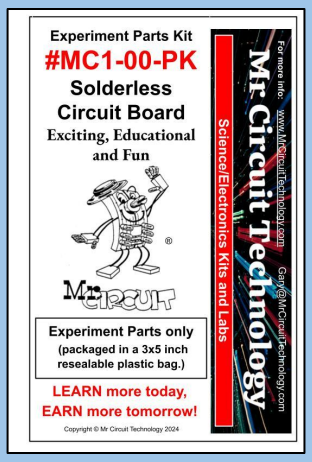
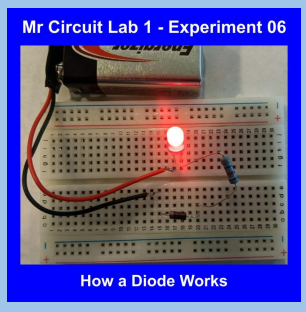
For more info: www.MrCircuitTechnology.com Gary@MrCircuitTechnology.com

Mr Circuit Technology

Science/Electronics Experiment Kits and Labs

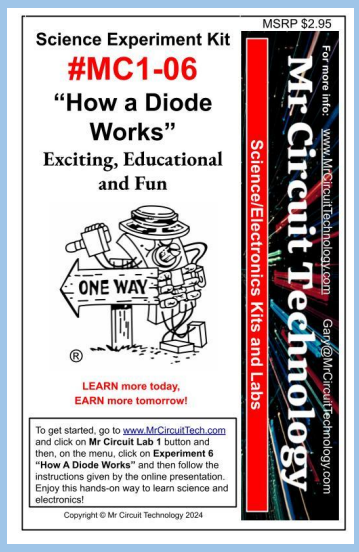
"HOW A DIODE WORKS"

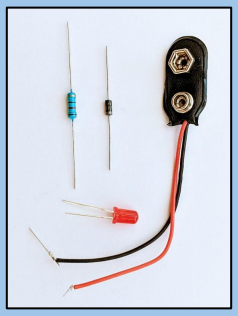




LESSON PLAN

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 #MC1-06-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 DIODE Works (Page 1)

MC1-06-R-1

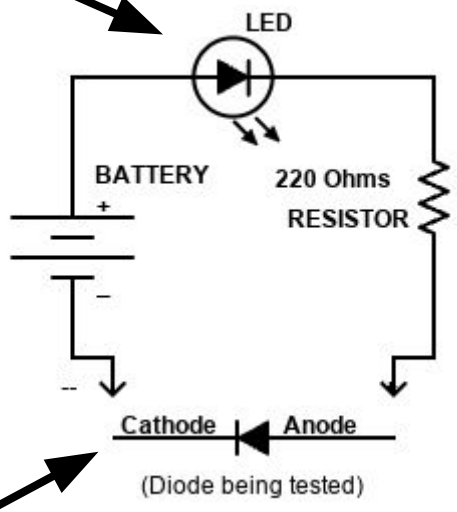
EXPLANATION OF EXPERIMENT

*** You are going to build a circuit to observe that a DIODE will allow current to flow in one-direction only, from Cathode to Anode. CATHODE  ANODE

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

1 This symbol represent a LED (light-emitting diode)

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



3 This is the schematic symbol for a diode. It has a Cathode and an Anode.

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

(Continue to Page 2)

How a DIODE Works (Page 2)

