Title of the STEAM Unit: Electric game

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RELATED SUBJECTS	GRADE RECOMMENDATIONS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
Science, Technology, Arts, Maths	Grade 6-8	180 min	Recognise the basic functioning principles of electric devices. Create devices applying the acquired scientific knowledge about the functioning of electric circuits. Finding connections between science and real life	Students recognise the presence of electric circuits at the base of the functioning of real life objects. Students apply their scientific knowledge in the creation of a technological project.

OVERVIEW: TOPIC & PURPOSE

In this unit students create a game applying their knowledge about the functioning of an electric circuit. Aim of the game is to match pairs correctly. When a pair is connected correctly a light switches on.

The game is based on an electric circuit, that is closed when two elements of a pair are connected with two pointers.

Games based on this principle can be found in shops. At the beginning of the lesson some of these are shown to the students. Students have to observe the game and disassemble it in order to understand the functioning principle, using the previous knowledge about electricity and electric circuits.

After having understood the functioning principle, students have to create a similar game using simple materials, choosing among those made available by the teacher.

Then students ask schoolmates of lower grade to play with their game and test it, giving them explanations about its functioning.

ACTIVITY PREREQUISITES

Knowledge: electricity, electric current, structure and components of an electric circuit.

STEAM ELEMENTS

ELEMENT 1: context presentation	**How "Sapientino" game works? Why the light switches on (or the bell rings) when two elements of a pair are connected in the right way? On which principle is it based? Can it recall any topic previously studied at school?** **Disassembling the game in order to understand its functioning.**
ELEMENT 2: creative design	**Creat a hand-made "Sapientino" game.** **Create the question sheets for the game including different topics.**
ELEMENT 3: emotional and social learning	**Learning cooperation and communication skills through working in groups.** **Experience focus and concentration during the building process.** **Experience satisfaction when the construction is ready and they can prove that it works by making other students play**

STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	Electricity, electric conductor and insulating materials, electric current	Electric circuit	Projecting a game based on an electric circuit	Using different materials to create a product Drawing pictures on the question sheets	Writing questions and answers about math topics for the quiz sheets

SYLLABUS

LESSONS	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES
1	Science, Technology	Project of a game based on electric circuits	Students explore and understand the functioning of an electric circuit and the role of power generator, conductor, electric user. Students project a game based on electric circuits.	Students identify the presence of electric circuits at the base of functioning of real life objects. Students apply their scientific knowledge in creating a technological project.

2	Science, Technology, Art, P.E.	Creation of a game based on electric circuits.	Students actively experiment the application of electric circuits in the creation of a game project	Choose the proper materials to create an artifact. Use tools to work with different materials and create products.
3	Technology, Art, Maths	Creation of sheets with questions and answers on a math topic	Using the specific language of the discipline (maths) to create a quiz. Choose and apply the most proper techniques and languages to create visual products with a precise aim, even integrating different communication codes and referring to different subjects.	

INSTRUCTIONAL PLAN BY LESSON (COPY AS MANY TIMES AS NEEDED)

LESSON 1-3

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (20 minutes)	Students are organised in groups. Teacher shows to the students a "Sapientino" game. Students observe the game, explore, disassemble it in order to understand its functioning.	"Spientino" game	Disassembling simple electric devices and understand their functioning
LEARNING ACTIVITIES (120 minutes)	Students project a hand-made "Sapientino" game. They choose and select the materials needed. They create a quiz-game based on the electric circuit. They create sheets with questions and answers for the quiz-game (matching pairs).	Small wooden boards, cables, batteries, light bulbs, sample holders, paperbag clips, scissors, insulating tape, cardboard sheets	Creating objects with different materials starting from real needs
WRAP-UP & EVALUATION (40 minutes)	Students ask their school mates (lower grades) to play with their game. Answer to questions about the functioning principle of the game. Find other games based on an electric circuit.	Smartboard with internet connection	Synthesis, finding applications in different contexts

EVALUATION PLAN BY LESSON

LESSON	EVALUATION CRITERIA	EVALUATION METHOD
1-2-3	Does the student understand how the Sapientino game works?	Quick answers Observation of project schemes
	Did the student make the project?	Observation, comparing products
	Is the student able to present the game?	Observation, peer-review of presentation materials
	Did the students cooperate with each other?	Observation, self-evaluation of groups / students.

NOTES

Optional

ACTIVITY SHEETS TO BE LINKED

Optional

EVALUATION MATERIALS TO BE LINKED

Optional

REFERENCES / SUPPORTING MATERIALS TO BE LINKED

Optional - Additional information for teachers to refer to.