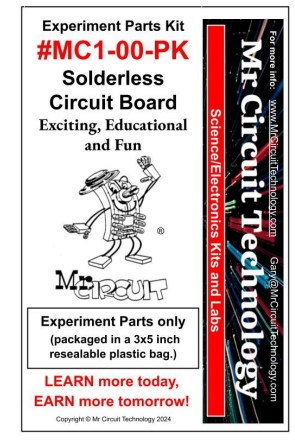
For more info: www.MrCircuitTechnology.com Gary@MrCircuitTechnology.com

Mr Circuit Technology

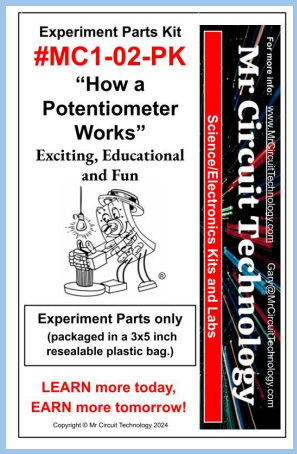
Science/Electronics Experiment Kits and Labs

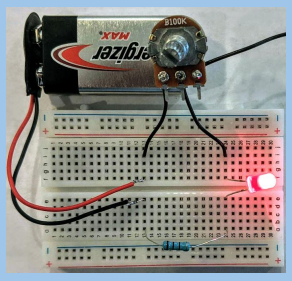
"HOW A POTENTIOMETER WORKS"

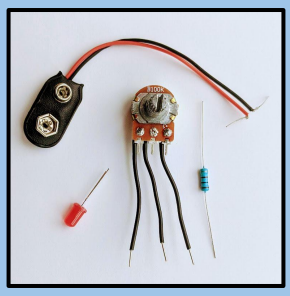


LESSON PLAN

Table of Contents







PREPARATION: You can put the Page 11 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 7 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 #MC1-02-PK (that has the experiment parts) with a 9-Volt battery. Give these items to each student along with the 7 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

Mr. CIRCUIT® How A Potentiometer Works (Page 1)

MC1-02-R-1

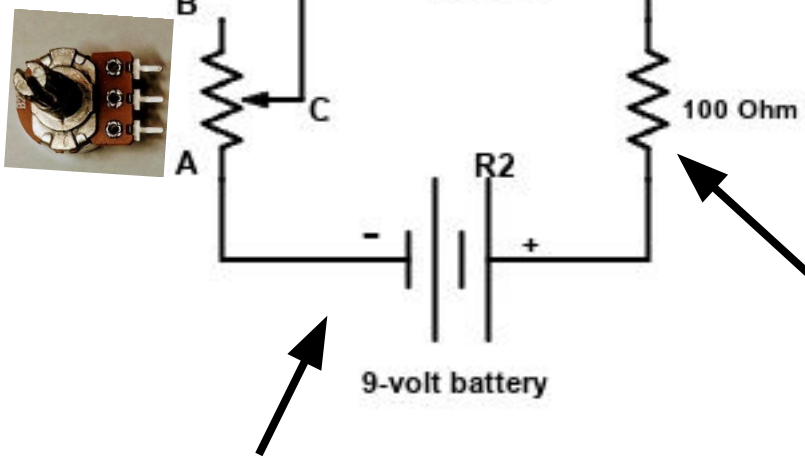
EXPLANATION OF EXPERIMENT

*** You are going to build a circuit to observe a potentiometer varying the current flow in a circuit.

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

1 R2, (the squiggly line labeled A, B, C) represents a potentiometer..

2 The LED symbol (a circle with an arrow in it) represents a light-emitting diode that lights up when electric current is flowing through it.



3 R1, (the squiggly line) represents a resistor.

4 The symbol (with the straight lines and a plus and minus sign) represents a battery.

The electron current in this circuit flows out of the negative side of the battery through the potentiometer, through the LED, through the 100 Ohm resistor and then back to the positive side of the battery.

