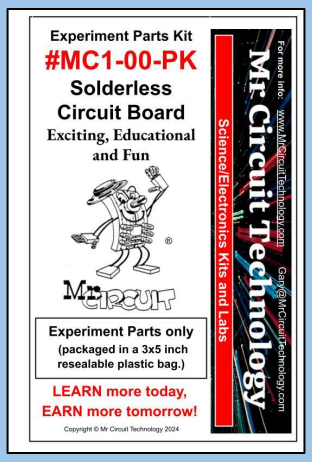
For more info: www.MrCircuitTechnology.com Gary@MrCircuitTechnology.com

Mr Circuit Technology

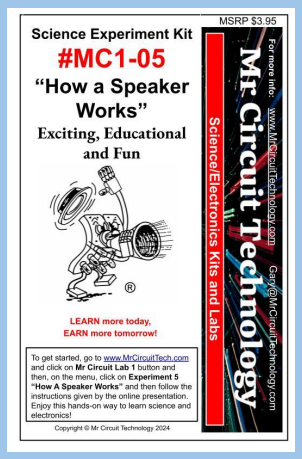
Science/Electronics Experiment Kits and Labs

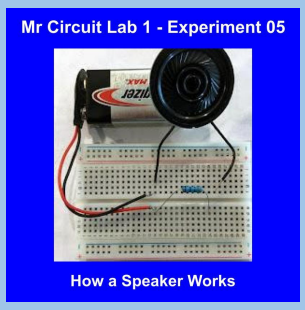
"HOW A SPEAKER WORKS"

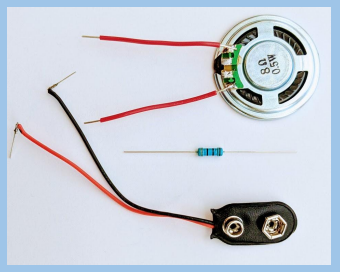


LESSON PLAN

Table of Contents







PREPARATION: You can put the Page 12 poster up on your classroom wall to announce the fact that you are going to do the Science-Electronics Experiment.

Step 1 - Make a copy of pages 1 through 8 for each student. The students can read and do these pages on their own or you can guide them.

Step 2 - Hand out Parts Kit #MC1-00-PK (that has the Solderless Circuit Board) and Parts Kit #MC1-05-PK (that has the experiment parts) with a 9-Volt battery. Give these items to each student along with the 8 pages.

Step 3 - When your students have completed the experiment, collect all the Parts Kits and batteries for later use.

Step 4 - Collect all the Written Quizzes for grading and use the Answer Key to grade them.

For Tech Support or any questions, you can email us or call 805-295-1642

How A SPEAKER Works (Page 1)

MC1-05-R-1

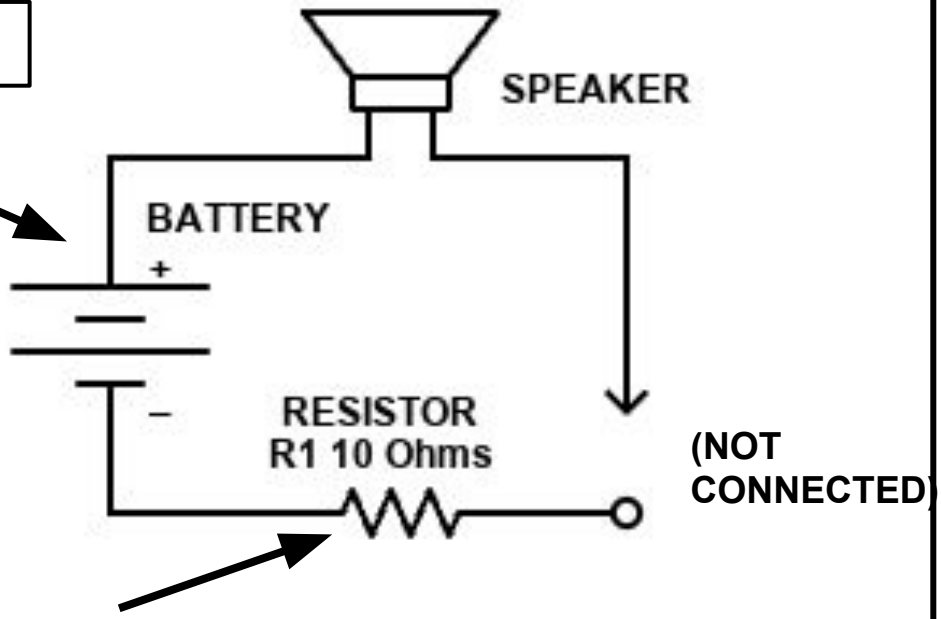
EXPLANATION OF EXPERIMENT

*** You are going to build a circuit to observe a SPEAKER transforming electrical energy into sound..

Here is the SCHEMATIC DIAGRAM of the circuit you will build.

