**O3.2\_Framework of the lesson plan**

**Age group/class:** 13-15 years

**Lesson title: Plant Reproduction**

**School Discipline:** Biology

**Key concepts:**

***1. Exploring biological systems, processes and phenomena, with scientific tools and methods***

* Systematization of information from texts, films, tables, drawings, diagrams, used as sources for exploring biological systems, processes and phenomena
* Independent carrying out of some investigation activities based on worksheets elaborated by the students.

***2. Adequate communication in different scientific and social contexts***

* Contextualized interpretation of scientific information
* Exposing, within a group, the information presented in the form of models, graphics, texts, artistic products, with ICT means, using appropriately the terminology specific to biology

***3. Solving problem situations in the living world based on logical thinking and creativity***

Realizarea unor modele ale sistemelor biologice

***4. Manifestation of a healthy lifestyle in a natural environment conducive to life***

* Designing measures to maintain and promote a healthy lifestyle

**Aims:**

Following the activity, the student will know the main structural characteristics of plants in order to form notions of an operational nature, necessary to understand the reproductive mode of plant groups on an evolutionary scale, will practice their skills of public presentation, dialogue and coordination of others. , critical thinking, teamwork.

**Skills developed**:

During the activity each team will exercise the ability to recognize, compare and classify different types of plants using different identification criteria (avascular, vascular, talophytes, cormophytes, asexual, sexual), will present the types of reproductive organs for each group of plants , the floral elements in gymnosperms, will describe the flower in angiosperms, the functions of the flower with the mention of new structures that appear after fertilization;

* **Materials/Equipment needed**: puzzle with detached floral elements, fresh / preserved biological material, various types of flowers, fruits and seeds, video "Fertilization", video "Fruit formation", flipchart, collages, microscope, microscopic preparations,
* - information and image sheets (collages with muscle species, ferns, gymnosperms and angiosperms),
* - paper, pencils, markers,
* - computers, video projector,
* - internet access; books,
* - access to the school library or from the locality;

**Lesson plan:**

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| **Stages** | **Description of activity** | **Time** |
| **Preparation before the lesson** | The classroom is prepared for the beginning of the lesson, the materials are ordered.  You can opt for one of the options: biology laboratory within the High School of Informatics "Grigore Moisil" Iasi  Greenhouse Botanical Garden "Anastasie Fătu", USAMV Iași laboratories | 1 min |
| **Introduction** | The teacher is the one who will announce the topic at least two weeks in advance and will indicate a minimum bibliography, will form the groups of students for the four categories of plants Briophyte, Pteridophyte, Gymnosperms and Angiosperms.  Reproduction –general law of perpetuation of life.  Reproduction is an essential function of living matter that leads to the formation of new individuals.  THE CHALLENGE -;  INNOVATION -  RELEVANT LESSONS - | 2 min |
| **Initial Immersive Experience** | Watch the movie or observe the materials, recognizing the floral elements involved in the generation of fruit types or in the formation of the seed, the generation of spores  Sexual reproduction involves the participation of the reproductive organs that form gametes (female and male reproductive cells) that form the egg cell through fertilization.  (zygote) from which a new plant develops.  Asexual reproduction (without fertilization) can be achieved through specialized structures (spores) or vegetative organs. | 20 min |
| **Guided Immersive Experience** | I define plants  Recognize and categorize the plants in the images on the worksheet.  I define asexual and sexual reproduction  I define the term gymnosperms and angiosperms  I recognize, name, describe and assemble the floral elements from the received puzzle or from the biological material.  Observe the well-developed receptacle of the flower and the placement of the ovaries inside it.  Locate male and female gametes and describe fertilization by watching the video.  Identifies the newly formed organs after fertilization: zygote, fruit, seeds and the structures from which they arise.  I recognize the ovary as a formation that turns into fruit  Argues the importance of the appearance of the fruit and its role in the diet of plants called angiosperms | 17 min |
| **Follow up** | I define plants  Recognize and categorize the plants in the images on the worksheet.  I define asexual and sexual reproduction  I define the term gymnosperms and angiosperms  Recognize, name, describe, and assemble floral elements in Meet the following requirements:  -Name three terms / concepts from the Plant Reproduction lesson.  -Exemplify with two ideas / sentences the notions you would like to deepen related to this topic  -Specify a capacity / skill that you have acquired as a result of the teaching-learning activity. | 5 min |
| **Formative Assessment** | Students:  - They will learn ways to solve problems;  - They will develop their critical thinking because in the case of each one they will have to identify: the challenge, the innovation, the relevant lessons.  - They will practice their presentation skills in front of an audience, effective communication, team collaboration, leadership and creative skills;  They will continue the process of self-knowledge and knowledge of others.  - Bibliography necessary for data collection;  - Activity organization sheets containing the names of the students in each group, the tasks they have in the activity, the deadline;  - Activity observation sheets: presentation of relevant information, their relevance to the topic, team collaboration, participation in discussions (with the related score);  Formative assessment  - through oral questionnaires, systematic observation of students, self-assessment and inter-assessment based on completing the requirements of the worksheets.  - by using established methods of examining students (oral, written, practical).  - by using alternative evaluation methods (for example: papers, projects, portfolios, investigation, self-evaluation, inter-evaluation, etc.)  - use of ICT methods, techniques and tools | 5 min |