



9 A very inventive Tower

Gustave Eiffel was not only an engineer but also a scientist. In fact, he paid tribute to scientists of the 18th and 19th centuries by writing the names of 72 of them on the facades of the Tower, in the cantilever located above the beam used to seal the big arches.

On the Paris side, we can read:

Petiet (engineer), Daguerre (painter and physicist), Wurtz (chemist), Le Verrier (astronomer), Perdonnet (engineer), Delambre (astronomer), Malus (physicist), Breguet (physicist and constructor), Polonceau (engineer), Dumas (chemist), Clapeyron (engineer), Borda (mathematician), Fourier (mathematician), Bichat (anatomist and physiologist), Sauvage (mechanic), Pelouze (chemist), Carnot (mathematician) and Lamé (geometrician).

On the Trocadero side:

Séguin (mechanic), Lalande (astronomer), Tresca (engineer and mechanic), Poncelet (geometrician), Bresse (mathematician), Lagrange (geometrician), Belanger (mathematician), Cuvier (naturalist), Laplace (astronomer and mathematician), Dulong (physicist), Chasles (geometrician), Lavoisier (chemist), Ampère (mathematician and physicist), Chevreul (chemist), Flachat (engineer), Navier (mathematician), Legendre (geometrician), Chaptal (agronomist and chemist).

On the Grenelle side:

Jamin (physicist), Gay-Lussac (chemist), Fizeau (physicist), Schneider (industrialist), Le Chatelier (engineer), Berthier (mineralogist), Barral (agronomist, physicist and chemist), De Dion (engineer), Gouin (engineer and industrialist), Jouselin (engineer), Broca (surgeon), Becquerel (physicist), Coriolis (mathematician), Cail (industrialist), Triger (engineer), Giffard (engineer), Perrier (geographer and mathematician), Sturm (mathematician).

Opposite the Military Academy:

Cauchy (mathematician), Belgrand (engineer), Regnault (chemist and physicist), Fresnel (physicist), De Prony (engineer), Vicat (engineer), Ebelmen (chemist), Coulomb (physicist), Poinot (mathematician), Foucault (physicist), Delaunay (astronomer), Morin (mathematician et and physicist), Haüy (mineralogist), Combes (engineer and metallurgist), Thénard (chemist), Arago (astronomer and physicist), Poisson (mathematician) et Monge (geometrician).

It is interesting to note that no woman can be found among all those scientists and that almost half of them went to the Ecole polytechnique.

The first laboratory set up by Eiffel on the third floor of the Tower was a weather station

« La Tour est un observatoire météorologique incomparable, dont le caractère ne tient pas à son altitude absolue, laquelle est seulement de 334 m ; ce caractère dépend essentiellement de la hauteur au-dessus de la couche d'air considérée pour laquelle les observations se font à l'air libre, en dehors de l'influence du sol [...]

Les instruments de mesure sont disposés sur la petite plate-forme de 1,60 m de diamètre qui termine la Tour

à 300 m du sol ; à l'aide d'un câble, ils transmettent électriquement leurs indications à des appareils enregistreurs situés au rez-de-chaussée du Bureau central qui est voisin.

Toutes ces observations sont relevées heure par heure ; pour le vent en vitesse et en direction, pour la température, pour la pression atmosphérique, pour l'état hygrométrique... »

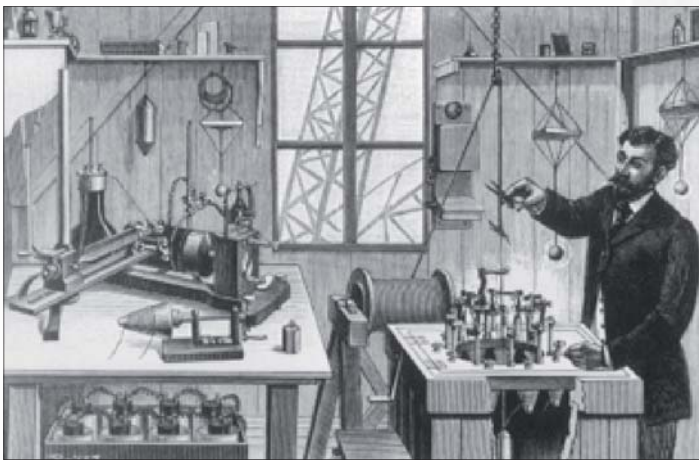
Gustave Eiffel



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On the third floor of the Tower, Eiffel set up an office where he could make measurements relating to astronomy and physiology, two subjects that he was very fond of.

