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Mr Circuit Technology**Science/Electronics Experiment Kits and Labs****“HOW A RESISTOR WORKS”****LESSON PLAN****Table of Contents**

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Page 13 - Price List for Parts Kits for your to order more. Send Purchase Order to Gary@MrCircuitTechnology.com or order online at www.MrCircuitTechnology.com

Experiment Parts Kit
#MC1-00-PK
Solderless
Circuit Board
Exciting, Educational
and Fun



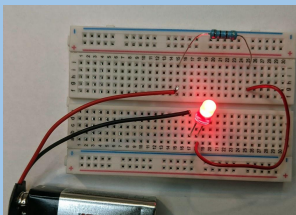
Experiment Parts only
(packaged in a 3x5 inch
resealable plastic bag.)

**LEARN more today,
EARN more tomorrow!**


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Experiment 1 Parts Kit
#MC1-01-PK
“How a Resistor
Works”
Exciting, Educational
and Fun



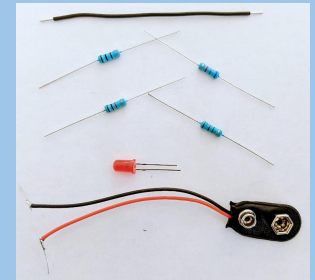
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Mr Circuit Technology
Science/Electronics Kits and Labs



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 #MC1-01-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

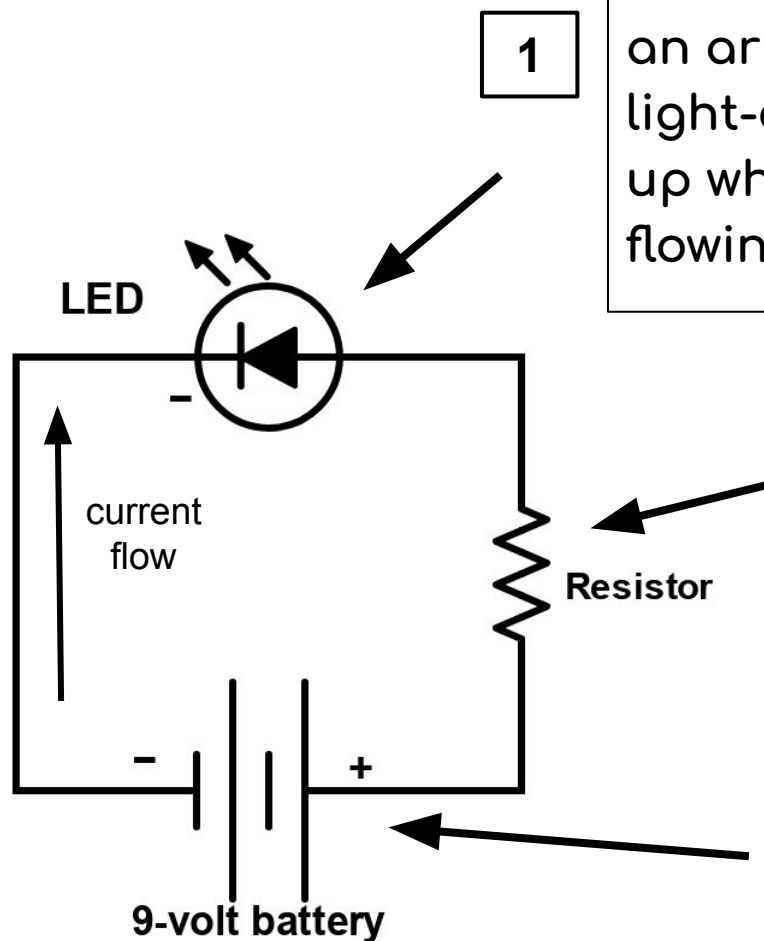
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EXPLANATION OF EXPERIMENT

MC1-01-R-1

You are going to build a circuit to observe a resistor controlling current flow in a circuit.

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



1 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.

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

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

The current in this circuit flows out of the negative side of the battery to the LED. Then the current flows out of the LED and through the resistor back to the battery.

(Continue to Page 2)

PURPOSE OF THIS EXPERIMENT

To observe a resistor controlling current flow in a circuit.