MC1-06-R-2

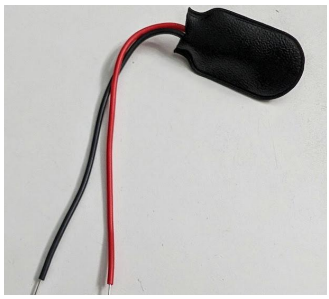
PURPOSE OF THIS EXPERIMENT

*** To observe a DIODE allowing current to flow in one direction only, from Cathode to Anode.

PARTS NEEDED FOR EXPERIMENT

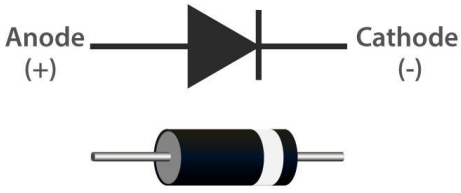
In this experiment, you will use

a BATTERY SNAP



an LED

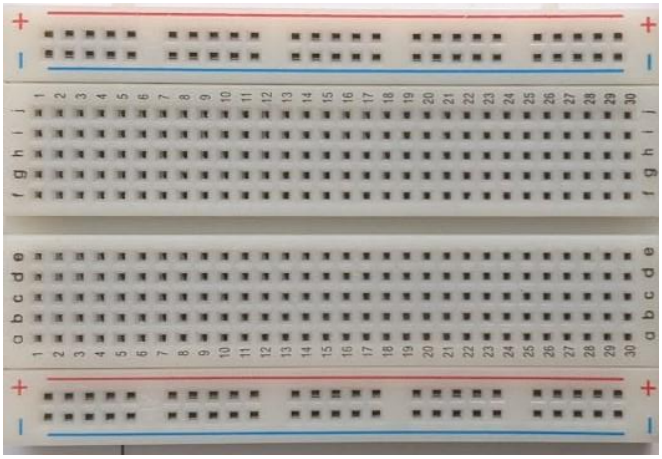
a DIODE



a **220 Ohm resistor**

A DIODE usually has a white band on the CATHODE end.

and a SOLDERLESS CIRCUIT BOARD.



You will also need a good 9 Volt battery

(Continue to Page 3)

How a DIODE Works (Page 3)

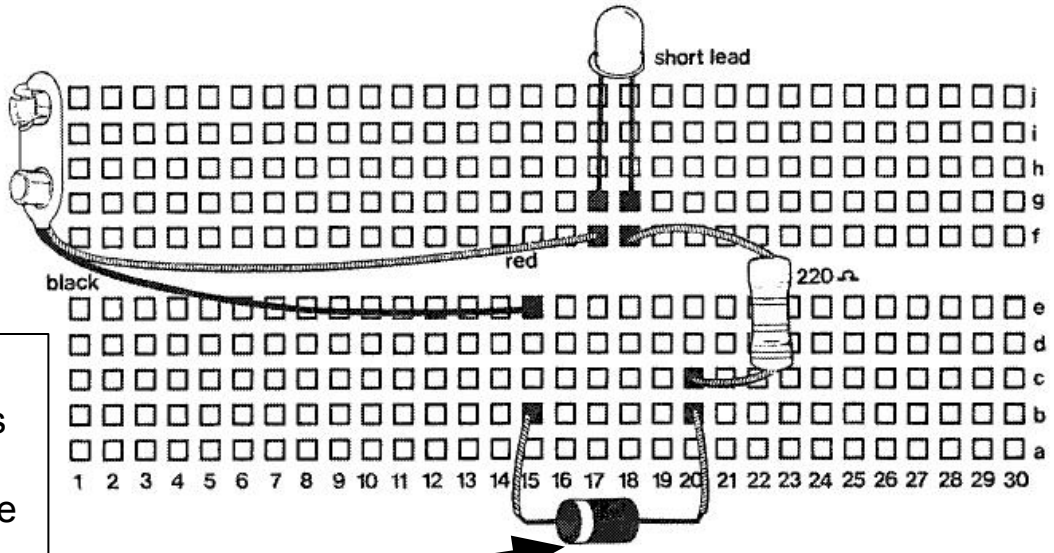
MC1-06-R-3

DO THE EXPERIMENT (part 1 of 3)

***** You are going to build a circuit to demonstrate a DIODE allowing current to flow in one direction only.**

Step 1 - Take out a **Battery Snap** and install it with its Red lead in hole **17f** and its Black lead in hole **15e** as shown in the pictorial diagram.

PICTORIAL DIAGRAM



A DIODE usually has a white band on the CATHODE end.

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

Step 3 - Install a 220 Ohm resistor (color bands Red, Red, Brown, Gold) as shown on the pictorial into holes **18f** and **20c**. (This resistor protects the LED from too much current.