Eiffel was also interested in aerodynamics and in his laboratory, he carried out research work about the fall of bodies.



Research work on the fall of bodies in the laboratory located on the second platform

To continue his experiments, he created an automatic device that slid along a cable stretched between the second floor and the ground.

In 1909, Eiffel built a small air tunnel at the foot of the Tower and carried out about 5,000 tests. A few years later, he set up his laboratory in Auteuil and designed a monoplane fighter and continued his research work on the span of the wings and on the propellers.

After World War I, he gave all his laboratories to the Government.



First aerodynamic experiments in the Tower



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Exercises

CP - CE1

French / Grammar / Conjugation

EDUCATIONAL OBJECTIVE

Conjugating the verbs belonging to the 1st group in the present tense; conjugating « être », « avoir », « faire », « aller », « dire », « venir » in the present tense.

Gustave Eiffel fait installer une station météorologique au sommet. C'est de là qu'il mesure les températures. Il peut aussi observer le ciel depuis son bureau.

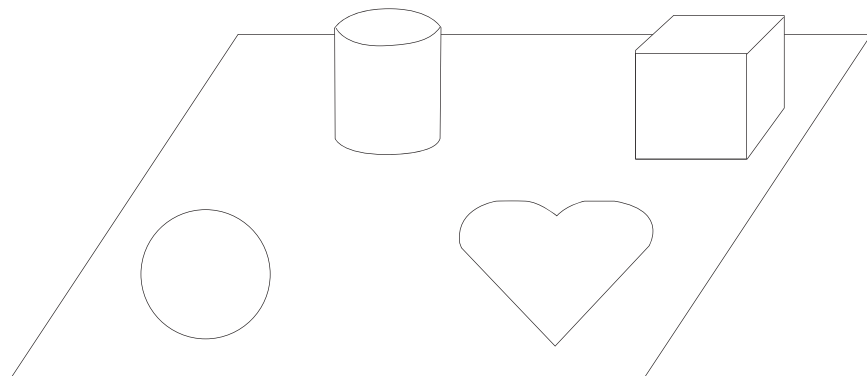
- Have the pupils find jointly the verbs and ask them to underline them.
- Have them find the endings of the verbs (agreement with the subject, tense).
- Have them use personal pronouns.
- Have the pupils rewrite the sentences replacing the words Gustave Eiffel by « I », then by « we ».

Mathematics

EDUCATIONAL OBJECTIVE

Locating an object and using the vocabulary that will enable to define positions (in front of, behind, left of, right of).

Mr. Eiffel's office is encumbered with objects. He is about to undertake experiments to study the fall of bodies with these objects. In order to help him, complete the following sentences using the words « devant », « derrière », « à gauche », « à droite », « au-dessus », « au-dessous ».



- La balle est la boîte cylindrique.
 Le cube est de la balle.
 Le cube est le cœur.
 Le cœur et la balle sont de la table.
 L'étoile est de la table.





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Exercises

CE2 - CM1 - CM2

French / Grammar / Conjugation

EDUCATIONAL OBJECTIVE

In the text, find the infinitive form of a verb already studied and conjugate the verbs in the present tense.

Gustave Eiffel fait installer au sommet une station météorologique pour mesurer les différences de pressions. L'ingénieur y implante également un laboratoire d'étude de l'aérodynamisme pour étudier la chute des objets. En 1909, il fait construire, au pied de la Tour, une soufflerie où sont testés plusieurs modèles d'avions.

Au troisième étage de la Tour, Eiffel installe un bureau où il peut se livrer à des observations d'astronomie et de physiologie.

- In the above text, ask the pupils to find the conjugated verbs and the verbs written in the infinitive mode (CE2 - CM1).
- Have the pupils find the verbs contained in the text, ask them to underline the conjugated verbs in green and the infinitive verbs in black. For conjugated verbs, indicate the infinitive and the group (CM1 - CM2).
- Complete the table below conjugating the verbs with the specified pronoun, in the present tense.

faire	je	nous	vous
implanter	tu	nous	ils
être	je	elle	nous
installer	je	vous	elles

Science / Mathematics

EDUCATIONAL OBJECTIVES

Making a table or a diagram.

Reading a table or a diagram.

- Complete the table below with the temperatures measured in the morning and early afternoon (ask a few pupils to record the temperature on Wednesday).

	Monday	Tuesday	Wednesday	Thursday	Friday
Morning					
Afternoon					

- Complete the diagram with the morning temperatures recorded using a blue dot and the afternoon ones with a red dot.
- Then connect the dots so as to obtain a diagram.

Temperatures
from 0 to 25°

