

**Field Trip # 36**

Developed by:

Subject:

Short description:

Educational Level:

Field trip type:

Educational

Outcomes:

Content:

Notes to instructor:

**Building a Low Power FM Radio Transmitter – Raspberry Pi**

Dr. Matt Campbell

Basic scripting &amp; radio wave transmission with Raspberry Pi

Students will learn how to build their own low power FM radio transmitter using a Raspberry Pi &amp; open source software.

6<sup>th</sup> – 10<sup>th</sup> Grade

Workshop

The Student will be able to:

- Explain how a radio transmitter works
- Setup & boot a Raspberry Pi
- Modify source code
- Compile the source code
- Modify hardware for FM broadcast
- Evaluate transmission strength

Source: [http://www.icrobotics.co.uk/wiki/index.php/Turning\\_the\\_Raspberry\\_Pi\\_Into\\_an\\_FM\\_Transmitter](http://www.icrobotics.co.uk/wiki/index.php/Turning_the_Raspberry_Pi_Into_an_FM_Transmitter)

It is recommended that the instructor have at least one assistant in the lab to assist learners with the project. This learning object can easily be fit into a 50 minute time frame or expanded as time allows. This activity should be done in a computer lab or a classroom with one Raspberry Pi, monitor, mouse, & keyboard for each group of 2-3 students. The instructor should have a Raspberry Pi connected to an overhead projector for demonstration.

A PowerPoint instructional slide show can be provided.

LESSON PLAN for  
Building a Low Power  
FM Radio Transmitter  
Using Raspberry Pi

Part 1 (10 minutes: 10)

Explain how radio waves are produced &amp; transmitted

Part 2 (10 minutes: 20)

Introduce Raspberry Pi with a brief description of hardware & capabilities  
 Connect the Raspberry Pi to a monitor, keyboard, mouse, & antenna

Part 3 (20 minutes: 40)

Work with source code to make minor modifications  
 Compile the software

Part 4 (10 minutes: 50)

Experiment with broadcasting radio signals through the building.

Content:

The lesson uses a custom research software called the Program Encryption Toolkit (PET) to help students visualize and create digital logic circuits and components. PET is also used to illustrate basic digital logic principles and security techniques such as obfuscation.

Notes to instructor: