OrganKits for STEAM

REPROHEALTH & GENDER

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Project No. 2022-1-ES01-KA220-SCH-000089616

Co-funded by the European Union

TECHNOLOGY & ENGINEERING

ORGANS 3D SCANNING AND PRINTING

OBJECTIVES

1. Develop spatial intelligence.
2. Know 3D scanning techniques.
3. Value the importance of 3D scanning techniques in medicine.
4. Scan organs of the female reproductive system to create polymer PLA prosthesis (cervix, ovaries, etc.) for assisted reproduction using a 3D printer.

MAIN QUESTIONS TO BE ANSWERED

- Which are the main 3D scan techniques?
- Which are the main applications of 3D scanning in medicine?
- Are 3D ultrasound and 3D scan the same technique?
- Which 3D print prosthesis have made pregnancy possible in infertile patients?

GROUPS AND TIME ORGANIZATION

GROUPS

- The students will make groups of 4 people.

TIME ORGANIZATION

- Time will be organized in 6 sessions.

GROUPS AND TIME ORGANIZATION

TIME ORGANIZATION

1st session

- 3D scanning techniques and awareness-raising of its importance in medicine.

2nd and 3rd sessions:

- Scanning of different organs available in the Reprohealth and Gender Organkit.

GROUPS AND TIME ORGANIZATION

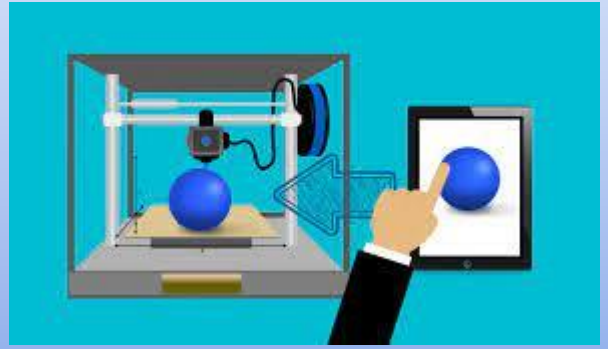
TIME ORGANIZATION

4th session

- Basic parameters of 3D print.

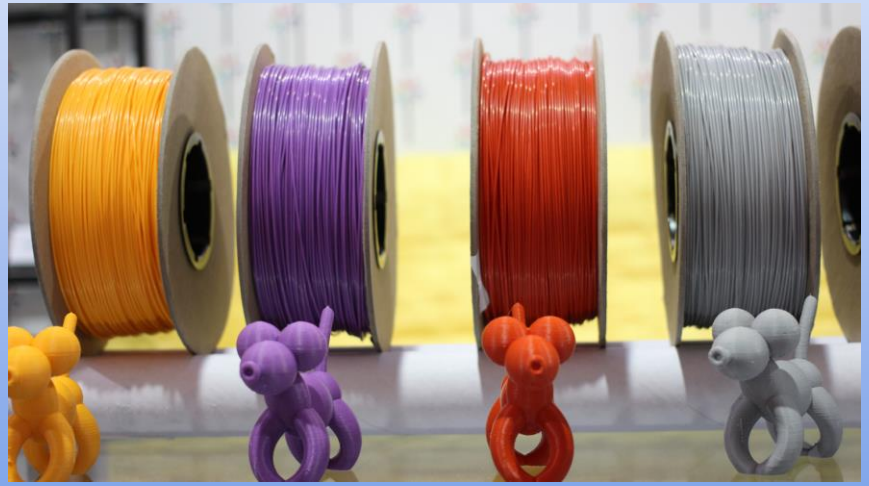
5th and 6th sessions

- 3D printing of selected prosthesis.