(Continue to Page 2)

Mr. CIRCUIT® How A Potentiometer Works (Page 2)

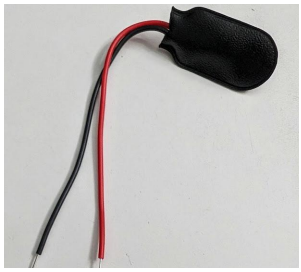
MC1-02-R-2

PURPOSE OF THIS EXPERIMENT

*** To observe a potentiometer varying current flow in a circuit.

PARTS NEEDED FOR EXPERIMENT

In this experiment, you will use a **Battery Snap**

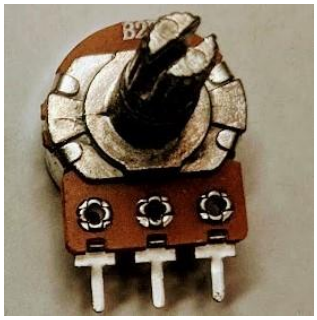


100 Ohm resistor

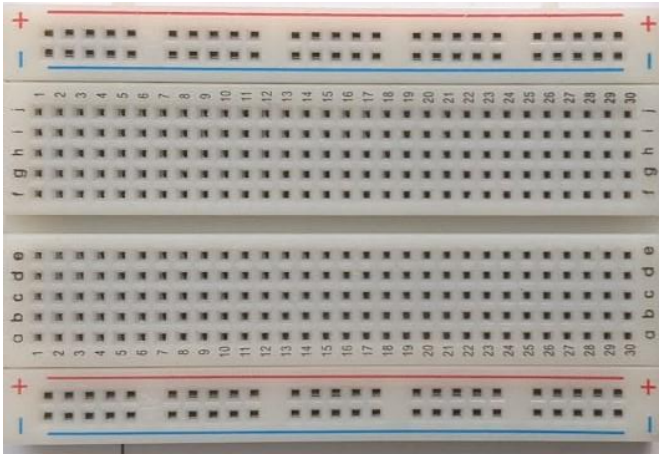
NOTE: THIS RESISTOR IS IN THE CIRCUIT TO LIMIT THE CURRENT WHEN THE POTENTIOMETER IS ADJUSTED TO ZERO OHMS. IF WE CONNECT THE LED DIRECTLY TO NINE VOLTS, THE LED WILL BURN OUT.

an LED

a **Potentiometer**



and a **Solderless Circuit Board.**



You will also need a good 9 Volt battery

(Continue to Page 3)

Mr. CIRCUIT® How A Potentiometer Works (Page 3)