(Continue to Page 4)

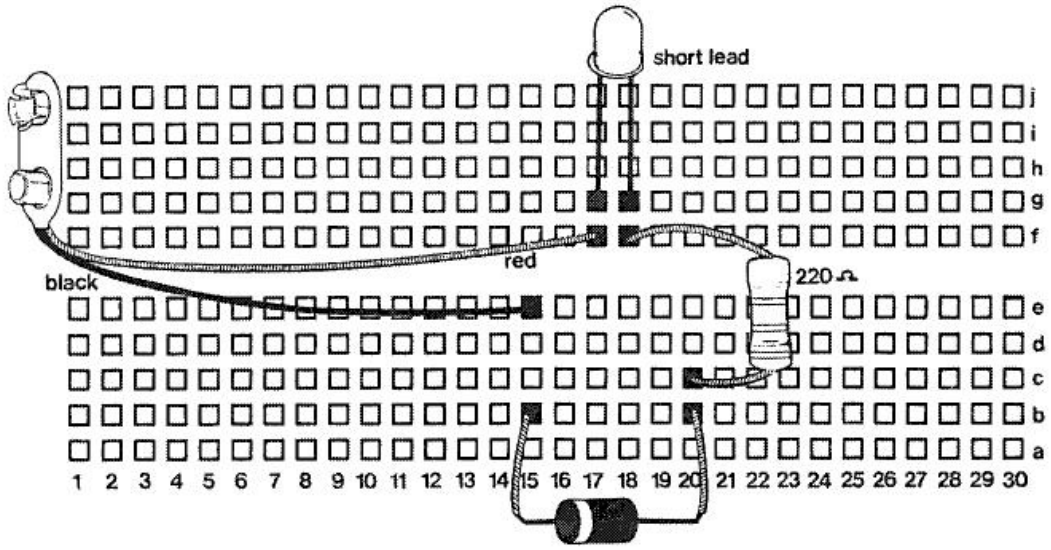
How a DIODE Works (Page 4)

MC1-06-R-4

DO THE EXPERIMENT (part 2 of 3)

Now, in this next step, you are going to install a DIODE on the SOLDERLESS CIRCUIT BOARD in the correct way so that the LED will light up. You are going to connect the CATHODE of the DIODE to the negative side of the battery. This will allow current to flow through the DIODE.

PICTORIAL DIAGRAM



Step 2 - Install the DIODE with the CATHODE lead into hole 15b and the ANODE into hole 20b.

Step 3 - Touch the battery to the BATTERY SNAP and you should see the LED light up.

(Continue to Page 5)

How a DIODE Works (Page 5)

