Co-funded by the European Union

STEAME TEACHER ACADEMY

*Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.*

# STEAME ACADEMY
# TEACHING FACILITATION LEARNING & CREATIVITY PLAN (L&C PLAN) - LEVEL 1
# STUDENT TEACHERS: Herbal Wellness

S T Eng A M Ent

## 1. Overview

| | |
|---|---|
| Title<br>Driving Question or Topic | Herbal Wellness<br>*1. What are some common herbs for wellness? Which parts of the plant are appropriate?*<br>*2. Which herbs are safe? Are there any potential side effects, allergic reactions, and any contraindications with existing medications.*<br>*3. How do some herbs interact? How chemistry helps to understand the interaction process?*<br>*4. Are any recommendations related to dosage, quality, and the source of herbs for wellness?* |
| Ages, Grades, …<br>Duration, Timeline, Activities | *Age selection 12-15* *Grades: 5-10*<br>*Number of learning hours: 4* *Timeline/frame, calendar: 4 x 50 min* *Number of activities: 4* |
| Curriculum Alignment | Plant anatomy<br>Plant taxonomy<br>Ethnobotany<br>Economic botany<br>Biochemistry and phytochemistry<br>Technologies / Biotechnologies |
| Contributors, Partners | *School partners, Herbal Wellness Enterprise* |
| Abstract - Synopsis | The objective of the HW - L&C Plan is to describe how student teachers can approach STEAME education to empower high-school students with entrepreneurial skills by establishing a sustainable Herbal Wellness (HW) business taking into account aspects like safety, quality, dosage, interaction and appropriate usage of herbs as supplementary sources for someone health. |
| References, Acknowledgements | There is a large volume of information on usage of herbs to support health aspects, common herbs, but also local herbs depending on geographical regions in the world. Here are some references:<br>1. Kerry Bone, The ultimate herbal compendium : a desktop guide for herbal prescribers, https://archive.org/details/ultimateherbalco0000bone, 2007 |

2. Andrew Chevallier, Encyclopedia of Herbal Medicine, 2016, http://repo.upertis.ac.id/1889/1/Encyclopedia%20Of%20Herbal%20Medicine.pdf,

3. KS1/KS2 Science: Parts of a plant, BBC Teach, https://www.bbc.co.uk/teach/class-clips-video/articles/zvdkpg8

4. S. Nanda, Integrating Traditional and Contemporary Systems for Health and Well-being, https://journals.sagepub.com/doi/10.1177/09727531231185648, 2023.

5. A guide to common medicinal herbs, https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=1&contentid=1169

6. James A. Duke, Mary Jo Bogenschutz-Godwin, Judi duCellier, Peggy-Ann K. Duke. Handbook of Medicinal Herbs, 2nd ed, 2002.

7. ***, Healing Remedies. A Holistic Approach to Health and Wellness. National Geographic, 2018.

8. Karimi A, Majlesi M, Rafieian-Kopaei M.Herbal versus synthetic drugs; beliefs and facts. J Nephropharmacol 2015; 4(1): 27-30.

9. Neeraj Jain. Survival and Scope of Herbal Products, International Journal of Scientific Research and Modern Education, Volume 4, Issue 1, pp. 32-37, 2019.

10. Lovepreet Kaur, Ajeet Pal Singh, Amar Pal Singh, Taranjit Kaur. A review on herbal cosmetics. Int J. Pharm. Drug. Anal, Vol: 9, Issue: 3, 2021; 196-201.

11. V. Chandini, N. Uday Kumar, T. Mounika Rani, K. Jahnavi Yadav, M. Siva, M. Kishore Babu. Herbal Cosmetics and Cosmeceuticals – A Review in New Technology of Cosmetology, World Journal of Pharmacy and Pharmaceutical Sciences, Volume 12, Issue 4, 930-951, 2023.

## 2. STEAME ACADEMY Framework*

| | |
|---|---|
| Teachers' Cooperation | Teacher 1 (Biology) cooperates with Teacher 2 (Chemistry) and Teacher 3 (Technologies) in the case of learning elements concerning the medicinal products obtained from herbs, their safety, quality and the appropriate usage for individual wellness.<br>*Work plan and steps with clear goals and activities between service and student teachers:*<br>Teacher 1 - is responsible to botanical aspects of herbs;<br>Teacher 2 - is responsible to chemical aspects when herbs interact when combined both with natural and chemical products;<br>Teacher 3 - is responsible for technical aspects of processing the parts of plants to ensure security of medicinal products under national/international regulations. |
| STEAME in Life (SiL) Organization | *Meeting with business representatives/Applications in real world Entrepreneurship – STEAME in Life (SiL) Days* |
| Action Plan Formulation | *Work plan and steps with clear goals and activities for student teachers. The following topics will be covered by teachers involved in project:*<br>*Teachers formulate some hypotheses about the medicinal herbs, their interaction and technical aspects in the context of botany, biochemistry and biotechnologies.* |