1 This symbol represent a SPEAKER.

2 This symbol with four lines and a plus and minus represents a multi-cell battery like a 9-volt battery.



3 This symbol with 3 up and down lines represents a RESISTOR.

The electron current in this circuit flows out of the negative side of the battery to the RESISTOR then through the SPEAKER back to the positive side of the battery.

(Continue to Page 2)

How a SPEAKER Works (Page 2)

MC1-05-R-2

PURPOSE OF THIS EXPERIMENT

*** To observe a SPEAKER converting electrical energy into sound.

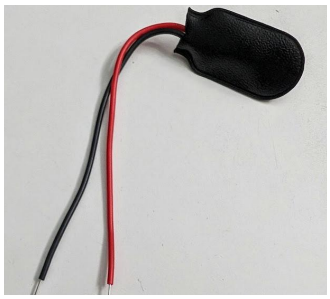
PARTS NEEDED FOR EXPERIMENT

In this experiment, you will use

a SPEAKER

A speaker has a magnet and a coil of wire inside of it. The coil moves the speaker cone when electric current flows through the coil.

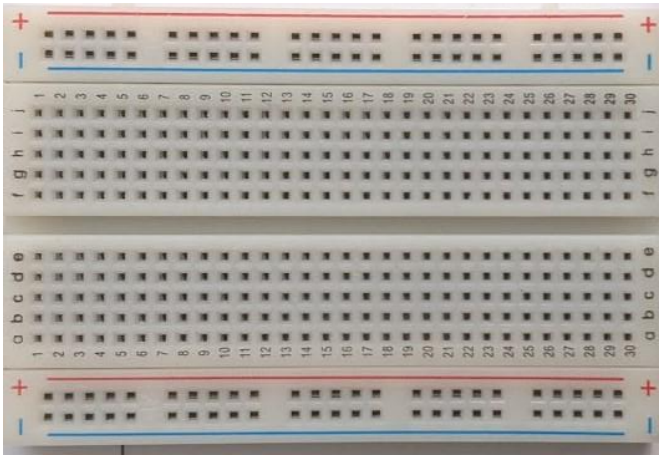
a BATTERY SNAP



10 Ohms

a RESISTOR

and a SOLDERLESS CIRCUIT BOARD.



You will also need a good 9 Volt battery

(Continue to Page 3)

How a SPEAKER Works (Page 3)

