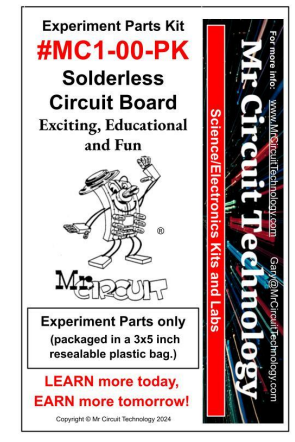
For more info: www.MrCircuitTechnology.com Gary@MrCircuitTechnology.com

Mr Circuit Technology

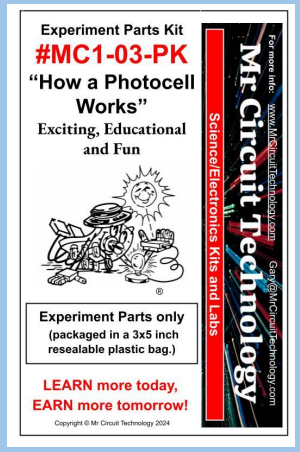
Science/Electronics Experiment Kits and Labs

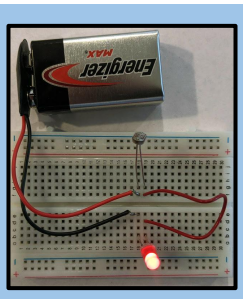
"HOW A PHOTOCELL WORKS"

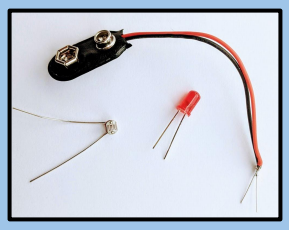


LESSON PLAN

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 #MC1-03-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

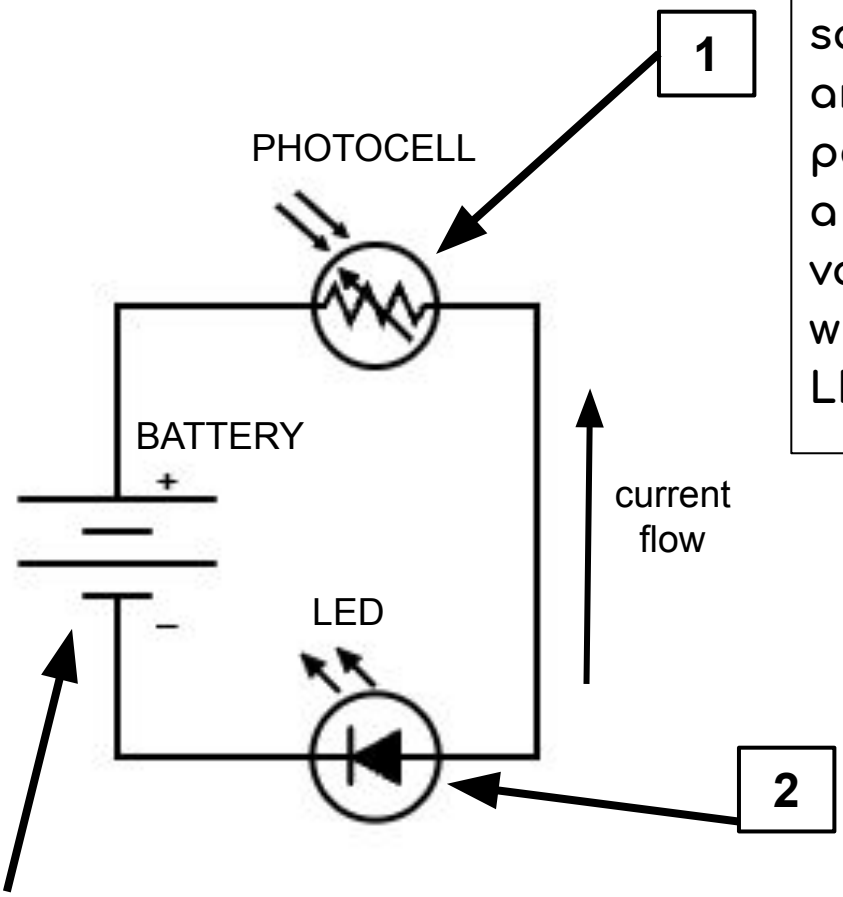
Mr. CIRCUIT® How A PHOTOCELL Works (Page 1)

MC1-03-R-1

EXPLANATION OF EXPERIMENT

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

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



This circle with a squiggly line inside and two arrows pointing in represents a PHOTOCELL which varies its resistance with light. MORE light, LESS resistance.