PARTS NEEDED FOR EXPERIMENT

In this experiment, you will use a Battery Snap



four resistors

100 OHM

220 OHM



1000 OHM

6800 OHM

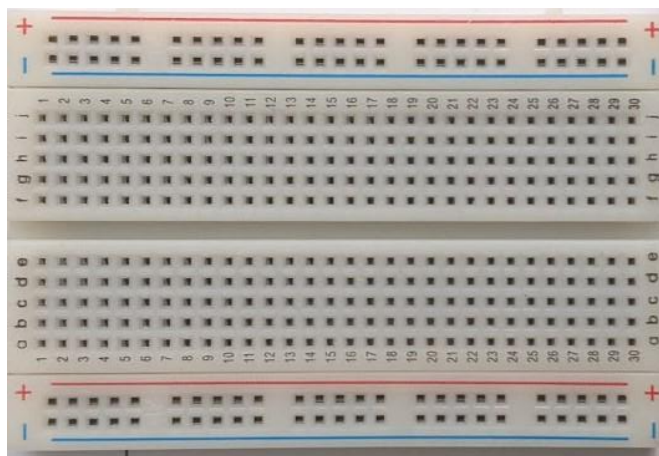
an LED



a Jumper Wire



and a Solderless Circuit Board.



You will also need a good 9 Volt battery

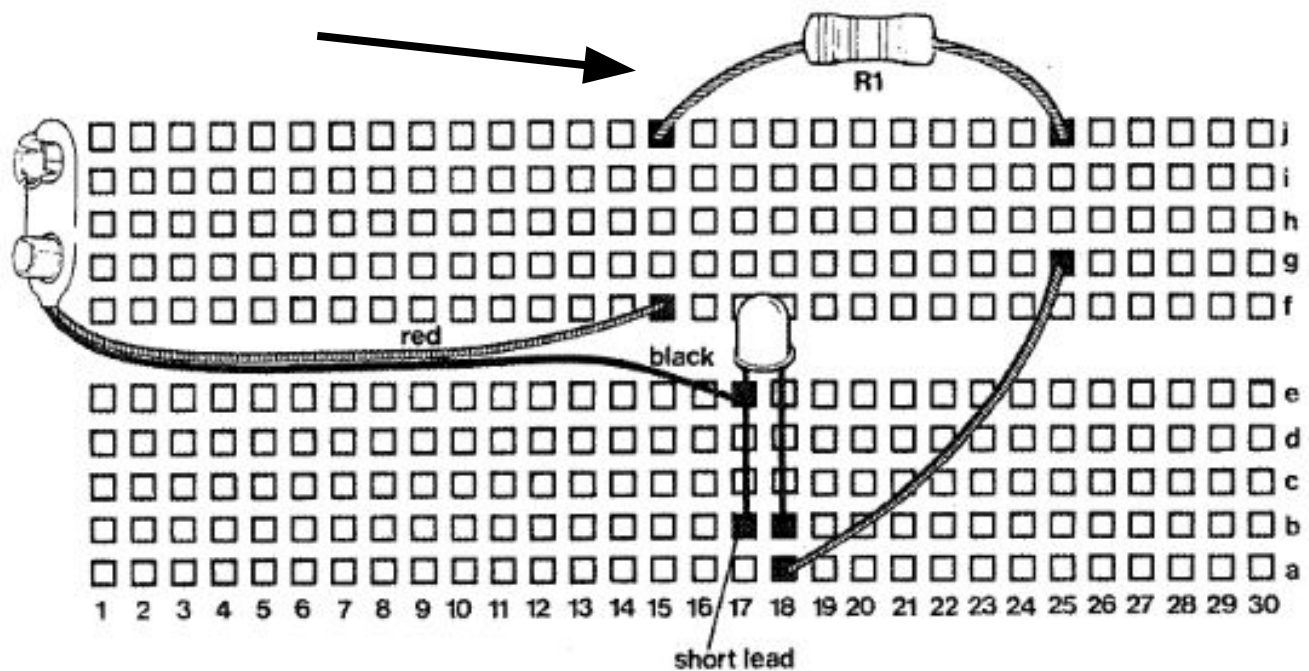
(Continue to Page 3)

DO THE EXPERIMENT (part 1 of 3)

MC1-01-R-3

You are going to build a circuit to demonstrate how resistors control 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 16j and the other lead into hole 25j as shown in the pictorial diagram.



Step 2 - Install an LED with its short lead into hole 17b and its long lead into hole 18b.

