

EXTRAITS

MINIMUM COMPETENCE IN SCIENTIFIC ENGLISH

nouvelle édition - pap-ebook

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AVANT-PROPOS

MCSE NOUVELLE ÉDITION – Depuis sa première édition en 1991, *Minimum Competence in Scientific English* a joué un rôle important dans l'enseignement de l'anglais scientifique en France. Plus de 200 000 scientifiques l'ont utilisé et il a semblé opportun de l'améliorer pour mieux répondre à l'attente des nouvelles générations d'étudiants. La structure de base ayant fait ses preuves, nous l'avons gardée comme telle. En revanche, les textes ont été renouvelés et furent affinés les *key points* et le *lexis*, élargie la gamme des activités linguistiques et communicatives et intégrée l'utilisation du *web*.

- ▶ **Public visé** – MCSE a été conçu d'abord pour les étudiants des universités scientifiques et technologiques, des IUT et des écoles d'ingénieurs ayant une base d'au moins trois années d'anglais, mais il est également adapté à tous les scientifiques francophones.
- ▶ **Contenu linguistique** – L'ouvrage est fondé sur une analyse du discours scientifique, notamment sur un recensement de la fréquence du lexique scientifique, et des fonctions qui sous-tendent le discours scientifique. C'est cette analyse préalable qui a permis d'établir un contenu particulièrement pertinent.
- ▶ **Contenu pédagogique** – Pédagogiquement, l'utilisateur se voit doté des armes nécessaires à un apprentissage efficace. D'abord il dispose d'un système d'auto-évaluation combiné avec une check list et peut établir avec clarté ce qu'il doit apprendre. Ensuite l'utilisation répétée des éléments permet d'optimiser l'apprentissage.

MCSE regroupe donc pour l'étudiant un inventaire de ce qu'il doit savoir, avec les outils pour l'apprendre. Il permet un parcours d'apprentissage rapide, efficace et, par conséquent, un parcours qui apporte beaucoup de satisfaction.

MODE D'EMPLOI – MCSE peut être utilisé de plusieurs façons : dans le cadre d'un cours traditionnel, en semi-autonomie ou en autonomie. Les quelques suggestions qui suivent sont loin d'être exhaustives.

L'ouvrage est divisé essentiellement en 2 sections : les 12 *units*, suivies d'*annexes* et d'un *lexis*. Chaque **unit** correspond à une fonction de base de l'anglais scientifique, *measurement*, *frequency*, *hypothesis*, etc. et comprend :

- ▶ **Entry test** – Ce test permet de faire d'emblée une évaluation réaliste de son niveau ; trop fréquemment, l'apprentissage est entravé par l'ignorance de l'étudiant quant à ses propres lacunes.
- ▶ **Key points** – Les *key points* doivent être considérés comme une check list, indiquant tous les éléments qui doivent être sus. Ainsi, et après avoir fait l'*entry test*, l'étudiant est en situation, dès le départ de l'*unit*, de déterminer avec précision ce qu'il doit faire, c'est-à-dire son "contrat d'apprentissage".



Exercises – Ce sont les exercices qui permettent de mettre la langue en pratique, de la manipuler et donc de l'assimiler. Ceux-ci se caractérisent par une répétition et une réutilisation continue des fonctions et du vocabulaire, pour qu'en fin de parcours tout étudiant "ne puisse pas ne pas avoir appris".

Notons, dans cette nouvelle édition, les **starters**, dont le but est d'amorcer un travail d'imagination de l'étudiant et de l'impliquer avant d'aborder le texte. Nouveaux également, les **talking points**, qui ouvrent la voie vers une interaction orale en petit groupe.

Les **checkpoints** constituent une autre innovation conçue pour permettre une révision et un approfondissement de trois domaines cruciaux pour l'apprentissage :

▶ *In other words* – Savoir reformuler est une compétence essentielle pour l'apprenant qui, par définition, a des difficultés à se faire comprendre. Il est donc de première importance qu'il puisse maîtriser les outils lui permettant de clarifier, de reformuler, et de "dire autrement".

▶ *Back to basics* – Trop souvent, hélas, les apprenants, même avancés, traînent d'année en année comme des boulets certaines erreurs de débutant, déjà corrigées 100 fois mais sans résultats. Cet exercice donne à l'étudiant la possibilité de faire le point sur son propre savoir et, ensuite, lui donne les outils pour se débarrasser de ses erreurs.

