energy of motion

TERM		CLASS		CHARACTERISTICS
energy	=	ability	+	to do work (INFINITIVE PHRASE)
kinetic energy	=	energy	+	of motion (PREPOSITIONAL PHRASE)

Thermal energy may be defined as the kinetic energy of molecules.

(The use of the modal of possibility *may* indicates that there is more than one way to define something.)

Potential energy is stored energy. Some time the characteristics precede the class

TERM		CHARACTERISTIC		CLASS
potential energy	=	stored	+	energy

1. A barometer is an instrument which is used to measure atmospheric pressure.

2. Science is the term which is used to denote systemized knowledge in any field.

3. A scientist is a person who studies science.

Note : when defining, remember the following :

1-definition require the present simple ense and the verb to be

2-the definite aricle ; the , is usually not used with the term being defined because definition are general statements. For example, we would define *a* giraffe (in general), not *the* giraffe (a specific giraffe).

Sentence paterns of definition :

TERM	=	GENERAL CLASS WORD	+	SPECIFIC CHARACTERISTICS
An astronomer	is	a scientist	who	studies the universe.
A barometer		an instrument	that	measures air pressure.
Conduction		a process	by which	heat is transferred.
A laboratory		a place	where	experiments are performed.

Physics	is	the study		of matter and energy.
A volt		a unit		for measuring electrical pressure.

TERM	=	SPECIFIC CHARACTERISTICS	+	GENERAL CLASS WORD
Mercury	is a	liquid		metal.
A triangle		three-sided		plane figure.
Asbestos		fire-resistant		mineral.
A dinosaur		prehistoric		reptile.
A monkey		small, long-tailed		primate.

The following list is some guideline for writing good defnition.

- Identify the class. Examples, descriptions, or comparisons may be included in your definition, but they should not replace the class term.
- Be precise. Saying that "carbon dioxide is a gas" is not enough. What are the specific characteristics that differentiate it from other gases?
- Beware of circular definitions. A statement like "an agronomist is a person who practices agronomy" clarifies nothing.
- Make sure the definition is not more difficult than the term you are defining. A definition should clarify, not confuse.
- Use negative definitions like "a tomato is not a vegetable," when you think people have a wrong idea. But then follow it with a proper definition. Now that we know what it isn't, what is it?
- Be objective. Saying that "a pizza is something really good to eat" explains nothing to a Martian who has never seen a pizza.

Review of relative clauses

A) A relative clause is also known as an adjective clause. It is a subordinate clause with the function of modifying a noun/ noun phrase or a pronoun.

Example:

1. Science (pure science) is a term which is used to denote systemized knowledge in any field.
2. Applied science is the term that is used to refer to the search for practical uses of scientific knowledge.
3. Neil Armstrong was the first person who walked on the Moon.
4. Here, we should distinguish pure science from technology through which applications are realized.
5. Newton whom many of us, scientists have respected used not to be a good student a tall.
6. Newton, whose discovery of the theory of gravity was very strange, has been the pioneer in Mechanics Physics.
7. The book of which the cover has been torn is a very famous one written by David Halliday.

From the above examples, we can see that the noun phrases *a term, the term, the first person; technology and Newton* are respectively modified by relative clauses

1. **which** is used to denote systemized knowledge in any field.
2. **that** is used to refer to the search for practical uses of scientific knowledge.
3. **who** walked on the Moon.
4. through **which** applications are realized.
5. **whom** many of us, scientists have respected.
6. **whose** discovery of the theory of gravity was very strange.
7. **of which** the cover has been torn.

B) You can easily realize that these clauses begin with **which/ that/ which/ who/ whom/ whose.** These are called **relative pronouns.** They function as pronouns, and at the same time, show the relationship between the modified noun/pronoun and other elements in the sentence. For example the first relative clause, listed above, shows the relationship between the subject and its complement (*science* and *term*).

By the functions and implications of these pronouns in each the above sentences, we can classify them into groups as in the following table.

Types / Functions	For persons	For both	For non-persons
Subject	Who	That	Which
Object	Whom/who	That	Which
Possessive	Whose	Whose	Whose/of which

Relative clauses with relative adverbs

in this unit you will have one more chance to review relative clauses with relative adverbs.

Example

a) The laboratory where experiments are conducted must be kept clean all the time.

b) The time when we should conduct the experiment has not been decided yet.

c) That Physics studies both universe and human being is the reason why I choose it to study for my life.

Each of the above sentences has a relative clause starting with a relative adverb:

a) **where** experiments are conducted b) **when** we should conduct the experiment

c) **why** I choose it to study for my life.

2) From the examples, it is deduced that relative adverb

a) **where** is used to modify a nouns referring to a place; b) **when** is used to modify the nouns referring to time; and c) **why** is used to modify the noun *reason.*

3) However, there is difference among these relative adverbs in forming defining and non- defining relative clauses

3.1. Non – defining relative clauses

When and **where** are used in non- defining relative clauses

Example

a) You have to read the report next week, **when** the meeting is chair- manned by the president of our society.

b) The earth, **where** we are living, has always been a mystery objective for scientists.

c) Last year, **when** he got help from sponsors, was the most successful year for him since the start of his study in mechanics.

3.2. Defining clause

a) **When** and **where** are used in defining relative clauses, but each of these clauses modifies a special group of nouns.

 When follows the word *time* or other time notion as *day, week, month, year*.

Example:

1. The time **when** we make the observations must be long enough.

2. The day **when** I started the first lesson on Physics was very impressive.

3. 1642 is the year **when** Newton, Sir Isaac was born.

Adverb **When** can be replaced with pronoun **which** and an appropriate preposition such as *in, at* or *on.*

The above examples can be rewritten in this way:

1. The time **during which** we make the observations must be long enough.

2. The day **on which** I started the first lesson on Physics was very impressive.

3. 1642 is the year **in which** Newton, Sir Isaac was born.