Step 3 - Install a Jumper Wire into holes 18a and 25g.

Step 4 - Install a Battery Snap with its Red lead in hole 15f and its Black lead in hole 17e.

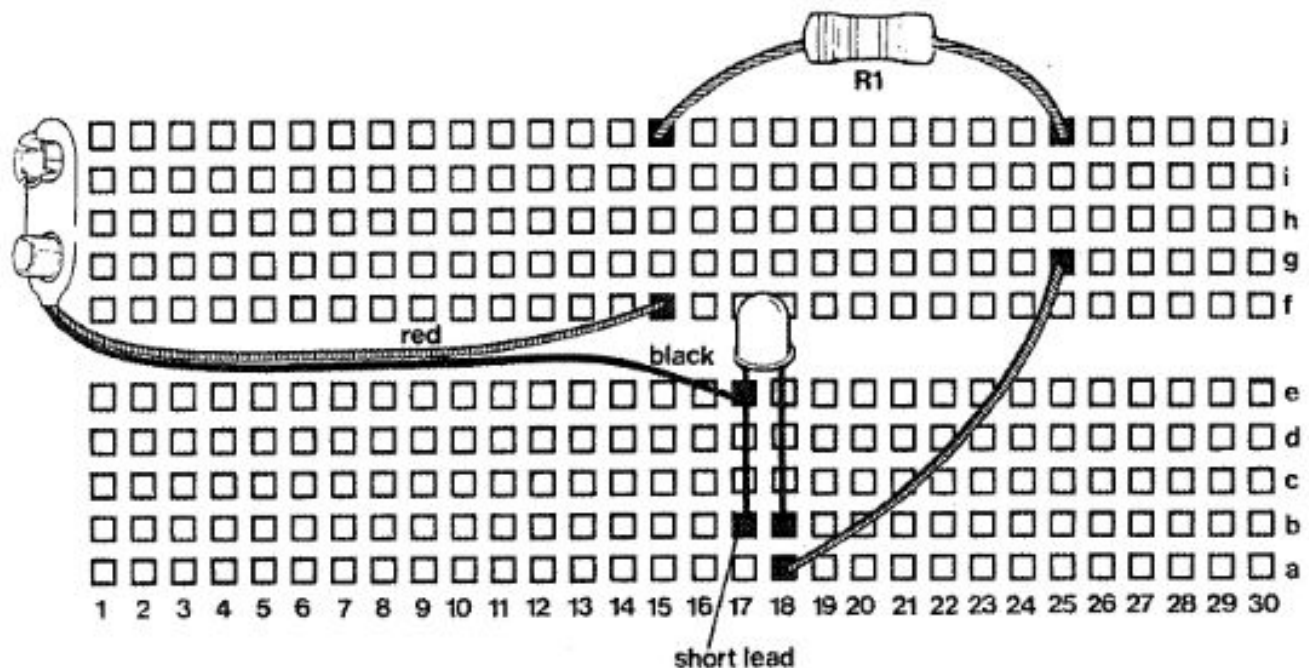
(Continue to Page 4)

DO THE EXPERIMENT (part 2 of 3)

MC1-01-R-4

Step 5 - Touch the battery to the battery snap and observe how bright the LED is.

Step 6 - Find the 220 Ohm resistor, (color bands Red, Red, Brown, Gold) and put in place of the 100 Ohm resistor. Then touch the battery to the snap and observe the brightness of the LED. Is it brighter or dimmer?



