

STE(A)M IT

INTEGRATED LESSON PLAN TEMPLATE

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Title

Little Meteorologists

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Summary

This learning scenario will address the topic of meteorology. Climate change and its consequences in Europe and the world will be discussed. Students will be asked to search for information online. In addition, they will study and record weather elements (i.e. temperature) within a month. They will participate in activities that include statistics, reading, charting, and presenting information through drawings and posters.

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Subject (s)

Please list in detail the subjects taught in this lesson and briefly explain why specific subjects and teachers were chosen, including the link of the non-STEM subjects and their use in improving the lesson.

STEM subject: Geography (important to introduce, define and understand what climate is, what changes it, why does it differ in different parts of the Planet; what is water cycle and why is it important; what is meteorology and why is it important in tracking climate change)

STEM subject: Mathematics (emphasis will be on statistics to present the need of information and their analysis as the main feature showing climate change before it impacts nature and its diversity)



STEM subject/non STEM subject: Language and Art (discuss the meaning of water circle; distinguishing the states of water in nature; understand the role of man in environmental sustainability with an emphasis on water conservation)

Real- life questions

What is the difference between the weather and the climate?

What do you think affects weather? What does affect climate?

Where do all the weather changes occur? Give an example.

What is wind, what are precipitations and how do they form? Why are they important? – give examples

How does the climate affect the planet?

What can you do to solve this problem?

Can you find the information you are looking for online?

Can you present the information found?

Can you present information using visual tools?

Aims of the lesson

Knowledge application (students are expected to demonstrate sound understanding of how the selected subjects are used and linked between them).

Overall Teaching Objectives

- *Students learn how to search for useful information online*
- *Involving students in multidisciplinary activities*
- *Presenting information in diverse ways*
- *Enrich students' vocabulary with words relevant to climate, meteorology ...*
- *Develop critical thinking*
- *Teamwork and collaboration*

GEOGRAPHY:

Defining and understanding what climate is, what changes it and why does it differ; show the importance of water cycle and meteorology in tracking climate change.

MATH:

Showing the need of information and their analysis as the main feature showing climate change before it impacts nature and its diversity.

LANGUAGE AND ART:

At the end of the activity, students will:

- *understand the meaning of water circle*
- *know how to distinguish the states of water in nature,*
- *understand the role of man in environmental sustainability with an emphasis on water*



conservation

- *learn to use AI resources in the classroom using a variety of tools.*

Connection to STEM careers

How the skills developed by this lesson connect to existing and perspective STEM careers. Students are expected to demonstrate (while working in groups or other) how the chosen subjects are linked to STEM careers and list some potential career paths.

It is expected that students will gain specific skills related to the most relevant careers of tomorrow in science, technology, engineering, and maths, such as: mathematician, environmental engineering technician engineer, meteorologist, research analyst, and/or statistician, etc.

Students will implement inquiry and mathematical skills throughout the learning scenario, they will practice critical-thinking and improve their creative writing skills by writing their own report or article based on scientific data.

Age of students

12 years

Time

Preparation time: 2hours

Teaching time:

- **Preparation: 30 minutes**
- **STEM Subject 1: Geography 2.5 hours**
- **STEM Subject 2: Mathematics: 1 hour**
- **STEM Subject 3/non-STEM subject: 2 hours**

Teaching resources (material & online tools)

Materials:

- *Teaching resources*
- *PC/laptop/tabet*
- *Paper*
- *Coloured pens and pencils*
- *Glue, scissors*
- *A book with poem "A Drop of Water" by Johan Wolfgang Goethe*
- *Worksheets*



- *art paper*

Online tools:

- *Office365 (Sway, Word, PPT, Excel)*
- *Wizer.me*
- *Wordwall*
- *Meteo.hr*
- *YouTube*
- *Climatecharts*
- *Climateandweather*
- *Learningapps*
- *Musiclab*

21st century skills

Critical thinking: *students will explore ideas, reason with, and consider other points of view*

Creative thinking: *students will generate ideas and complete projects, learning how to respond creatively to a challenge*

Collaborating: *students will complete activities while working in pairs and groups*

Communicating: *students will work in teams and will exercise their reading, writing, speaking and listening skills in order to engage in productive discussions and achieve common goals*

Information literacy: *students will seek for information online and use a wide variety of tools, such as websites and applications*

Media literacy: *while looking for information online, students will learn how to analyse and choose the appropriate resources*

Technology literacy: *students will conduct research on their assigned image and data and filter the available information*

Productivity: *completing the assigned tasks, students will develop the ability to meet the targets*

STEM Strategy Criteria

Please indicate which Criteria correspond to the specific learning scenario, contributing on a broader scale to the development of a STEM School strategy, and briefly explain how did you use or applied the specific Criterion. For a more detailed overview and description of the Elements and Criteria for a STEM School strategy, please visit: <https://www.stemschoollabel.eu/criteria>

Examples:



Connections >> With industry: in the context of this learning scenario, a school visit to a Three Rs research center will be scheduled, either physically or virtually, so students can directly discuss with professionals about the recent developments in the field.