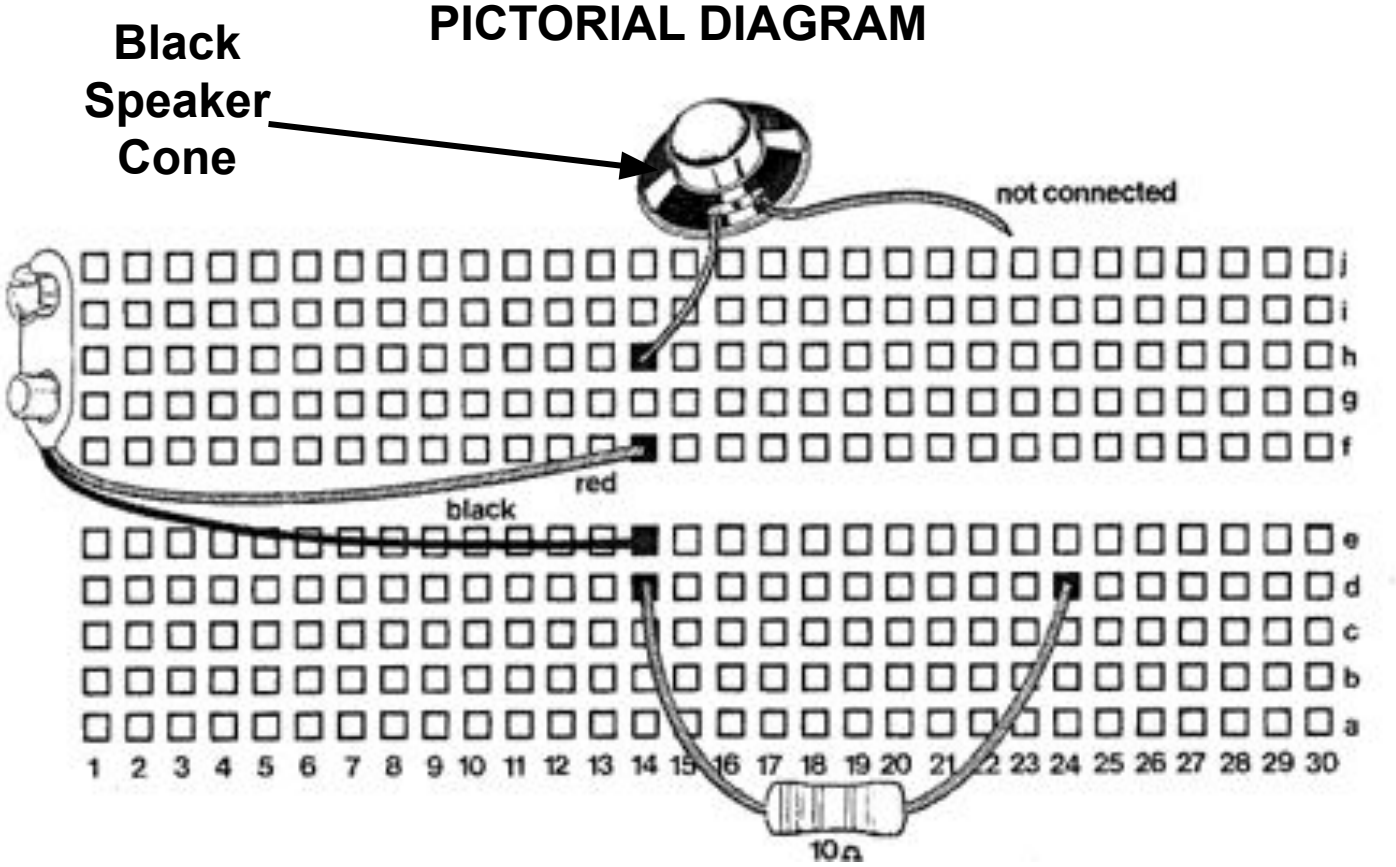
MC1-05-R-3

DO THE EXPERIMENT (part 1 of 3)

******* You are going to build a circuit to demonstrate a SPEAKER converting electrical energy into sound..

Step 1 - Take out a **Battery Snap** and install it with its Red lead in hole **14f** and its Black lead in hole **14e** as shown in the pictorial diagram.

PICTORIAL DIAGRAM



Step 2 - Install the SPEAKER with one lead into hole **14h** and leave the other lead loose.

Step 3 - Install a 10 Ohm resistor (color bands Brown, Black, Black, Gold) as shown on the pictorial into holes **14d** and **24d**. (This resistor protects the SPEAKER from too much current.

(Continue to Page 4)

How a SPEAKER Works (Page 4)