▶ *The word web* – Un mot n'existe pas seul, mais seulement en relation avec les autres. Cet exercice donne l'occasion de revenir sur les familles lexicales, les homonymes et les synonymes, la formation et la structure et de les approfondir.

Nouveaux aussi sont **web search** et **word search**. Le premier prolonge le travail sur les textes en exploitant les richesses du web, le second, technique originale, amène l'étudiant à utiliser le web comme corpus pour personnaliser son propre apprentissage.



Exit test – Comme dans les éditions précédentes, chaque *unit* se termine par un *exit test* où l'étudiant peut faire un constat objectif de ses progrès et en tirer les conclusions.

Le lecteur trouvera ensuite des **annexes** : *OHP* (utilisation du rétroprojecteur), *answers* (corrigés des exercices) et *grammar notes* (notes grammaticales).

Enfin, le **lexis** joue un rôle primordial dans MCSE. A ce stade, et contrairement à ce que tant de personnes pensent, ce n'est pas la structure mais bien le lexique qui est le maillon faible des apprenants. Cette liste de vocabulaire de haute fréquence, organisée en rubriques, est construite à partir d'un pré-acquis du vocabulaire de base de quelques 1 200 mots et des homographes communs à l'anglais et au français. Elle constitue un outil puissant, permettant à un étudiant de "couvrir" 85% des mots de tout texte dans sa spécialité.

MCSE s'adresse à des apprenants volontaristes et motivés qui ont fait le choix de passer au stade d'utilisateur professionnel. Il permet à celui qui s'investit et qui travaille de façon intelligente d'atteindre, après une année ou dix-huit mois, un niveau de langue où il pourra utiliser indifféremment des documents en anglais ou dans sa langue maternelle, où il pourra parler de sa spécialité, sinon dans un anglais parfait, du moins avec clarté et aisance.

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2. FREQUENCY

Frequency is the expression of repetition. It refers to events that occur more often than once and less often than always. Frequency is, of course, related to measurement and consequently you will meet certain expressions already seen in Unit 1 for a second time. This function can be expressed by:

- lexical items (particularly adverbs),
- grammatical structures (particularly word formation),
- certain fixed adverbial phrases.

Self evaluation – entry test

■ Fill in the blanks using appropriate expressions. The first two letters of the answer are printed.

Example:

The batteries must be recharged **tw** a month. (two times)

→ The batteries must be recharged **twice** a month.

1. Under stress, the heart **be** faster. (pulsates)
2. Over the past 100,000 years, the polar ice sheets have advanced or retreated depending on periodic **sw** in the climate. (variations, oscillations)
3. The famous 19th century millionaire, Carnegie, emigrated to the US from Scotland and began work in a factory for \$1.20 **pe** week. (each)
4. There will be a **re** of epidemics as soon as natural immunisation dies out. (they will happen again, repeated incidence)
5. The Ebola virus produces a mortality **ra** which can be as high as 88% in human beings. (a measure of frequency)
6. Over the past 300 years, the average height of Europeans has increased **st** (regularly)
7. The world population is growing fast. A new child is born **ev** 60 seconds. (each minute)
8. The **se** of earthquakes that struck Missouri in 1811 were among the most powerful ever experienced in the United States. (succession, repeated incidents)
9. It is estimated that the **ho** flow of water of the Amazon river is between 12,000 and 44,000 million litres. (every 60 minutes)
10. The strength of a steel alloy depends on the **ra** of iron to carbon. (mathematical relationship of proportion)

Functions & Grammar

KEY POINTS – ORGANISING TIME: THE PRESENT & THE PAST

→ There are four present tenses and four past tenses.

PRESENT TIME

1. Present simple

Example

The newspaper **says** ...
 He likes Ann. She **drinks** coffee.
 She **lives** in Turin.
 He **leaves** for work at 7 o'clock.
 Water **freezes** at 0°C.

Meaning

The "general" present.
 Opinions and habits.
 The "status quo".
 Habitual actions.
 Scientific facts.

TYPICAL TIME MARKERS

(N.B. – Time markers may be implicit)

every day • usually • often • sometimes

2. Present continuous

Example

Look! It **is raining**.
 Mary **is trying** to finish her work.
At the moment, he **is working** in London.