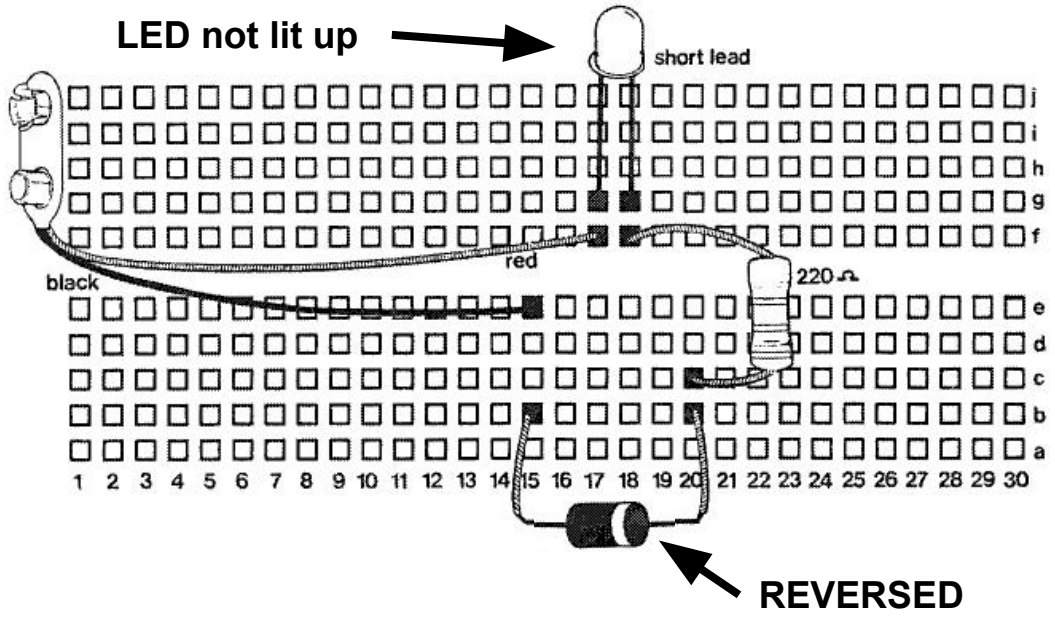
MC1-06-R-5

DO THE EXPERIMENT (part 3 of 3)

Step 4 - Now we are going to reverse the DIODE on the circuit board. Put the CATHODE lead into hole 20b and the ANODE lead into hole 15b.

Step 5 - Touch the battery to the BATTERY SNAP and what happens? You should see the LED not light up. This is correct since the DIODE will only allow current to flow in one direction.

PICTORIAL DIAGRAM



CONCLUSION

By doing this experiment you learned that a DIODE will allow current to flow in one direction only, from CATHODE to ANODE. A DIODE is known as a one-way Gate.

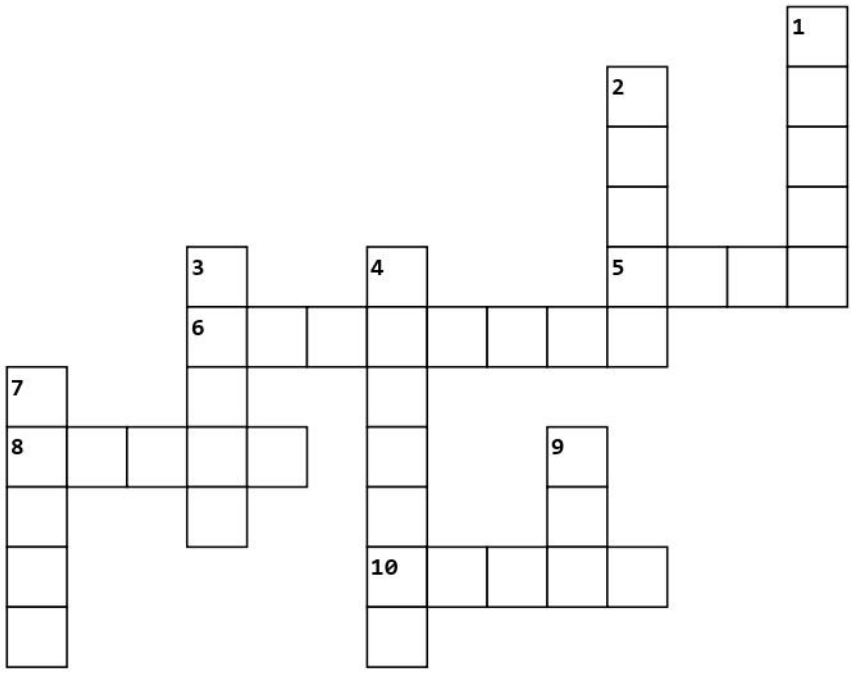
(End of Experiment 6)

Mr. CIRCUIT®

MC1-06-CW

CROSSWORD

Experiment 6 - "How a DIODE Works"



Across

5. True or False: A DIODE allow current to flow through it freely from the CATHODE to the ANODE.

6. The LED will light up only when the CATHODE of the DIODE is connected towards the _____ of the battery.

8. A DIODE allows current to flow through it from CATHODE to _____ .

10. A _____ has a CATHODE and an ANODE.

Down

1. What is the name of a component that allows current to flow only in one way?

2. The CATHODE of a DIODE is usually marked with a _____ band.

3. What side of a DIODE releases current flow?

4. What side of a DIODE accept current flow?

7. True or False: A DIODE allows current to flow through it freely in both ways.

9. The resistor in this circuit is to protect the _____ .

Mr. CIRCUIT®

MC1-06-WS

WORD SEARCH

Experiment 6 - "How a DIODE Works"