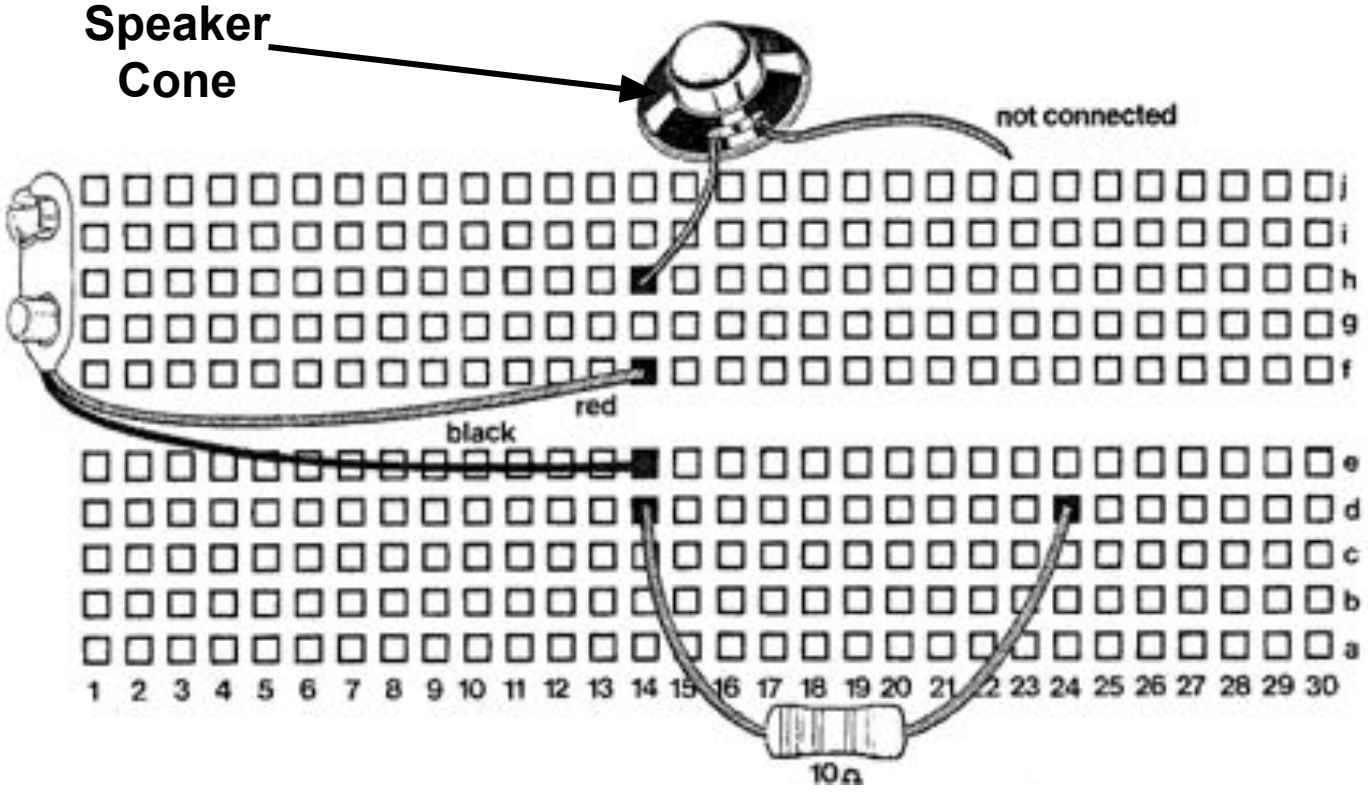
MC1-05-R-4

DO THE EXPERIMENT (part 2 of 3)

Step 4 - Connect the Battery to the Battery Snap. You should **NOT** hear any sound from the SPEAKER.

Step 5 - Now touch the loose lead to the lead of the 10 Ohm resistor that is in hole 24d. You should hear one click sound as you make the connection and one click sound as you disconnect the lead again.

PICTORIAL DIAGRAM



Note: The reason your hear a sound is because current flowing through the coil of wire inside the SPEAKER causes the speaker cone to move which causes the air to move. Each time the speaker cone moves, you hear a click.

