Radio Communicating with Microbits

Overview: In this project, you and a partner will code a program that is capable of sending a coded message to each other. Each of you will have a microbit and will need to code the 'a' and 'b' buttons to send two different messages, that when combined with a key can be decrypted. You can use binary, morse code, or create a coded message system of your own!

Objectives: Students will be able to…

- Code a microbit to send a radio signal to another microbit
- Code a microbit to send different messages when different buttons are pressed

Pre/Post Test Questions:

1. How do you ensure that two microbits are communicating on the same radio group?
2. Compare and contrast the "on start", "forever" and "on button 'a' pressed" blocks.
3. Why is it important to send messages that are coded/encrypted?

Hook: Show a brief video or have a quick discussion on the uses and applications of coded messaging throughout history.

Instructions:

1. Use makecode.microbit.org to create a coded messaging program that can send coded messages to other microbits.
2. BEFORE YOU BEGIN CODING:
    a. Find the following blocks of code, right click on them, and select the "help" option. Then read the documentation for that block so that you understand how it works! You will have to search through the block options on the left side of the screen to find each of these.
        i. "Radio set group" block
        ii. "Radio send number" block
        iii. "On radio received…" block
        iv. "On button 'a' pressed" block
        v. "If…then" block
3. Your program should do the following:
    a. Send a coded message to another microbit. A coded message is a message that cannot be read without the knowledge of how to translate it into letters or words.
    b. Your message can be coded in any way you want! Some examples include binary and morse code. You can also create your own coded language to use, but be careful as this can take up a lot of your time! Start simple, you can always make it more complicated later.

Wrap-Up:

1. Have random pairs of students demonstrate their communication device and describe their coded language system to the class.

Things You Should Know for this Lesson:

1. Some background knowledge in binary or morse code will be beneficial to the teacher. Additionally, having some background on the purposes of encryption can help connect this lesson to real world applications.

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    a. Find the following blocks of code, right click on them, and select the “help” option. Then read the documentation for that block so that you understand how it works! You will have to search through the block options on the left side of the screen to find each of these. Write down a brief description of each block below.
        i. “Radio set group” block

        ii. “Radio send number” block

        iii. “On radio received…” block

        iv. “On button ‘a’ pressed” block

        v. “If…then” block

3. Your program should do the following:
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    b. Your message can be coded in any way you want! Some examples include binary and morse code. You can also create your own coded language to use, but be careful as this can take up a lot of your time! Start simple, you can always make it more complicated later.
4. Before you start coding on the computer, write out what you and your partners plan is to accomplish the task. You can draw a picture, write in sentences, write in pseudocode,... whatever works best for your group, as long as you write something down! Write your plan below.

5. Now go code and test it!