

LEARNING & CREATIVITY PLAN (L&C PLAN): STEAME in the work of entrepreneurs, scientists, artists

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1. Overview

Title	Projects for development of soft skills				
Driving Question or Topic	How do I conduct research, do analysis and summarize results in presentations and videos?				
Ages, Grades, ...	Ages 14-16	8th-9th grade			
Duration, Timeline, Activities	24 learning hours	36*40 minutes			1 project/team
Curriculum Alignment	Personal development and IT classes in 8 th and 9 th grades				
Contributors, Partners					
Abstract - Synopsis	Students are divided in teams of 5-6 in their classes of Personal development and do research on topics related to Science, education, arts, business, digital technologies. All teams go through three main phases in one school year – between October and June: do desktop research and analyze information; conduct interviews with matter experts; prepare final presentation with a video on the topic to present to their peers at school. The teams and topics are assigned by the main teacher of the subject Personal development.				
References, Acknowledgements					

2. STEAME Framework*

Teachers' Cooperation	Teacher 1 is the main teacher – in Personal development (soft skills) and/or Psychology who works in cooperation with the teachers: in Science and IT, Technology (IT, Computer Science). T1 provides the workplan, gives the foundational knowledge to students and assign main tasks for all teams starting with the division of teams and assigning one topic to each one of them: topics can vary, e.g.: Digital innovation, Innovation in education, Theater, Cinematography, Climate change, Innovative business, etc.
STEAME in Life (SiL) Organization	Teacher 2 is in Science – Chemistry, Biology, Physics. Teaching scientific elements and topics and guidelines for students how to conduct scientific research, bibliography quotations, references , credible sources of information. T2 supports the project work with questions and particular tasks aligned with the main plan and workflow provided by T1. S/he assists with guidelines and ideas about potential interviewees – e.g. academic professors, scientists, other experts. Teacher 3 is in Computer science/IT T3 works with the student teams to prepare their presentations and videos from technical point of view – provide guidelines about the existing tools,

software, approaches – PowerPoint, Google slides, Prezi, Storyboardthat, video making tools, comix creation tools, digital storytelling and other tools.

Action Plan Formulation

Stage 1 is preparatory actions by the teachers who work together led by the main teacher T1 who develops sample workplan with tasks, deadlines and topics aligned according to the curriculum of 8th and 9th grades. At this stage the assessment methodology is also developed – criteria and way of assessing students’ work including self-assessment. Students are divided into teams and each one has a specific topic to research and analyze.

Stage 2 is the implementation when students start their work with introduction to the topics and all teachers work in their classes and online to mentor the students with specific questions. Throughout the classes students research and analyze the topics to get further clarification.

Stage 3 is finalization when all teams prepare their final presentations in the Computer science/IT classes and Personal development classes.

Stage 4 is evaluation of the work. Each teacher follows the aligned evaluation methodology, i.e. evaluates the teamwork, the research and knowledge, the presentation and communication skills of students. Teachers in English language could also participate to evaluate the English language skills.

**under development the final elements of the framework*

3. Objectives and Methodologies

Learning Goals and Objectives

Upon completion of the class students should **know**:

- How to conduct research, draw insights, analyze data
- What are soft/non-technical skills
- What project work and how to lead and implement it
- Main terminology and key theoretical concepts in different topics

They should **be able to**

- Work in teams
- Lead a team
- Cooperate with their teachers in the relationship mentor-mentee
- Conduct scientific research
- Provide references
- Conduct interviews
- Arrange meetings, incl., planning the meeting
- Business communication
- Analyze data and prepare diagrams, graphs, Excel tables, etc.
- Prepare presentations and videos
- Apply creativity and generate new ideas
- Communicate in the team and in front of an audience

Learning Outcomes and expected Results

Expected **results**:

- Presentations with storytelling elements/videos/comix, etc.
- Analysis and research results
- Final conclusions
- Conduction of interviews
- Real application of the topics taught in their science classes

Prior Knowledge and Prerequisites

IT – Excel, presentation skills with PowerPoint, work with MS office, research and analysis.

Motivation, Methodology, Strategies, Scaffolds

The main differentiator in this Plan is the new subject taught at school – Personal development/soft skills development and the new role of teachers T2-T3 who guide and support the student teams on their work. Other approaches applied in the process are project- and inquiry-based learning. Under the new conditions of Covid-19 it can be easily adapted and be implemented as blended learning with flipped learning elements.