Meaning

On-going present time.
 Actions happening now.
Temporary actions in the present.

TIME MARKERS

now • at the moment • currently • at present • temporarily

3. Present perfect simple

Example

She **has already finished** her work.
 He **has broken** his leg.

Meaning

It is important **now** / a surprise.
 The **result** is important – he can't walk **now**.

3. Nouns

■ Cause

cause • reason • origin • source

► *The real cause of his resignation was bad health.*

■ Consequence

- consequence • result • outcome • effect
- by-product • spin-off

► *The final outcome of the illness was the minister's resignation.*

Examples in context

THE SCANNING ELECTRON MICROSCOPE (SEM)

■ Read the description and find synonyms for the words in bold.

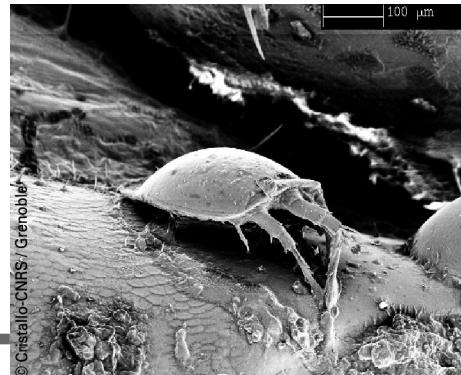
As the wavelength of visible light is approximately 4,000 angstrom, this means that there is a lower limit to the resolution of optical microscopes. To obtain higher resolution, shorter wavelengths are required. Electrons used in SEMs have wavelengths of 0.5 angstrom, **hence** it is possible to visualise molecules and even atoms. Samples cannot be scanned unless they are dry (to prevent vaporisation) and electrically conductive. **As a result**, organic materials must be coated with a metallic layer, such as gold.

Thanks to the scanning pattern, a 3-dimensional image of the surface structure can be obtained.

The suggestion that electrons might be regarded as a form of wave motion and used for microscopy **stems from** the work of Louis de Broglie (1924), as an **outcome** of his research into quantum mechanics. The first SEM was built in 1933.

starter

- Ask your neighbour questions about scanning electron microscopes.
How? – what for? – who? – when?



Dust mite (Acari)

Exercises

11.1. Exercise

A. "All generalisations are dangerous, even this one", said Alexandre Dumas fils.
We can make them more acceptable by qualifying them.

Match the phrases.

1. It is hardly ever acknowledged that ...
2. It is sometimes claimed that ...
3. It is commonly thought that ...
4. It is seldom admitted that ...
5. It is widely believed that ...
6. It has often been suggested that ...

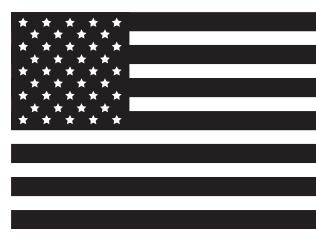
- a. the rich are too rich and the poor are too poor.
- b. efficient government is impossible in a democratic society.
- c. after the age of 55, the accident rate of surgeons increases sharply.
- d. the stars influence our health.
- e. incest is not uncommon in Western Europe.
- f. university examination procedures are unreliable.
- g. simple people are more honest than intellectuals.

B. Make qualified generalisations about the photos.



Women

Dolphins



C. Make two qualified generalisations of your own.

10.2. Sleeping pilots and chaos theory

Why are there accidents? Where does the responsibility lie? One of the uses of technology is to devise ways and means of reducing the consequences of human error.

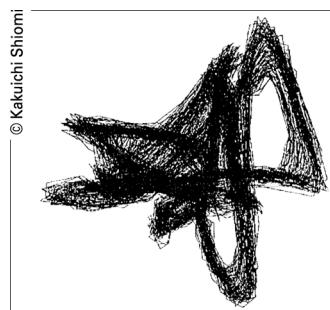
■ Fill in the gaps with the following words:

SO THAT • OBJECTIVES • BY MEANS OF •
ENABLES • DESIGN • DEVISE • PROVIDE •
MAKES IT POSSIBLE TO • IS RESPONSIBLE FOR

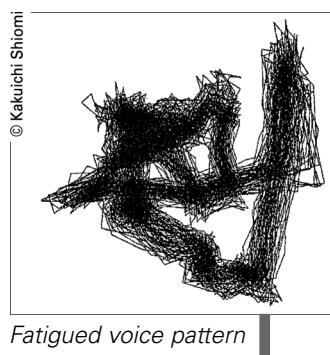
starter

- Give examples of both major and minor accidents.
- Were they brought about by faulty technology or human error?
- Was any action taken as a result of the accident?
- Give examples of how technology can be used to increase safety.