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

1. What is the name of a component that allows current to flow only in one way?

2. What side of a DIODE accept current flow? **3.** What side of a DIODE releases current flow?

4. A _____ has a CATHODE and an ANODE.

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7. A DIODE allows current to flow through it from CATHODE to _____ .

8. True or False: A DIODE allow current to flow through it freely from the CATHODE to the ANODE.

9. The resistor in this circuit is to protect the _____ .

10. The LED will light up only when the CATHODE of the DIODE is connected towards the _____ of the battery.

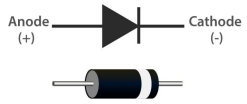
(Student Name) (Period/Student Number) (Date)

QUIZ for Exp 06 or STEM KIT #06
in the Mr Circuit Electronics Training Lab 1

(Page 8)

This Quiz covers the training learned by completing

"How a Diode Works" Experiment 6



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 #6, what is the component that you learned about?

A. a capacitor
B. a diode
C. an LED
D. a battery snap

A B C D

#2 A diode allows current to flow through it _____ .

A. freely both ways
B. in one direction only
C. if it is warm
D. only if there is a resistor in the circuit

A B C D

#3 How is the Cathode side of a diode marked on the diode itself?

A. with a double color stripe
B. with an arrow
C. with a white band around one end
D. with an asterisk

A B C D

#4 A diode allows an easy flow of electrons from _____ to _____ .

A. top, bottom
B. bottom, top
C. Anode, Cathode
D. Cathode, Anode

A B C D

#5 In Exp. #6, what component do we use to indicate that current is flowing?

A. a speaker
B. an LED
C. an electrolytic capacitor
D. a disc capacitor

A B C D

#6 The arrow on the schematic symbol for a diode points to the _____ .

A. Anode
B. Gate
C. Door
D. Cathode

A B C D

#7 An LED is also a type of _____ .

A. inductor
B. diode
C. capacitor
D. speaker

A B C D

#8 If we were to increase the value of the resistor in the circuit from 220 Ohms to 1000 Ohms, how would that affect the LED?

A. the LED would increase its brightness
B. the LED would reduce in brightness
C. the current flow in the LED would increase
D. the brightness would stay the same

A B C D

#9 If the LED lights up the same regardless of the polarity of the diode in the circuit, what would we assume?

A. the LED is defective
B. the diode is working fine
C. the battery is weak
D. the diode is defective

A B C D

#10 A diode is considered a _____ .

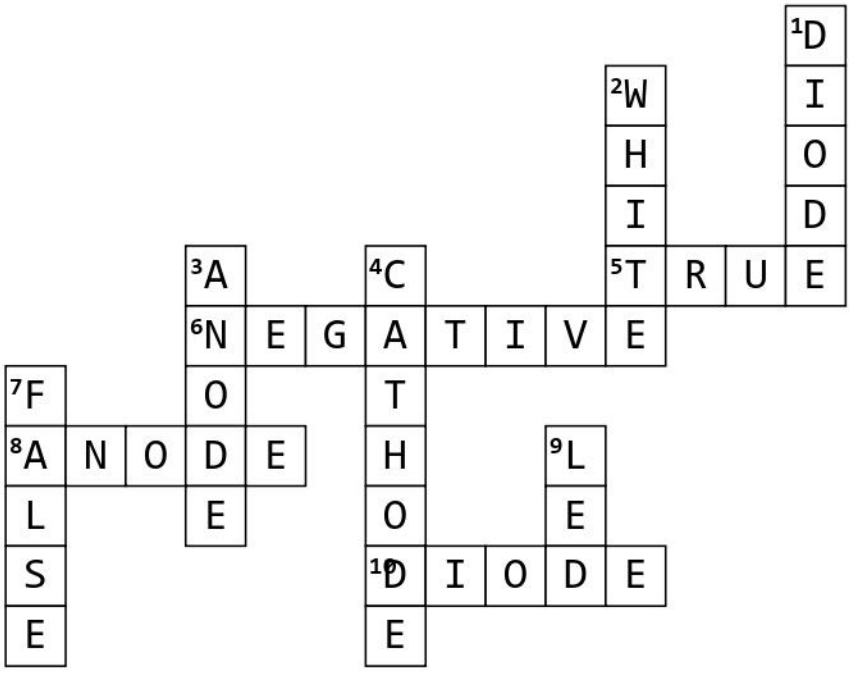
A. simple resistor
B. one-way gate
C. a variable resistor
D. a simple capacitor

