



LEARNING UNIT PLAN

DALFYS

DATA Literacy competences For Young students towards STEAM education
2020-1-IT02-KA226-SCH-095305

Title	Digital Skills in Understanding the Laws of the Electrical Circuit (Ohm's Laws)
Outcome	<p>Developing digital content (on Google Classroom and creating a website) where the following content could be found:</p> <ol style="list-style-type: none"> 1. Method of determining the value of electrical resistance. The study of the current-voltage characteristic. 2. Electrical circuit construction kit (https://phet.colorado.edu/en/simulations) 3. Theoretical notions (PowerPoint presentations)
Target (indicate the age of students)	16-17 years old
Pre-requisites (indicate what students should know before starting this learning unit contents)	<ul style="list-style-type: none"> • Knowledge of the characteristic elements of an electrical circuit. • Knowledge and understanding of the quantities characteristic of direct current • Knowledge of equipment in the physics laboratory • Knowledge of safety rules in the Physics lab • Knowledge of how to use the Microsoft package
Period of application (indicate when you start and when you end the learning unit)	October-November 2022
Assessment (how does this lesson relate to	Process evaluation: journal, portfolio

assignments/homework/readings	Product evaluation: building a website
Goals of the unit	Determining the electrical resistance of an electrical circuit, making graphic interpretations of the elements characteristic of a circuit, making presentations and scientific reports on Classroom/website.
Competence/s	<p><i>Discipline-specific competences (Physics)</i></p> <ul style="list-style-type: none"> • Understanding and explaining some physical phenomena, some technological processes, the functioning and use of some products of the technique encountered in everyday life • Experimental and theoretical scientific investigation applied in physics • Protecting oneself, others and the environment <p><i>DALFYS competences</i></p> <p>• Digital content development</p> <p><i>Knowledge:</i></p> <p>The learner...</p> <ul style="list-style-type: none"> • knows how to select digital content. • knows how to develop digital content. • literacy and the related competencies. • has a positive attitude towards copyright and licenses of digital content • knows how to integrate and re-elaborate digital content. • has knowledge of how copyright and licenses work. <p><i>Skills:</i></p> <p>The learner is able to deal with...</p> <ul style="list-style-type: none"> • media literacy. • Internet literacy • digital resources literacy • copyright and licenses literacy <p><i>Attitudes:</i></p> <p>The learner...</p> <ul style="list-style-type: none"> • is proactive and motivated to create and edit digital content in different formats. • is willing to critically analyze the information in order to determine its relevance, suitability and reliability. <p>values media</p> <p>Teamwork: Collaboration</p> <p><i>Knowledge:</i></p> <p>The learner...</p> <ul style="list-style-type: none"> • knows that communication skills are needed in the

digital environment, as in any other field.

- knows the importance of interactivity in the process of acquisition and development of data literacy skills.
- knows how to intermingle collaboration, research tools and critical thinking in order to get effective solutions to problems/ specific tasks in a creative online environment.
- knows how to transfer the most effective interactive problem-solving strategies to various other digital environment contexts.

Skills:

The learner is able to...

- create effective communication-based strategies for solving problems/ specific tasks involving data literacy skills.
- actively get involved in collaborative activities which require good communication and digital skills, as well as creativity, critical thinking and mastery of research tools in an online environment
- continuously enhance their data literacy skills level by perfecting their communicative digital work strategies.
- transfer these communication-based strategies to various contexts related to school, work and life.

Attitudes:

The learner...

- is open to the concept of communicative solving of data literacy tasks.
- is curious and interested in acquiring and enhancing communicative digital work strategies.
- is willing to transfer these strategies to various contexts.

Problem solving

Knowledge:

The learner...