Despite the thousands of parts which are used in the construction of aeroplanes, very few air-crashes are caused by component failure. It is, in fact, human error that 80% of air accidents. This explains why one of the primary of the aircraft industry today is to ways of improving these figures. One area of particular concern is pilot fatigue. This problem is far more widespread than is commonly realised and Dr. Mark Rosekind claims that "70% or more pilots say that they have fallen asleep at least once while piloting". Fatigue is particularly linked to the crossing of time zones which can severely disturb the circadian rhythm.



Normal voice pattern



Fatigued voice pattern

The Japanese company, Electronic Navigation Research Institute (ENRI), is currently in the process of developing a monitoring system which will be able to early warning of fatigue voice recognition techniques.

Biological functions, such as blood pressure, heartbeat and voice, have a fractal structure which can be identified. Under stress or fatigue, these physiological manifestations undergo change and consequently, as can be seen in the figure, the pattern alters, gradually losing its structure and becoming chaotic. By using the mathematics of chaos theory, Kakuichi Shiomi, chief researcher of ENRI, has been able to software which these minute distinctions to be identified the pilot's voice pattern can be matched with a control model of an alert voice. It takes no more than 10 seconds for data samples to be processed which means that fatigue can be measured in real time without interfering with the normal activity of the flight crew.

According to Shiomi, the system detect tiredness in test subjects 10 to 20 minutes before they become aware of it themselves.

2.4. Checkpoints

IN OTHER WORDS

Definitions – relative clauses: "which / that"

Make a definition using the pattern:

"An X is a Y **which** does Z."

Example: "A bat is a mammal which flies by night."

■ Define these words used in Exercise 2.2:

predator • sonar system • skin • food

BACK TO BASICS

• "Actually": do you use this word correctly?

■ Is the following sentence correct or not?

"Actually, the number of illiterate people in the world is increasing steadily."

■ Check in the answer section.