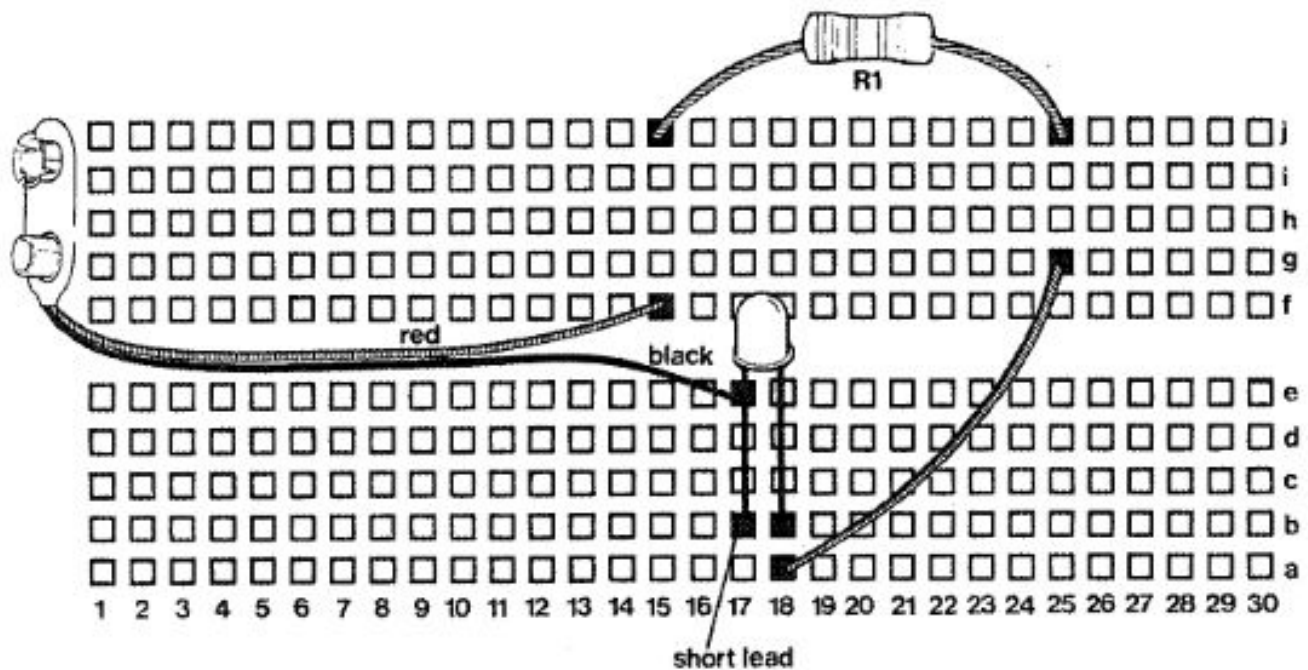
Step 7 - Find the 1000 Ohm resistor, (color bands Brown, Black, Red, Gold) and put in place of the 220 Ohm resistor. Then touch the battery to the snap and observe the brightness of the LED. Is it brighter or dimmer?

(Continue to Page 5)

DO THE EXPERIMENT (part 3 of 3)

MC1-01-R-5

Step 8 - Find the 6800 Ohm resistor, (color bands Blue, Gray, Red, Gold) and put in place of the 1000 Ohm resistor. Then touch the battery to the snap and observe the brightness of the LED. Is it brighter or dimmer?



