

Water detector – “Waasserfräsch”

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RELATED SUBJECTS	GRADE RECOMMENDATIONS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
Workshop, Science	12 y -15y	12h	Material handling, design, fabrication, interdisciplinarity	Connecting Workshops, science and arts

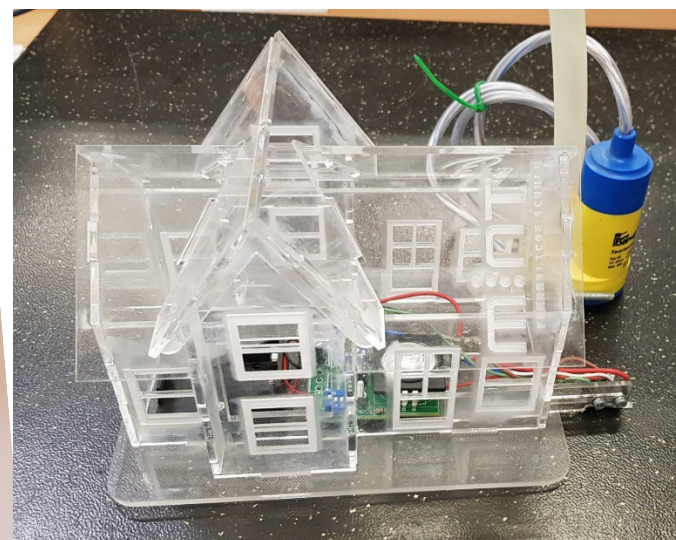
OVERVIEW: TOPIC & PURPOSE

Construction of a water detector in case of flooding

Construction Principles

Water / Density / Simple electrical circuit

Creative learning through various detection methods





ACTIVITY PREREQUISITES

None

STEAM ELEMENTS

ELEMENT 1: context presentation	Reflections about the function and the available tools and materials in our Workshop (MINT TP)
ELEMENT 2: creative design	Sketch the design in fusion 360, Thinkercad, etc Workshop in the science Lab (MINT Lab) Free the design
ELEMENT 3: emotional and social learning	Inform other pupils about the project, project fair

STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	Density, water	3 D Design Thinkercad and/or Fusion 360 floating element, ultrasonic detector	Mechanical construction Electrical circuitry	Design of the product, color, material	Area and volumetric calculation

SYLLABUS





LESSONS	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES
1	Water- detector	Project presentation and brainstorming	Acquiring ideas and inspiration to start the project	All information to start the project
2	MINT TP	Design/ cut / 3D print	Design and produce the product (several cycles) 3D Print, Lasercutting, Workshop...	Several iterations to produce a working device
3	MINT TP	Assembly and Testing	Production 3D Print, Lasercutting, Workshop...	
4	MINT TP / Arts	Design and painting	Creative design an artistic painting	
5	MINT LAB	Properties of Water	Measuring densities Analyzing water properties	
6	Mathematics	Calculations	Calculation of different areas and volumes	
7	History	Flooding in history	Flooding in Egypt (Nile) and in Luxembourg summer 2021	





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

LESSON 1 – MINT TP - Water detector – Project presentation and brainstorming

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (15 minutes)	Project presentation		
LEARNING ACTIVITIES (75minutes)	Brainstorming and design development	ThinkerCAD and Fusion 360	
WRAP-UP & EVALUATION (10 minutes)	Coming out of the brainstorming → fixing the ideas		Design or concept

LESSON2 – MINT TP - Design/ cut / 3D print

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Repeating the objectives		
LEARNING ACTIVITIES (75 minutes)	Working on the Product – Design and production	ThinkerCAD and Fusion 360 3D Printer, Lasercutter and Workshop	Use of the different machines → Being creative
WRAP-UP & EVALUATION (10 minutes)	Planning the next steps		

LESSON3 – MINT TP - Assembly and Testing

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Repeating the objectives		
LEARNING ACTIVITIES (75 minutes)	Working on the Product – Design and production	ThinkerCAD and Fusion 360	Use of the different machines Being creative





		3D Printer, Lasercutter and Workshop	
WRAP-UP & EVALUATION (10 minutes)	Planning the next steps and testing the product		

LESSON₄ – Arts - Design and painting

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Objective of the lesson	Paint, diff materials	
LEARNING ACTIVITIES (75 minutes)	Letting the students get creative for the design and painting		
WRAP-UP & EVALUATION (10 minutes)	Documentation and discussion of the results		Being creative

LESSON₅ – MINT LAB - Properties of Water

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Introduction into the lesson and analysis		
LEARNING ACTIVITIES (75 minutes)	Measuring density of the Water for one group and		





	observing different animals in the water		
WRAP-UP & EVALUATION (10 minutes)	Fixing the results in the report	iPad OneNote	Analyzing different data and documentation

LESSON6 – Mathematics - Calculations

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Introduction area calculation	Calculator	
LEARNING ACTIVITIES (35 minutes)	Examples of different areas of the project	Calculator	
WRAP-UP & EVALUATION (10 minutes)	Presentation and correction of the results	Calculator	Practical Examples of mathematics

LESSON7 - Flooding in history

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (5 minutes)	Explanation of the subject	iPad	
LEARNING ACTIVITIES (35 minutes)	Flooding in Egypt -Nile	iPad	





	Flooding in Luxembourg – Summer 21		
WRAP-UP & EVALUATION (10 minutes)	Getting a short summary of the Event and their main properties	iPad	Flooding Events

EVALUATION PLAN BY LESSON

LESSON	EVALUATION CRITERIA	EVALUATION METHOD
1	Does the student understand the objectives of the project	Is it possible to create a concept/desing
2 + 3	Was it possible to use the workshops equipment/ to act as team to realize the product	Observation, comparing designs
4	Was it possible to get a nice design for the product	Observation, comparing designs
5	Did the student write a correct report	
6	Did the students the correct calculations	E.g. Observation, self-evaluation of groups / students.
7	Could the students write a brief summary of the events	E.g. 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.