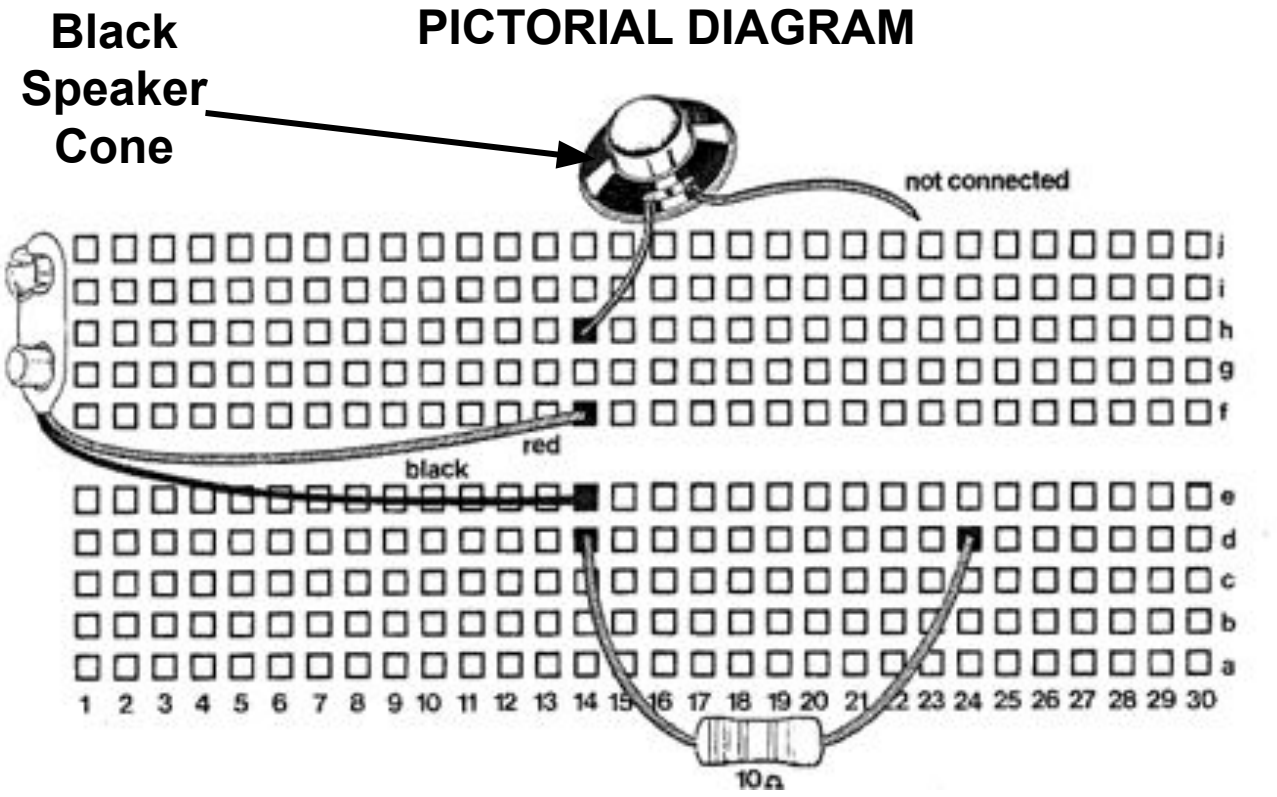
(Continue to Page 5)

How a SPEAKER Works (Page 5)

MC1-05-R-5

DO THE EXPERIMENT (part 3 of 3)

PICTORIAL DIAGRAM



CONCLUSION

*** You should have observed that a SPEAKER is an electronic device that makes a sound when the cone moves. When the cone stops moving, the sound stops.

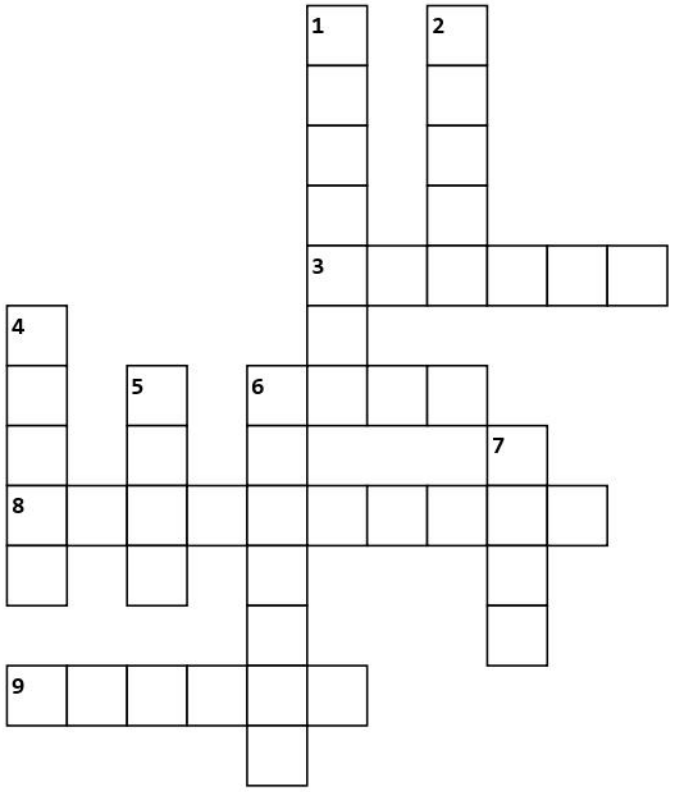
To make the SPEAKER cone move, electric current has to flow through the SPEAKER coil. If the current is turned on and off, the SPEAKER will make a click each time the cone moves.

If you reverse the battery leads, the SPEAKER will still make a click but the cone just moves in the opposite direction. If the SPEAKER is connected to an AC current like music, the SPEAKER will emit a musical sound..