| | |
|---|---|
| | ***Activities of Teacher 1:***<br>1. *Adapt botany concepts for the grade level.*<br>2. *Explain Plant Life Cycles, the parts, and the economical value*<br>3. *Encourage observation and classification.*<br>***Activities of Teacher 2:***<br>1. *Adapt biochemistry concept for the grade level.*<br>2. *Explain the basic chemical components and the molecules to understand about alkaloids, glycosides, polyphenols, and terpenes. Discuss about flavonoids and their effects.*<br>3. *Encourage observation and experiment.*<br>***Activities of Teacher 3:***<br>1. *Adapt biotechnology concepts for the grade level.*<br>2. *Explain the role of biotechnologies for herbs, tools for quality control of herbal products and introduce students to the phyto-pharmacy field.*<br>3. *Encourage students to make a simple medicinal product and measure the basic characteristics.*<br>***Common activity:*** *Discuss the opportunity to design a new combination of herbs to increase the immunity of people. Design a strategy to promote the product in order to set up an entrepreneurial desire for students.* |

[*] *under development the final elements of the framework*

## 3. Objectives and Methodologies

| | |
|---|---|
| Learning Goals and Objectives | *Identification of goals or objectives using appropriate verbs, related or corresponding to competences (knowledge – skills - attitudes), what learner will be able to do after the project*<br>*Knowledge:*<br>1. *Name the main parts of plants.*<br>2. *Identify the part(s) of a specific plant to be used for wellness purposes.*<br>3. *Explain how to increase the positive effect of a combination of natural constituents obtained from plants.*<br>4. *Explain how to control the quality of a medicinal product based on plants.*<br>*Skills:*<br>1. *Generate medicinal products from plants*<br>2. *Differentiate between good plants and poisonous plants*<br>3. *Improve team working style*<br>*Attitudes:*<br>1. *Be aware of potential issues with herbal medicines.*<br>2. *Accept the potential of some plants to combine very well to increase the effect of conventional medicine.*<br>3. *Know about who should avoid herbal medicines and adopt an appropriate attitude to help.*<br>4. *Recognize the value of interdisciplinary study of herbs to support wellness and produce new drugs taking into account the power of some herbs.*<br>5. *Know about risks of buying herbal medicines online or by mail order.* |
| Learning Outcomes and expected Results | *Definition of Learning Outcomes using action verbs*<br>1. *Students will acquire knowledge about plants, their life, the chemical aspects of combining herbs and how to produce a medicinal product to support wellness.*<br>2. *Students will develop practical skills to classify plants, and to use appropriate biotechnology tools.* |

| | |
|---|---|
| | 3. *Students will gain new experience working with parts of plants and cooperating in order to design a medicinal product to improve the health state of people.*<br>4. *Students will be able to analyze the received information (from teachers, by searching on Internet, or by invited partners).*<br>5. *Students will be able to work as a team in new product development and product promotion to colleagues, community, on social media.*<br>*Expected results:*<br>1. *Every student will be able to create a portfolio on some category of plants/treatment etc.*<br>2. *The teamwork will be improved to participate with new ideas to create a medicinal product.* |
| Prior Knowledge and Prerequisites | *Prior experiences, knowledge and skills required by learners to bring with them to this learning experience*<br>***Students should have general knowledge in botany, chemistry. Depending on grade level different aspects will be considered including chemical formulas, chemical reactions, in order to prove the result of plants interaction.*** |
| Motivation, Methodology, Strategies, Scaffolds | *Teaching and learning strategies, approaches, methods, and/or techniques for achieving learning objectives (a project-based activity may help the competence development, or gamification, or other methods, etc.)*<br>*Instruction differentiation for students' needs (learning styles, multi-modal representations, roles to students etc.)*<br>*Active students' engagement, individual-team-classroom work, scaffolding techniques, etc.*<br>***To achieve the learning objectives, teachers apply an adapted strategy depending on the grade level, learning styles and the initial preparation. Appropriate methods will be used as teacher-centered learning, small group based learning, project-based learning, and inquiring learning.***<br>***Also the teaching strategies and the plan will be organized to support cooperative learning, experiential learning, and differentiation (some plants are good, other plants are poisonous).*** |

## 4. Preparation and Means

| | |
|---|---|
| Preparation, Space Setting, *Troubleshooting Tips* | *Procedures, spaces, and material preparation*<br>*Setting in classroom, outdoor activity, computer lab, hybrid environment, etc.*<br>***Classroom / Interdisciplinary laboratory***<br>***White boards and markers (Smart board if exists)***<br>***Double sided adhesive tape***<br>***Laptop per student/LCD projector*** |
| Resources, Tools, Material, Attachments, Equipment | *Instructional sources and digital material with the related references needed for the implementation of the learning plan*<br>Teachers will have appropriate learning resources such as presentations, video files, practical examples, and experimental kits established before.<br>- https://www.youtube.com/playlist?list=PLkRuW3pBo2U1L9HQwnhP77raYPlsxIs7L<br>- https://www.naturopathy-uk.com/category/herbal-recipes/<br>- https://landscapeplants.oregonstate.edu/scientific-plant-names-binomial-nomenclature<br>- Good Manufacturing Practices for Medicinal Products, https://www.youtube.com/watch?v=dS-dJYa-G1g |
| *Health and Safety* | Students and teachers work in a healthy and safe environment. |

