Une séance de 2h sur la science et les scientifiques dans la série *Les Simpsons*
(CE, CO, exercice de mathématiques en anglais et EO)

Contexte :
Au deuxième semestre, les étudiants de L2 physique, chimie, parcours spéciaux (maths, physique, chimie) ont au programme la thématique "la science dans la fiction".
→ Les documents étudiés pendant les 12 TD (groupes d'environ 24 étudiants) leur font découvrir ou redécouvrir des œuvres de science fiction (*The Martian, Interstellar, Star Wars*), des fictions à substrat professionnel (*Breaking Bad, The Big Bang Theory…*). Les étudiants sont ainsi invités tout au long du semestre à réfléchir à la manière dont les scientifiques et la science sont représentés dans la fiction et à comment ces représentations reflètent ou influencent la réalité.
→ Cette thématique est l'occasion d'apprendre ou réviser les hypothèses et la modalité mais aussi de les initier à l'anglais des mathématiques, de la physique et de la chimie.
→ Les modalités d'évaluation en fin de semestre sont les suivantes : compréhension de l'oral (vidéo inconnue sur le thème étudié en cours), expression écrite (écrit créatif ou argumentatif de 250 mots sur un sujet lié au thème du semestre), expression orale en continu et en interaction (exposé préparé à l'avance sur une œuvre de leur choix non étudiée en cours suivi d'une interaction avec 5 autres étudiants).

Prérequis :
→ Une liste de vocabulaire pour l'expression des opinions et les exposés et débats a été distribuée. Ce vocabulaire peut aussi être appris en ligne sur le site ou l'application **Memrise**.
→ Les étudiants ont été encouragés à réviser les hypothèses et la modalité sur le site **englisch-hilfen**.
→ En L1, ils ont été initiés au vocabulaire des mathématiques en anglais et ont révisé les temps, les comparatifs et superlatifs.

Science in *The Simpsons*

INTRODUCTION - READING COMPREHENSION

Summarize the main ideas in the following text.

Excerpts from *The Simpsons and their mathematical secrets*, Simon Singh

The Simpsons is arguably the most successful television show in history. Inevitably, its global appeal and enduring popularity have prompted academics [...] to identify the subtext of the series and to ask some profound questions. […]

However, all these philosophers, psychologists, theologians and politicians have missed the primary subtext of the world's favorite TV series. The truth is that many of the writers of *The Simpsons* are deeply in love with numbers and their ultimate desire is to drip-feed morsels of mathematics into the subconscious minds of viewers.

[Many of the authors involved in] the writing of *The Simpsons* have remarkable backgrounds in mathematical subjects. In fact, some have PhDs and have even held senior research positions in academia and industry. […] [This is why] I will endeavour to prove that nerds and geeks paved the way for [*The Simpsons* to become a] vehicle for pop culture mathematics, with mentions of theorems, conjectures and equations peppered throughout the episodes. […]

With this in mind, I began to ask writers why they thought so many mathematically inclined writers had found a home at *The Simpsons*. As far as Cohen is concerned, mathematically trained comedy writers are more confident and comfortable exploring the unknown armed only with their intuition: "The process of proving something has some similarity with the process of comedy writing, inasmuch as there is no guarantee you're going to get to your ending. […] In both cases -finding a joke or proving a theorem- intuition tells you if your time is being invested in a profitable area.

Although the writers have offered various explanations of why mathematical minds lend themselves to writing comedy, one important question remains: Why have all these mathematicians ended up working on *The Simpsons* rather than *30 Rock* or *Modern Family*? Al Jean has one possible explanation: "I hated experimental science because I was terrible in the lab and I could never get results correct. Doing mathematics was very different." In other words, scientists have to cope with reality and all its imperfections and demands, whereas mathematicians practice their craft in an ideal abstract world. According to Jean, the difference between mathematics and science is paralleled by the difference between writing for a live-action sitcom versus writing for an animated series."

LISTENING COMPREHENSION
Watch “Bart the genius” (*The Simpsons*, season 1, episode 2) and make a list of all the references to scientific subjects.

CLASS DISCUSSION – group work
After reading the text and watching this episode, what would you say are the main characteristics of mathematicians and other scientists according to the screenwriters of *The Simpsons*. How accurate do you think this portrayal is? Find personal anecdotes to justify.

THE MATH PROBLEM
Fill in the blanks.
https://www.youtube.com/watch?v=6Jq_9ghf-jI

“"At 7:30 a.m., an express train traveling _____leaves Santa Fe bound for Phoenix, _____ away. […] At the same time, a local train traveling _____and carrying _____ leaves Phoenix bound for Santa Fe. It's _____ long and always carries the same number of passengers in each car. An hour later, a number of passengers equal to _____ get off but _____ get on. At the second stop, _____ get off but _____ get on as got on at the first stop."