Packet (Form SQ06)

Score

ANSWERS FOR CROSSWORD

Experiment 6 - “How a DIODE Works”



Across

5. True or False: A DIODE allow current to flow through it freely from the CATHODE to the ANODE.

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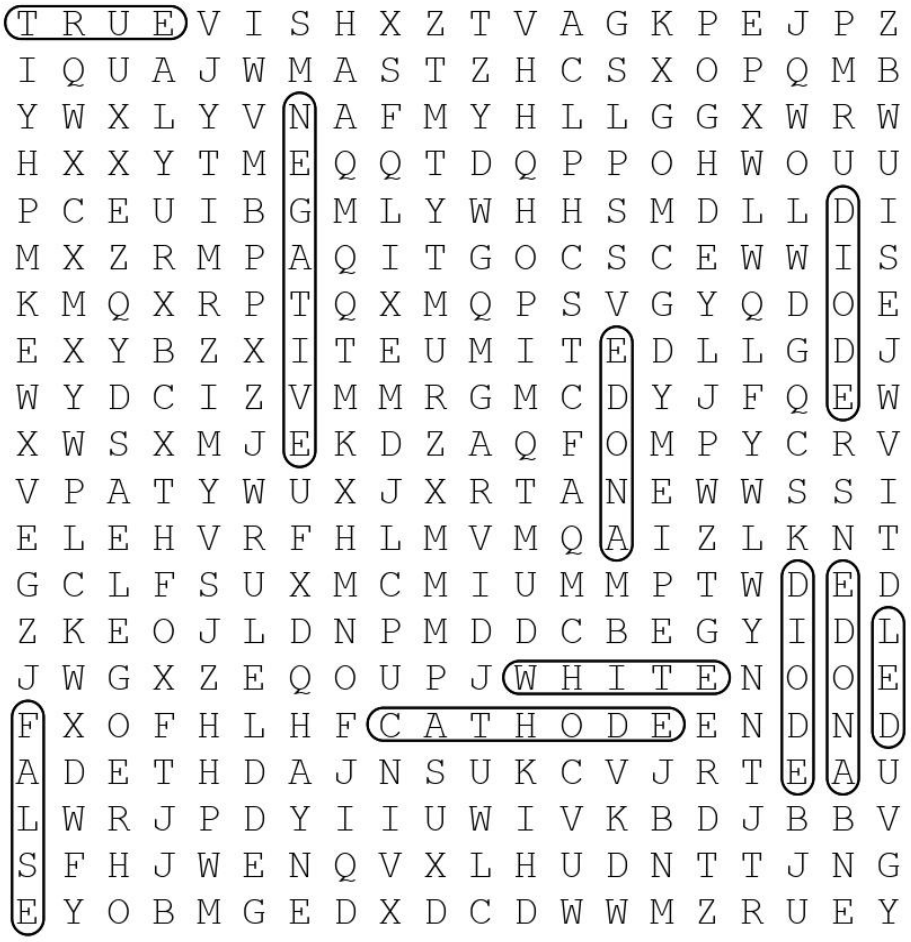
ANSWERS FOR WORD SEARCH

Experiment 6 - "How a DIODE Works"



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7. A DIODE allows current to flow through it from CATHODE to _____ .