RESOURCES

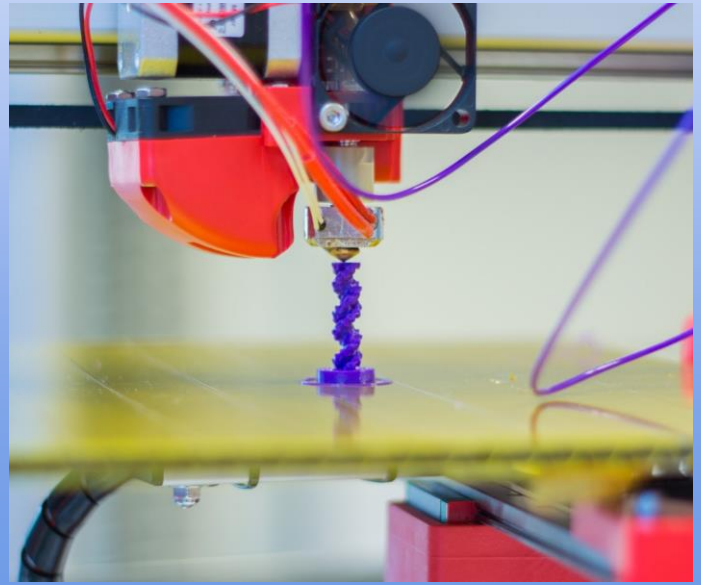
- Reprohealth Organkit
- 3D Scanner
- Laptops
- 3D printer
- PLA filament



ASSESSMENT AND EVALUATION

The assessment of each group of students will be carried out by a rubric which will include the following points:

- Raising a problem
- Objectives
- Theoretical framework
- Methodology
- Results analysis
- Built object



TIPS & TRICKS

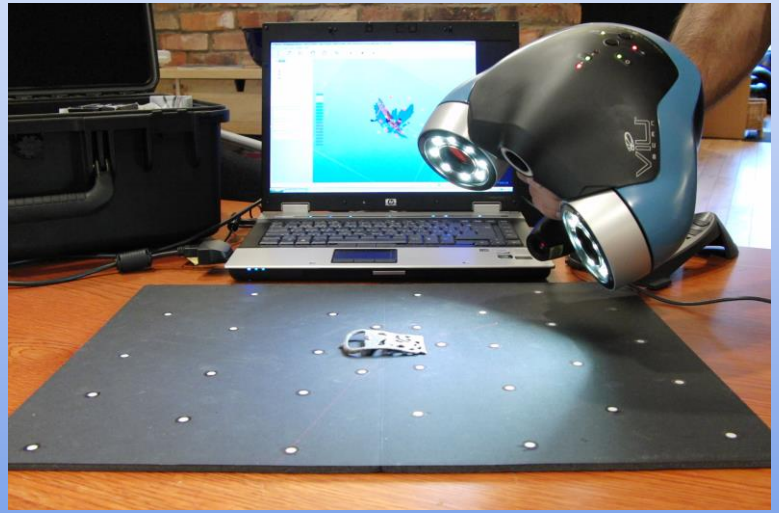
The files obtained with the scanned organs will be available for any department which could be interested in using them.

- e.g. it would be interesting if the Biology and Geology department made an identification of the different structures in the reproductive system.

PROCESS OF WORK

- Firstly, the students in each group will develop a research project in which they must find answers to the main questions of the project.

- Secondly, they will begin with the scanning of the organs included in the Organkit.



PROCESS OF WORK

- Afterwards, using the knowledge acquired during the sessions in Biology and Geology and the appropriate software, they will identify the main structures in each organ.

- Finally, using additive manufacturing (3D printer), they will obtain the most important structures according to the research performed by each group.

SCIENCE

MALE AND FEMALE REPRODUCTIVE SYSTEM

SESSIONS 1-2:
FEMALE & MALE REPRODUCTIVE SYSTEM

OBJECTIVES

1. Identify the main organs in the reproductive system.
2. Understand the physiology and function of the main organs in the reproductive system.
3. Assimilate new scientific vocabulary related to the reproductive system.

MAIN QUESTIONS

- Which organs are involved in reproduction?
- How does the female and male reproductive system work?

