

JAF02 Unit 6 Heat

Task 1 Pronunciation

A. In pairs, read the words below out loud. What is tricky about their pronunciation?
mechanical – thumb – psychologist – parameter – analysis – predator – strength – schedule – aisle – tear – gauge – mirage – xenophobic – model – miscellaneous

B. Listen and underline the word with a different stress pattern from the others.

Example: money machine mountain message

1. answer agree allow attract
2. middle minute mission mistake
3. compare correct copy collect
4. garden granny guitar grammar
5. complete common careful crazy
6. pronounce provide promise prefer
7. shampoo shoulder shower shopping
8. reason remove receive review

C. Read the sentences and decide what stress pattern the words in bold have. Then listen, check and repeat.

Example: I got my first **record** as a **present** when I was eleven.

record=Oo present=Oo

1. You've progressed well this year, but I'd like to see even more progress.
progressed=
progress=
2. We **import** too much petrol and the country's **export** figures are going down.
import=
export=
3. It started as a student **protest**, but now the army has **rebelled** against the government.
protest=
rebelled=
4. In the **desert**, there is a big **contrast** between temperatures in the day and at night.
desert=
contrast=
5. These companies **produce** household **objects** such as fridges and washing machines.
produce=
objects=

(B and C adapted from Donna, S; Hancock, M. *English Pronunciation in Use*. CUP, 2010)

Task 2 Exemplifying

Introduction

After giving a definition or making any general statement, the best way to clarify a point is to give an example of it. A Chinese proverb says that a picture is worth a thousand words. It might also be said that one example is worth a thousand explanations.

Scientists use examples to explain or clarify a concept and to give evidence to support it. Examples can sometimes serve to test the validity of a point. If no example can be found to illustrate a point, there may not be a point.

Reading

Read the passage below and underline examples of how heat affects the properties of matter.

The Effects of Temperature

Temperature affects matter in many ways. As a substance gets hotter, its molecules move faster and its properties are altered. The physical state of a substance is affected by its temperature. For example, at a temperature of 0°C or below, water is solid (ice); above 0°C it becomes a liquid; and at 100°C it turns to a gas (steam). Almost all other substances are similarly affected by temperature.

Temperature alters the colour of matter. Iron, for example, turns red, then orange, and then white at increasingly high temperatures. An incandescent light bulb provides another example of a colour change, for its tungsten wire gives off a white light when it is hot.

The size of an object is affected by temperature. Most materials expand when they are heated and contract when they are cooled. A glass may break when boiling water is poured into it because part of the glass heats up and expands more rapidly than the rest.

Temperature also affects the pressure of a gas. As a gas is heated, its molecules begin to move rapidly, colliding with the walls of the container. If a closed glass tube is heated, the increased pressure inside will cause it to break.

The ability of a metal to resist electricity varies with its temperature. The increased movement of its molecules makes the molecules less resistant to electrical charge. Heated wires cause excess electrical movement, which can damage machines. Computers and other sensitive machines function best in air-conditioned rooms.

Living things are very sensitive to comparatively small temperature changes. This is exemplified when we touch something very hot or cold and feel pain. The pain serves to protect us, because living things cannot stand extremes of temperature. Using the same principle, we pasteurize milk and cook meat to kill harmful bacteria and other organisms that cannot tolerate the heat.

Sentence patterns for exemplifying

For example,

For instance, iron turns red when it is heated.

To be specific,

To illustrate,

Iron is an example
a case of a substance that turns red when heated.
an instance
an illustration

Iron, for example, / for instance, turns red when heated.

Solids such as / like iron and copper turn red when heated.

Recognising examples

Each of these general statements is followed by three sentences. Circle the sentence(s) that best support the general statement. 1,2 or 3 sentences can be circled.

1. There is little possibility that there is life on any other planet within our solar system.
 - a) Mercury and Venus are too hot to support life.
 - b) There are eight planets in our solar system.
 - c) Uranus and Neptune are extremely cold and dark.
2. A machine is a device that transforms energy from one source to another.
 - a) A car engine converts the chemical energy of gasoline into mechanical energy.
 - b) The food we eat is converted into energy in our bodies.
 - c) A generator changes mechanical energy into electrical energy.
3. Energy has many forms.
 - a) Nuclear energy comes from splitting the nucleus of uranium or plutonium atoms.
 - b) Radiant energy comes in the form of sunlight, x-rays, or gamma rays.
 - c) Energy may be converted from one form to another.
4. Vitamins may be harmful in excessive doses.
 - a) Vitamin C can be taken in large doses without harm.
 - b) Excessive amounts of vitamin A may increase susceptibility to disease.
 - c) Vitamin D prevents the disease rickets.

Task 3 Discussion

Give one or two examples of each of the following. Explain your answers.

1. Scientific facts that still amaze you.
2. Scientific discoveries you would like to have witnessed.
3. Things you think scientists will never know.

Task 4 Grammar

Modals of necessity

The modals of necessity are *must*, *have to*, *should* and *ought to*.

In scientific writing, these modals are used in special ways. *Should* and *must* appear most frequently, usually in the passive voice.

1. *Must* expresses a very strong need. It implies that anything else is impossible.
E.g. A speed of 18,000 miles per hour *must be maintained* for the satellite to remain in orbit.
X-rays must only be administered when necessary.

2. *Should* is more moderate and sometimes expresses a recommendation.
E.g. This crop *should be watered* every day during the dry season.
You should have been more polite to the audience.

3. To express lack of necessity, use the phrasal alternative *do/does/did not have to*.
E.g. The essay *does not have to* be long.

! The negative form *must not* expresses a prohibition, not a lack of necessity.

Exercise:

Rewrite the following sentences. Use modal verbs of necessity as appropriate.

1. It is necessary for all candidates to pass an examination.
2. It would have been advisable for him to have not stayed out in the sun for so long (but he did).
3. It was necessary for us to hand in the report at the end of the month.
4. Smoking is prohibited in the whole facility.
5. It is a good idea for candidates to send in references.
6. There is no necessity for you to take the exam this term.
7. It was not a good idea for serious students to party all night every night during the semester.

Task 5 Vocabulary

1. Suffixes. Convert each of the nouns or adjectives to verbs.

deep	wide	weak	soft	tight	loose
short	bright	strength	length	sharp	straight

Can you match them with some of the words below to create meaningful sentences?

knife	crisis	muscles	shadows	grip	material	sky
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2. Make verbs from the nouns and adjectives below. Some words require a change in spelling.

(to find) the identity

(to make) solid

(to make) pure

(to give) an example

(to charge with) electricity

(to make) clear

3. If possible, convert each of the –ify verbs into a noun, e.g. *identification*.

(Task 2, 3, and 5 from Zimmerman, F. *English for Science*. Prentice Hall Regents, 1989)