

SCIENTIFIC ENGLISH

Workbook d'anglais scientifique

Parcours thématique pour perfectionner
sa maîtrise de l'anglais et ses connaissances
en culture scientifique

B1
B2



10 dossiers thématiques scientifiques et technologiques

1 fiche de lexique spécialisé par dossier

Capsules pour faire le point sur les notions et le vocabulaire clés

Textes d'informations sur le thème du dossier

Rappels de grammaire avec exercices corrigés

Activités de rédaction corrigées en lien avec le thème culturel étudié

Cartes mentales et frises chronologiques à compléter.



Karine Goyer



SPACE AND TIME

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- **amas d'étoiles** → nebula
- **année lumière** → light year
- **atome** → atom
- **article scientifique** → paper
- **attirer** → draw, pull

- **calcul (analyse)** → calculus
- **calcul (opération)** → calculation
- **champ magnétique** → magnetic field

- **comprimer** → squeeze

- **courber** → curve
- **courbure de l'espace temps** → curvature of space time
- **découverte capitale** → breakthrough
- **déformation** → curvature, warp
- **déformer, courber** → curve, distort
- **dérivation de la lumière** → deflection of light
- **éloigné** → remote

- **énorme** → huge
- **entremêlé** → interwoven
- **ensemble infini** → continuum

- **éruption solaire** → solar flare
- **espace temps** → spacetime

- **essai, test** → trial, test

- **étirer** → stretch

- **exact** → accurate

- **faire une expérience** → (perform, conduct) an experiment
- **faible (signal)** → faint, weak
- **faisceau** → beam
- **fusion** → merger

- **fusionner** → merge
- **interféromètre** → interferometer

- **lame séparatrice** → beamsplitter
- **libérer** → release
- **longueur d'onde** → wavelength
- **matière** → matter
- **mécanique quantique** → quantum mechanics
- **minuscule** → tiny
- **naine** → dwarf
- **noyau (d'atome)** → nucleus (pluriel : nuclei)

- **ondes gravitationnelles** → gravitational waves
- **onde radio** → radio wave
- **onde lumineuse** → light wave

- **onduler** → ripple
- **ondulation** → ripple, undulation
- **perturbation** → disturbance
- **physicien** → physicist

- **pionnier** → pioneer, trailblazer, forerunner
- **prédire** → predict
- **rayons cosmiques** → cosmic rays
- **relativité restreinte** → special relativity
- **révolutionnaire** → groundbreaking
- **sensible (appareil)** → sensitive
- **table de manip (expériences)** → experimental setup
- **théorie de la relativité** → theory of relativity
- **théorie des quanta** → (old) quantum theory
- **tourner** → spin

- **trou noir** → black hole
- **trou de ver** → worm hole
- **tissu de l'espace temps** → fabric of space time
- **vide** → vacuum
- **vitesse de la lumière** → speed of light

Albert Einstein and Isaac Newton

LEXIQUE EXERCICES

■ JOBS AND CAREERS

1 Complétez en suivant l'exemple en italique.

Ex. *science* → *a scientist*

- | | |
|-----------------------------|---------------------------------|
| 1. physics → | 4. cosmology → |
| 2. astrophysics → | 5. mathematics → |
| 3. astrophotography → | 6. astronomy → |
| | 7. nanoscience research → |

■ THE UNIVERSE

2 Associez les mots anglais aux mots français.

réponses ↓

- | | | |
|------------------------|-------|----------------------------|
| 1. fabric of spacetime | | a. année lumière (unité) |
| 2. cosmic ray | | b. longueur d'onde |
| 3. radio wave | | c. onde lumineuse |
| 4. wavelength | | d. rayon cosmique |
| 5. light wave | | e. vitesse de la lumière |
| 6. speed of light | | f. onde radio |
| 7. light-year | | g. tissu de l'espace-temps |