Interdisciplinary instruction: in this learning scenario, we will examine and implement a variety of activities in a wide spectrum of subjects, ranging from ethics and philosophy (non-STEM) to biology and chemistry (STEM).

Elements and criteria	How is this criterion addressed in the learning scenario
Instruction	
Personalization of learning	
Problem and project-based learning (PBL)	<i>Acquiring data and making charts - analysis</i>
Inquiry-Based Science Education (IBSE)	
Curriculum implementation	
Emphasis on STEM topics and competencies	
Interdisciplinary instruction	<i>We will examine and implement a variety of activities in a wide spectrum of subjects – geography, math, art and language</i>
Contextualization of STEM teaching	
Assessment	
Continuous assessment	
Personalized assessment	<i>Team-members assessment</i>
Professionalization of staff	
Highly qualified professionals	
Existence of supporting (pedagogical) staff	
Professional development	
School leadership and culture	
School leadership	
High-level of cooperation among staff	
Inclusive culture	
Connections	
With industry	
With parents/guardians	
With other schools and/or educational platforms	
With universities and/or research centres	
With local communities	
School infrastructure	
Access to technology and equipment	<i>Wi-fi access in school, tablets for each student</i>
High quality instruction classroom materials	

Lesson Plan

The implementation of integrated STEM teaching and learning is facilitated by the use of specific pedagogical approaches (PBL, IBL, etc). In order to facilitate the research done by the teachers and the



design of activities by teachers, a selection of such approaches is presented in Annex 1. Maintaining Annex 1 in the Learning Scenario and citing where necessary is mandatory.

Name of activity	Procedure	Time
PREPARATION		
Brainstorming and discussion	The teacher introduces the students to the topic and then plays a video on climate change (https://youtu.be/-D_Np-3dVBQ). After that, the teacher and students discuss the content:	10'
Discussion and preparation for the next lesson	Talk to students: What do you think about the video? How do we treat our beautiful Earth? What can we do to change things? What "little" things can we personally do to change things? Students on Padlet write their impressions.	20'
1ST Lesson		
STEM Subject 1	GEOGRAPHY	
STEM Subject 1	LEARNING OUTCOMES: • Explain: how climate modifiers affect climate elements by using ICT and maps • Analyse: Causes and effects of atmosphere circulation giving examples on the local area • Create: meteo-charts and how to create weather forecast 1. ACTIVITY Teacher talks to students and shows PPT 1_Vrijeme i klima.pptx Students define the difference between climate and weather, they discuss what affects them and why do they differ in different parts of the planet. Where do all the weather changes occur? What is water cycle and why is it important They give rel-life examples. Students are divided into teams and their task is keep notes all the time during the lesson. They need to find and analyse the appropriate thematic map in the atlas and in the textbook according to the teacher's instructions.	30'



Name of activity	Procedure	Time
	2. ACTIVITY Each team answers the question what the difference between climate factors and elements is and they explain the influence of certain climate factors on climate characteristics by reading the text on the following https://www.climateandweather.net/global-warming/factors-that-influence-climate/ They will be given an example chart to practice - they need to fill in the gaps. All students check if the task is done correctly before they move on The following task is to analyse climate charts in teams - https://climatecharts.net/ Each team is given one continent. They need to analyse one climate chart on that continent. They make notes in teams. 3. ACTIVITY Teacher shares another PPT 2_Temperatura zraka i tlak zraka.pptx 3_Vjetrovi, vlaga, naoblaka i padaline.pptx which address the climate elements needed for the weather forecast. They answer what meteorology is and why is it important in tracking climate change. Teams discuss what the wind and precipitations are and how they are formed; Why are they important? They give examples. All this is done in teams. 4. ACTIVITY Students watch the video https://youtu.be/O7I7lgFv5NU Teams have to create their own weather forecast for any town in Croatia using data from https://meteo.hr/	30' 30' 45'