- knows if there is a problem.
- knows different problem-solving techniques or knows who or what to address in case of a problem.
- knows how to transfer problem-solving knowledge to other situations and challenges
- knows which resources can be used to come to a solution

	<p>Skills: The learner is able to...</p> <ul style="list-style-type: none"> • define the concrete problem and its background. • analyze the problem situation • recognize when a problem has no immediate solution • plan and reason towards solutions to the problem • discover new, complex solutions by themselves • apply problem-solving techniques <p>Attitudes: The learner...</p> <ul style="list-style-type: none"> • feels that problem-solving competences are valuable. • is eager to find good solutions • is autonomous and responsible • is intrinsically motivated to solve problems 	
Evaluation	process evaluation and product evaluation	
Description of the steps		
1st step		
Name of the teacher: Daniela Dinu		
Subject: Physics		
Knowledge	Skills	Attitudes
General notions about the electrical circuit	Identify the elements of an electrical circuit	Willingness to collaborate with team members to accomplish tasks
Electric current intensity. Electrical voltage. Electrical resistance.	Identification of the physical quantities characteristic of the stationary electric current	Spirit of initiative in solving problems
Content:		
	The electrical circuit. Characteristic physical quantities	
Description of the Activity:	<p>Students will describe and build an electrical circuit. (https://phet.colorado.edu/ro/simulations)</p> <p>Students will describe the following physical quantities: electric current intensity, electrical voltage, and electrical resistance.</p>	
Time (indicate how many hours of lessons are needed)	3 hours	
Used resources:	Textbook, Internet, physics kit	
Students accomplishment:	Electrical circuits models	
Method	Interactive teaching, cooperative and collaborative learning	
Tools	Interactive whiteboard, Classroom	
2nd step		

Name of the teacher: Daniela Dinu		
Subject: Physics		
Knowledge	Skills	Attitudes
To have knowledge of Ohm's laws	Applying Ohm's laws for part of the circuit and for the whole circuit in problem-solving	Compliance with measures for protection against electric shock
	Comparison of theoretical and experimental results and their interpretation	Spirit of initiative and responsibility in solving work tasks
Content:		
	Ohm's laws Determination of the electrical resistance of a resistor	
Description of the Activity:	Students will be required to determine the electrical resistance of a resistor in the laboratory	
Time (indicate how many hours of lessons are needed)	2 hours	
Used resources:	Textbook	
Students accomplishment:	Experimental determination of the resistance of a resistor	
Method	Cooperative learning, experimentation, problematization	
Tools	Resistor with unknown resistance, connecting conductors, dc generator, ammeter, voltmeter and switch	
3rd step		
Name of the teacher: Viorica Artenie		
Subject: ICT		
Knowledge	Skills	Attitudes
Know and know how to use graphical tools and statistical modelling approaches for data analysis.	Systematic analysis of experimental values	Taking responsibility for compliance with specifications and working recommendations
	Using tools for automatic calculation, generating tables, and graphs, and applying statistical models and mathematical calculations to synthesize and present experimental values.	The ability to learn from past experiences and the desire for self-improvement Compliance with deadlines for the performance of tasks Collaboration with team members for the purpose of making the presentation

Content:	<p>Creation of databases (calculation of average resistance, calculation of errors).</p> <p>Construction of the current-voltage feature $I = f(U)$.</p> <p>Making presentations using charts and tables</p>	
Time (Indicate how many hours of lessons are needed)	1 hour	
Used resources:	Laptop, interactive whiteboard	
Students' accomplishment:	<p>Construction of the intensity-voltage characteristic (making data tables, applying formulas for calculating the average resistance and errors, determining by extrapolation the resistance values</p> <p>Google forms, PPT presentation, scientific report, project, concept map</p>	
Method	Cooperative learning, problematization	
Tools	Interactive whiteboard, Excel, PPT	
4th step		
Name of the teacher: Viorica Artenie		
Subject: ICT		
Knowledge	Skills	Attitudes
Use of information tools and networks in study activities	Know how to use search engines and find information on the Internet	To be motivated to look for resources necessary to solve the requirements
To know the diverse types of websites	Know how to design a website	Willingness to analyse and select the information
Content:	<p>Making scientific reports (Ampere, electric generators) and evaluation questionnaires</p>	
Description of the Activity:	<p>The students will have to report the results of the activity graphically. They will create the website including the way of working, the scientific papers, the assessment questionnaires, the tutorial photos and the graphic interpretations</p>	
Time (indicate how many hours of lessons are needed)	3 hours	
Used resources:	Textbook, auxiliary, virtual library, electronic spreadsheets, websites	
Students' accomplishments:	Complete website, and data analysis	
Method	Cooperative learning	
Tools	Interactive whiteboard	