This is another innovative approach, used in the project which is a type of blended learning where students are introduced to content at home and practice working through it at school. This is the reverse of the more common practice of introducing new content at school, then assigning homework and/or project to be completed by the students independently at home¹. The plan allows individual work by each student when doing their research as the team leader divides the topic into sub-topics for each team member, then data analysis and preparation and organization of interviews for primary research followed by preparation of team presentations, video making, etc. It is a multi-modal approach and allows flexibility based on the student's learning style.

4. Preparation and Means

Preparation, Space Setting, *Troubleshooting Tips*

There is one leading Teacher 1 who is in Personal development, Psychology, Philosophy or another related subject. T1 leads the process as the classes are organized around the student projects on specific topics aligned with the topics of studies in science, business, IT, Arts, and more general ones. There are classes taught in the Labs – science, arts, IT and students work there. All student teams should have at least one PC/laptop/desktop. In addition teachers provide also online support in the mentoring process according to a work plan. Their support is very important to guide students in the organization of interviews with external experts.

Resources, Tools, Material, Attachments, Equipment

Tools to be used:

- MS office – Word, Excel, PowerPoint, mind maps, analytical tools,
- Citation Guide (<https://libguides.dixie.edu/>)
- Digital storytelling: www.storyboardthat.com , www.powtoon.com , www.pixton.com , www.canva.com, etc.
- Mind maps – www.miro.com, www.mindmup.com, www.mindmeister.com , venngage.com, etc.
- communication and collaboration platform - Google Meet, Google Classroom, Zoom, Skype, etc.
- e-learning platform – Google classroom, Moodle, other.
- Data analysis tools

Safety and Health

5. Implementation

Instructional Activities, Procedures, Reflections

This Plan is developed around the school classes in the subjects Psychology, Personal development, Philosophy and other as the leading teacher/class. It covers:

- i. Information Technology
- ii. Science
- iii. Entrepreneurship
- iv. Art
- v. Presentation and communication skills
- vi. English language

Teachers plan their activities on Google Calendar as part of the curriculum. T2-T3 follow their regular plans and includes examples and information and activities based on the field of research of the student teams.

Students are actively engaged through hands-on experience and research conducted as homework assignments which can be discussed in class.

The planned **24 learning hours** are based on a class of 40 minutes. All classes take place once a week with curriculum for 36 weeks in one school year.

¹ <https://www.teachthought.com/learning/the-definition-of-the-flipped-classroom/>

The lead teacher, T1 is engaged in all his/her classes in one school year, i.e. 36 classes of 40 minutes each.

- 4 hours introduction and preparation
- followed by 12 hours – implementation
- 4 classes work on presentations and video making
- 4 hours final presentations and feedback sessions which are organized in the last two weeks of the school year and presented to a jury involving T1, T2, T3 and English language teacher/s and all students from 8th and 9th grades.

T2-T3 align their activities with the implementation including interview guidelines and how to analyze data, citation and bibliography, develop diagrams/graphs, presentations and online surveys (Google forms, Survey monkey, etc.). They support the teams and provide feedback for their work and final results.

Assessment - Evaluation

The evaluation is done on the following scale:

- Self-assessment by team members (reflects the degree of critical thinking of each team member): from 0 to 100%, depending on the % of the total result achieved as an individual contribution
- Team assessment by the team leader and the main teacher T1: (reflects the opinion of the team leader and the teacher about the work of each team member: from 0 to 100%, depending on the % of each contribution to the overall team result
- Jury rating (depending on the ranking): from 0 to 100%
- Assessment in English by the teacher/s for the English language of the presentations – this represents annual oral exam of students in their English classes
- Bonus assessment (set at the teacher's discretion: from 0 to 100%).

Presentation - Reporting
- Sharing

The presentation of the final results is done in front of: a jury of T1, T2, T3, peers in grades 8th and 9th, English teachers, the interviewees, i.e. the external experts, parents.

*Extensions - Other
Information*

All videos and presentations are uploaded on the school website and publications in social media. The projects can be further developed into case studies and students and teachers use them in their classes as learning materials and/or develop them further as projects.