 Where follows the word *place* or other words referring to a place such as *room* or *street* and the two words *situation* and *stage*

Example:

1. The place **where** we do experiment is called a laboratory.

2. The room **where** lectures are given is called the lecture hall.

Adverb **where** can be replaced with pronoun **which** and an appropriate preposition.

The above examples can be rewritten in this way:

1. The place **in which** we do experiment is called a laboratory.
2. The room **in which** lectures are given is called the lecture hall.

b) Adverb **why** follows the noun *reason*

Example

1. The reason **why** you did not succeed was because you had not well prepared for it.
2. Their conservations are the reason **why** they failed.

Exercises

In each of the following definitions, underline the general class once and the specific charactristics twice.

1. Helium is an inert gas that is light and nonflammable.
2. Protozoa are one-celled organisms.
3. A machine is a device that transforms energy from one form to another.
4. The cerebrum is the part of the brain that is the center of reasoning.
5. An insulator is a substance that does not conduct heat or electricity.
6. Fog is a cloud that forms on the ground.
7. Ecology is the study of the environment.
8. A satellite is a celestial body that orbits another celestial body.

The following listed are some poorly written definitions. Determine what is wrong with each definition and discuss how you would improve it.

1. A scientific theory is a theory like Darwin's theory.
2. An apple is round, red, and about the size of a fist.
3. Calculus is a tough subject.
4. An ear is an auditory appendage of *Homo sapiens* and other species.
5. A unicorn is not a real animal.
6. Tornadoes are very dangerous.
7. Radium is an element.

Using relative clauses : combine each of the following pairs of sentences to produce a one sentence definition with relative clause.

1. Protons are positively charged particles. They are contained in the nucleus of an atom.

Protons are positively charged particles that are contained in the nucleus of an atom.

2. A black hole is an area in space. It has a gravitational pull so powerful that nothing, not even light, can escape.
3. Marine biologists are scientists. They study animals and plants that live in the sea.
4. The stratosphere is a portion of the atmosphere. It is over seven miles high.
5. Insulin is used in the treatment of diabetes. It is a hormone produced by the pancreas.
6. The most abundant form of life on earth are bacteria. They are simple forms of plant life.
7. Oxidation is a chemical reaction. It involves the loss of one or more electrons by an atom or ion.
8. Nitrogen makes up 80 percent of the air. It is a colorless, odorless gas.

Combining each of the clauses in section A with a suitable one in section B to make a definition on each branch of science.

Section A

1. Archaeology	9. Information Science
2. Architecture(computerscience)	10. Linguistics
3. Biology	11. Mathematics
4. Chemistry	12. Meteorology
5. Earth Science	13. Physics
6. Economics	14. Political Science
7. Geography	15. Psychology
8. History	

Is a branch of science which/that

Section B

a. studies the relationships among quantities, magnitudes, and properties and of logical operations by which unknown quantities, magnitudes, and properties may be deduced.
b. deals with the fundamental constituents of the universe, the forces they exert on one another, and the results produced by these forces.
c. studies of the composition, structure, properties, and interactions of matter.
d. functions as a means of encompassing the growing number of disciplines involved with the study of living forms.
e. deals with the distribution and arrangement of all elements of the earth's surface.
f. is the scientific study of language.
g. , in its broadest sense, is the totality of all past events, although a more realistic definition would limit it to the known past.
h. deals with the generation, collection, organization, storage, retrieval, and dissemination of recorded

knowledge.

i. is concerned with the production, distribution, exchange, and consumption of goods and services.
j. is concerned with the planet Earth or one or more of its parts.
k. refers to the study of the structure of all or part of a computer system.
l. is the scientific study of behavior and the mind.
m. is the scientific study of past human culture and behavior, from the origins of humans to the present.
n. is the systematic study of and reflection upon politics.
o. studies the earth's atmosphere and especially the weather.

Using the information given in each series, write a definition. (use the sentence paterns)

1. an amoeba / one-celled animal / constantly changes its shape
   An amoeba is a one-celled animal that constantly changes its shape.
2. an antibiotic / drug / cures bacterial diseases
3. lung / organ / breathing
4. acoustics / science / sound
5. photosynthesis / process / plants manufacture food
6. catalyst / substance / speeds up but is not changed by a chemical reaction
7. calorie / unit / measures heat
8. cyclotron / apparatus / bombards the nuclei of atoms

Exended definitions

A definition may consist of as little as a sentence or as much as a book. When a concept is too complex to be defined in one or two sentences, an extended definition is needed. An extended definition includes the basic parts of a formal definition (class + characteristics) as well as additional information that may include description, examples, classification, comparison, explanation, or other details. For example, an extended definition of a natural phenomenon (such as an eclipse, earthquake, or hurricane) would probably include causes and effects. An extended definition of a machine would probably include its functions and uses. An extended definition of a celestial object (such as a planet or comet) might include its location in respect to the earth and a comparison with another heavenly object. An extended definition of a disease would probably include its symptoms, prevention, and cure. An extended definition of an element or chemical would include where it occurs in nature and its chemical and physical properties.

writing an extended definition

Write a paragraph giving an extended definition of a simple instrument or device such as a compass, fever thermometer, electric fan, pencil sharpener, flashlight, calculator, or toaster. Your topic sentence should be a formal definition, that is, the class plus distinguishing characteristics:

A thermometer is a device for measuring temperature.

A flashlight is a portable light that works on batteries.

The rest of the paragraph should include additional characteristics such as:

1. A description of its appearance, such as its shape, size and color;
2. A description of what it is made of; and
3. An explanation of its principle of operation or how it works.

A good way to conclude this type of definition is to describe its uses.