(End of Experiment 5)

CROSSWORD

Experiment 5 - "How a SPEAKER Works"



Across

3. A SPEAKER converts electrical _____ into sound.

6. If you leave the battery connected to the SPEAKER, the sound will _____ .

8. When a _____ is made, a sound comes from the SPEAKER.

9. A SPEAKER has a coil of wire and a _____ inside of it.

Down

1. The 10 Ohm RESISTOR is in the circuit to _____ the SPEAKER from too much current.

2. If we leave the battery connected, the SPEAKER will product a steady tone. True or False

4. When you touch the SPEAKER wire to the resistor, you hear a _____ .

5. What part of the SPEAKER moves when current flows through it?

6. What electronic device converts electrical energy into sound?

7. Inside a SPEAKER there is a wire _____ .

Mr. CIRCUIT®

MC1-05-WS

WORD SEARCH

Experiment 5 - "How a SPEAKER Works"

N E E U D Y X E Z S P E A K E R P U D L
Z J P O E Y O T B J E R R B E B R Z B M
P G B U B W L Z B Q G O N N F W O J V A
Z X T V R R I Y N U T A Q O H I T S V G
O R L B L N A O T I E H T I W B E Y X N
V E X H I F M N V V E I X T Y Y C G C E
R M J S O N Q E V W S H V C U C T P F T
W B T Y C A D U Z Z I I Z E M D G O E A
W G Z C V W X S K B L O V N N B N T R T
I H K F M G L H B R Z Q R N W Y O S D T
Q M H F B T A V F S J U N O W D F Y O J
E Y R P D W I Y O G W G U C A X E C V C
X G Y U F O O Z C H E O L J E B Q L E Z
I R C Z H G J P L A F R G E S D P H O D
K E F P N S Y O V V I R E A L H C O B X
E N U V O B X M L V Z R Q V A H L S Q S
U E W H N S A L T C T E N H F Z I U X O
E H S M U L U T G G V N Z H P K C H F T
V J Z I V B P R L M D O W E Z K K F P U
Y M K Q T B G X E J M C E I C H I L A Q

1. What electronic device converts electrical energy into sound?

2. Inside a SPEAKER there is a wire _____ .

3. What part of the SPEAKER moves when current flows through it?

4. If you leave the battery connected to the SPEAKER, the sound will _____ .

5. When you touch the SPEAKER wire to the resistor, you hear a _____ .

6. When a _____ is made, a sound comes from the SPEAKER.

7. A SPEAKER converts electrical _____ into sound.

8. If we leave the battery connected, the SPEAKER will product a steady tone. True or False

9. A SPEAKER has a coil of wire and a _____ inside of it.

10. The 10 Ohm RESISTOR is in the circuit to _____ the SPEAKER from too much current.

(Student Name) (Period/Student Number) (Date)

QUIZ for Exp 05 or STEM KIT #05
in the Mr Circuit Electronics Training Lab 1

(Page 8)

This Quiz covers the training learned by completing

"How a Speaker Works" Experiment 5

Circle the letter for your answer to each question and then hand this quiz in to your teacher.

#1 What would happen in this circuit if you reverse the polarity of the battery snap?

A. the speaker will burn out
B. it will not work at all
C. the speaker will whistle
D. it will work just fine

#2 What do you think the purpose of the 10 Ohm resistor is in this circuit?

A. to increase the amount of current
B. to reduce the amount of current
C. to increase the capacitance
D. to decrease the inductance

#3 When you reverse the polarity of the battery snap in this circuit, it affects the _____ of the speaker.

A. cone
B. magnet
C. volume
D. sound quality

#4 Why does the sound stop when you leave the battery connected?

A. the magnet gets weak
B. the speaker burns out
C. the cone stops moving
D. the current increases

#5 Why does the speaker make a 'click' when you connect and when you disconnect the battery?

A. the cone moves each time
B. the speaker is alive
C. the magnet is weak
D. the speaker is round

#6 What is the name of the part we learn about in Exp. #5?

A. a speaker
B. a capacitor
C. a resistor
D. a photocell

#7 What is the function of the part we learn about in Exp. #5?

A. reduce the amount of current flow
B. to store electrons and protons
C. transform electrical energy to sound waves
D. to look nice in a circuit

#8 What part of a Speaker moves when current flows through it?

A. the bracket
B. the magnet
C. the handle
D. the cone

#9 What sound comes out of a speaker when a steady DC current is connected to its coil?

A. it makes a steady tone
B. it makes a click and then becomes silent
C. it plays music
D. it sounds like a siren

#10 What kind of device is a Speaker?