SESSIONS 1-2:
FEMALE & MALE REPRODUCTIVE SYSTEM

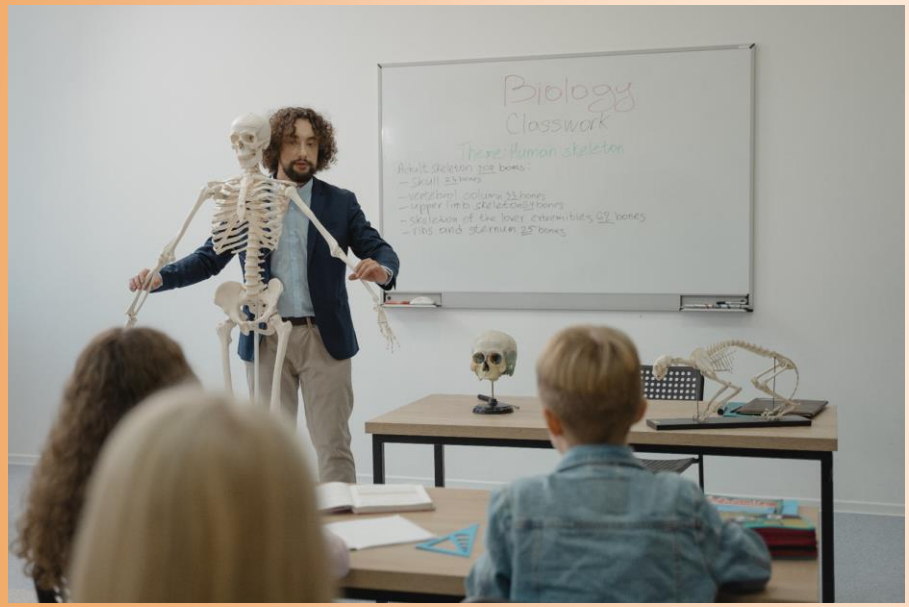
ORGANIZATION

- Groups of 4-5 students.

RESOURCES

- Reprohealth organkit
- Smartphone / video camera
- Open resources

SESSIONS 1-2:
FEMALE & MALE REPRODUCTIVE SYSTEM



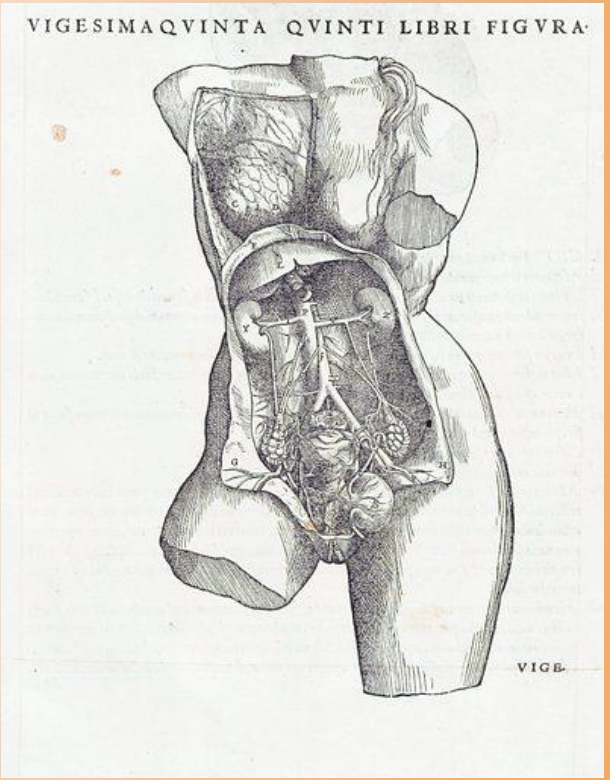
PROCESS OF WORK

- Explanation of the organkit contents
- Specific vocabulary
- Anatomical structures
- Functions

SESSIONS 1-2:
FEMALE & MALE REPRODUCTIVE SYSTEM

OPEN RESOURCES

- Female reproductive system pic (SPA)
- Male reproductive system pic (SPA)
- Female reproductive system video (SPA)
- Male reproductive system video (SPA)
- Gamets (ENG)
- Reproductive system anatomy quiz (SPA)



SESSION 3:
FERTILISATION, EMBRYO DEVELOPMENT & BIRTH

OBJECTIVES

2. Understand the physiology and function of the main organs in the reproductive system.

3. Assimilate new scientific vocabulary related to the reproductive system.

4. Identify the most common causes of infertility.

MAIN QUESTIONS

- Where does the development of the embryo take place?