STEAME Prototype/Guide for Learning & Creativity Approach Action Plan Formulation - Steps provided by Kypriaki Mathimatiki Etaireia

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:
 - a. Research and analysis of data
 - b. Presentation and communication skills, tools and methods
 - c. Digital storytelling
 - d. Preparation of online surveys and questionnaires
 - e. Ethics of science
2. Engaging the world of the wider environment / work / business / parents / society / environment/ ethics
The project- and inquiry-based learning is organized around student projects based on fined topics. The projects include research and data analysis, conducting interviews with matter experts – i.e. scientists, entrepreneurs, including local ones who can be involved in the process with interviews, brief presentations, discussions, participation and evaluation at the final presentations, etc.
3. Target Age Group of Students - Associating with the Official Curriculum - Setting Goals and Objectives
The plan allows for involvement of students in Grades 8-9.
4. Organization of the tasks of the parties involved - Designation of Coordinator - Workplaces etc.
T1 is the teacher in Personal development, Psychology, Philosophy. S/he provides the main case study/topic of work of the students and provides organizational guidance to the other teachers T2-T3 including strict workplan, tasks and monitoring. The classes can be done both online and in the classroom.
T2 is teacher in Science – Biology, Chemistry, Physics – providing guidance in terms of scientific research approach, methods, and provide knowledge about the specific examples, analysis of the work of the team assigned, including terminology and theory to be considered in the research; bibliography, citation rules and sources of credible information; guidance for analysis of data. Classes are conducted in the Science Lab.
T3 is teacher in Computer science/IT fields. S/he prepares students how to analyze data, use Excel incl. formulas, diagrams/graphs, online surveys and questionnaires, etc. for statistical analysis and technical tools for development of presentations. T3 conducts classes in the Computer lab. The main task of T3 is to broaden the scope of presentation preparation beyond PowerPoint and Google slides and include also tools and software for video making.

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

Preparation (by teachers)

1. Relation to the Real World – Reflection

Students are engaged in a project to apply their knowledge and skills in the real world examples around a common topic. Students work in team as in the real work environment.

2. Incentive – Motivation

Students work in teams of 5-6. According to the criteria they can compete for the first place. They receive additional recognition by the T1 and/or the school as Certificates, extra-

curricular work they conduct, etc. This L&C Plan allows for organization of final competition among all teams and/or different classes. Part of the work process is establishing contacts with successful and popular people in interviews and common discussions.

3. Formulation of a problem (possibly in stages or phases) resulting from the above

Defining the main topic can be defined either by the group of teachers involved in this plan and/or by the students themselves. It is necessary to define criteria for selection – e.g., popularity, success, fields of interest, interesting facts, news, attractive trends for students, etc. It needs to be interesting and appealing to students and their age. At the same time the topic should be broad enough to allow division of sub-topics and decision making by the teams to focus on narrow areas and trends within the broad topic – e.g. Innovative education can include research, selection and analysis of existing best practices among schools worldwide for innovative approaches and new ways of teaching including trends in Asia, North America, Europe, etc.

Students in general are more creative, they look for information online via different channels/platforms/media and can define the topic themselves, guided by their teachers. This approach is suitable for 9th grade when they have some experience assuming they work on projects in 8th grade, too. This however should be a well-structured and guided process as they work in teams and the topic should allow division of sub-topics.

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

4. Background Creation - Search / Gather Information

Students learn about the key success factors and concepts of work, incl. entrepreneurship and development in the specific fields. The main information is taught in class with the theoretical part, and then additional research is conducted online and via interviews. Some additional knowledge should be conveyed to them as well – e.g., how to contact people by email and/or phone, how to conduct interview, how to generate questionnaires for surveys, how to analyze data, what is an insight, etc.

The role of all involved teachers is to teach them how to find the credible sources, too.

5. Simplify the issue - Configure the problem with a limited number of requirements

After the initial definition of the main topic for the work of students the team guided by the T1 defines more specific sub-topics which are then assigned to each team member to start research and then combine all findings and summarize the information to start structuring and planning the presentations and the videos related to the topic – thus there are at least six teams of 5-6 students within the following aspects/sub-topics:

- Science
- Technology
- Entrepreneurship

The definition is broad enough to give freedom to students to develop their own research plan and main goals. The minimum requirements are related to the development of: online survey, desktop research, processing of the survey results, visualization of key findings and drawing conclusions, interviews and making a video. All of the above is structured in a presentation of two main parts – presentation with information and images, infographs, etc. and a story told in a video and/or comics.

6. Case Making - Designing - identifying materials for building / development / creation

All student work in teams. T1 provides general guidance and introduction to the projects in the first 2-3 classes in subject Personal development. During the first five classes teams should be formed by various tools like exercises, leadership style tests, personality tests, games, etc.

Teams are formed by students and led by pre-defined leader who is their peer. Teachers 1-3 provide in-class and extracurricular distance (online) support. All teams follow the same working process but in different sub-fields: preparation on the subject, initial desktop

research, online survey, analysis of survey results, further research, interviews, preparation of a presentation and video.

7. Construction - Workflow - Implementation of projects

During the implementation of projects students follow their action plans approved by the main teacher T1. Each plan should include desktop research, collection and analysis of responses to online survey, key conclusions and insights presented in final team presentations. The main content is developed within the sub-area defined at the introduction and preparatory stage.