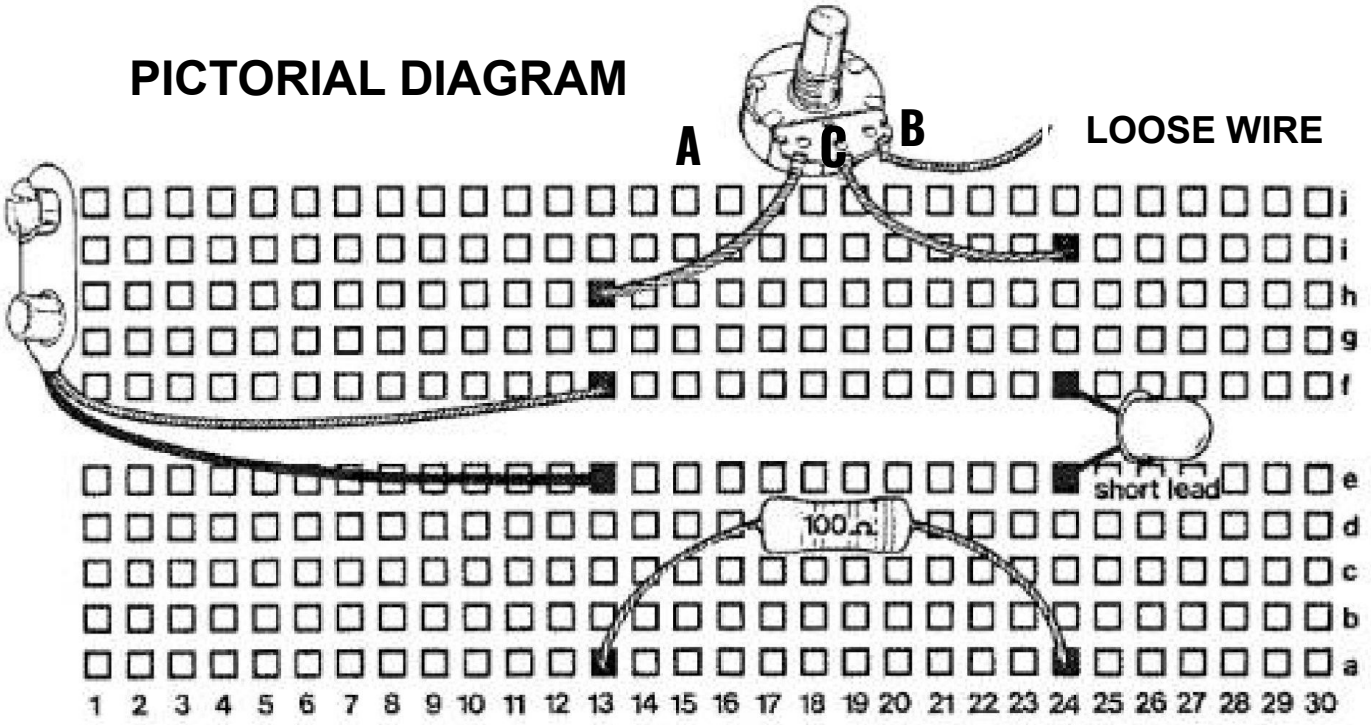
MC1-02-R-3

DO THE EXPERIMENT (part 1 of 2)

***** You are going to build a circuit to demonstrate how a potentiometer varies the amount of current in a circuit.**

Step 1 - Take out a **100 Ohm resistor** from your parts kit. (It has color bands Brown, Black, Brown, Gold) Install the resistor by putting one lead into hole **13a** and the other lead into hole **24a** as shown in the pictorial diagram.

PICTORIAL DIAGRAM



Step 2 - Install an **LED** with its short lead into hole **24e** and its long lead into hole **24f.**

Step 3 - Install the potentiometer as shown on the pictorial into holes **13h** and **24i**. (Note: leave one wire loose as shown in pictorial diagram.

Step 4 - Install a **Battery Snap** with its Red lead in hole **13f** and its Black lead in hole **13e.**

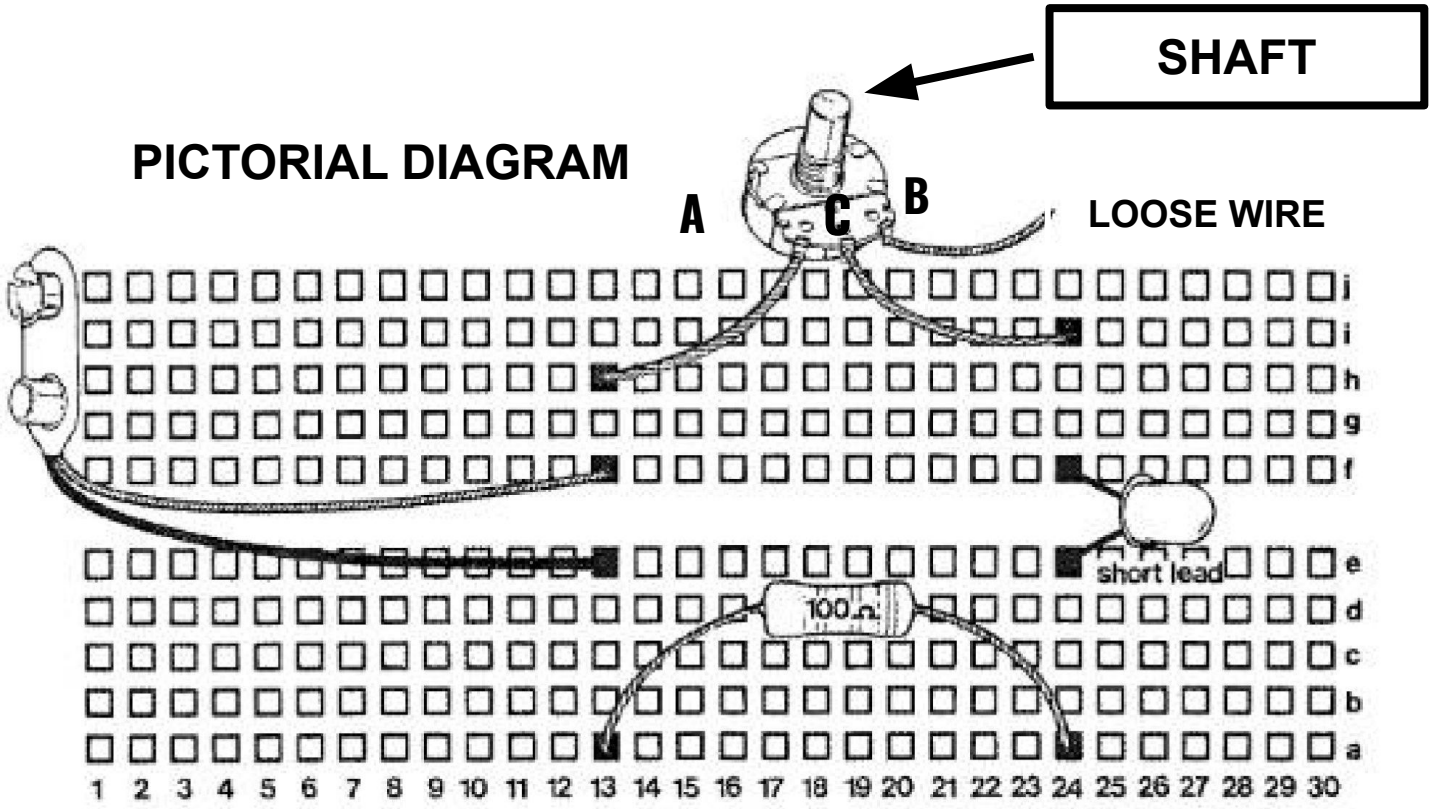
(Continue to Page 4)

