



*A STEAM project for Empathy, Resilience and Creativity*

## INTERNET OF THINGS

### Author(s)

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### Summary

This seminar is designed to give the students a foundation on the notion of Internet of Things, including the components, tools and analysis by teaching the concepts behind the IoT and a look at real-world solutions. Students will understand the definition and the significance of the IoT, will discuss the architecture, the operation and the business benefits of an IoT solution. Moreover, the program will give the opportunity to the students not only to explore the relationship between IoT and cloud computing by monitoring real-time data in a low code platform, but also to learn about the basic communication protocols.

### Key elements

<i>Key elements</i>	<i>IoT / IoT solution / Communication Protocols / Data / Cloud / Sensors / Engineering / Platform / Low Code</i>
Subject	<i>Internet of Things</i>
Topic	<i>Internet of Things</i>
Age of students	12-17
Preparation time	8 hours
Teaching time	4-6 hours
Online teaching material	
Offline teaching material	
Resources used	

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## Ai

Many companies are working to accelerate the rate that IoT-derived data can be analysed and turned into useful insights in data centers and at the edge.

## Trends

**Smart cars, smart meters, machine-to-machine communications, cybersecurity, remote controlled systems, smart homes applications, wearables.**

## 21<sup>st</sup> century skills

**Problem solving, information technologies literacy, innovation skills, critical thinking, collaboration and communication**

## Lesson Plan

Name of activity	Procedure	Time
<b>Introduction to the IoT in general</b>	<p>Using .pptx material guide your class through the meaning of Internet of Things and how it works</p> <ol style="list-style-type: none"> <li>1. Explain to your class what is an IoT system, what is its purpose and how it works (basic concepts and implementation)</li> <li>2. Using familiar notions of everyday life, highlight some examples of IoT systems and their operation</li> <li>3. Explain to the students the benefits, the advantages and disadvantages of IoT systems. (e.g. a smart city system in which cameras enables drivers to avoid congestion)</li> </ol>	80 min

<b>Communication Protocols</b>	<ol style="list-style-type: none"> <li>1. List the most popular communication protocols such as Lo-rawan, and explain to your class their use</li> <li>2. Emphasize to the protocol which you will use (e.g. MQTT)</li> </ol>	30 min
<b>Software Demonstration</b>	Familiarise your class with the software you are about to use. Indicatively <a href="https://thingsboard.io">https://thingsboard.io</a> (free and online)	30 min
<b>Code</b>	Proceed to the implementation of an IoT system step by step, using the data from some sensors such as a temperature sensor and make the system “visible” through some add-on gadgets that are available in the platform	40 min
<b>Recap and review</b>	<ol style="list-style-type: none"> <li>1. Summarize the key concepts</li> <li>2. Allow time for questions and further discussion</li> </ol>	15 min

### Assessment

Here we include as an example the image of a rubric teachers can use to assess their students:

### Students’ and teachers’ feedback after the implementation of the Learning Scenario during the Pilot phase of the project

#### Student feedback

#### Teacher’s remarks

#### About STEAM EmbRaCe project

This Learning Scenario has been created in the framework of the STEAM EmbRaCe project.

### Annex 1

### Annex 2