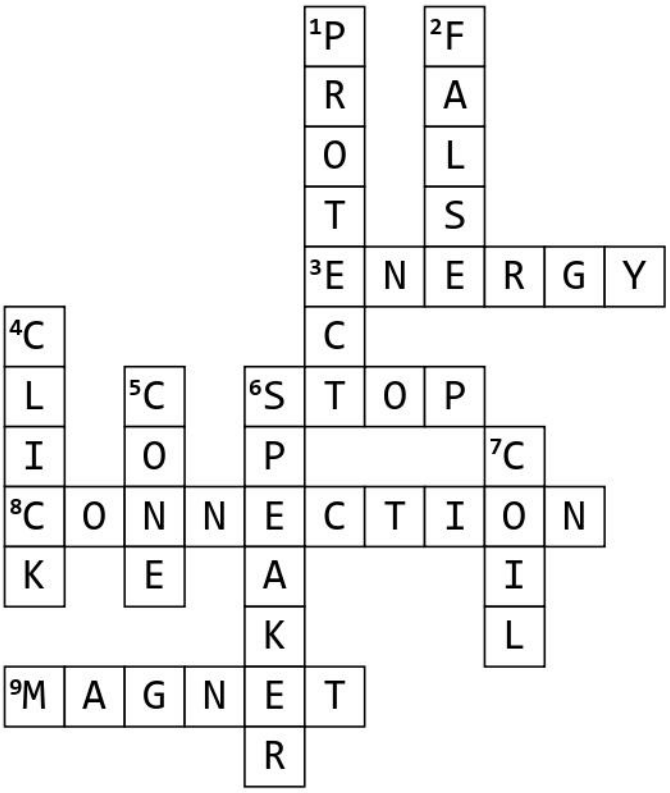
A. rectifying device
B. electromechanical device
C. photoelectric device
D. semiconductor device

(Form SQ05)

Score

ANSWERS FOR CROSSWORD

Experiment 5 - "How a SPEAKER Works"



Across

3. A SPEAKER converts electrical _____ into sound.

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Down

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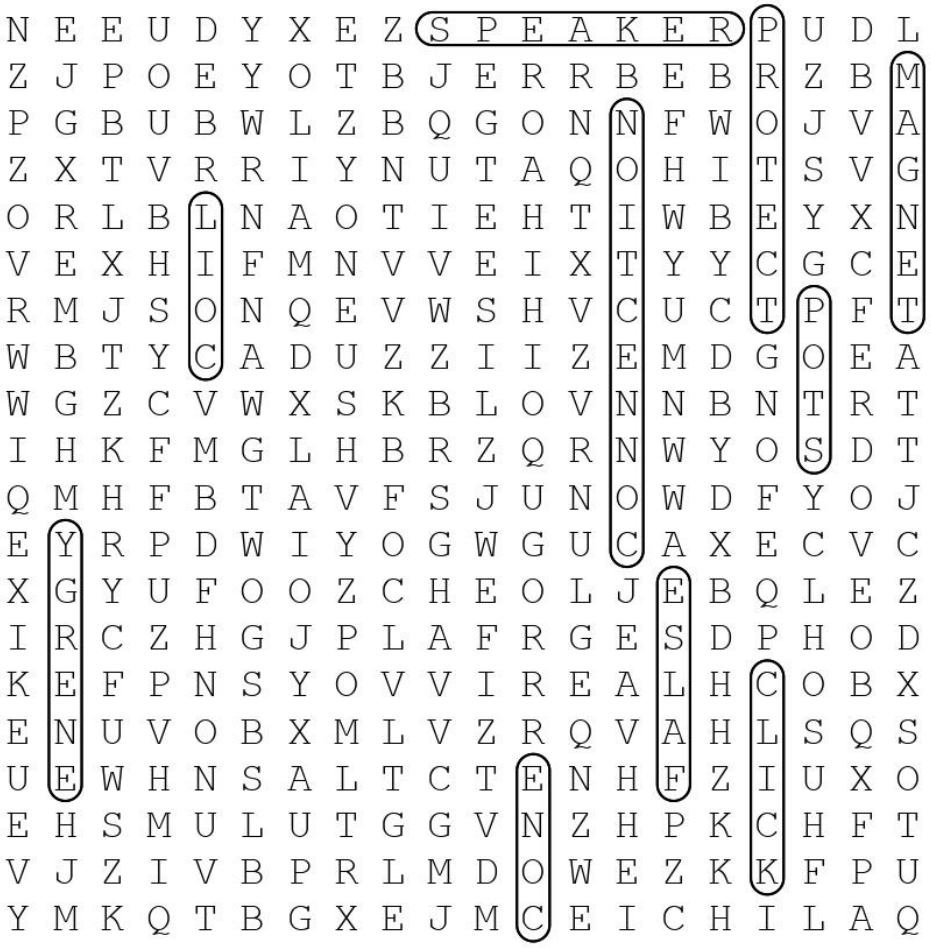
ANSWERS FOR WORD SEARCH