Mr. CIRCUIT® How A Potentiometer Works (Page 4)

MC1-02-R-4

DO THE EXPERIMENT (part 2 of 2)

Step 5 - Connect the battery to the battery snap and twist the shaft on the potentiometer and observe how this affects the brightness the LED.



CONCLUSION

*** You should have noticed that you can vary the electron current in a circuit with a potentiometer. As you change the resistance in the potentiometer by twisting the shaft clockwise and counter-clockwise, the LED gets brighter and dimmer.

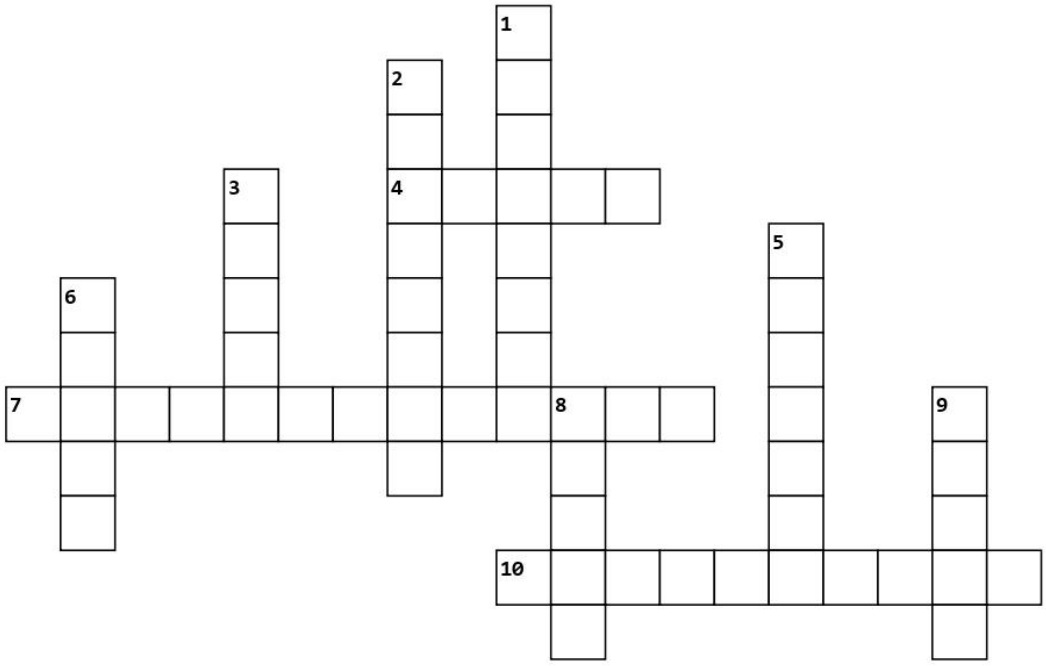
(End of Experiment 2)

Mr. CIRCUIT®

MC1-02-CW

CROSSWORD

Experiment 2 - "How A Potentiometer Works"