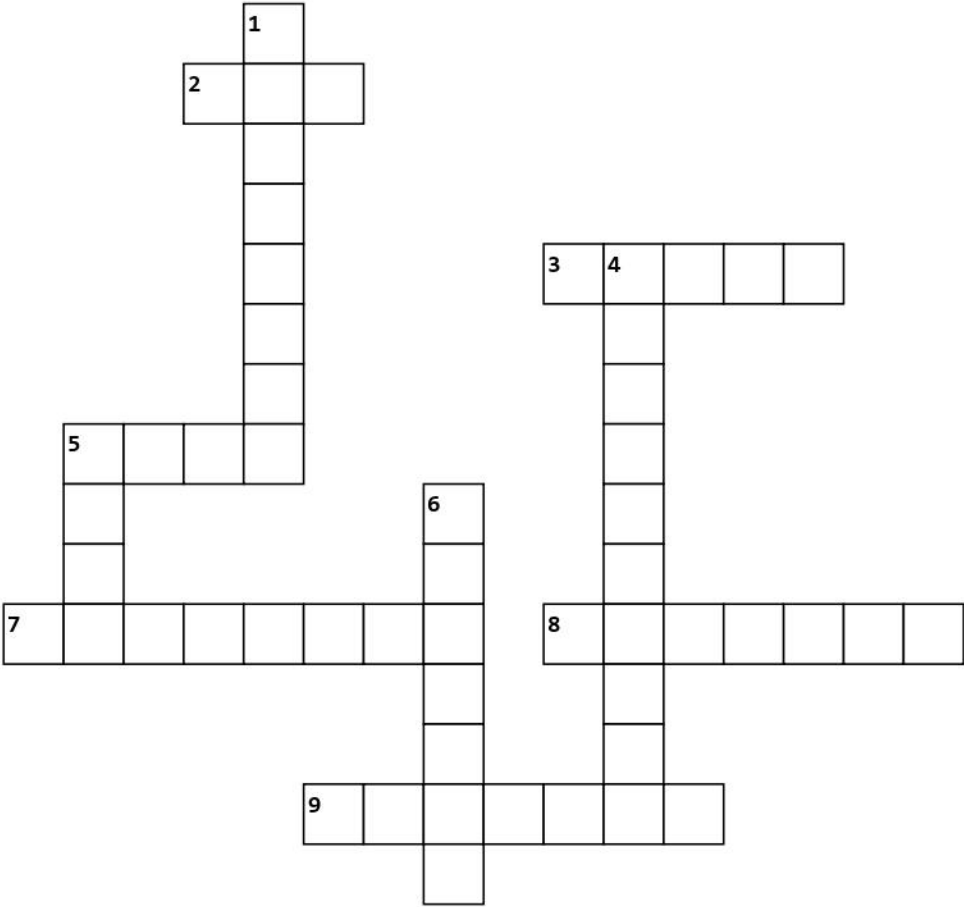
CONCLUSION

You should have noticed that as you increase the ohms of the resistor in the circuit, the LED gets dimmer. So, therefore, a resistor controls the amount of current flowing in a circuit. The higher the resistance, the lower the current flowing in a circuit.

(End of Experiment)

CROSSWORD

Experiment 1 - "How A Resistor Works"



Across

- 2. What color is the positive lead on the battery snap?
- 3. What is the first color on a 1000 Ohm resistor?
- 5. What is the color of the third band on a 6.8k Ohm resistor?
- 7. The brightness of the LED depends on the Ohms of the
- 8. What is the short lead on an LED is connected to?
- 9. How many Ohms made the LED the brightest?

Down

- 1. Which side of the battery do the electrons flow from?
- 4. What reduces the current flow in a circuit?
- 5. What is the first color band on a 6800 Ohm resistor?
- 6. What determines the brightness of the LED?

Experiment 1 - "How A Resistor Works"

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

1. resistor
2. led
3. current
4. battery
5. component
6. schematic
7. brightness
8. illuminate
9. flow
10. dimmer
11. ohms
12. opposition
13. progressively
14. jumper
15. wire
16. snap
17. diagram
18. pictorial
19. indicator
20. series
21. negative
22. positive
23. performing
24. experiment
25. value



QUIZ for Experiment 1 in Mr Circuit Lab 1

This Quiz covers the training learned by completing



“How a Resistor Works” Experiment 1

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

A
B
C
D

#1 In Experiment #1, the brightness of the LED depends on _____ .

A. the capacitor value in the circuit
 B. the value of the resistor in the circuit
 C. the solderless circuit board
 D. the battery snap

#6 The short lead on an LED is?

A. the Gate
 B. the Anode
 C. the Cathode
 D. the Positive

A
B
C
D

A
B
C
D

#2 Of the four values of resistors in Exp. #1, which value caused the LED to be the brightest?

A. 100 ohm
 B. 220 ohm
 C. 1k ohm
 D. 6.8k ohm

#7 What are the colors on a 1000 Ohm $\pm 5\%$ resistor?

A. brown, black, red, gold
 B. green, blue, red, silver
 C. blue, gray, red, gold
 D. brown, red, green silver

A
B
C
D

A
B
C
D

#3 What color is the third band on the 6.8k ohm resistor?

A. blue
 B. green
 C. black
 D. red

#8 With an LED in a circuit, the more _____, the greater the brightness.

A. air
 B. capacitance
 C. current
 D. light

A
B
C
D

A
B
C
D

#4 Which side of battery does the electron current flow from?

A. positive side
 B. left side
 C. negative side
 D. top side

#9 To reduce the amount of current flowing in a circuit, you can _____ the amount of resistance.

A. increase
 B. decrease
 C. rotate
 D. circle

A
B
C
D

A
B
C
D

#5 What is the color of the positive lead on the battery snap?

A. green
 B. red
 C. black
 D. yellow

#10 Of the four values of resistors in Exp. #1, which value caused the LED to be the dimmest?

