Loudspeaker Kit

97-7801

INSTRUCTIONAL GUIDE

Contents

- 6 plastic base moldings
- 6 rare-earth magnets
- 1 reel of enameled copper wire
- 1 crocodile clip to 3.5 mm headphone jack connector
- Instructional Guide

Recommended for activities:

- Scissors
- Card stock
- Wave or music output device

Background

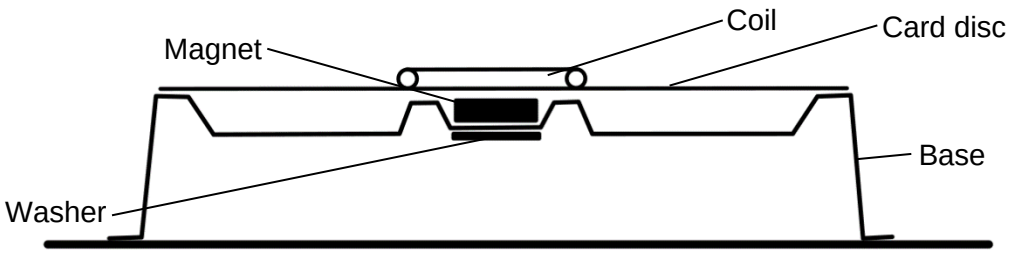
This apparatus provides a simple and effective method for students to investigate the construction and operational principles of a loudspeaker. Teachers can adapt the component parts to suit their own requirements so students construct loudspeakers of varying complexity. All the parts are re-usable. The kit contains everything necessary for the construction of ten complete loudspeakers.

Introduction

The plastic molding supports the magnet in a small divot in the center. A large steel washer is placed under the well on the other side of the plastic to clamp the magnet in place. A disc of paper or light card stock is cut to the same diameter as the rim of the base molding and taped in place. A coil of wire is attached to the top surface of the card disc and connected to the signal source.

Construction:

1. Place the magnet in the divot on the base molding.
2. Place the washer behind the magnet, on the underside of the base.
3. Use compasses to mark out a circle 11 cm in diameter on light card stock or paper. Carefully cut out the disc.
4. Use a dowel, large test tube, or some similar object which is 2 to 2.5 cm in diameter as a form to wind the coil. Wind about 100 turns of wire to create a donut-shaped coil. Wrap the last 20 cm or so around the coil (passing through the center) to hold the coil together.
5. Scrape the coating from the two ends of the coil wire using fine sand paper.
6. Tape the coil to the center of the card disc.
7. With the coil facing up, tape the card disc to the top of the base.



Operation:

Place the completed loudspeaker on a flat surface such as the bench and connect the coil to a signal generator using crocodile clips and connecting leads. Use a low-impedance output if applicable and select an audible frequency range from your frequency generator—something like 2000 Hz works well.

Variations and Notes:

- In a real loudspeaker, the magnet is inside the coil rather than below it. By winding a 3.5 cm diameter coil and attaching it to the underside of the disc (so the top surface is plain and the coil sits around the disc), this design can be more closely replicated.
- The coil could be wound on a small card stock tube to more accurately replicate actual loudspeaker construction. This element would add to the construction task for a more detailed approach.
- Students are more impressed by the final product if it can play music. A 3.5 mm plug with alligator leads is included for this reason. The easiest way to play music is through phone or computer with a matching jack.

Related Products

Mechanical Wave Complete Bundle (P7-1100) The Arbor Scientific Mechanical Wave Complete Bundle makes harmonic and motion demonstrations affordable for ALL Physics classrooms.

Mini Ripple Tank (PA-8638) The Mini Ripple Tank provides a simple and effective method to investigate the properties of waves. The tank has settings that allow you to adjust the wave frequency and the frequency of the strobe light showing a broad range of wave patterns.