8. Observation-Experimentation - Initial Conclusions

Student teams take part also in field trips organized by their teachers to a certain place, organisation, business – e.g., a company, theater, museum, cinema, etc. from professional point of view to observe how the process is organized, how people do their jobs, etc. In their classes they do different games, exercises, examples and theory. Students observe the processes and main concepts, then generate their own research which includes desktop research and online surveys. Depending on the topic defined it may include also conducting focus groups with peers and partners and parents. Final results are accumulated and visualized in a presentation and a video/story.

9. Documentation - Searching Thematic Areas (STEAME fields) related to the subject under study – Explanation based on Existing Theories and / or Empirical Results

Students work together in their teams supported by T1, T2, T3 to validate the findings of the research. The models that are used for data analysis and main findings for the final presentations are aligned with the studies in 8th and 9th grades. Most common tools are based on MS Excel with focus on visual representation and use of graphs. In terms of science, simple experiments and knowledge are applied so that students can draw conclusions for the application in real life and work related to the topic they are working on – e.g., one of the popular and attractive topics is climate change and sustainable lifestyle. The method of flipped classroom can be applied here as students work at home to review the theoretical content and then discuss in class and/or in their teams and ask relevant questions for further clarification and application in their projects.

10. Gathering of results / information based on points 7, 8, 9

The main challenge in gathering accurate results is the source of information and the target groups for the online questionnaires that are distributed mainly in the existing networks in social media of students and mentors. Part of the process is the credibility of the source for the desktop research, which is covered by all teachers and mainly the ones who teach science. They provide guidance and monitor the process – e.g., what is the average age, area of expertise, geographic area, gender, etc.

11. First group presentation by students

There are several presentations which mark the milestones in the work of the teams:

- One for the findings of the desktop research
- One based on the online surveys and the collection of answers, analysis and visualization.
- Semi-final with information gathered by the interviews
- Final two-part presentation with slides and video.

Important part is the synthesis of all information and the ability to prepare graphs and comparisons – e.g. technologies and processes in the past and present days. Another important aspect is the impact on business development when working on topic related to business and entrepreneurship.

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

12. Configure mathematics or other STEAME models to describe / represent / illustrate the results

Besides mathematical/statistical and scientific models, the presentations and analysis should include some financial analysis in terms of costs, revenue, profit and financial forecast. In their Math classes further clarification can be provided in terms of models for analysis and data bases.

13. Studying the results in 9 and drawing conclusions, using 12

Students work actively in steps 4-9 but the role of mentors is critical for their argumentation, main conclusions and validity of results. The models that are applied should be relevant to their grade/age and experience. Main aspect of evaluation and success factor is their understanding for the real-life applications and practical use of the results. This is supported by the videos that they should prepare which proves how they perceive the knowledge gained in class.

14. Applications in Everyday Life - Suggestions for Developing 9 (Entrepreneurship - SIL Days)

The research of topics can lead to direct application to other fields and businesses. Their projects can be leveraged and developed further in 10th grade with work with business owners, managers and employees who provide their cases to be solved in the Entrepreneurship classes. The role of T1 here is important. The challenge can be related to finding the right challenger and/or organisation to work with. It is also key success factor to select the most suitable expert to interview.

Review (by teachers)

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

The main findings of students are structured in sub-areas and specific topics that they should identify to find the main problem and then provide recommendations. Teachers act as mentors and monitor if and how the topic is approached, researched and analyzed.

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

As described in step 14 the projects can be extended to draw conclusions and compare results with real companies and/or other organisations who agree to work with students on defined challenge to test new approaches and ideas, e.g. how the approaches of successful people/companies would affect their business.

18. Presentation of Conclusions - Communication Tactics

The final presentations should consist of two main parts:

- Presentation with key findings, recommendations and conclusions with graphs, images, etc.
- Video telling a compelling story that complements the presentation and the main topic
- Preparation of tables, spreadsheets, graphs, etc. to represent analysis of answers from the online questionnaires.
- Use of social media and e-learning platforms for communication with the teachers and in the teams.

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

Title of STEAME Project : _____

Brief Description/Outline of Organizational Arrangements / Responsibilities for Action

STAGE	Activities/Steps	Activities /Steps	Activities /Steps
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	Teacher 1(T1) Cooperation with T2-T3 and student guidance	By Students Age Group: 8 th - 9 th grade (13-15 years old)	Teacher 2 (T2) Cooperation with T1 and 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) STEAME in Life	14 Meeting with experts	Organization (SIL) 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