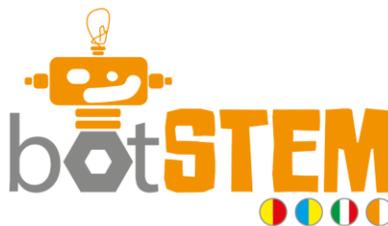


## BotSTEM – Erasmms+ KA2 Project

2017-1-ES01-KA201-038204

### Good practice template

<b>1. Title of the activity / practice</b>	<b>Sound and Light through Cryptology and Robotics</b>
<b>2. Origin of the activity</b>	Halil İbrahim Aydemir, Esat Altun, Doga School
<b>3. Age of the students</b>	5 years and above
<b>4. Target group (type of the learners, size of the group)</b>	Learners from mainstream education and with special needs 20-25
<b>5. School subjects + topics concerned</b>	Science, Maths, Language
<b>6. Educational goals of the practice</b>	The following are desired for the target group students: <ul style="list-style-type: none"> <li>· To improve their group work skills,</li> <li>· To improve their problem solving skills,</li> <li>· To help them come up with new solutions through referring to basic sciences and scientific comparisons</li> <li>· To improve their multi-dimensional thinking skills</li> <li>· To help them develop an understanding of sound and light through instructions using everyday life and nature</li> </ul>
<b>7. Duration</b>	2 lesson (~80-90 minutes)
<b>8. Place</b>	Computer lab Class Home



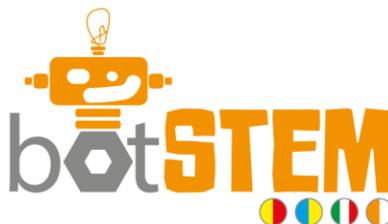
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### 9. Short description of the activity

The teacher greets the students and goes on to tell them that s/he is very enthusiastic and impatient to start the class. S/he tells the students that their task of the day is to be a spy whose mission is to convey the secret messages, which cannot be deciphered by others, safely to their center and to break the trap codes created by bad people. S/he also tells that contribution from the whole group will make him/her very happy.

The teacher introduces a device with blue, red and green lights that s/he has brought to the class saying that it is the communication device that will help them in their secret mission. Then, s/he invites the students to play a game using the device before starting the activity. Together, they assign movements to the lamp (light) colours. For example, blue might mean standing up, red sitting down and green raising their hands. They start to play the game using the movements, assigned to light colours, determined by themselves. Those who fail to do the movements are the odd ones, out of the game. When the teacher touches all the switches together, the light becomes white and that moment, the students are expected either not to move at all or to display different reactions. They go on to discuss these reactions. Following the discussion, the Mors code is mentioned briefly and sheets with The Mors Code are handed out. The students are divided into four groups and while the first group are trying to send messages using the device with colour lamps, the others try to decipher these messages. The other groups take it turns to send their messages while their friends try to decipher. And when all the groups have finished sending their messages, the discussion on why is it white when all the switches are touched at the same time, through trial and error. During the discussion, a rainbow pictogram is shown to the students and they are asked to make connections with the process .The teacher tells the spies (students) that they will start to work on their second mission, which is to find out secret traps. S/he introduces the mission saying "My Dear Spies, we have received a piece of intelligence that our enemies have created traps using an invisible material. The Big Spy has sent some information and materials to help us." The teacher adds that one of the things advised by the Big Spy to be of help in this mission is to study the superior skills of the bat. The materials sent by the Big Spy are taken out of the secret box. It is an Arduino Kit with ultrasonic sensors showing the distance to what's ahead on a screen. And the teacher has the students watch a short film on bats for a better understanding of the superior skills of the bat. And a short activity



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	<p>concerning the sound transmission is held. In this activity, the students stand for the particles of the matter. The students are told that the vibration of the matter is sound and they are told about how it is transmitted. They are presented with the specifications of the Arduino Kit and then asked how it can be used in the mission. A game in which the students will be able to detect the objects they cannot see with this kit is played. Then, this game is changed into the game of range estimation. All the students are involved in this game, which is to last for about ten minutes and then the students are handed out sheets to put down how they solved the problems they faced saying “now is the time to share your experiences with the spies to follow you.” The students are given five minutes to do this. The evaluation is done using the structured grid in Annex 1. The teacher tells the students that they can create their own code systems to send their messages to their friends. S/he finishes the activity thanking the students for their performances and says that s/he will let the students know if spies are needed again.</p>
<p><b>10. Evaluation</b></p>	<p>Evaluation grid</p>
<p><b>11. Materials / Resources / technical requirements</b></p>	<p>3 buttoned light system (Switch RGB) Arduino Kit (Ultrasonic system) Morse Alphabet (For each student)</p>
<p><b>12. Tips for educators / theoretical background (if applicable) or curriculum context</b></p>	