3 Choisissez l'un des deux synonymes correspondant au verbe en gras. Puis traduisez.

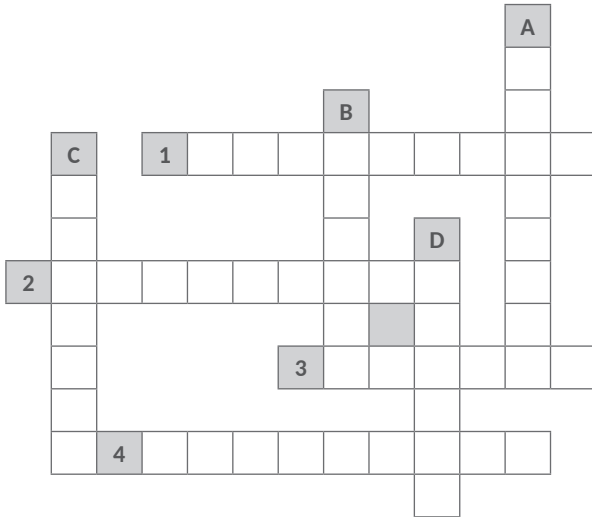
- | | | |
|--|-----------------------|---------|
| 1. release energy | = collapse / emit | → |
| 2. draw massive objects | = attract / transform | → |
| 3. ripple /'ripəl/ through the universe | = fall / undulate | → |
| 4. curve the fabric of spacetime | = distort / explode | → |

4 Choisissez l'un des deux antonymes correspondant à l'adjectif en gras. Puis traduisez.

- | | | |
|--------------------------------------|-----------------------|---------|
| 1. tiny particles | ≠ specific / enormous | → |
| 2. huge /'hju:dʒ/ black holes | ≠ very small / long | → |
| 3. accurate atomic clocks | ≠ modern / inexact | → |
| 4. faint signals | ≠ distinct / weak | → |
| 5. remote galaxies | ≠ close / rare | → |

5 Associez les mots anglais aux mots français. Puis placez les mots anglais dans la grille de mots croisés.

matter • continuum • nucleus • curvature • worm hole • motion • vacuum • black hole



ACROSS →

- 1. courbure
- 2. ensemble infini
- 3. matière
- 4. trou noir

DOWN ↓

- A. trou de ver
- B. vide
- C. noyau (d'un atome)
- D. mouvement

■ SCIENTIFIC DISCOVERIES

6 Placez dans chaque phrase les deux mots qui sont équivalents au mot en gras.

a. forerunner • b. discovery • c. advance •
d. trailblazer • e. turning point • f. landmark

1. Albert Einstein was a **pioneer** of spacetime as he contributed to a new understanding of the universe.

.....

2. A new experiment has reached a **milestone** in the quest to understand the structure of the cosmic web.

.....

3. In 2019, astronomers made¹ a **breakthrough** by capturing the first image of a black hole.



.....

1. GRAMMAIRE 1 : *make* et *do*, exercice 1, page 13

Albert Einstein, a scientist who changed the world

Albert Einstein (1879–1955) was a German-born theoretical physicist best known for his contributions to quantum mechanics and electrodynamics through his relativity theory and his challenge to Newtonian physics.

In 1905 he published four groundbreaking¹ papers called the *Annus Mirabilis* papers. These four papers laid the foundation of modern physics and changed the way scientists understood space, time and matter. For example, Einstein's special relativity was a new way to relate the motions of objects in the universe. Einstein's paper on the matter-energy relationship proposed the formula $E = mc^2$ suggesting that tiny particles of matter could be converted into huge amounts of energy.

Between 1907 and 1915, based on his theory of special relativity, Einstein proposed the theory of general relativity and rewrote the rules for space and time that had existed since the time of Isaac Newton ( texte 2). Einstein said that matter and energy causes the distortion of space and time producing the effect we call gravity. In 1916, Einstein applied the theory of general relativity to model the structure of the universe predicting the existence of black holes, wormholes and gravitational waves. ( texte 3)

Albert Einstein received the 1921 Nobel Prize in Physics “for his services to theoretical physics, and especially for his discovery of the law of the photoelectric effect”, a pivotal step in the development of quantum theory. He also investigated the thermal properties of light and the quantum theory of radiation, which provided the foundation of the photon theory of light. In 1933, Einstein moved to the United States when Adolf Hitler came to power in Germany. He accepted a position in Princeton and settled there. He became an American citizen in 1940. Until his death, Einstein worked in a campaign for international peace and nuclear disarmament.