SESSION 3:
FERTILISATION, EMBRYO DEVELOPMENT & BIRTH

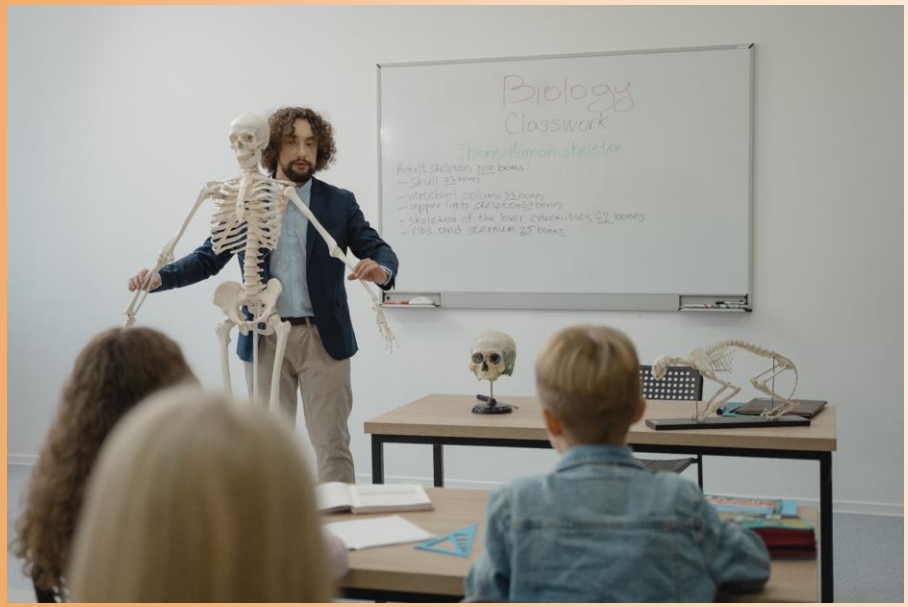
ORGANIZATION

- Groups of 4-5 students.

RESOURCES

- Reprohealth organkit
- Smartphone / video camera
- Open resources

SESSION 3:
FERTILISATION, EMBRYO DEVELOPMENT & BIRTH



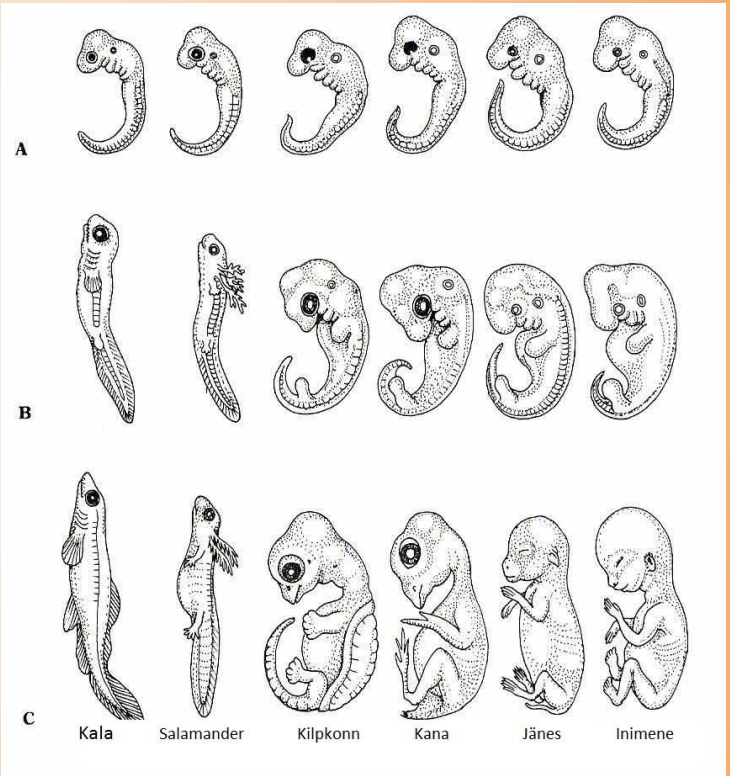
PROCESS OF WORK

- Explanation of the organkit contents
- Specific vocabulary
- Anatomical structures
- Functions

SESSION 3:
FERTILISATION, EMBRYO DEVELOPMENT & BIRTH

OPEN RESOURCES

- Fecundation picture (ENG)
- Embryo development picture (SPA)
- Stages in pregnancy picture (ENG)
- Human embryo video (ENG)



SESSION 4:
DISEASES OF THE REPRODUCTIVE SYSTEM AND ASSISTED REPRODUCTION TECHNIQUES

OBJECTIVES

1. Assimilate new scientific vocabulary related to the reproductive system.
2. Identify the most common causes of infertility.

MAIN QUESTIONS

- Which are the healthy habits related to the reproductive system?