8. True or False: A DIODE allow current to flow through it freely from the CATHODE to the ANODE.

9. The resistor in this circuit is to protect the _____ .

10. The LED will light up only when the CATHODE of the DIODE is connected towards the _____ of the battery.

QUICK-CHECK ANSWER KEY for Experiment 06 QUIZ
for Mr Circuit Electronics Training ("How a Diode 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

#1 In Experiment #6, what is the component that you learned about?

A. a capacitor
B. a diode
C. an LED
D. a battery snap

A
(B)
C
D

#2 A diode allows current to flow through it _____ .

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D. only if there is a resistor in the circuit

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
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C
(D)

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C. capacitor
D. speaker

A
(B)
C
D

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A
(B)
C
D

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B. the diode is working fine
C. the battery is weak
D. the diode is defective

A
B
C
(D)

#10 A diode is considered a _____ .

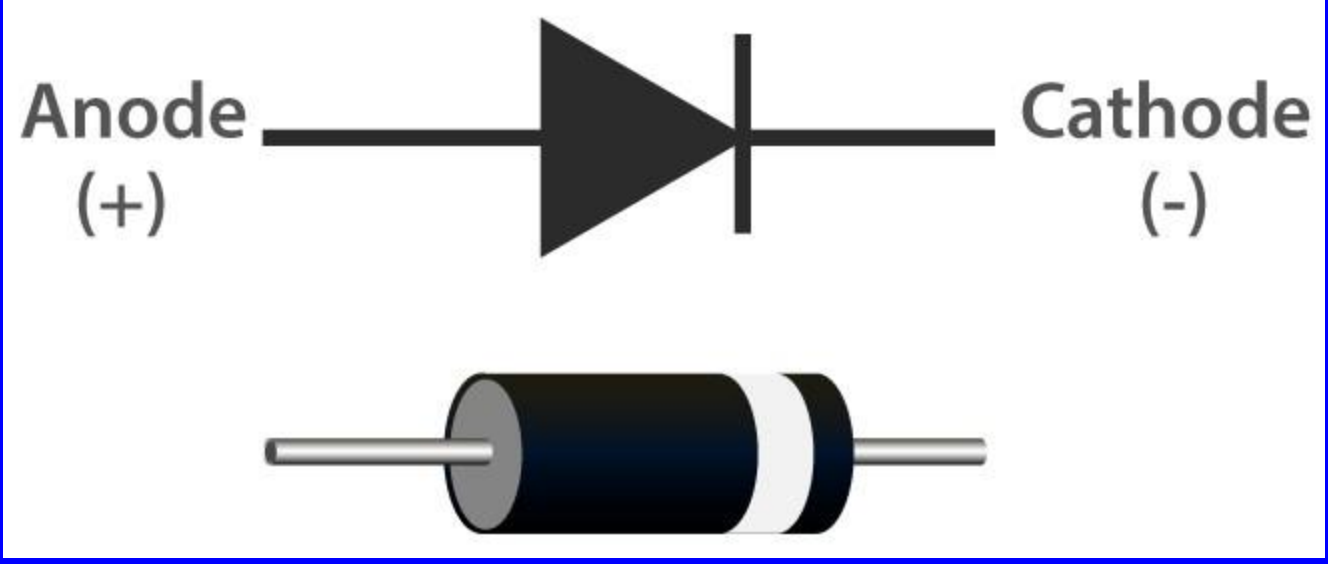
A. simple resistor
B. one-way gate
C. a variable resistor
D. a simple capacitor

A
(B)
C
D

(Form SQAK06)

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

A DIODE

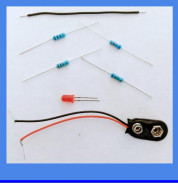


BASIC ELECTRONICS LAB 1

"HOW A DIODE WORKS"

(Poster MC1-06P01)

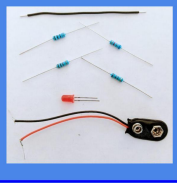
MC1-01
Electronic Parts



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
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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
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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**