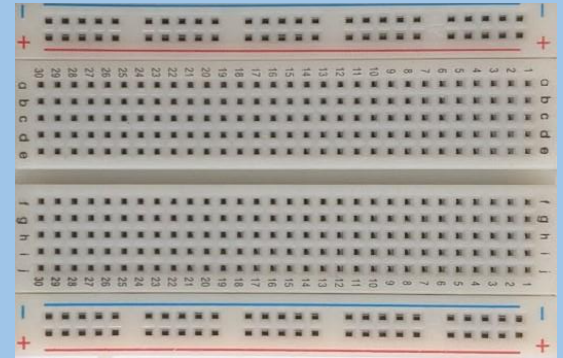


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Mr Circuit Technology**Science/Electronics Experiment Kits and Labs****“SOLDERLESS CIRCUIT BOARD”****LESSON PLAN****Table of Contents**

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Page 14 - Price List for Parts Kits for your to order more. Send Purchase Order to Gary@MrCircuitTechnology.com or order online at www.MrCircuitTechnology.com



PREPARATION: You can put the Page 13 poster up on your classroom wall to announce the fact that you are going to do this Science-Electronics Lesson.

Step 1 - Make a copy of pages 1 through 9 for each student. The students can read and do these pages on their own or you can guide them.

Step 2 - When your students have completed reading the Lesson, the Crossword Puzzle, Word Search Puzzle, and the Written Quiz, collect all their work for grading using the Answer Keys in this Lesson Plan.

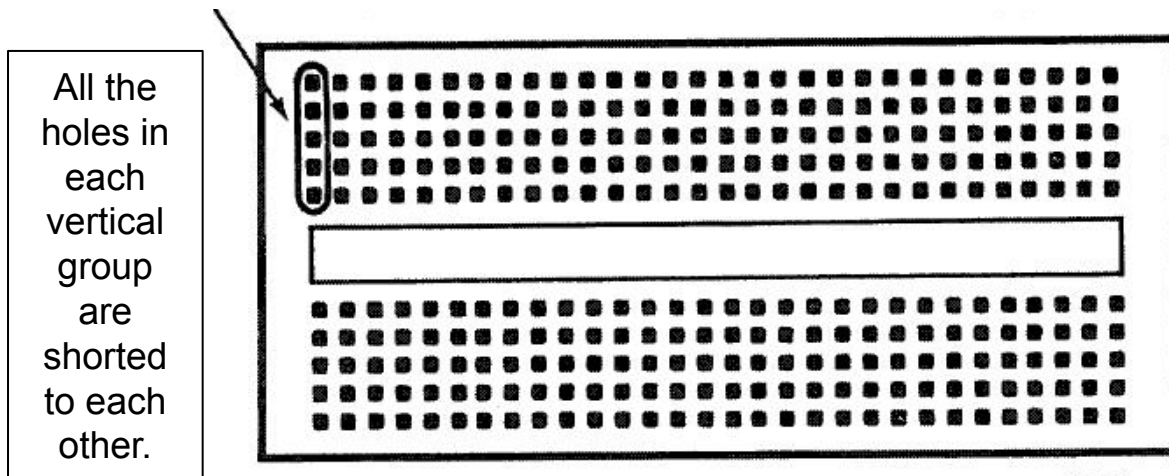
For Tech Support or any questions, you can email us or call 805-295-1642

LESSON 4 (page 1 of 6)

MC1-004-R-1

What is a SOLDERLESS CIRCUIT BOARD? It is a device that allows an engineer or technician to build an electronic circuit with the use of solder. This allows for quick and fast construction and testing of a circuit.

Here is a drawing of a SOLDERLESS CIRCUIT BOARD. This board has 60 sets of 5 holes. We have circled one of the sets of 5 holes. Each hole is designed to fit only one wire.



There are numbers and letters on the board to identify each and every hole. A SOLDERLESS CIRCUIT BOARD is designed to be reusable many times.

