**Finding the Robot**

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| **Grade/ Grade Band**: 9-12 | **Topic:** Test your Robot | **Lesson #** \_\_1\_\_\_ **in a series of** \_2\_\_\_\_ **lessons** |
| **Brief Lesson Description**:  The teacher will briefly introduce the method walkie-talkies use to communicate. Introduce the game the next day and demonstrate what happens when the walkie-talkie comes close to the mobile node. | | |
| **Specific Learning Outcomes:**   * Students will have a brief understanding of how walkie-talkies communicate. * Students will understand the definition of amplifier, modulation, demodulation. | | |
| **Narrative / Background Information** | | |
| **Prior Student Knowledge Required:**  Students should be able to control the robot to move. | | |
| **Problem Solving Practices (Ex: Standards for Mathematical Practice):**  [CCSS.ELA-Literacy.RST.9-10.7](http://www.corestandards.org/ELA-Literacy/RST/9-10/7/)  Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. | **Main Content Ideas:**  1A-CS-01Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. | **Possible Multidisciplinary Concepts:** |
| **Possible Preconceptions/Misconceptions:**  Since this is not a physics class, the teacher may use a homework assignment to help students get familiar with the properties of wave. I attached a file called “properties of waves reading”. Students should read and complete all questions from page 307-309. | | |
| **LESSON PLAN – 5-E Model** | | |
| [**ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions:**](http://www.youtube.com/watch?v=PUB1GU_tvpI&safe=active)  Turn and talk with your elbow partners to complete the following questions   * What makes these devices wireless? * What does it mean to be wireless? * Write down at least 3 wireless communication devices that you use everyday. | | |
| **EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions:**  4 X walkie talkies  Mobile Node/ Raspberry pi  NUC kit  GNU Radio | | |
| **EXPLAIN: Concepts Explained and Vocabulary Defined:**  **Key Vocabulary:**  Amplifier- An electronic device for increasing the amplitude of electrical signal, used chiefly in sound reproduction.  Modulator- a device that modulating a carrier wave  Demodulator- an electronic circuit that is used to recover the information content from the modulated carrier wave.  Transducer- a device that converts a signal in one form of energy to another form of energy. Microphone and loudspeaker are the transducers.  Modulation is the process of superimposing a signal (message signal) on a high frequency signal (carrier signal) to transmit easily. | | |
| **ELABORATE: Applications and Extensions:**  How can we apply the concept of this game in real life**?** | | |
| **EVALUATE:**  **Formative Monitoring (Questioning / Discussion):**  How you plan to search for the robot? What do you think is the most efficient way to collaborate with other teams to win this game?  **Summative Assessment (Quiz / Project / Report):**  Students will write a plan on how they want to hide/search for the robot. | | |
| **Elaborate Further / Reflect: Enrichment:**  If we play this game one more that? What can you improve in order to locate the robot faster? | | |

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| **Grade/ Grade Band**: 9-12 | **Topic:** Test your Robot | **Lesson #** \_\_2\_\_\_ **in a series of** \_2\_\_\_\_ **lessons** |
| **Brief Lesson Description**:  Based on previously discussed, students should work in their assigned groups. The group that controls the robot will have 5 mins to hide the robot. The other 4 groups will leave the room and use the walkie talkie try to locate them. With in the class period, if any group find the robot, the finding side win. If none of the groups able to find the robot, the hiding side win.   |  |  |  | | --- | --- | --- | | Group # | Duty | Description | | 1 | Hide the robot | They will have 5 mins to hide the robot, they can also control the robot to move as other groups are looking for them. | | 2,3,4,5 | Look for the robot | They will have 30 minutes to look for the robot. They will use the walkie talkie try to locate the robot. The walkie talkie will make a noise when they come close to the robot. | | | |
| **Specific Learning Outcomes:** | | |
| **Narrative / Background Information** | | |
| **Prior Student Knowledge Required:**   * Students should be able to control the robot to move. * Students should have a brief idea of how walkie-talkie works. | | |
| **Problem Solving Practices (Ex: Standards for Mathematical Practice):**  [CCSS.ELA-Literacy.RST.9-10.7](http://www.corestandards.org/ELA-Literacy/RST/9-10/7/)  Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. | **Main Content Ideas:**  1A-CS-01Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. | **Possible Multidisciplinary Concepts:** |
| **Possible Preconceptions/Misconceptions:** | | |
| **LESSON PLAN – 5-E Model** | | |
| [**ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions:**](http://www.youtube.com/watch?v=PUB1GU_tvpI&safe=active)  Students will quickly form their groups as they previous discussed and start the activity. | | |
| **EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions:**  4 X walkie talkie  Mobile Node/ Raspberry pi  NUC kit  GNU Radio | | |
| **EXPLAIN: Concepts Explained and Vocabulary Defined:**  **Key Vocabulary:**  Amplifier- An electronic device for increasing the amplitude of electrical signal, used chiefly in sound reproduction.  Modulator- a device that modulating a carrier wave  Demodulator- an electronic circuit that is used to recover the information content from the modulated carrier wave.  Transducer- a device that converts a signal in one form of energy to another form of energy. Microphone and loudspeaker are the transducers.  Modulation is the process of superimposing a signal (message signal) on a high frequency signal (carrier signal) to transmit easily. | | |
| **ELABORATE: Applications and Extensions:**  How can we apply the concept of this game in real life**?** | | |
| **EVALUATE:**  **Formative Monitoring (Questioning / Discussion):**  **Summative Assessment (Quiz / Project / Report):**  Write a brief summary of the activity you did today. You summary should include what you did in this activity in detail, where did you go? what did you try in order to find the robot? What are some obstacles that you overcame? What do you think you can improve if we play this game again? | | |
| **Elaborate Further / Reflect: Enrichment:**  If we play this game one more that? What can you improve in order to locate the robot faster? | | |