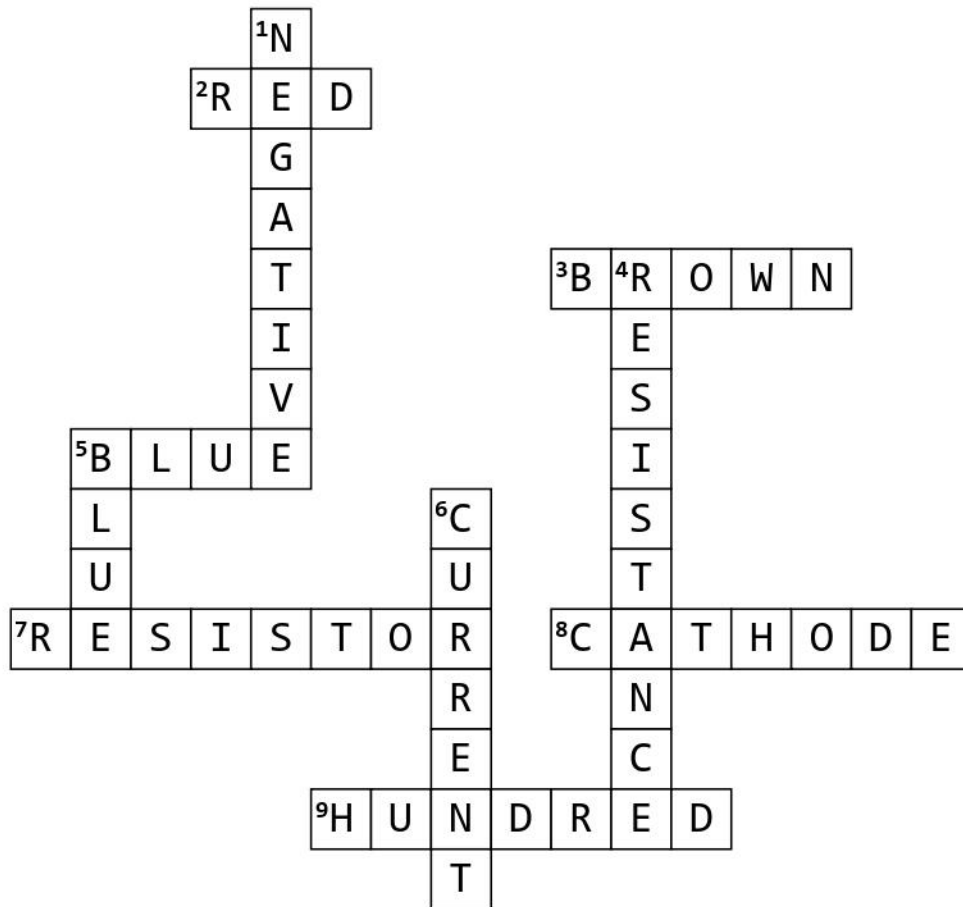
A. 100 ohm
 B. 220 ohm
 C. 1k ohm
 D. 6.8k ohm

A
B
C
D

Score	
-------	--

ANSWERS FOR CROSSWORD

Experiment 1 - "How A Resistor Works"