Name of activity	Procedure	Time
	They also must present all their former group-work to others in the form of PPT or Sway and upload it on Padlet which will be later used also by Math teacher. 5. ACTIVITY EVALUATION (team self-evaluation) AND ASSESSMENT (formative) Links given in the Assessment section.	15'
Learning products	<i>If you wish to share more materials that complement the text, please include them in the Annexes section and refer to them in this section as well.</i> Students make their own weather forecast and presentation about the acquired knowledge.	
2 ND Lesson		
STEM Subject 2	Mathematics	
STEM Subject 2 Teacher’s presentation using projector, screen and graphics tablet and discussion; students analyse data	Using a projector, screen and graphics tablet, teachers present to students the changes in temperature in the three countries over the last 10 years. The presentation must contain statistical data that students will need to use to create bar and line charts. Students will be divided into groups of 4 students and will create multiple charts.	60'
Learning products	Poster containing all the data as found and analysed by the students.	
3 RD Lesson		
STEM Subject 3/non-STEM subject	Language and Art	
	1. Activity We will start the activity with association game (snow, rain, clouds...) After that we continue by showing videos and listening carefully.	10'



Name of activity	Procedure	Time
	https://www.youtube.com/watch?v=yjbpwlqp5Qw&feature=kp Students will try the same. After announcing to them that we are going to talk about water today and the importance of water I ask them a riddle. They play in pairs on tablets. https://learningapps.org/watch?v=pvrq1re2a19 This is followed by a reading of the poem "A Drop of Water" by Johann Wolfgang von Goethe and an analysis of the questions in digital book on Mozaik education platform. I give the students the task to imagine that they are a drop of water and live in a cloud. In the form of a composition, they must tell what has been going on on the trip. At the end students reading their essays. 2.Activity I ask to imagine how the sound of water, the gurgling of water in the mill, the falling rain would sound... The students work in pairs then and use the applications to create "water" music. https://musiclab.chromeexperiments.com/Experiments We will have a classroom concert. 3.Activity The last activity is planned for art. Students will make a poster about water in nature with water colours and write an eco message. Firstly, they will talk about environmental and ecology and how we can contribute to the development of the environment. At the end of the activity, we will make a class exhibition of their works.	10' 35' 20' 45'
Learning products	<i>Lesson activities should include scientific methods such as watching and exploring, formulating, and seeking answers to questions, making systematic observations, Students are given opportunities to state their arguments and present their analyses and conclusions. They will also be given the opportunity to use tablets and computers. They will present their findings in music and art on posters.</i>	



Assessment

- Compilation of students' impressions on a Padlet
- Online research assignment
- Creation of visual elements that will make up the poster
- Responses given to the online feedback form
- Team – self evaluation

The assessment is to help students take greater responsibility for content. The main assessment will concern students' contribution during teamwork which reveals their level of participation and understanding the process. The LearningApps game are used to verify the acquisition of new scientific knowledge and of the other disciplines involved in the project. Group evaluation about art works gives them opportunity to have their own opinion. All that can also be used to assess students' knowledge.

They will also be given a rubric in order to evaluate the work of their team-members in order to raise awareness of the importance of the high effort of every team member in order to succeed.

Initial assessment

Lesson 1: Pictures – initiating brainstorming

Lesson 2: Discussion

Lesson 3: Association games (water, cloud, rain, snow...)

Formative evaluation

Lesson 1: Discussion, quiz questions <https://wordwall.net/hr/resource/5530920>

Lesson 2: Poster

Lesson 3: Brief discussion, answers to questions, quiz on Learning Apps

Final assessment

Lesson 1: Worksheet <https://app.wizer.me/preview/81U3O1> (teacher preview link)

Lesson 2: Posters

Lesson 3: essay about The journey of a raindrop, art work- poster with ecology message

Student feedback

Geography: They will take part in discussion and brainstorming – it is important to keep them highly active by triggering them with real-life questions. [Team-self evaluation rubric.](#)



Math: Students will be content when they learn what to do with the data and how to create their own material (tables and diagrams) for analysis.

Language and Art: The method with which my students give me feedback of lessons are: work in Music Lab, essay about water and artwork poster, participation in the discussion.

Teacher feedback

The teachers are expected to provide feedback on how the lessons were received and implemented.

Geography: After the lesson it is expected for students to be able to apply the knowledge in fulfilling the task given by Math teacher. They will be able to understand the importance of acquiring data and analyzing it in order to discuss ways of saving the planet Earth.

Math: Students will be able to create charts and analyze them. This will lead to better understanding of the environmental process that affects climate changes.

Language and Art:

An excellent indicator of how much the students understood the material being processed in essay about clouds and water and at the end through poster.