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

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 LED, through the PHOTOCELL and then back to the positive side of the battery.

(Continue to Page 2)

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

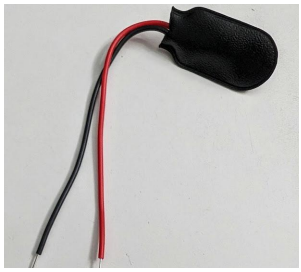
MC1-03-R-2

PURPOSE OF THIS EXPERIMENT

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

PARTS NEEDED FOR EXPERIMENT

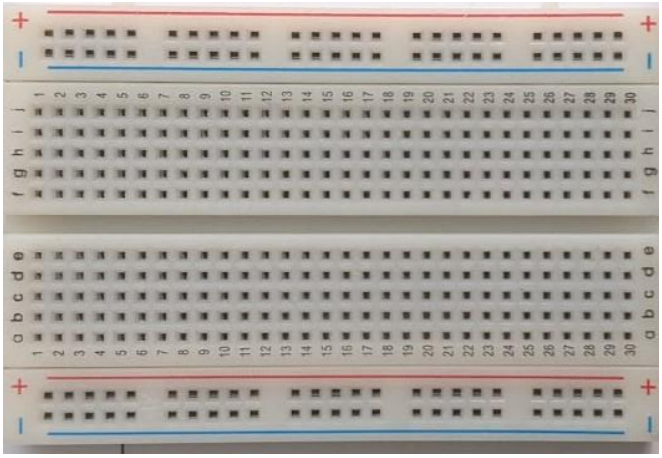
In this experiment, you will use a BATTERY SNAP



a PHOTOCELL

an LED 

and a SOLDERLESS CIRCUIT BOARD.



You will also need a good 9 Volt battery

(Continue to Page 3)

How a PHOTOCELL Works (Page 3)

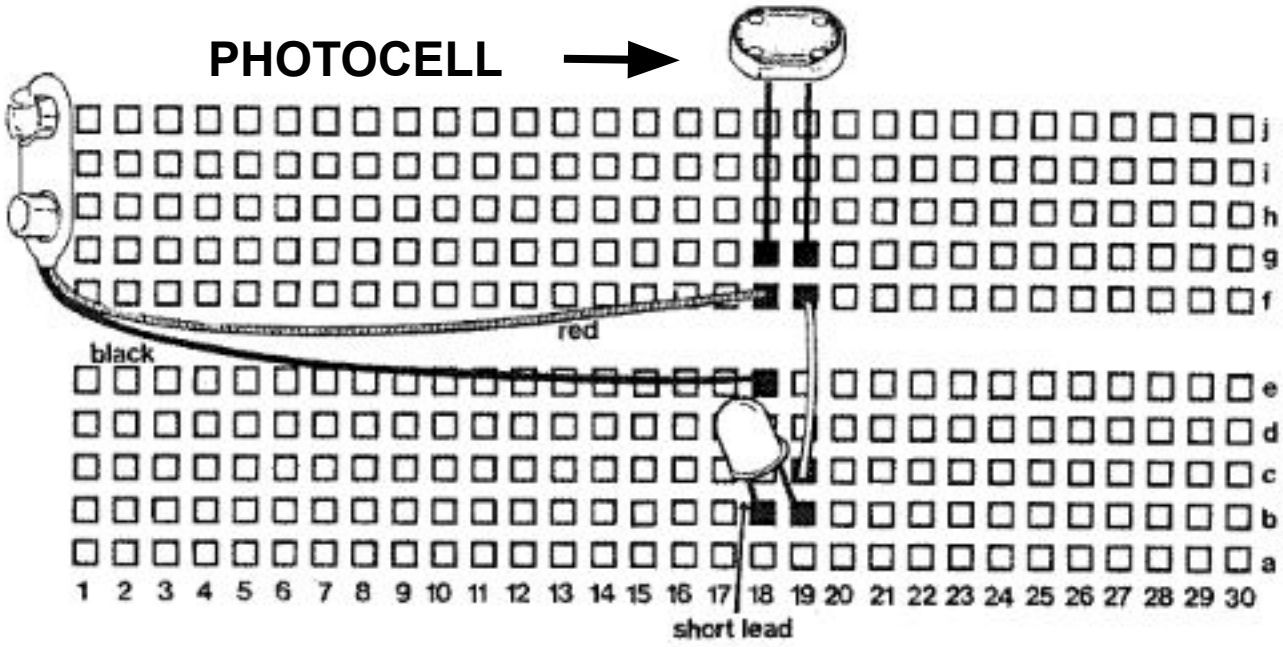
MC1-03-R-3

DO THE EXPERIMENT (part 1 of 2)