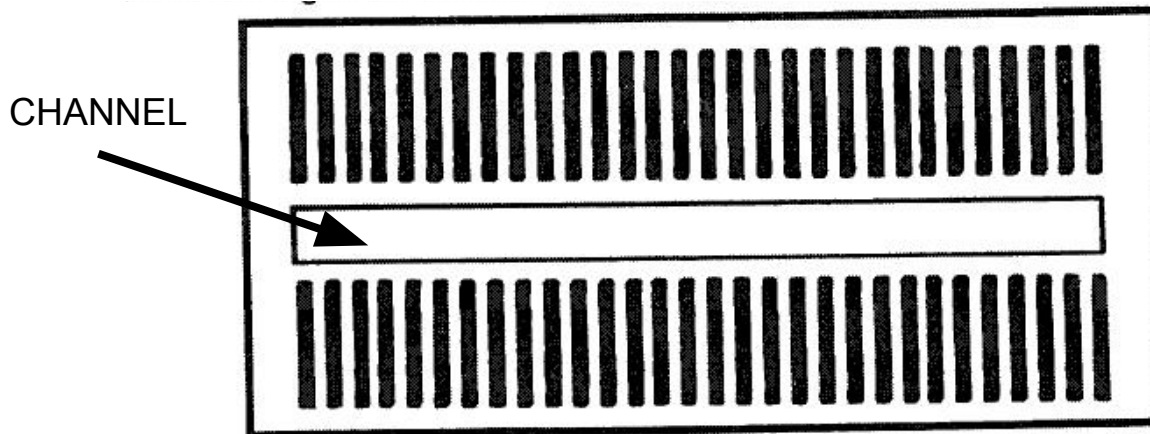
All the holes in each set of 5 are connected by a metal clip inside the board such that any wires you insert into any of the 5 holes are connected together just like if you had soldered them together. So, this SOLDERLESS CIRCUIT BOARD has 60 sets of 5 holes. Each set is separate and is not connected to any other set.

(Continue to Page 2)

LESSON 4 (page 2 of 6)

MC1-004-R-2

Here is a drawing of the underside of a SOLDERLESS CIRCUIT BOARD. It shows the bottom of the separate metal strips that are inside the board. As you can see, no metal strip touches any other metal strip.



UNDER SIDE OF SOLDERLESS CIRCUIT BOARD SHOWING METAL STRIPS WHICH CONNECT EACH SET OF FIVE HOLES.

Notice the 'channel' across the center of this SOLDERLESS CIRCUIT BOARD. Most boards have this 'channel'. What is the 'channel' for? This 'channel' is the perfect size to allow an INTEGRATED CIRCUIT to fit across it. Here is a drawing of a 555 Timer Integrated Circuit plugged into the board.

