



# Fab Lab Design Brief

## MP3 Speakers

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Intermediate Unit 1  
6<sup>th</sup> - 8<sup>th</sup> Grade

### Summary

Students will design and fabricate their very own speaker system! First, students are given an amplifier/speaker kit that they will have to assemble and solder themselves. Afterwards, it's all up to the individual to create a casing for this circuit system. This could be done either by using the step-by-step tutorial design provided, or by creating their very own unique and original design. **Estimated Time: Nine (1 hour) Days**

### Standards

#### National Standards for Technological Literacy:

1. STL1.6-8.H - Structures are constructed using a variety of processes and procedures.
2. STL1.6-8.G - The design of structures includes a number of requirements.
3. STL8.6-8.E - Design is a creative planning process that leads to useful products and systems.
4. STL11.6-8.K - Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.

#### State Academic Standards for Science, Technology and Engineering Education:

1. PA.3.4.8.C1 - Evaluate the criteria and constraints of a design.
2. PA.3.4.8.C2 - Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.
3. PA.3.4.8.D1 - Test and evaluate the solutions for a design problem.
4. PA.3.4.8.D3 - Interpret and evaluate the accuracy of the information obtained and determine its usefulness.

### Objectives

- 1) Students will construct a creative expression of a common household item.
- 2) Students will apply basic soldering and circuit layout techniques to produce a working circuit board.
- 3) Students will understand the different features of vectoring software and how it can be easily used to their needs.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Mp3 Speaker Project

Design and fabricate your very own speaker system! This could be done by either using the step-by-step tutorial design provided, or by creating your very own unique and original design.

### Days 1&2: Solder the Amplifier Circuit Board

Using the step-by-step instructions provided in the kit, build/ solder your circuit board and then connect the two speakers.

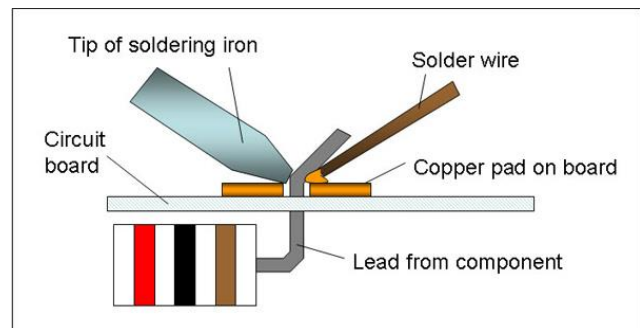


#### Resources:

[2x5 Watt Amplifier for Portable Audio Player Kit 6-14VDC/1A](#)

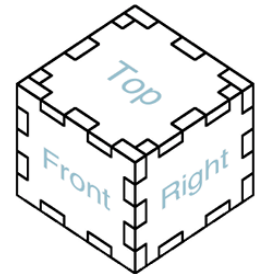
[Square Ferrite Speaker 3" 8 Ohm 5 Watt](#)

[Power Supply Wall Adapter](#)



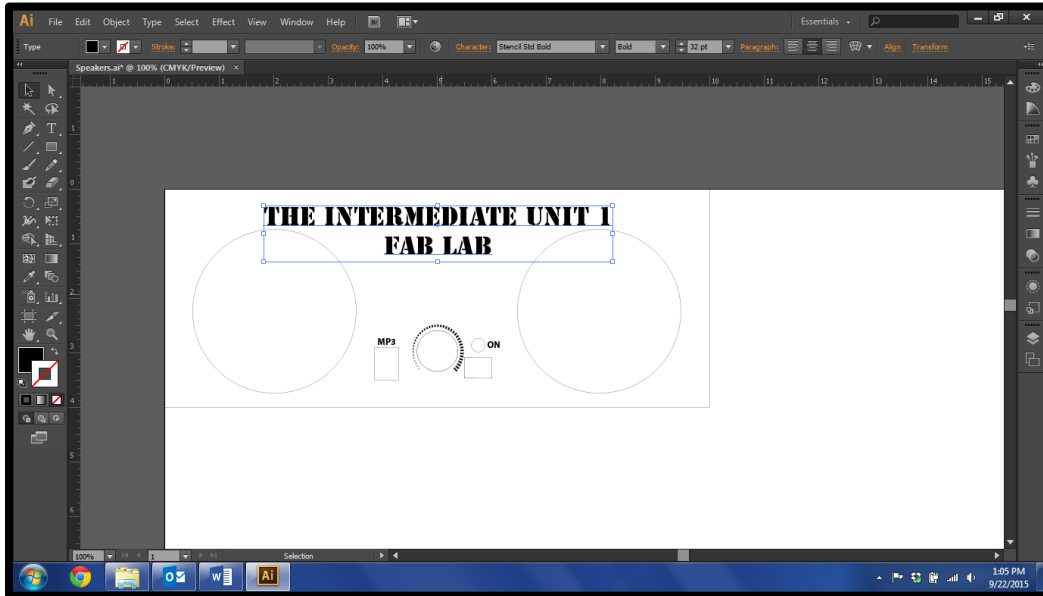
### Days 3&4: Create a Vector for a Casing Design