Across

4. To change the resistance on a potentiometer, you twist the _____ .

7. What component can vary current in a circuit?

10. The change in current is caused by the change in _____ .

Down

1. The electrons come out of the _____ terminal of the battery.

2. A potentiometer is a variable _____ .

3. What is the third color band on a 100 Ohm resistor?

5. The purpose of the 100 Ohm resistor in the circuit is to _____ the LED.

6. The word LED stands for Light-Emitting _____ .

8. How many terminals does a potentiometer have?

9. What is the color of the negative lead on the battery snap?

Mr. CIRCUIT®

MC1-02-WS

WORD SEARCH

Experiment 2 - "How A Potentiometer Works"

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

1. What component can vary current in a circuit?

2. What is the third color band on a 100 Ohm resistor?

3. To change the resistance on a potentiometer, you twist the _____ .

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5. What is the color of the negative lead on the battery snap?

6. The purpose of the 100 Ohm resistor in the circuit is to _____ the LED.

7. The change in current is caused by the change in _____ .

8. The electrons come out of the _____ terminal of the battery.

9. The word LED stands for Light-Emitting _____ .

10. A potentiometer is a variable _____ .

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

QUIZ for Exp 02 or STEM KIT #02
in the Mr Circuit Electronics Training Lab 1

(Page 7)

This Quiz covers the training learned by completing

"How a Potentiometer Works" Experiment 2

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

A B C D

#1 Between which leads on the Potentiometer in Experiment #02 does the resistance measure the maximum?
A. leads A and B
B. leads A and C
C. leads C and B
D. there is no maximum resistance

A B C D

#2 The 'cursor' on the Potentiometer is connected to which lead?

A. C
B. A
C. it is not connected to any lead
D. B

A B C D

#3 The resistance value of the Potentiometer is zero when the 'cursor' is moved next to which lead?
A. B
B. A
C. black
D. C

A B C D

#4 Does the polarity of the battery connection matter in this circuit?

A. NO
B. it is not important
C. YES
D. the LED will light up either way

A B C D

#5 In Exp. #2, what is the name of the electronic component that you are learning about?
A. the Potentiometer
B. an LED
C. a capacitor
D. a battery snap

A B C D

#6 What is the function of the Potentiometer in Exp. #2?

A. to vary the capacitance in the circuit
B. to reduce proton flow
C. to slow down the speed of the electrons
D. to vary the resistance in the circuit

A B C D

#7 In Exp. #2, what is the purpose of the 100 ohm resistor in the circuit?

A. to protect the LED from burning out
B. to increase the amount of current flowing
C. to make the circuit more interesting
D. to increase the parts used in the circuit

A B C D

#8 When you twist the shaft on a Potentiometer, it varies its _____ .

A. resistance
B. capacitance
C. area
D. wattage

A B C D

#9 To set the Potentiometer at its maximum resistance you have to move the 'cursor' next to which lead?
A. B
B. A
C. black
D. C

A B C D

#10 The LED is the brightest when the 'cursor' on the Potentiometer is next to which lead?