## 5. Implementation

| | |
|---|---|
| Instructional Activities, Procedures, Reflections | *Brief and comprehensive description of the creative activities, tasks, or learning experiences (individual-team-classroom work)*<br>Teachers will plan their activities as part of the curriculum, along four activities of 50 minutes allocated to every activity. The planned time can be one day (for all activities). Other variants can be established by teachers from the beginning taking into account the students' opinion.<br>*Activity 1 (50min). The three teachers establish the working framework in order to address knowledge accumulation about basic concepts in botany, chemistry and technology.*<br>*Activity 2(50min). The three teachers supervise small groups (of 4-5 students) to solve some tasks like:*<br>- *Identification of a particular category of plants*<br>- *Selection of parts of plants (root, leaves, seeds etc) and identification of the processing technology in order to obtain a mixed composition. Depending on the availability of plants this activity is a practical one in the laboratory, or a simulated one.*<br>*Activity 3 (50min). The three teachers and students evaluate the composition taking into account the benefits, risks, and the potential impact on someone's wellness.*<br>*Activity 4 (50min). The three teachers and students cross validate the results of groups to exchange information, best practice and identify ways to develop a business oriented activity for herbal wellness.* |
| Assessment - Evaluation | *Assessment and formative evaluation processes and rubrics to measure the student's ability to perform what was described in the objectives*<br>A rubric will be used during Activity 4, to assess the satisfaction of students along the four activities. |
| Presentation - Reporting - Sharing | *Documents, outputs, artifacts, products produced by the students with references, web links etc., for sharing to media*<br><br>Conclusions should be presented and future ideas will be exchanged. |
| *Extensions - Other Information* | The findings during activities 2, 3 and 4 will be shared on the school website/social media. |

**STEAME ACADEMY Prototype/Guide for Learning & Creativity Approach**
Action Plan Formulation

*Major steps in the STEAME learning approach:*

## STAGE I: Preparation by one or more teachers

1. Formulating initial thoughts on the thematic sectors/areas to be covered
2. Engaging the world of the wider environment / work / business / parents / society / environment/ ethics
3. Target Age Group of Students - Associating with the Official Curriculum - Setting Goals and Objectives
4. Organization of the tasks of the parties involved - Designation of Coordinator - Workplaces etc.

## STAGE II: Action Plan Formulation (Steps 1-18)

*Preparation (by teachers)*

1. Relation to the Real World – Reflection
2. Incentive – Motivation
3. Formulation of a problem (possibly in stages or phases) resulting from the above

*Development (by students) – Guidance & Evaluation (in 9-11, by teachers)*

4. Background Creation - Search / Gather Information
5. Simplify the issue - Configure the problem with a limited number of requirements
6. Case Making - Designing - identifying materials for building / development / creation
7. Construction - Workflow - Implementation of projects
8. Observation-Experimentation - Initial Conclusions
9. Documentation - Searching Thematic Areas (AI fields) related to the subject under study – Explanation based on Existing Theories and / or Empirical Results
10. Gathering of results / information based on points 7, 8, 9
11. First group presentation by students

*Configuration & Results (by students) – Guidance & Evaluation (by teachers)*

12. Configure STEAME models to describe / represent / illustrate the results
13. Studying the results in 9 and drawing conclusions, using 12
14. Applications in Everyday Life - Suggestions for Developing 9 (Entrepreneurship - SIL Days)

*Review (by teachers)*

15. Review the problem and review it under more demanding conditions

*Project Completion (by students) – Guidance & Evaluation (by teachers)*

16. Repeat steps 5 through 11 with additional or new requirements as formulated in 15
17. Investigation - Case Studies - Expansion - New Theories - Testing New Conclusions

18. Presentation of Conclusions - Communication Tactics.

## STAGE III: STEAME ACADEMY Actions and Cooperation in Creative Projects for school students

**Title of Project: _____**
Brief Description/Outline of Organizational Arrangements / Responsibilities for Action

| **STAGE** | **Activities/Steps**<br>Teacher 1(T1)<br>Cooperation with T2<br>and student guidance | **Activities /Steps**<br>**By Students**<br>Age Group: ____ | **Activities /Steps**<br>Teacher 2 (T2)<br>Cooperation with T1 and<br>student guidance |
|---|---|---|---|
| | | | |
| A | Preparation of steps 1,2,3 | | Cooperation in step 3 |
| B | Guidance in step 9 | 4,5,6,7,8,9,10 | Support guidance in step 9 |
| C | Creative Evaluation | 11 | Creative Evaluation |
| D | Guidance | 12 | Guidance |
| E | Guidance | 13 (9+12) | Guidance |
| F | Organization (SIL)<br>STEAME in Life | 14<br>Meeting with Business representatives | Organization (SIL)<br>STEAME in Life |
| G | Preparation of step 15 | | Cooperation in step 15 |
| H | Guidance | 16 (repetition 5-11) | Support Guidance |
| I | Guidance | 17 | Support Guidance |
| K | Creative Evaluation | 18 | Creative Evaluation |