Across

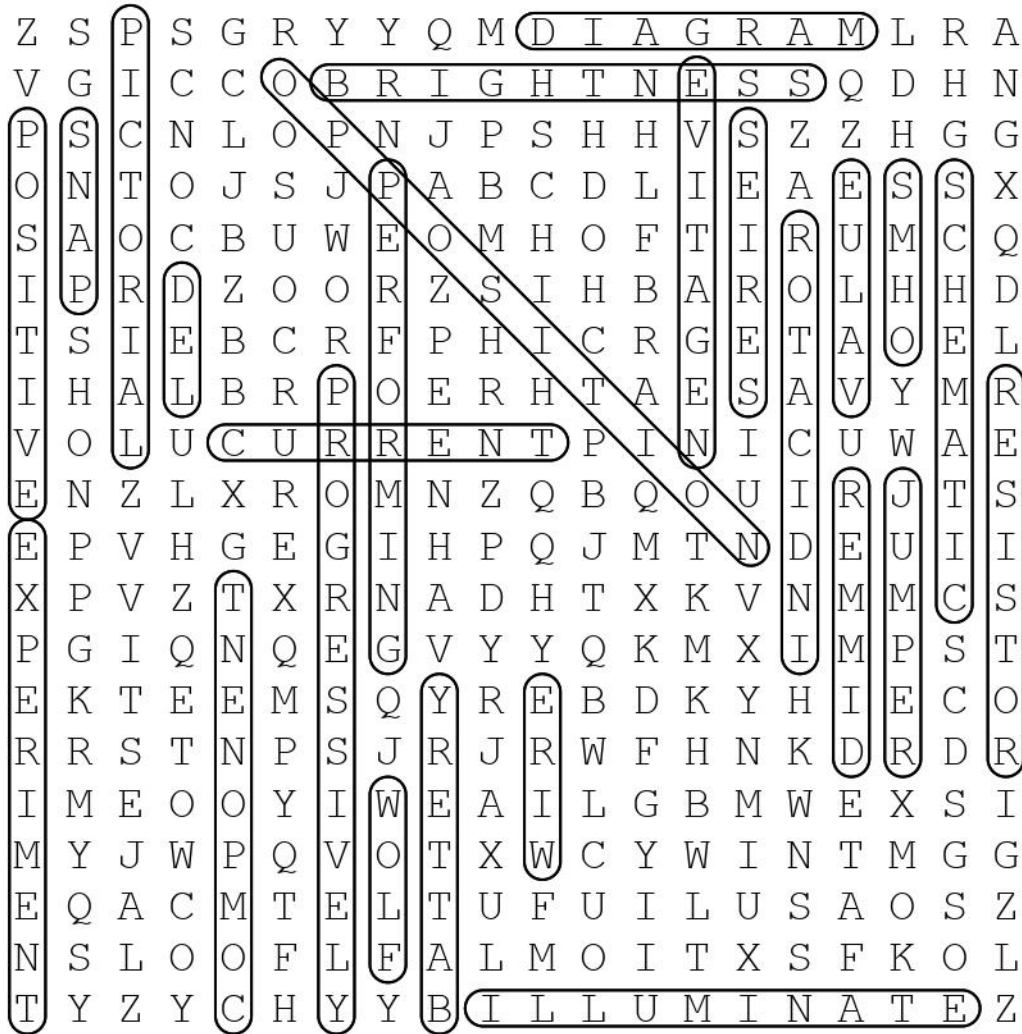
2. What color is the positive lead on the battery snap?
3. What is the first color on a 1000 Ohm resistor?
5. What is the color of the third band on a 6.8k Ohm resistor?
7. The brightness of the LED depends on the Ohms of the
8. What is the short lead on an LED is connected to?
9. How many Ohms made the LED the brightest?

Down

1. Which side of the battery do the electrons flow from?
4. What reduces the current flow in a circuit?
5. What is the first color band on a 6800 Ohm resistor?
6. What determines the brightness of the LED?

ANSWERS FOR WORD SEARCH

Experiment 1 - "How A Resistor Works"

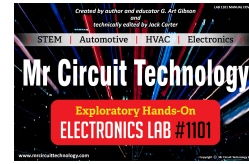


1. resistor
2. led
3. current
4. battery
5. component
6. schematic
7. brightness
8. illuminate
9. flow
10. dimmer
11. ohms
12. opposition
13. progressively
14. jumper
15. wire
16. snap
17. diagram
18. pictorial
19. indicator
20. series
21. negative
22. positive
23. performing
24. experiment
25. value

**QUICK-CHECK ANSWER KEY for Experiment 1 QUIZ
for Mr Circuit Electronics Training (“How a Resistor 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.