SESSION 4:
DISEASES OF THE REPRODUCTIVE SYSTEM AND ASSISTED REPRODUCTION TECHNIQUES

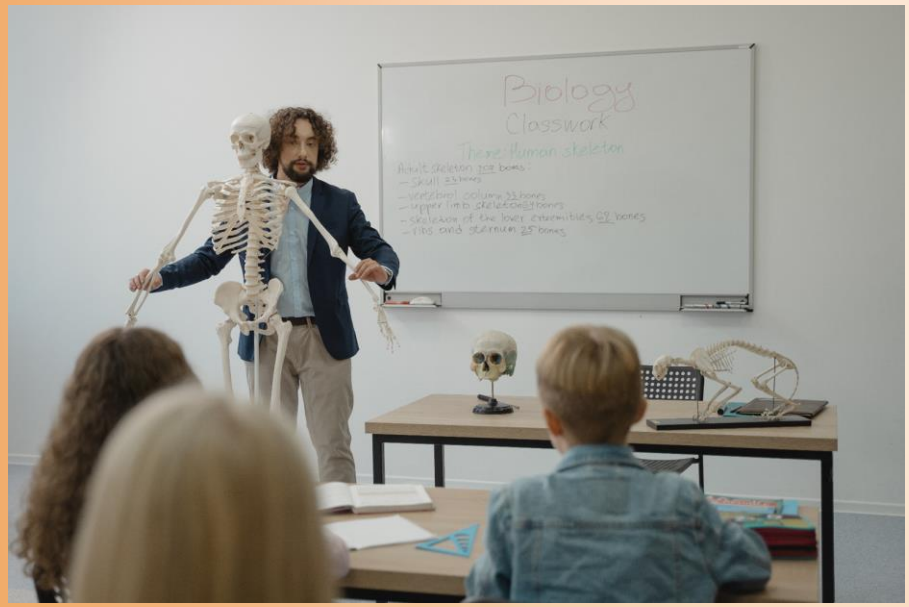
ORGANIZATION

- Groups of 4-5 students.

RESOURCES

- Reprohealth organkit
- Smartphone / video camera
- Open resources

SESSION 4:
DISEASES OF THE REPRODUCTIVE SYSTEM AND ASSISTED REPRODUCTION TECHNIQUES



PROCESS OF WORK

- Explanation of the organkit contents
- Specific vocabulary
- Anatomical structures
- Functions

SESSION 4:
DISEASES OF THE REPRODUCTIVE SYSTEM AND ASSISTED REPRODUCTION TECHNIQUES

OPEN RESOURCES

- Assisted reproduction techniques picture (ENG)
- Sexually Transmitted Diseases video (SPA sub ENG)
- HIV/AIDS video (ENG)
- WHO sexual health (ENG)

FINAL PRODUCT

VIDEO

- Resources: smartphone / video camera
- Students record a video in which they identify and explain the main organs involved in male and female reproduction.

PHYSICAL EDUCATION

PELVIC FLOOR MUSCULATURE USING EVA RUBBER

OBJECTIVES

1. Identify the main reproductive organs of the human being differentiated by binary gender.
2. Know the physiological functioning according to the muscle fibres and muscles of which they are composed.
3. Being able to recognise the pelvic floor
4. To experience the different toning exercises and their direct relationship with their improvement in terms of the physiological functioning of the reproductive organs.
5. To be able to generate specific models from the plastinated organs.

MAIN QUESTIONS TO BE ANSWERED

- What are the main human reproductive organs?
- What is their physiological functioning under normal conditions?
- What are the main pathologies of these organs in the presence of muscular hypology?
- What are the most recommended exercises to improve the pelvic floor?
- Would you be able to reproduce a muscular model of the pelvic floor?

GROUPS AND TIME ORGANIZATION

GROUPS

- The students will organize in groups of 4-5 people.

TIME ORGANIZATION

- The time will be organized in 3 sessions.

GROUPS AND TIME ORGANIZATION

TIME ORGANIZATION

1st session

- Presentation/explanation of reproductive organs and pelvic floor musculature.
- Practical implementation of the main pelvic floor strengthening exercises.

GROUPS AND TIME ORGANIZATION

TIME ORGANIZATION

2nd session

- Reproduction of the pelvic floor model based on the plastinated organs and using the 3D digital anatomical atlas model.
- Eva rubber will be used as a material to recreate the pelvic floor musculature.