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

Step 1 - Take out a **Battery Snap** and install it with its Red lead in hole **18f** and its Black lead in hole **18e** as shown in the pictorial diagram. **(Note: If you reverse the leads, the circuit will NOT work.)**

PICTORIAL DIAGRAM



Step 2 - Install an **LED** with its short lead into hole **18b** and its long lead into hole **19b.**

Step 3 - Install the PHOTOCELL as shown on the pictorial into holes **18g** and **19g. (Note: A PHOTOCELL does not have polarity so there is no positive or negative side.)**

(Continue to Page 4)

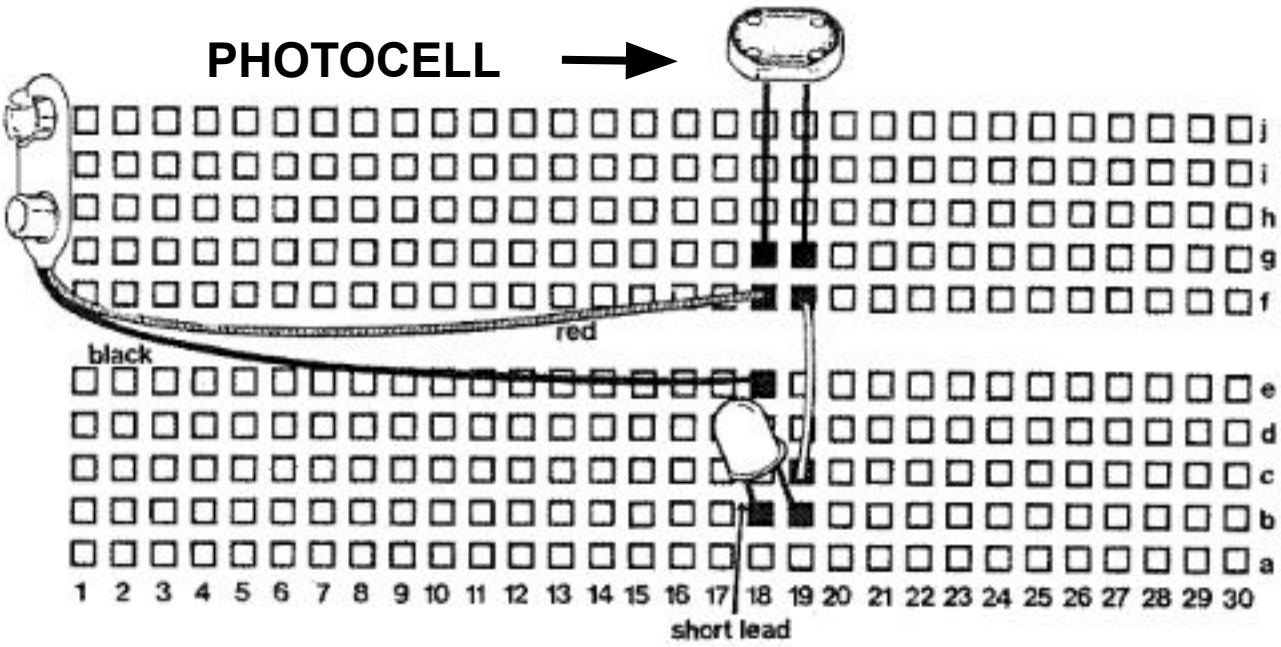
How a PHOTOCELL Works (Page 4)

MC1-03-R-4

DO THE EXPERIMENT (part 2 of 2)

Step 5 - Connect the battery to the battery snap and observe how the LED lights up. Then put your finger on top of the LED. How does that affect the brightness of the LED.