Train conductor: "Ticket, please."

Bart: "I don't have a ticket."

Train conductor: "Come with me, boy. We've got a stowaway, sir."

Bart: "I'll pay. How much?"

Martin: "'_____ the fare from Tucson to Flagstaff..._____ of the fare from Albuquerque to El Paso."

3) Try to solve Bart's math problem as quickly as possible. *(from mathbits.com)*

a) In hours and minutes, how long will it take the express train to reach Phoenix?

b) In hours and minutes, how long will it take the local train to reach Santa Fe?

c) Assume that the trains are traveling on adjacent train tracks and travel the same distances between Phoenix and Santa Fe. To the nearest tenth of an hour, after how many hours will the two trains be at the same location?

d) If there are as many passengers in each car, how many passengers are in each car as the train leaves Phoenix?

e) How many passengers get off the train at the first stop?

f) How many passengers get on the train at the first stop?

g) How many passengers are now on the train as it leaves its first stop?

h) How many passengers get off the train at the second stop?

i) How many passengers get on the train at the second stop?

j) How many passengers are now on the train as it leaves its second stop?

k) If the fare from Tucson to Flagstaff is $65.80 and the fare from Albuquerque to El Paso is $84.90, find Bart's fare.

Scientists in *The Simpsons*, case study (Professor Frink, the mad inventor)

BRAINSTORMING – group work
Watch the video entitled "The Best of Professor Frink".
https://www.youtube.com/watch?v=KLmJzQPQfdI&list=RDKLmJzQPQfdI&t=227

1) How is the main scientist of *The Simpsons* portrayed?

2) List up his craziest inventions.

ORAL EXPRESSION – group work

You are a group of mad inventors who have just patented an invention. Prepare a speech to convince a jury to elect your prototype as the invention of the year. You need to be very convincing because a grant that could help you to market your product is at stake. **Make sure you use the appropriate tenses, a few if-clauses and modal auxiliaries and expressions**. **Superlatives and comparatives** are also useful to convince your audience.

You can imitate Professor Frink (as long as you are understandable) and choose to present one of his inventions... or find your way to interpret the role of a mad inventor and imagine your own crazy invention.

ANSWERS

1)

- $E=mc^2$ "In hindsight, the mathematical undercurrent in The Simpsons was obvious from the start. In the first scene of "Bart the Genius", viewers catch a glimpse of the most famous mathematical equation in the history of science. The episode begins with a scene in which Maggie is buiding a tower out of her alphabet blocks. After placing a sixth block on top, she stares at the stack of letters. The doomed-to-be-eternally-one-year-old scratches her head, sucks her pacifier, and admires her creation : EMCSQU. Unable to represent an equal sign and lacking any numbered blocks, this was the closest that Maggie could get to representing Einstein's famous scientific equation $E=mc^2$. […]"
- oxidize
- the math pb
- units of measurement
- hamsters used for experiments
- the teacher's pun (Hardy-har-har)
- units of measurement
- acids and bases
- the research proposal
- reference to Jane Goodall and the chimps
- Homer : "I bet Einstein turned himself all sorts of colors"
- before he invented the light bulb" (+ picture)

2) At 7:30am, an express train travelling **60 miles an hour** leaves Santa Fe bound for Phoenix, **520 miles** away. At the same time a local train travelling **30 miles an hour** and carrying **40 passengers** leaves Phoenix bound for Santa Fe. It's **8 cars** long and always carries the same number of passengers in each car. An hour later, the number of passengers equal to **half the number of minutes past the hour** get off, but **3 times as many plus 6** get on. At the second stop, **half the passengers plus two** get off, but **twice as many** get on as got on at the first stop.
[…]
Martin : **twice** the fare from Tucson to Flagstaff **minus two thirds** of the fare from A to EP.

3)
a) 520/60=8.67... → 8 hours and 40 minutes
b) twice more time → 17 hours and 20 minutes
c) the express train travels twice quicker than the local train → (520/60) X (2/3) = 5.8 hours
d) 40/8 = 5 passengers in each car
e) 7:30 → 8:30 ; 30/2= 15 passengers get off
f) 15x3 + 6 = 51 passengers get on
g) 40-15+51=76 passengers are on the train
h) (76/2) +2 = 40 passengers get off
i) 51x2 = 102 passengers get on
j) 76-40 +102=138 passengers are on the train
k) 65.80x2 – (2/3) x 84.90 = $ 75