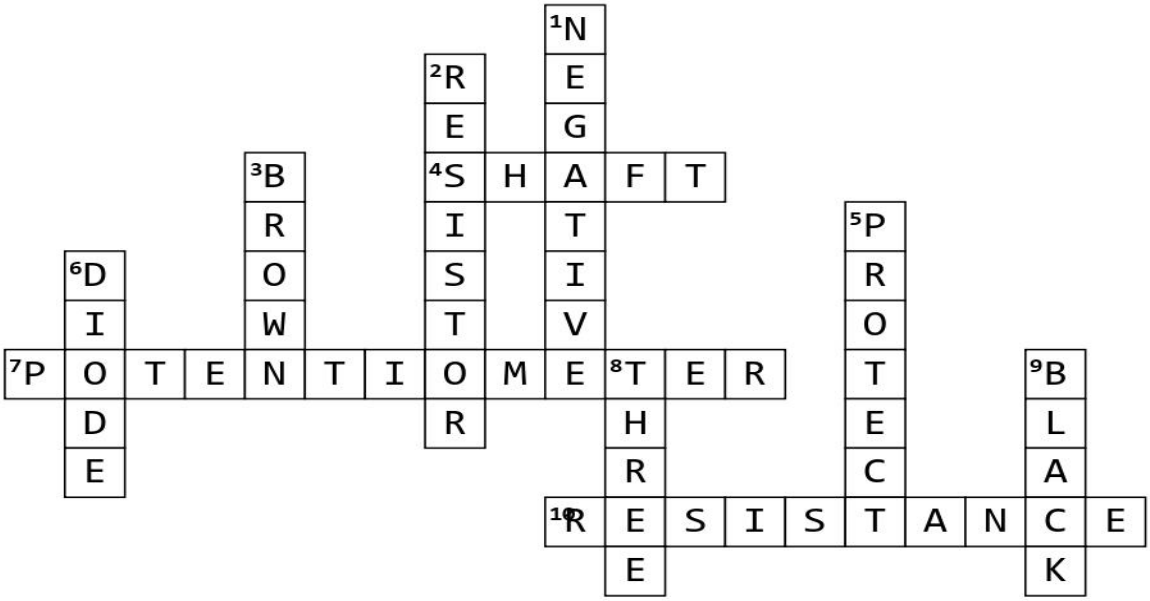
A. B
B. A
C. black
D. C

(Form SQ02)

Score

ANSWERS FOR CROSSWORD

Experiment 2 - "How A Potentiometer Works"



Across

4. To change the resistance on a potentiometer, you twist the _____ .

7. What component can vary current in a circuit?

10. The change in current is caused by the change in _____ .

Down

1. The electrons come out of the _____ terminal of the battery.

2. A potentiometer is a variable _____ .

3. What is the third color band on a 100 Ohm resistor?

5. The purpose of the 100 Ohm resistor in the circuit is to _____ the LED.

6. The word LED stands for Light-Emitting _____ .

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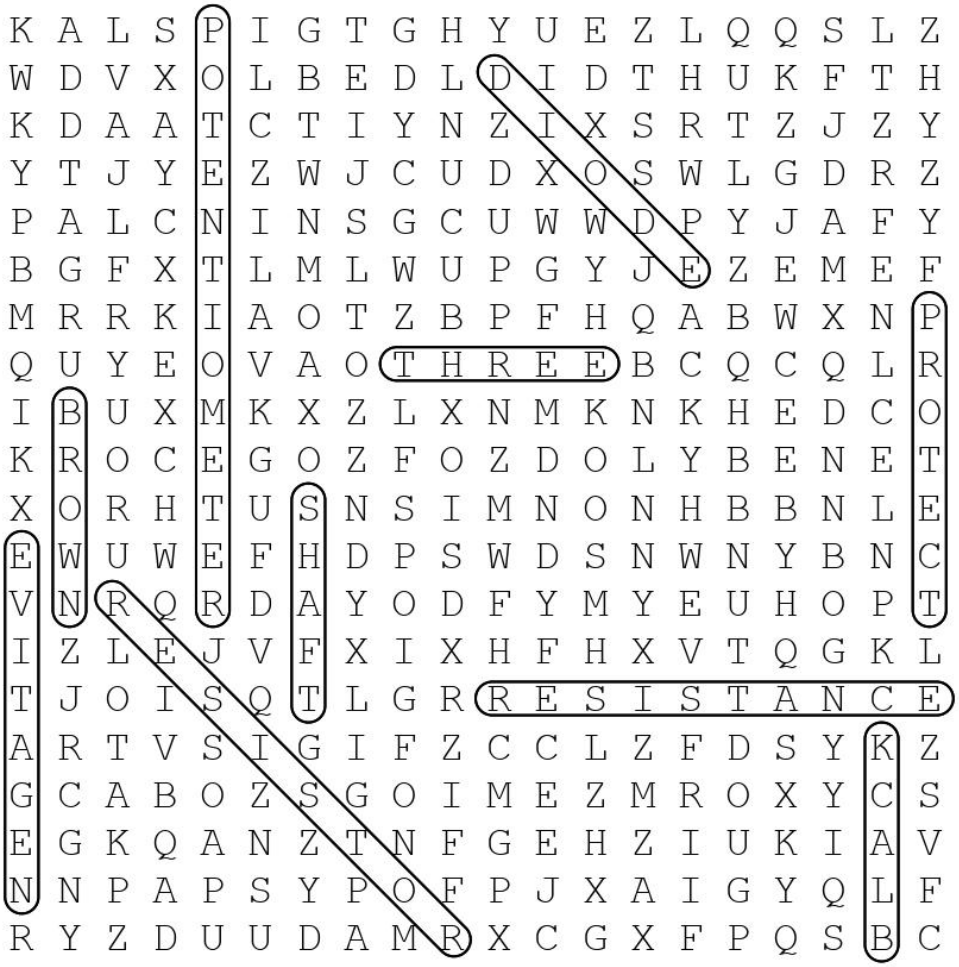
ANSWERS FOR WORD SEARCH

Experiment 2 - "How A Potentiometer Works"



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QUICK-CHECK ANSWER KEY for Experiment 02 QUIZ
for Mr Circuit Electronics Training ("How a Potentiometer 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.