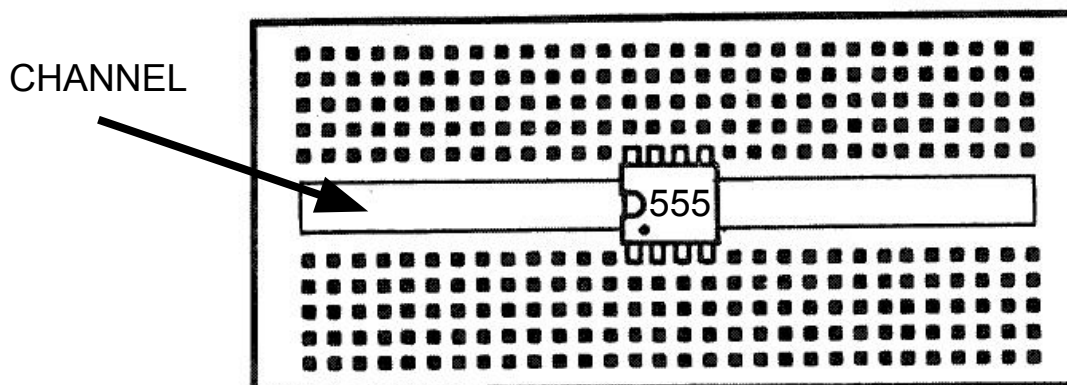


FIG. 4

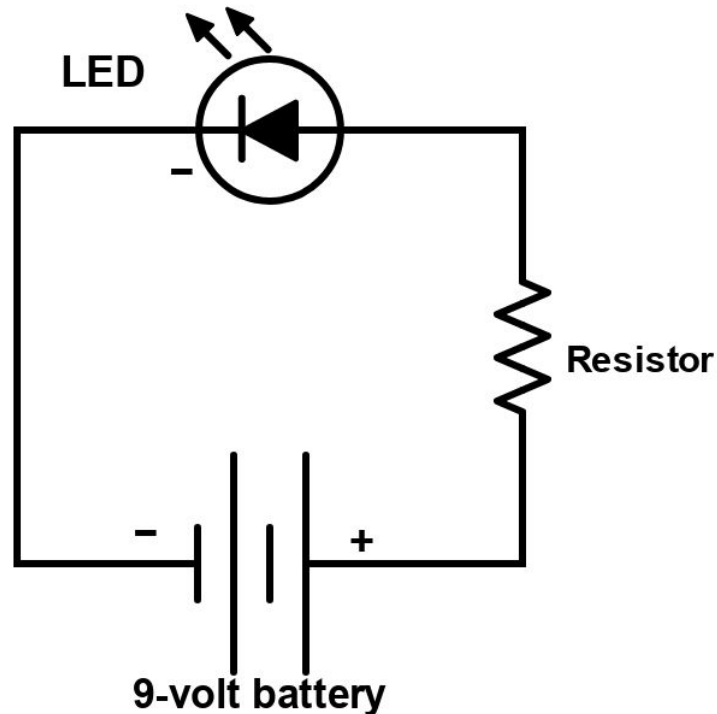
(Continue to Page 3)

LESSON 4 (page 3 of 6)

MC1-004-R-3

Suppose we need to build the circuit shown below.

This circuit has
a battery, an LED,
and a resistor.

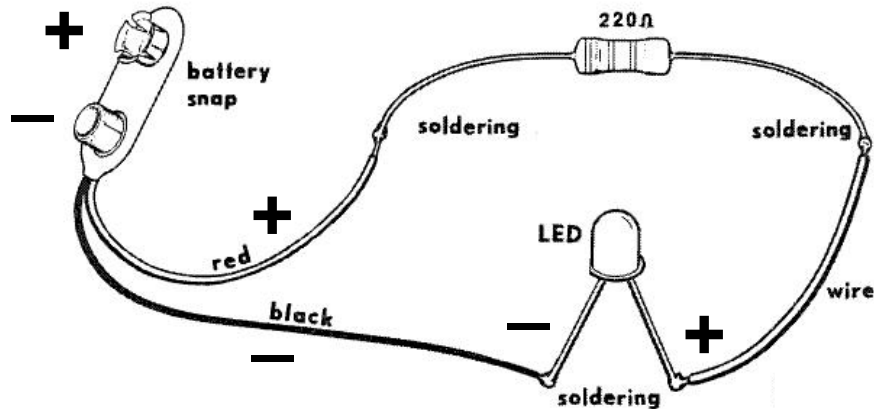


In this circuit, the electron current flows out of the battery to the negative side of the LED and through the LED to the resistor and then out of the resistor to the positive side of the battery.

(Continue to Page 4)

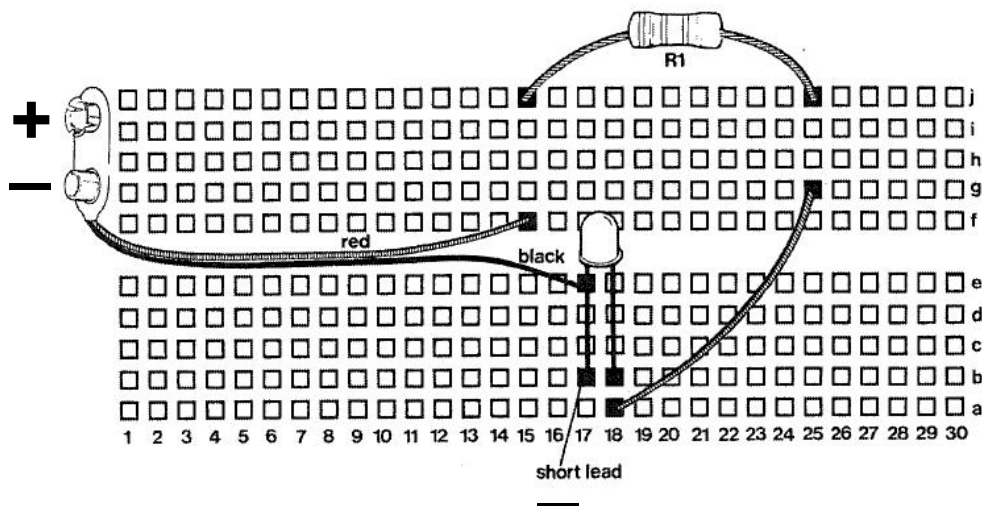
LESSON 4 (page 4 of 6)