GROUPS AND TIME ORGANIZATION

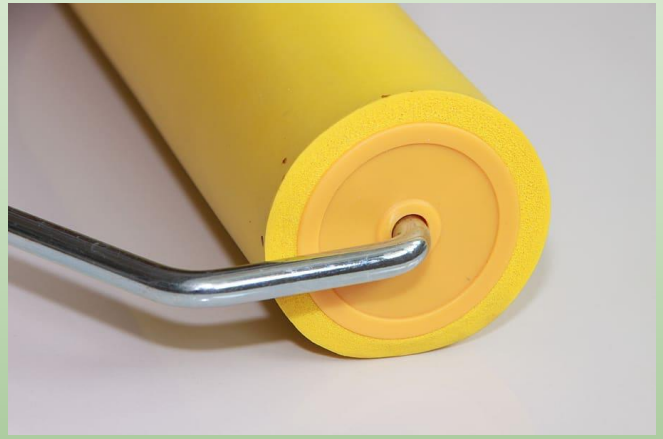
TIME ORGANIZATION

3rd session

- Each group will create a presentation of their pelvic floor model together with a practical explanation of the basic exercise sequence to achieve the proposed health objectives.

RESOURCES

- Organkits:
  Plastinated organs.
- 3D digital anatomical atlas model.
- Eva rubber.



ASSESSMENT AND EVALUATION

- Hetero Assessment rubric for the student-generated presentation template.

PROCESS OF WORK

- The plastinated organs are presented and the explanation is reinforced by using the 3D digital anatomical atlas to connect the content to the pelvic floor.
- The practical explanation of the pelvic floor exercises is followed by a practical explanation of the pelvic floor exercises.

PROCESS OF WORK

- The next step is to generate a real 3D model that connects the plastinated organs with the musculature generated with eva rubber.
- Finally, a presentation is created as a routine explaining the physical exercises for the improvement and/or maintenance of pelvic floor health.

MATHS

STATISTICS STUDY

OBJECTIVES

LEARNING UNIT 1: STATISTICS

1. To understand the importance of the statistical method in order to make choices and decisions.
2. To know how to carry out a statistical survey by identifying with certainty the relevant phases: reading, interpreting and ordering data.
3. To be able to graphically represent summarised data collected in the survey (by "hand" and using Excel).
4. To know how to analyse statistical distributions using position and variance indices (by "hand"and using Excel).

OBJECTIVES

LEARNING UNIT 2: BIRTH DATA STATISTICS ANALYSIS

1. To be able to read the demographic statistical data in order to interpret phenomena.
2. Interpret statistical data.
3. Detect consequences from statistical data.
4. To know how to analyse statistical distributions using position and variance indices (by "hand" and using Excel).

MAIN QUESTIONS TO BE ANSWERED

- Identifying real difficult situations that occur daily; questions on situations to be examined, data collection and tabulation of information.

GROUPS AND TIME ORGANIZATION

GROUPS

- ?

TIME ORGANIZATION

- Learning unit 1: 8 sessions

- Learning unit 2: 8 sessions

RESOURCES

- Educational videos.
- Supplementary multimedia material.
- Textbook and open Internet resources.

ASSESSMENT AND EVALUATION

Final product:

- Graphs and tables of social surveys
- Interviews with classes
- "Sample classes"

TIPS & TRICKS

Suggested contents:

LEARNING UNIT 1: STATISTICS

- Statistical survey
- Graphical representations
- Analysis of statistical distributions

TIPS & TRICKS

Suggested contents:

LEARNING UNIT 2: BIRTH DATA STATISTICS ANALYSIS

- Demographic indicators:
  - Birth rate
  - Life expectancy at birth
  - Infertility statistics data

PROCESS OF WORK

- Active learning.
- Project based learning.
- Interactive lesson.
- Debate.

HISTORY

WOMEN´S EMPOWERMENT AND MOTHERHOOD

OBJECTIVES

1. Planning, identifying links and relationships.

1. Collaborating and participating.

1. Communicating, acquiring and interpreting information.

1. Be aware of the historical evolutionary path that has led to a re-evaluation of the role of women in society.

MAIN QUESTIONS TO BE ANSWERED

- How has the role of women changed in our nation during the last century?

GROUPS AND TIME ORGANIZATION

GROUPS

- Students will work in groups of 4-5.

TIME ORGANIZATION

- 10 sessions

RESOURCES

- Multimedia Interactive Whiteboard.
- Plastinated organs (Reprohealth Organkit).
- Textbook / open source of information.