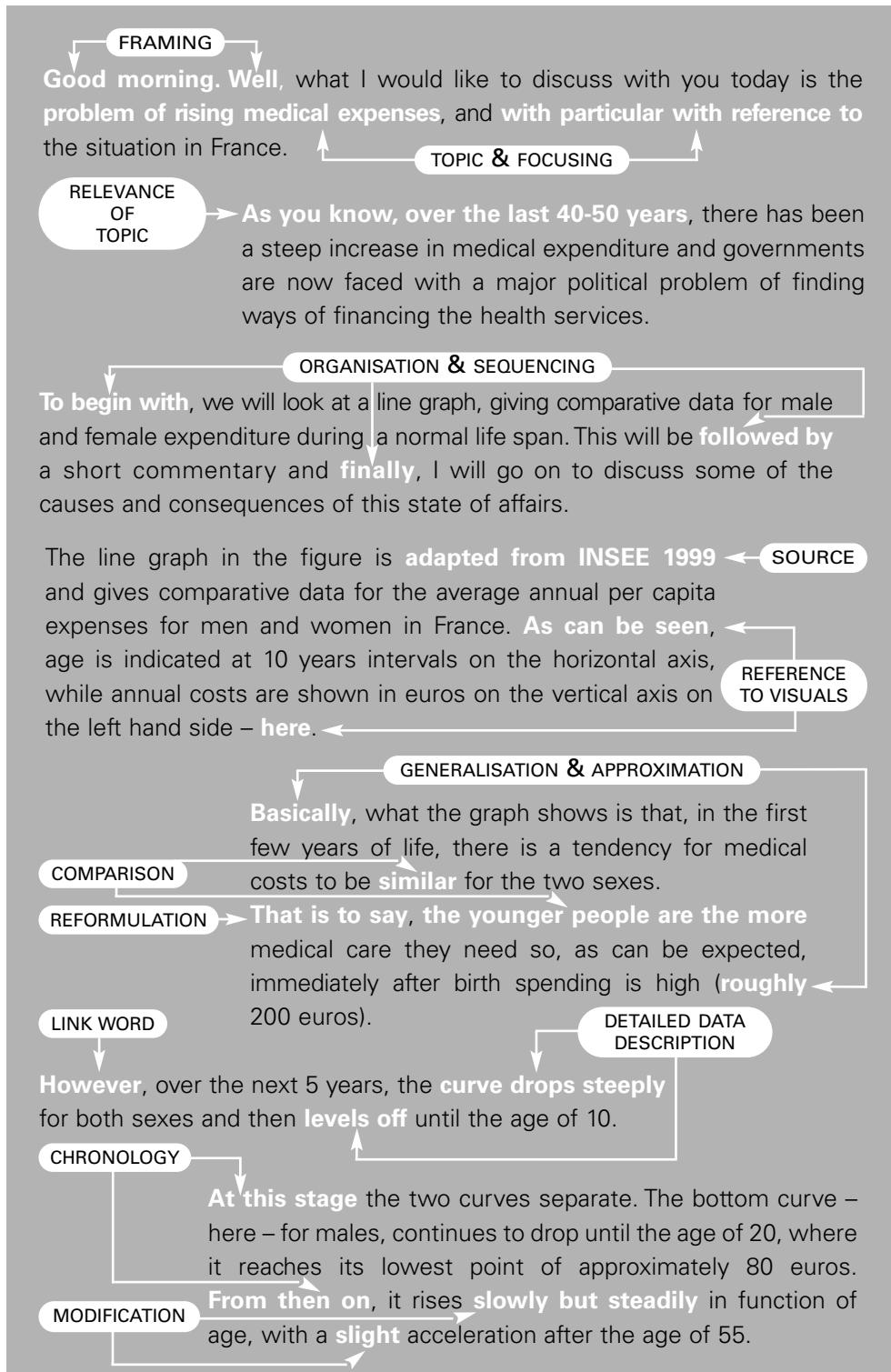
THE WORD WEB – MULTI-WORD VERBS

The meaning of many verbs depends on the preposition or adverb that follows. These are called multi-word (or phrasal) verbs.

■ Match the meaning of the verb with the definition and then write in the correct particle for each verb: IN • OF • UP • OUT • FOR • ON.

1. When visibility is reduced, airports **rely** radar control.
2. In 1830, Babbage designed a machine to **carry** complex arithmetical calculations.
3. A protein may **consist** several polypeptide chains held together by weak molecular bonds.
4. In 1937, four Soviet scientists **set** temporary scientific stations on drifting icebergs in the Arctic.
5. Chemists can **work** the number of carbon atoms from the weight of the object.
6. Testosterone is **involved** the development of secondary sex characteristics such as the growth of body hair, and changes in the larynx.
7. It is the ability to use the Sun and the stars to navigate which **accounts** the migration of birds.
8. The level of pH **depends** the strength of the acid.

- a. to do / to perform
- b. to be made of / formed from
- c. to be determined by
- d. to calculate / find the solution
- e. to create / establish
- f. to use because you have confidence
- g. to be linked / a necessary part of
- h. to provide an explanation



- to take out a tooth – remove
- to step up production – increase
- to step in to prevent a conflict – intervene
- to cut up meat – divide into small pieces
- to cut off the electricity – stop the supply

Exit test

1. might / may (have)
 2. should
 3. must have
 4. could / can
 5. may / could / might have
 6. will
 7. assume
 8. feasible
 9. expected
 10. likely
-



UNIT 10

Entry test

1. target
2. supplying
3. so as to
4. aim
5. thereby
6. designed / devised
7. by means of
8. enables
9. allowed
10. through

Examples in context

1. What does the human being provide?
2. How does the machine operate?
3. How does the man keep his balance?
4. What do the counterweights do?
5. What is the water pipe for?
6. What do the steel springs do?

7. In what way is the pressure transmitted?
8. What do the valves control?
9. What was responsible for industrial stagnation?

Exercises

→ 10.1. – A

1. designed
2. provides
3. responsible for
4. make it possible
5. in order to
6. so that
7. purpose
8. aims

→ 10.1. – B

1. / f • 2. / a • 3. / b • 4. / e • 5. / g •
6. / d • 7. / c

→ 10.2.