One of the ways we could build this circuit is by soldering all the pieces together as shown here:



In this circuit, the electron current flows out of the battery to the negative side of the LED and through the LED to the resistor and then out of the resistor to the positive side of the battery.

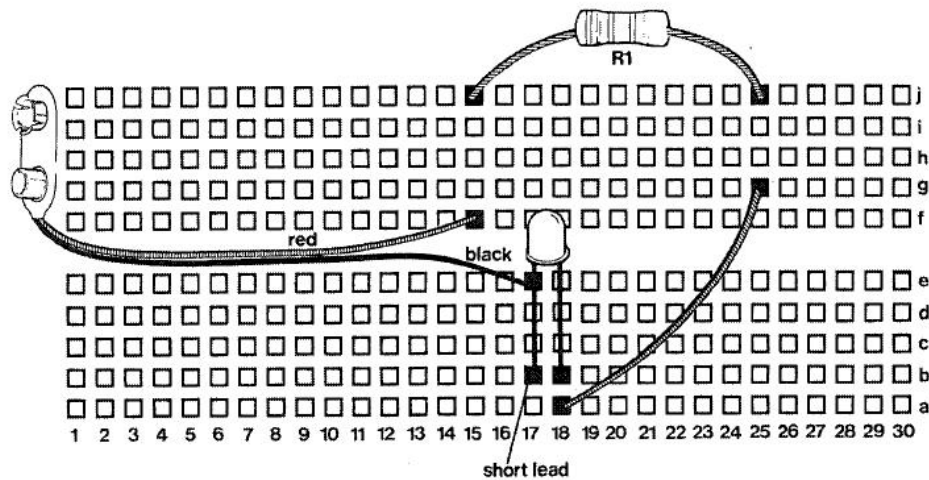
We can build this same circuit by using a SOLDERLESS CIRCUIT BOARD. Here is how it would look.



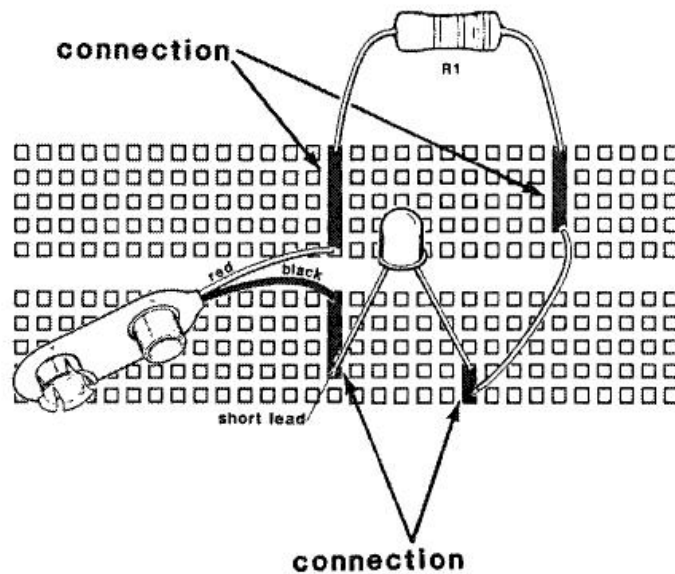
(Continue to Page 5)

LESSON 4 (page 5 of 6)

Notice that the current travels the same way as if we soldered the pieces together. Electron current travels from the black lead of the battery snap to the LED, and then through the LED to a jumper wire, through the jumper wire to the resistor and from the resistor to the red lead on the battery snap.



Here we show the metal strips in black so you can trace the path of the current through the circuit.