ASSESSMENT AND EVALUATION

- Students will be asked to debate the topic and create a slides presentation.

TIPS & TRICKS

Suggested contents:

- Kathe Schirmaker.
- 18th-19th century (Post-unification period in Italy).
- Urbanization post-WWII.
- The sexual revolution.

PROCESS OF WORK

- Introductory lesson
- Brainstorming on selected works
- Analysis of works in circle time
- Extrapolation of recurring themes
- Co-presence with the science teacher
- Multimedia work production

ENGLISH

THE VOCABULARY OF REPRODUCTION

OBJECTIVES

1. To enable students to recognize and learn in English the reproductive organs after biology lessons.

1. To learn vocabulary related to the reproductive system (male and female)

MAIN QUESTIONS TO BE ANSWERED

- What is reproduction?
- How does reproduction happen?
- Which are the reproductive organs?

GROUPS AND TIME ORGANIZATION

GROUPS

- Whole class (brainstorming & feedback)
- Pairs (matching flashcards game)
- Whole class (online game: quiz show)

TIME ORGANIZATION

- 2 sessions

RESOURCES

- Computer/ whiteboard/ blackboard
- Worksheet (true/false)
- Definition cards (flashcards)
- Videos: reproductive systems
- Organkit

ASSESSMENT AND EVALUATION

- Recognition of vocabulary
- Worksheet (true or false)
- Matching activity (word - definition)

ex: “testis - egg shaped organs where sperm is produced.“

PROCESS OF WORK

- 1st Session

- Brainstorming: Ask students to mention the key words learnt in the Biology lessons to translate them into English. Post them on the board at the same time they remember the vocabulary (Flashcards)
- True or False: The teacher will show the organkits to students and read aloud some statements about the process of reproduction and the reproductive systems. Students have to tick on their worksheets if the sentences are true or false. Once they have finished, the teacher collects the worksheets to be checked after the Quiz Show.
- Game: Quiz show : In turns, students answer the questions in groups of four.

PROCESS OF WORK

- 2nd Session

- Watching videos related to both reproductive systems focusing on the key words previously studied in class (female reproductive system / male reproductive system).

- Matching activity : face down cards with reproductive vocabulary and definitions. In pairs, the students have to match them correctly.

- Feedback: once the matching activity has finished, the teacher hands out the true/false worksheets done by the students the day before, so that each one corrects himself/herself the task as a feedback activity of the contents previously worked.

  - Students share their new results to the rest of their mates to check how well/badly they have acquired the different contents and vocabulary related to the reproductive systems.

ARTS

THE GESTATIONAL ANATOMY OF FRIDA KAHLO

OBJECTIVES

1. Create personal and creative works based on an original conception and design.
2. Apply the knowledge and rules of visual language.
3. Choose different techniques and materials in a functional way even with the integration of multiple media and expressive codes.
4. Master the main elements of visual language.
5. Read and understand the meanings of still and moving images, audiovisual movies and multimedia products.

GROUPS AND TIME ORGANIZATION

GROUPS

- ?

TIME ORGANIZATION

- 10 sessions

RESOURCES

- Multimedia Interactive Whiteboard.
- Plastinated organs (Reprohealth Organkit).
- Textbook / open source of information.

ASSESSMENT AND EVALUATION

Final product:

- Video.
- Oral presentation.
- Text production.

TIPS & TRICKS

Suggested contents to work on:

- Surrealism
- Naif Art
- Symbolism
- Frida Kahlo
- The Relationship between the work of Frida Kahlo and Freudian psychoanalysis
- The Gestational Anthology in Frida Kahlo

PROCESS OF WORK

- Introductory lesson.
- Brainstorming on selected works.
- Analysis of works in circle time.
- Extrapolation of recurring themes.
- Co-presence with the science teacher.
- Multimedia work production.

PROCESS OF WORK

- Reading the most significant works produced in ancient, medieval, modern and contemporary art, knowing how to place them in their respective historical, cultural and environmental contexts.

- Recognizing the cultural value of images, works and handicrafts produced in countries other than one's own.

PROCESS OF WORK

- Recognizing the main elements of the cultural, artistic and environmental heritage of its territory and is sensitive to the problems of its protection and conservation.

- Analyzing and describing cultural heritage, static and multimedia images, using the appropriate language.

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