Experiment 5 - "How a SPEAKER Works"



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QUICK-CHECK ANSWER KEY for Experiment 05 QUIZ
for Mr Circuit Electronics Training ("How a Speaker Works")

Place this sheet over top of the STUDENT QUIZ (offset a little to the left and then offset to the right) to compare the answers on this sheet to the answers that the student marked. Put an 'X' for each wrong answer.

Count the right answers and record the score of right answers in your grade book.

A B C (D)

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A. the speaker will burn out
B. it will not work at all
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A (B) C D

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(A) B C D

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A B (C) D

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A B C D

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A B (C) D

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A B C (D)

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A (B) C D

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A. rectifying device
B. electromechanical device
C. photoelectric device
D. semiconductor device

A (B) C D

(Form SQAK05)

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

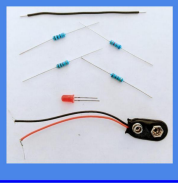
SPEAKERS CONVERT ELECTRICAL ENERGY INTO SOUND

BASIC ELECTRONICS LAB 1

"HOW A SPEAKER WORKS"

(Poster MC1-05-P01)

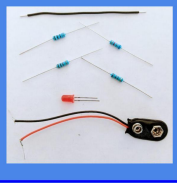
MC1-01
Electronic Parts



For more info: www.MrCircuitTechnology.com MrCircuit23@gmail.com

Mr Circuit Technology

MC1-01
Electronic Parts



PRICE LIST May 2024

PRICE LIST

PARTS KIT Number	Mr Circuit Series 1 SCIENCE / ELECTRONICS "PARTS KITS"	Price Each
MC1-00-PK	Solderless Circuit Board to build kits	$3.95
MC1-01-PK	Parts Kit for "How a Resistor Works	$1.95
MC1-02-PK	Parts Kit for "How a Potentiometer Works	$2.95
MC1-03-PK	Parts Kit for "How a Photocell Works	$1.95
MC1-04-PK	Parts Kit for "How a Capacitor Works	$2.95
MC1-05-PK	Parts Kit for "How a Speaker Works	$2.95
MC1-06-PK	Parts Kit for "How a Diode Works	$1.95
MC1-07-PK	Parts Kit for "How an SCR Works	$3.95
MC1-08-PK	Parts Kit for "How an NPN Transistor Works	$2.95
MC1-09-PK	Parts Kit for "How a PNP Transistor Works	$2.95
MC1-10-PK	Parts Kit for "How a Transistor Oscillator Works	$3.95
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MC1-12-PK	Parts Kit for "Burglar Alarm circuit	$3.95
MC1-13-PK	Parts Kit for "Solar-Activated Night Light circuit	$3.95
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MC1-16-PK	Parts Kit for "Electronic Motorcycle circuit	$3.95
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MC1-18-PK	Parts Kit for "Variable Speed Lights circuit	$3.95
MC1-19-PK	Parts Kit for "Continuity Tester circuit	$4.95
MC1-20-PK	Parts Kit for "Audio Generator circuit	$5.95
MC1-21-PK	Parts Kit for "Electronic Police Siren circuit	$4.95
MC1-22-PK	Parts Kit for "Solar-Activated Wake-Up Alarm circuit	$3.95
MC1-23-PK	Parts Kit for "Variable Timer circuit	$3.95
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MC1-25-PK	Parts Kit for "Code Oscillator circuit	$4.95
MC1-26-PK	Parts Kit for "Audible Water Detector circuit	$4.95
MC1-27-PK	Parts Kit for "English Police Siren circuit	$4.95
MC1-28-PK	Parts Kit for "Electronic Canary circuit	$7.95
MC1-29-PK	Parts Kit for "fantasy Space Machine Gun circuit	$5.95
MC1-30-PK	Parts Kit for "Ultrasonic Pest Repeller circuit	$5.95
Set-MC1-PK	**Complete Set of All Series 1 Parts Kits (31 total)**	**$120.00**