PICTORIAL DIAGRAM



CONCLUSION

*** You should have noticed that when you cover the light from hitting the PHOTOCELL, the LED gets dimmer. So, a PHOTOCELL increases its resistance when the light is diminished. The MORE light hitting the PHOTOCELL, the LESS resistance. So, the MORE light hitting the PHOTOCELL, the brighter the LED.

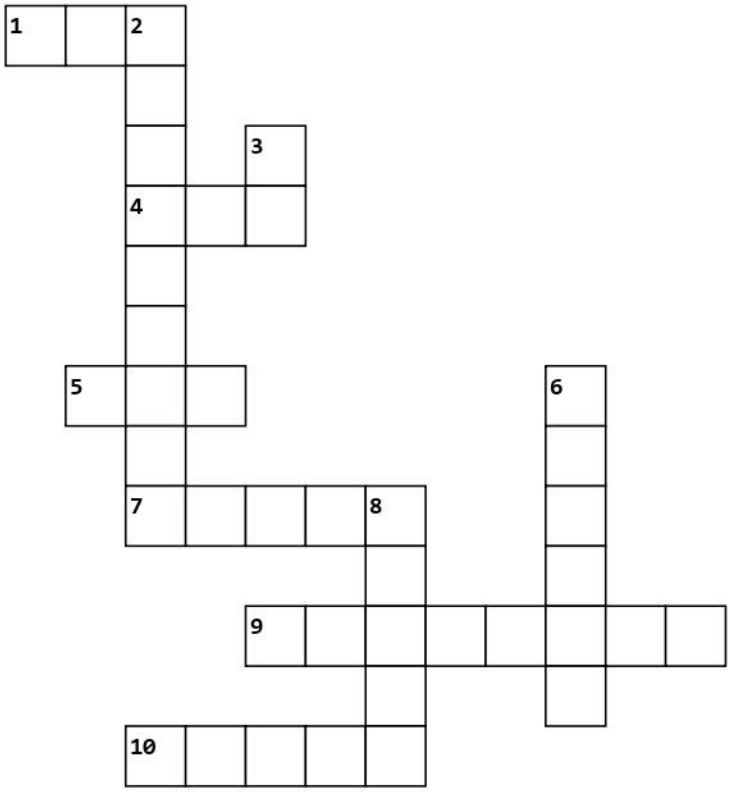
(End of Experiment 3)

Mr. CIRCUIT®

MC1-03-CW

CROSSWORD

Experiment 3 - "How A PHOTOCELL Works"



Across

1. What part of the PHOTOCELL is sensitive to light?

4. How many leads does a PHOTOCELL have?

5. Does an LED have polarity?

7. What causes the PHOTOCELL to vary its resistance?

9. What will cause the resistance of the PHOTOCELL to increase?

10. True or False, an LED is sensitive to light?

Down

2. This circuit has an LED, a _____, and a BATTERY.

3. Does a PHOTOCELL have polarity?

6. What do you use to shield the light from hitting the PHOTOCELL?

8. This circuit has how many electronic parts?

Mr. CIRCUIT®

MC1-03-WS

WORD SEARCH

Experiment 3 - "How A PHOTOCELL Works"

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

1. How many leads does a PHOTOCELL have? **2.** Does a PHOTOCELL have polarity?

3. What causes the PHOTOCELL to vary its resistance?

4. What part of the PHOTOCELL is sensitive to light? **5.** Does an LED have polarity?

6. What will cause the resistance of the PHOTOCELL to increase?

7. This circuit has how many electronic parts?

8. What do you use to shield the light from hitting the PHOTOCELL?

9. This circuit has an LED, a _____, and a BATTERY.

10. True or False, an LED is sensitive to light?

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

QUIZ for Exp 03 or STEM KIT #03
in the Mr Circuit Electronics Training Lab 1

(Page 7)

This Quiz covers the training learned by completing

"How a Photocell Works" Experiment 3

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

#1 How many leads does a Photocell have?

A
B
C
D

A. 1
B. 2
C. 3
D. 6

#2 Does a Photocell have polarity?

A
B
C
D

A. YES
B. NO
C. maybe
D. not necessarily

#3 In order for a Photocell to vary its resistance, light has to hit the _____.

A
B
C
D

A. top surface
B. bottom surface
C. the leads
D. the left side

#4 If you reverse the leads on the battery snap, how will that affect the circuit?