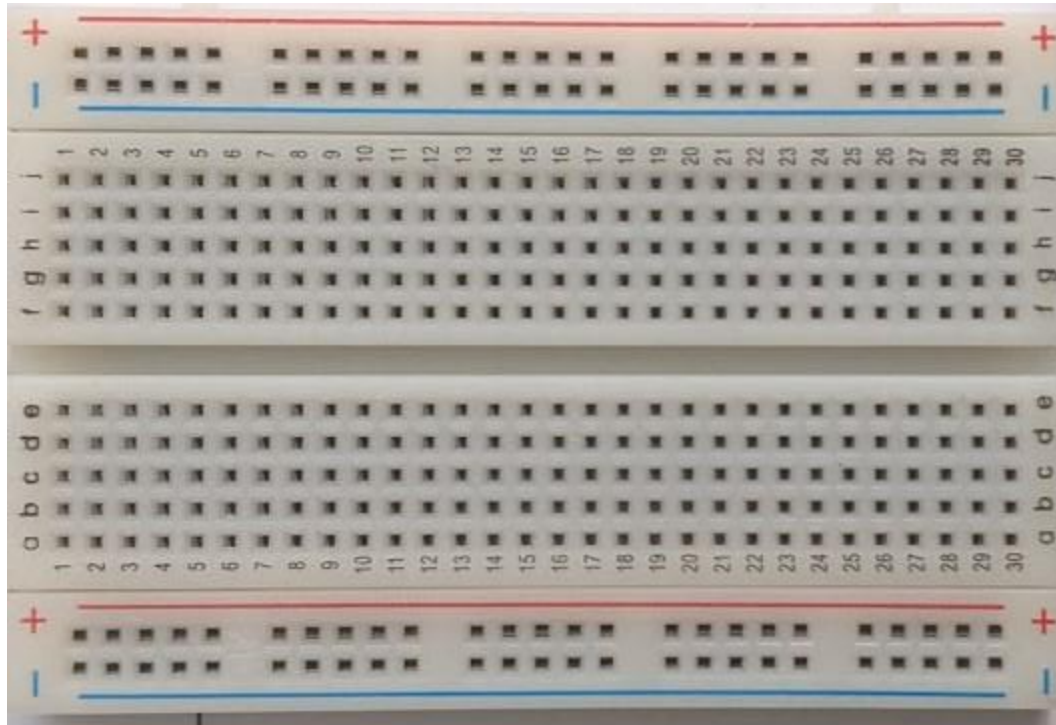


(Continue to Page 5)

LESSON 4 (page 6 of 6)

MC1-004-R-6

Here is a SOLDERLESS CIRCUIT BOARD that has 'extra holes' along both edges of the board. What are these 'extra holes' for?

BUSS BARS**BUSS BARS**

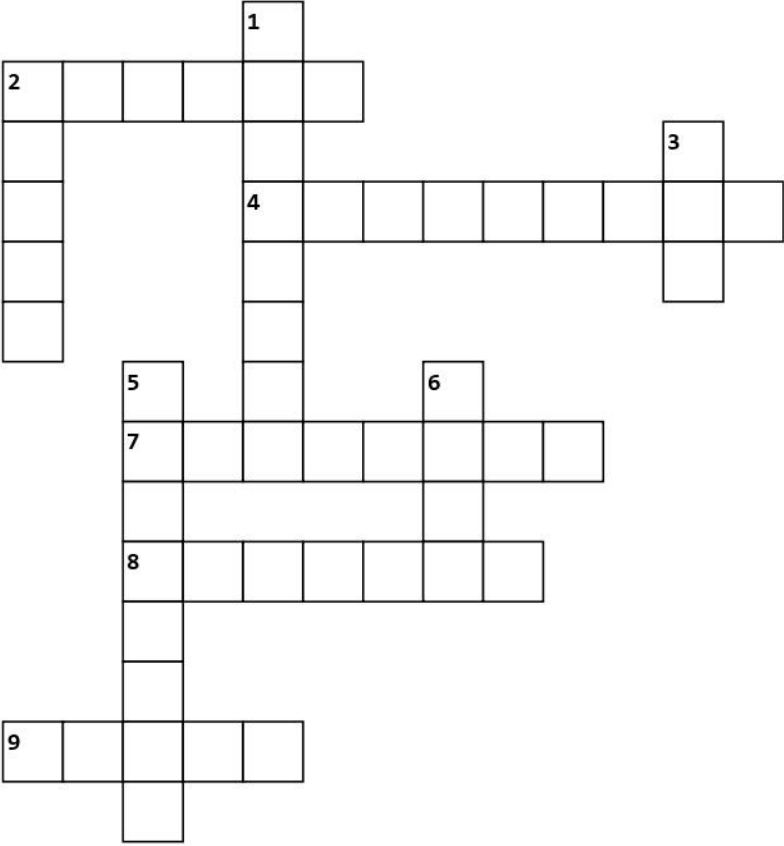
These 'extra holes' are called 'BUSS BARS'. These holes are connected differently from the other 5-hole sets on the board.

