CLIL Lesson Plan 3 (Karolina Mysłowska, VIII LO, Bielsko-Biała, January 2020)

Topic: HGP – The Human Genome Project

Level: 3rd-4th grade of secondary school, advanced level of English (C1-C2)

Timing: 45 minutes

Aims:

- To present both general (taught in English lessons, Longman, Repetytorium maturalne, **Unit 9 „Health, sports"**) and specific (taught in biology lessons) vocabulary connected with the topic of the human genome
- To introduce the concept of HGP
- To make learners aware of cultural and ethical factors that determine the perception of the HGP
- To help learners understand that learning can be achieved in a second language.

Criteria for assessment

Teacher, peer- and self-assessment processes will be used to assess how well learners:

- Understand the HGP
- Describe what the HGP is
- Construct and use pre-taught terminology

Teaching Objectives

Content	**Cognition**
• Introduction of the topic • What HGP is • How HGP is perceived	• Provide learners with opportunities to understand the key concepts and apply them in different contexts. • Enable learners to describe HGP • Encourage knowledge transfer about HGP • Vocabulary building, learning and using. • Arouse learner curiosity – creative use of language and learner questions.

Culture

- Identify countries where the HGP functions
- Become objective: relativizing the concept depending on the point of view (ethical, financial, geo-political issues)
- Understand that they can learn no matter which language they are using.

Communication

Language of learning	Language for learning	Language through learning
Key vocabulary: genes, genome, sequence of pars, DNA, personalise medical treatment	Asking each other questions: What do you know about…? Can you tell me sth about..? What is a HGP? Ordering: Firstly…, secondly…, thirdly…, finally…	Distinguish language to carry out activities. Retain language revised by both the teacher and the learners. Make use of peer explanations.

	Comparing and contrasting: Other: How do you spell…? What does … mean?	Record, predict and learn new words which arise from activities.

Learning outcomes (what learners will be able to do by the end of the lesson):

- demonstrate understanding of concept of the HGP
- classify information
- use language creatively
- ask and respond to wh-questions about their work
- use a class vocabulary record of new words.

Instruments for assessment:

- T monitors group and individual activities
- Learners successfully play “True of False? Trivia game”
- Learners interact with their partners.
- Ls ‘ participation in all tasks and activities.
- Ls asks each other questions “What have you learned today?”.

Resources

Worksheets, whiteboard, pens, leaflets from Pinterest; Skinner, Gary and Ann Skinner: Revise Salters-Nuffield, AS/A Level, Biology A, Revision Workbook, p.133
TED-Ed “The race to sequence the human genome – Tien Nguyen”
https://ed.ted.com/lessons/the-race-to-sequence-the-human-genome-tien-nguyen

Teaching and learning activities

TED-Ed "The race to sequence the human genome – Tien Nguyen" (5 minutes)
https://ed.ted.com/lessons/the-race-to-sequence-the-human-genome-tien-nguyen

Exercise 1. "HGP – associations?" (5 minutes)
(warm up/ scaffolding activity on the board including brainstorming, resulting in a mind-map)

Answer:
genes, genome, sequence of pars, DNA, personalise medical treatment

Exercise 2. Reading and playing "True or false? Trivia Game. (20 minutes)
Read the information about the HGP. Try to remember as much as you can as the information will be taken away.

HGP – The Human Genome Project

Begun formally in 1990, the Human Genome Project was a 13-year effort designed to identify all of the approximately 25 000 genes in the human DNA and determine the sequence of the approximately 3 billion base pairs that make up the human DNA. As this knowledge grows, not only does the scope of what might be achieved increase but also the concerns about where it will all lead (Skinner, Gary and Ann Skinner: Revise Salters-Nuffield, AS/A Level, Biology A, Revision Workbook, p.133).

It remains the world's largest collaborative biological project After the idea was picked up in 1984 by the US government when the planning started, the project formally launched in 1990 and was declared complete on April 14, 2003. Funding came from the US government through the National Institutes of Health (NIH) as well as numerous other groups from around the world. A parallel project was conducted outside government by the Celera Corporation, or Celera Genomics, which was formally launched in 1998. Most of the government-sponsored sequencing was performed in twenty universities and research centers in the United States, the United Kingdom, Japan, France, Germany and China.

The "genome" of any given individual is unique; mapping the "human genome" involved sequencing a small number of individuals and then assembling these together to get a complete sequence for each chromosome. Therefore, the finished human genome is a mosaic, not representing any one individual (…) The sequencing of the human genome holds benefits for many fields, from molecular medicine to human evolution. The Human Genome Project, through its sequencing of the DNA, can help us understand diseases including: genotyping of specific viruses to direct appropriate treatment; identification of mutations linked to different forms of cancer; the design of medication and more accurate prediction of their effects; advancement in forensic applied sciences; biofuels and other energy applications; agriculture, animal husbandry, bioprocessing; risk assessment; bioarcheology, anthropology and evolution. Another proposed benefit is the commercial development of genomics research related to DNA based products, a multibillion-dollar industry.

The sequence of the DNA is stored in databases available to anyone on the Internet. (…)

At the onset of the Human Genome Project several ethical, legal, and social concerns were raised in regards to how increased knowledge of the human genome could be used to discriminate against people. One of the main concerns of most individuals was the fear that both employers and health insurance companies would refuse to hire individuals or refuse to provide insurance to people because of a health concern indicated by someone's genes (wikipedia).

True or false? Trivia game.
In pairs, decide whether the following facts are true or false. You must bet between 10-100 points for each one. You start with 1000 points. If you guess correctly, you gain the amount of the bet. If you guess wrongly, you lose the amount of the bet, so be careful!

	True	*False*	*Bet*	*New Total*
1. The Humen Genome Project was a 13-year effort designed to identify all of the approximately 25 000 genes in the human DNA and determine the sequence of the approximately 3 million base pairs that make up the human DNA.		*f*		
2. Ihe idea was picked up in 1984 by the British government.		*f*		
3. The project formally launched in 1990 and was declared complete in 2013.		*f*		
4. Most of the government-sponsored sequencing was performed in the United States, the United Kingdom, Japan, France, Germany and China.	*t*			
5. A parallel project was conducted outside government by the private Celera Corporation, or Celera Genomics.	*t*			
6. The "genome" of any given individual is unique.	*t*			
7. The finished human genome is a mosaic, representing one particular individual.		*f*		
8. The Human Genome Project, through its sequencing of the DNA, can help us some diseases.	*t*			
9. The sequence of the DNA is kept secret and not available to the public.		*f*		
10. Human genome could be used to discriminate against people by employers and health insurance companies.	*t*			

Exercise 3. Discussion. (15 minutes)
Sum up the discussion (critical thinking). Take into account both the positive as well as the negative aspects of the HGP, relate it to the geo-political situation (culture) of a country and try to answer the following questions:

*a) Why would it be an **advantage for a woman to know that she has a high risk** of developing breast cancer?*

Answer: It might prompt her to more regular self-examinations or attendance for medical checks, avoid high-risk practices such as drinking alcohol, hormone replacement therapy, smoking.

*b) Why a patient might **prefer not to know that she has genes that increase her risk** of developing breast cancer?*

Answer: The patient may feel strongly about data protection and be afraid that third parties, such as insurance companies, may have access to this information. This knowledge may cause anxiety when in fact the information is about risk and not certainty.