A
B
C
D

A. the LED will be brighter
B. the circuit will work just fine
C. the LED will get hot and burn up
D. the LED will not light up

#5 If you put this circuit into a dark room, how will that affect the LED brightness?

A
B
C
D

A. it will be super bright
B. it will burn out
C. it will be dimmer
D. it will be the same as in bright light

#6 This circuit has three components. They are the battery snap, a resistor, and a _____ .

A
B
C
D

A. Photocell
B. Potentiometer
C. capacitor
D. microphone

#7 In this experiment, what do we use to shield the light from hitting the Photocell?

A
B
C
D

A. a flashlight
B. a fork
C. a hand
D. a forklift

#8 A Photocell changes its resistance because it is sensitive to _____.

A
B
C
D

A. air
B. pressure
C. gravity
D. light

#9 When you block the amount of light hitting a Photocell, its resistance _____ .

A
B
C
D

A. is not affected
B. decreases
C. causes more capacitance in the circuit
D. increases

#10 How does the brightness of the light that hits the Photocell affect the LED in the circuit?

A
B
C
D

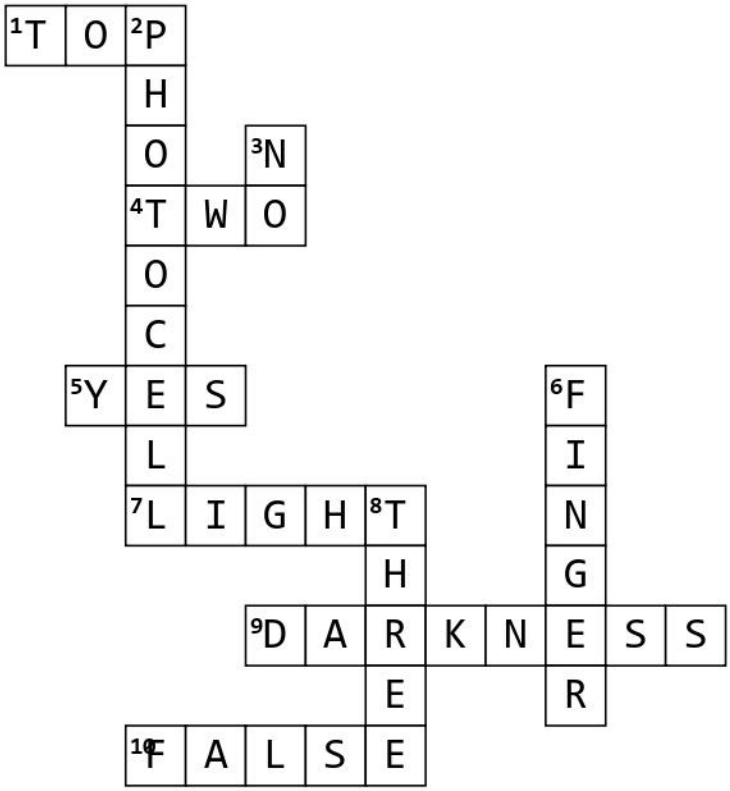
A. has no effect at all
B. brighter the light, brighter the LED
C. LEDs don't get brighter or dimmer
D. dimmer the light, brighter the LED

(Form SQ03)

Score

ANSWERS FOR CROSSWORD

Experiment 3 - "How A PHOTOCELL Works"