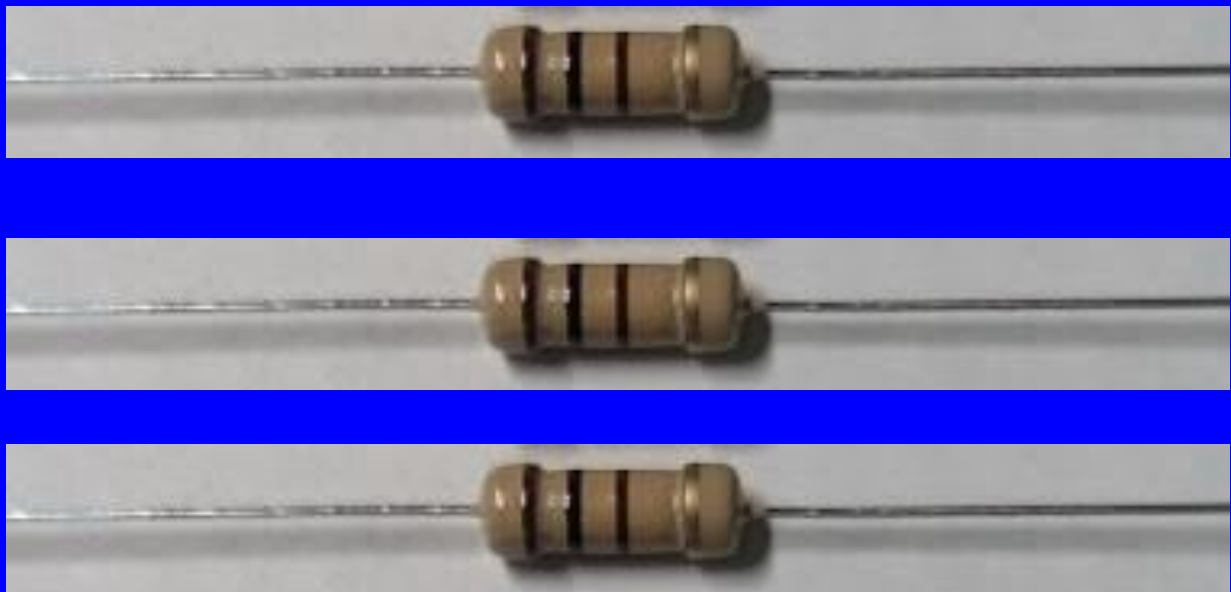
Count the right answers and record the score of right answers in your grade book.



<p>A <input checked="" type="radio"/> B C D</p>	<p>#1 In Experiment #1, the brightness of the LED depends on _____ .</p> <p>A. the capacitor value in the circuit B. the value of the resistor in the circuit C. the solderless circuit board D. the battery snap</p>	<p>#6 The short lead on an LED is?</p> <p>A. the Gate B. the Anode C. the Cathode D. the Positive</p>	<p>A B <input checked="" type="radio"/> C D</p>
<p><input checked="" type="radio"/> A B C D</p>	<p>#2 Of the four values of resistors in Exp. #1, which value caused the LED to be the brightest?</p> <p>A. 100 ohm B. 220 ohm C. 1k ohm D. 6.8k ohm</p>	<p>#7 What are the colors on a 1000 Ohm ±5% resistor?</p> <p>A. brown, black, red, gold B. green, blue, red, silver C. blue, gray, red, gold D. brown, red, green silver</p>	<p><input checked="" type="radio"/> A B C D</p>
<p>A B C <input checked="" type="radio"/> D</p>	<p>#3 What color is the third band on the 6.8k ohm resistor?</p> <p>A. blue B. green C. black D. red</p>	<p>#8 With an LED in a circuit, the more _____, the greater the brightness.</p> <p>A. air B. capacitance C. current D. light</p>	<p>A B <input checked="" type="radio"/> C D</p>
<p>A B <input checked="" type="radio"/> C D</p>	<p>#4 Which side of battery does the electron current flow from?</p> <p>A. positive side B. left side C. negative side D. top side</p>	<p>#9 To reduce the amount of current flowing in a circuit, you can _____ the amount of resistance.</p> <p>A. increase B. decrease C. rotate D. circle</p>	<p><input checked="" type="radio"/> A B C D</p>
<p>A <input checked="" type="radio"/> B C D</p>	<p>#5 What is the color of the positive lead on the battery snap?</p> <p>A. green B. red C. black D. yellow</p>	<p>#10 Of the four values of resistors in Exp. #1, which value caused the LED to be the dimmest?</p> <p>A. 100 ohm B. 220 ohm C. 1k ohm D. 6.8k ohm</p>	<p>A B C <input checked="" type="radio"/> D</p>

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

RESISTORS CONTROL CURRENT

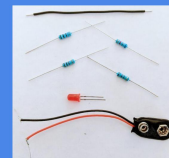
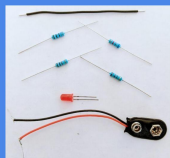


BASIC ELECTRONICS LAB 1

“HOW A RESISTOR WORKS”

(Poster MC1-P01)

(Page 12)



PRICE LIST May 2024

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PARTS KIT	Mr Circuit Series 1	Price
Number	SCIENCE / ELECTRONICS "PARTS KITS"	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