1. révolutionnaire

2. $E = mc^2$ = the energy of a body (m) is equal to the mass (m) of that body times the speed of light squared (c^2).

GRAMMAIRE 2 • Les noms terminés par «s» qui s'emploient au singulier

Les noms de sciences (*physics, quantum mechanics, mathematics*), d'activités humaines (*athletics*) terminés par «-ics », quelques noms de jeux (*chess, dominoes*) et de maladies (*measles, mumps*) terminés par un «s» s'emploient au singulier.

Ex. *physics is a branch of science.*

 GRAMMAIRE, exercices 2 et 3, page 14

GRAMMAIRE 3 • Verbe irrégulier

► *lay, laid, laid* : poser

1 Testez votre compréhension du texte 1. Répondez aux questions.

1. What theory completed Einstein's special relativity theory of 1905?
.....

2. What did Einstein predict in 1916?
.....

3. For which discovery did Einstein win the Nobel Prize?
.....

2 Sélectionnez la traduction correcte des mots extraits du texte 1.

1. Theory of special relativity

- théorie relative et spéciale théorie de la relativité restreinte

2. (old) Quantum theory

- théorie des quanta physique théorique

3. Quantum mechanics

- théorie de la mécanique mécanique quantique

3  01 Lisez l'équation d'Einstein, écrivez-la en anglais, puis écoutez le fichier audio.

$E = mc^2 \rightarrow$

Texte 2

Isaac Newton

Isaac¹ Newton (1642-1727) was a British physicist and mathematician who made three major discoveries. In the field of optics and the study of light, he elaborated a sophisticated theory of color. Then, he developed a binomial theorem paving the way² for the field of math known as calculus³.

But his most important innovation was the concept of gravity in 1687 called Newton's law of universal gravitation, the attraction between bodies in space that holds planets, moons and comets in orbit, and draws falling objects toward the earth.

adapted from sparknotes

<https://www.sparknotes.com/biography/newton/summary/>

1. Isaac : /'aizək/
2. ouvrir la voie
3. calcul (analyse)

Texte 3

→ Placez dans le texte les mots proposés ci-dessous.

1. continuum • 2. ripple • 3. fabric of spacetime •
4. theory of general relativity • 5. curvature

Albert Einstein's general relativity

The basic idea of Einstein's is that instead of being an invisible force that attracts objects to one another, gravity is the of space. Space and time are interwoven¹ into a single known as spacetime. Massive objects caused a distortion² in the like a large object in the center of a trampoline. The object would press down into the fabric causing it to

1. entremêlé
2. déformation

GRAMMAIRE EXERCICES

■ LES VERBES MAKE ET DO

1 Placez *make* ou *do* devant les noms.

- | | |
|-------------------------------------|-----------------------------|
| 1. a breakthrough, a discovery | 6. a change |
| 2. research | 7. progress |
| 3. a mistake, an error | 8. money |
| 4. calculations, exercises | 9. work, a job, a task |
| 5. an assumption, a comment | 10. testing, trials |

■ LE PLURIEL ET LE SINGULIER DES NOMS

2 Sélectionnez la réponse correcte.

1. **Mathematics** is / are the science of numbers and shapes.
2. Today **college students** is / are taking fewer credit hours than before.
3. Silver **nanoparticles** is / are highly toxic.
4. **The United States of America** is / are the fourth largest country in the world.
5. **Soundwaves** is / are providing fascinating evidence of what's actually going on inside the Sun.
6. They say that **astrophysics** is / are way too complex for them.
7. **Dominoes** is / are played at a professional level, similar to poker.
8. **Wales** is / are part of the United Kingdom.
9. Scientists look at the centre of galaxies where supermassive **black holes** is / are thought to reside.
10. **German measles**¹ is / are dangerous during pregnancy.

1. /'mizəlz/ : rubéole

3 Classez les noms en gras de l'exercice 1 dans l'une des deux catégories.

1. Les noms qui s'emploient au singulier et au pluriel

.....

2. Les noms terminés par « s » qui s'emploient uniquement au singulier

.....

QUOTE

"Student is not a container you have to fill but a torch you have to light up."

Albert Einstein