#1 Between which leads on the Potentiometer in Experiment #02 does the resistance measure the maximum?
A. leads A and B
B. leads A and C
C. leads C and B
D. there is no maximum resistance

(A) B C D

#2 The 'cursor' on the Potentiometer is connected to which lead?

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D. B

(A) B C D

#3 The resistance value of the Potentiometer is zero when the 'cursor' is moved next to which lead?
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A (B) C D

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A B (C) D

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D. to vary the resistance in the circuit

A B C (D)

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(A) B C D

#10 The LED is the brightest when the 'cursor' on the Potentiometer is next to which lead?

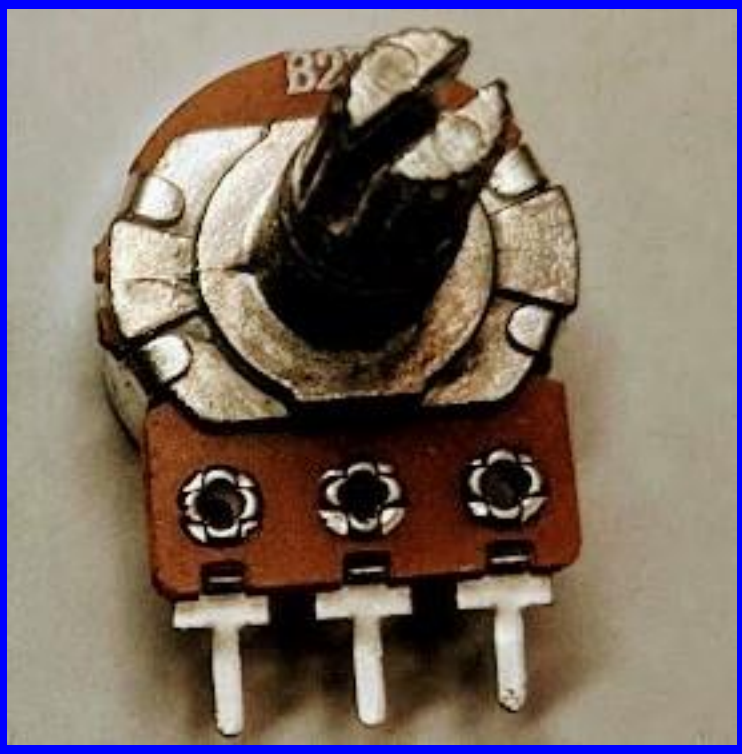
A. B
B. A
C. black
D. C

A (B) C D

(Form SQAK02)

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

POTENTIOMETERS VARY CURRENT

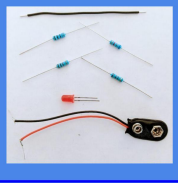


BASIC ELECTRONICS LAB 1

"HOW A POTENTIOMETER WORKS"

(Poster MC1-02-P01)

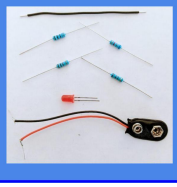
MC1-01
Electronic Parts



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
MC1-11-PK	Parts Kit for "How a 555 Timer IC Works	$2.95
MC1-12-PK	Parts Kit for "Burglar Alarm circuit	$3.95
MC1-13-PK	Parts Kit for "Solar-Activated Night Light circuit	$3.95
MC1-14-PK	Parts Kit for "DC to DC Power Supply circuit	$2.95
MC1-15-PK	Parts Kit for "Electronic Metronome circuit	$4.95
MC1-16-PK	Parts Kit for "Electronic Motorcycle circuit	$3.95
MC1-17-PK	Parts Kit for "Railroad Lights circuit	$2.95
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
MC1-24-PK	Parts Kit for "Moisture Detector circuit	$2.95
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**