- ... human factor that is responsible for 80% of air accidents...
- ... the primary objectives of the aircraft industry ...
- ... is to devise / design ways of improving these figures...
- ... will be able to provide early warning ...
- ... by means of voice recognition ...
- ... has been able to design / devise software ...
- ... which enables these minute ...
- ... be identified so that the pilot's voice ...
- ... the system makes it possible to detect tiredness ...

→ 10.3.

- What has it enabled them to do?
- What was the primary aim?
- Why do they adopt unusual behaviour?
- Why did she shift position?
- What was the objective?
- What made it impossible to gain access?
- What were the counter measures devised to do?
- Why did he walk away?

Check /tʃek/

- 1.v To **check the oil level** of a car.
The **results must be checked** before publishing them.
- n Workers exposed to radiation must have a monthly **check-up**.
→ **To verify, inspect. Inspection**
- 2.v New vaccines will **check** the spread of the disease.
→ **To stop temporarily, to slow down**

Note — To check is often followed by a particle which changes its meaning.

- to **check in** at the airport
(to register)
- to **check out** of a hotel
(to leave, to pay the bill)
- to **check over** someone's work
(to reread, to verify)
- to **check up** on some calculations
(to verify)

Cost /kɒst/

- n Mass production **reduces costs**.
The **cost of living**.
The **cost** of recycling industrial waste is increasing.
- v (cost, cost, cost) The car **costs** a lot of money.
Developing alternative fuels will **cost** millions of dollars.
→ **What must be paid, the price.**
To require money

Couple /'kʌpl/

- 1.n To have a **couple** of drinks.
She noticed a **couple** of mistakes.
→ **Two together**
- 2.v To **couple** two circuits together.
Economic growth is closely **coupled** to capital investment.
→ **To join, to link**

Cross-section /krɒs'sekjən/

- n To examine the **cross-section** of a sample under a microscope.
The resistance of wire is proportional to its length and its **cross-section**.
A **cross-section** of society.
→ **A view of an interior surface.**
A typical sample

Data /deɪta/

- n The **data** is **stored** on the hard disk.
To study **data-processing**.
With a binary system, **data can be handled** much more quickly.
→ **Information, facts**

Note — Data is a Latin word:
Sing. "datum". Pl. "data".
"Datum" is rarely used. "Data" can be either singular or plural.
→ **the data is ... / the data are ...**

Deep /di:p/

- adj Avalanches are most common when the snow is **deep**.
- adv The notion of male superiority is **deeply rooted** in traditional societies.
- n What is the **depth** of the river?
→ **Profound. Distance below the surface**

Draw /drɔ:/ (draw, drew, drawn)

- 1.v **To draw** a straight line.
Under hypnosis, adults appear to **draw** like children.
- n To study a technical **drawing**.
→ **To mark on paper, to make a picture. Graphic representation**
- 2.v The air is **drawn** into the lungs via the nose.
It is too early for a **conclusion to be drawn**.
→ **To move in a direction. To arrive at**

Even /'i:vn/

- 1.adj The microscope must stand on an **even surface**.
The temperature must remain **even** throughout the experiment.
- adv The population is **evenly distributed**.
→ **Smooth, regular. Equally**
- 2.adj 4, 6, 8, are **even numbers**.
→ **Divisible by 2 ≠ odd**
- 3.adv **Even** the doctor was ill.
Even if you take a taxi, you will still be late.
→ **Surprisingly, believe it or not**

Extend /ɪk'stend/

- v The region **extends** from Hungary to Poland.
The electromagnetic spectrum **extends** to ultraviolet and to X-rays.
→ **To cover a distance, to reach, to include**

Extent /ɪk'stent/

- n **To what extent** does meteorology effect human behaviour?
To a certain extent, disease depends on the standard of living.
→ **Degree, amount**

Far /fa:/

- 1.adv **How far** is it to the post office?
So far, no one has been able to find an answer.
As far as I am concerned, the matter is of no importance.
→ **Distant. Up to now. To that extent**
- 2.adv It is **far too** hot to work.
Working conditions are now **far better**.
→ **Much, considerably**
- 3.adj He lives on the **far side** of the town.
The **Far East**.
→ **Distant, remote ≠ near**