Across

1. What part of the PHOTOCELL is sensitive to light?

4. How many leads does a PHOTOCELL have?

5. Does an LED have polarity?

7. What causes the PHOTOCELL to vary its resistance?

9. What will cause the resistance of the PHOTOCELL to increase?

10. True or False, an LED is sensitive to light?

Down

2. This circuit has an LED, a _____, and a BATTERY.

3. Does a PHOTOCELL have polarity?

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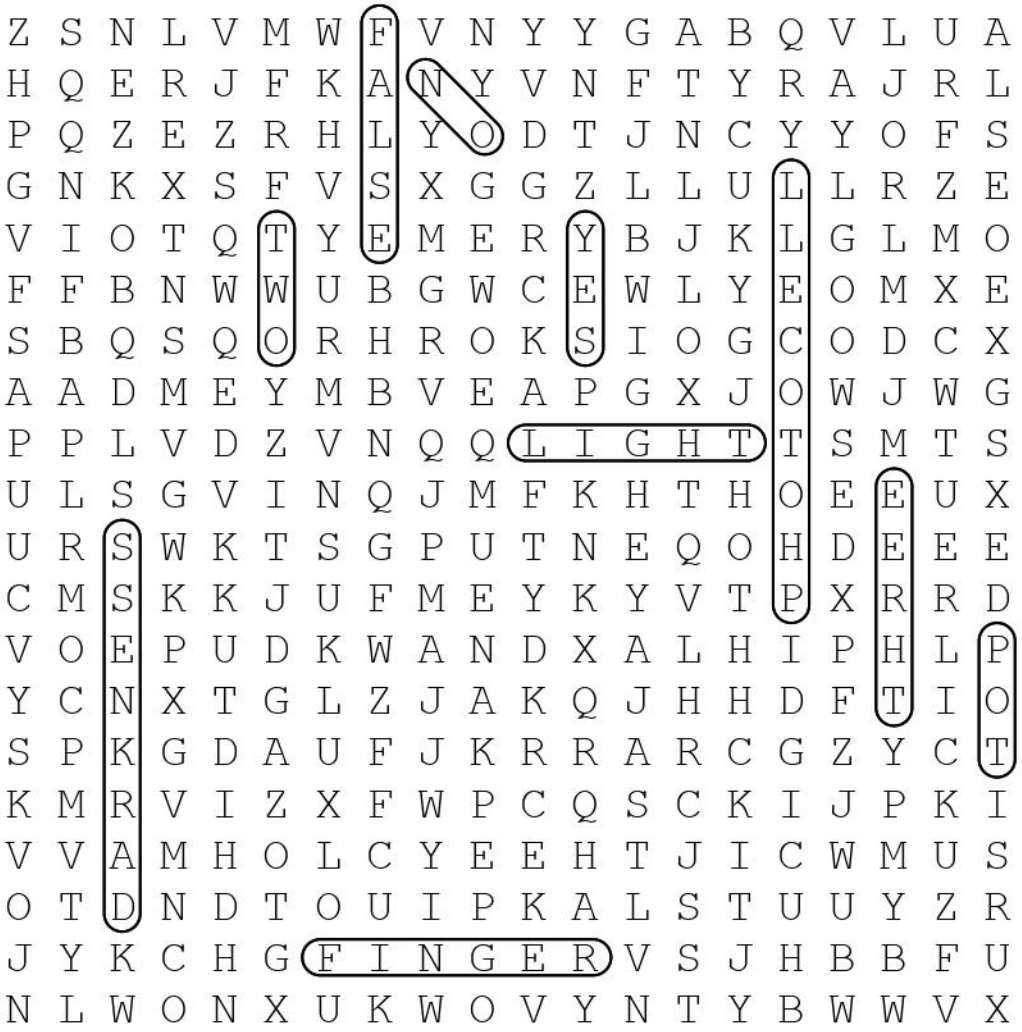
ANSWERS FOR WORD SEARCH

Experiment 3 - "How A PHOTOCELL Works"



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10. True or False, an LED is sensitive to light?

QUICK-CHECK ANSWER KEY for Experiment 03 QUIZ
for Mr Circuit Electronics Training ("How a PHOTOCELL 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 How many leads does a Photocell have?

A. 1
B. 2
C. 3
D. 6

A
(B)
C
D

#2 Does a Photocell have polarity?

A. YES
B. NO
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D. not necessarily

(A)
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C
D

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B
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B. Potentiometer
C. capacitor
D. microphone

(A)
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C
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A. a flashlight
B. a fork
C. a hand
D. a forklift

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B
(C)
D

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B. pressure
C. gravity
D. light

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C
(D)

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C. causes more capacitance in the circuit
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B
C
(D)

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D. dimmer the light, brighter the LED

A
(B)
C
D

BUILD A BETTER FUTURE by UNDERSTANDING SCIENCE-ELECTRONICS

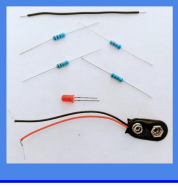
PHOTOCELLS VARY CURRENT WITH LIGHT

BASIC ELECTRONICS LAB 1

"HOW A PHOTOCELL WORKS"

(Poster MC1-03-P01)

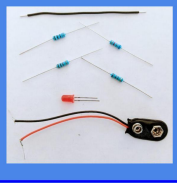
MC1-01
Electronic Parts



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**