**(OPTIONAL)** – Create a simple box vector to house each speaker and the kit, separately by going to [www.makercase.com](http://www.makercase.com) and following the instructions to download the .SVG file that is specific for your design. You will then import this file into whatever vectoring software provided (Adobe Illustrator, CorelDraw, Inkscape, Etc).



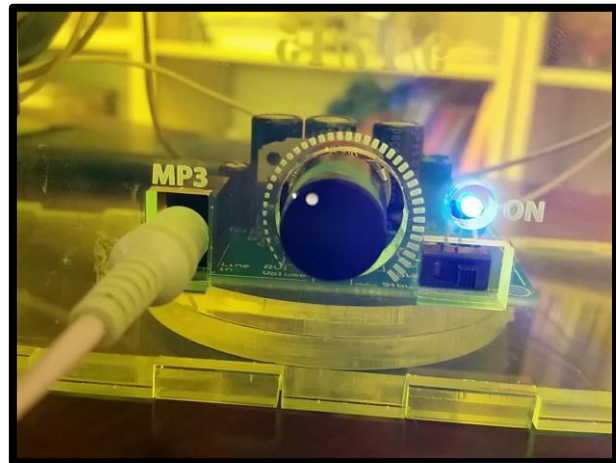
Whether you create a unique casing of your own, or vector a box design instructed above, it is important afterwards to draw out the specific cutouts for every part that needs exposed from the casing (3" speaker fronts, volume control knob, LED switch light, power/auxiliary port).

\*Also use this step to apply any graphics via laser engraver to make your casing stand out!



## Day 5: Putting It All Together

Use adhesives and/or screws depending on the project size/materials to assemble your casing. This also includes how you attach your circuit board inside the casing, based on your project design.





# Mp3 Speaker Rubric

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Students are to use the following rubric to target expectations and achievement to complete the mp3 speaker project.

| Points                                 | 10 - 12   | 7 - 9   | 4 - 6  | 1 - 3  | Score |
|--|---|---|--|--|-------|
| <b><u>Required Elements</u></b>        | The speaker set has all the features that were required.          | Most of the required features are included for the speakers.      | Speakers are missing a few features.   | More than half of the required features are missing.                       |       |
| <b><u>Creativity</u></b>               | The student's speakers are designed very well.                    | The student's speakers are designed typical.                      | The student's speakers are designed below average.                             | The student's speakers are designed very poorly.                           |       |
| <b><u>Appearance</u></b>               | The appearance of the speaker box are exceptionally attractive    | The designs are mostly attractive and neat.                       | The designs are not well thought out or organized.                             | The appearance of the designs are messy and unpractical.                   |       |
| <b><u>Construction</u></b>             | Construction is very symmetrical and square. Everything lines up. | Construction is solid and mostly square. Most components line up. | Not very solid. Out of square in places. Parts don't line up. Symmetry is off. | Construction is poor. Nothing lines up or is square. Joints are not solid. |       |
| <b><u>Circuit Board /Soldering</u></b> | The curcuit board is properly installed and soldered well.        | Most of the solders are good and the circuit board is functional. | A lot of the solders are not done well and circuit board wasn't done properly. | The solders are made poorly and circuit board failed.                      |       |

**Total Score:            /60**