



Co-funded by the
Erasmus+ Programme
of the European Union



Unit Title: DNA: Observation of human chromosomes...Genes in a bottle. Capture your unique essence.

Topic: Biology

Language: English

Language Level **B1** / **B2**

Target students: Secondary school (ages from 16 years)

Time: 4 hours

Aims:

- To learn basic terminology of Biology like nucleic acids, nucleotides, hereditary material, base pairs, genetic code, proteins, chromosomes, mitosis, metaphase, cell membrane, enzymes, etc.
- To communicate using words and expressions related to molecular Biology, microscopy and chemistry.
- To understand the 3D structure of DNA by using molecular models.
- To observe metaphase human chromosomes under a microscope (400X).
- To learn how he/she can isolate DNA from his/her cheek cells .

Final product: Capture of DNA in a small necklace.

Methodology, classroom activities:

- Teacher's presentation (ppt)
- Demonstration of molecular models of DNA nucleotides and DNA double helix.
- Microscopes and samples
- Laboratory equipment
- Material (enzymes, lysis buffer, alcohol, laptops, projector, power point presentations, Laboratory equipment).

Assessment tools: Conversation, final product (DNA in a necklace)



Co-funded by the
Erasmus+ Programme
of the European Union



Documents and materials : Scientific Articles about DNA, presentation, papers for taking notes or notepads.

Description of activities

Students work	Methods and resources	Assessment
First Lesson: General Information about DNA structure.		
The students are informed about the structure of DNA and the main steps of DNA extraction (2h).	Teacher's speech Powerpoint presentation	Conversation & keeping notes.
Second Lesson: DNA extraction		
The second lesson (2h) takes place in the Chemistry Laboratory. The students observe metaphase human chromosomes under a microscope. Metaphase is the third phase of mitosis, the process that separates duplicated genetic material carried in the nucleus of a parent cell into two identical daughter cells. The chromosomes, which have been replicated and remain joined at a central point called the centromere, are	Group work Teacher's guidance http://onlinelibrary.wiley.com/doi/10.1002/bmb.20351/pdf	Final product: the DNA in a small necklace. Conversation. Notes about the procedure of extracting DNA. Conclusions on a Flipchart.





Co-funded by the
Erasmus+ Programme
of the European Union



Students work	Methods and resources	Assessment
<p>called sister chromatids. (SEE IMAGE AT THE APPENDIX).</p> <p>Each student is invited to extract his/her own DNA from cheek cells.</p> <p>The students realize that our “unique essence” is included in the nucleus of every cell of our body in the form of a miraculous molecule, the DNA and that it can be easily isolated, captured and live in a bottle for quite a long time!</p>		

WORKSHEETS

Worksheet 1: Build groups of three students. Write down 10 words/expressions associated with the DNA structure.

word/ expression	Translation

Write down 10 sentences associated with Chemistry and the DNA extraction.

Worksheet 2





Co-funded by the
Erasmus+ Programme
of the European Union



1. Search for the meaning of the words in wordbook or translate with your mobile. Save your result on a flip chart paper. Ask the lecturers the questions occurring during the presentation.
2. Present your results shortly in front of the audience.

IMAGE 1