Notice the plus sign (+) and the beginning and the end of the top row. The top row is connected together from end-to-end with one solid metal strip. And, the set of holes, just under it, with the negative sign (-) are also all connected end-to-end with a different metal strip. This also applies to the bottom two rows of holes on this board.

(End of Lesson 4)

CROSSWORD

Lesson 4 - "SOLDERLESS CIRCUIT BOARD"



Across

- 2. The SOLDERLESS CIRCUIT BOARD was created to be able to build circuits without using _____ .
- 4. With a SOLDERLESS CIRCUIT BOARD, you can build circuits without _____ .
- 7. There are numbers and letters on the SOLDERLESS CIRCUIT BOARD to _____ each and every hole.
- 8. Integrated Circuits are installed on a SOLDERLESS CIRCUIT BOARD across a center _____ .
- 9. Inside the holes on a SOLDERLESS CIRCUIT BOARD are _____ strips.

Down

- 1. A SOLDERLESS CIRCUIT BOARD is designed to be _____ many times.
- 2. The SOLDERLESS CIRCUIT BOARD we show in this lesson has _____ sets of 5 holes.
- 3. Each hole on a SOLDERLESS CIRCUIT BOARD is designed to fit _____ wire.
- 5. The SOLDERLESS CIRCUIT BOARD was created to build _____ fast and easy.
- 6. The SOLDERLESS CIRCUIT BOARD is made of sets of _____ holes.

Lesson 4 - "SOLDERLESS CIRCUIT BOARD"

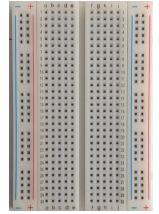
L R S R P F L E R P P X B I G K P Z T J
J D B V F A W U D N X K A F B B N T X H
J G P Q M F P R J X B C C R Y F C A L L
Q C R T N R B H D X G Q P M P F I V K H
V H I K C H A N N E L B K N V Q H V T Z
S R N W H T G B R C I A R E M H T I E Z
S O H F V N V E R H O V B A L J X T C N
U T L V F C F D L I M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

1. Integrated Circuits are installed on a SOLDERLESS CIRCUIT BOARD across a center _____.
2. The SOLDERLESS CIRCUIT BOARD was created to be able to build circuits without using _____.
3. The SOLDERLESS CIRCUIT BOARD is made of sets of _____ holes.
4. Inside the holes on a SOLDERLESS CIRCUIT BOARD are _____ strips.
5. Each hole on a SOLDERLESS CIRCUIT BOARD is designed to fit _____ wire.
6. There are numbers and letters on the SOLDERLESS CIRCUIT BOARD to _____ each and every hole.
7. A SOLDERLESS CIRCUIT BOARD is designed to be _____ many times.
8. The SOLDERLESS CIRCUIT BOARD we show in this lesson has _____ sets of 5 holes.
9. The SOLDERLESS CIRCUIT BOARD was created to build _____ fast and easy.
10. With a SOLDERLESS CIRCUIT BOARD, you can build circuits without _____.



QUIZ for Lesson 4 in the Mr Circuit Lab 1 (Page 9)

QUIZ for Lesson 4 "Solderless Circuit Board"



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

A
B
C
D

#1 Why do we use a Solderless Circuit Board to assemble circuits?

A. to make the circuit more permanent
 B. to add more resistance to the circuit
 C. to slow down the electrons
 D. to make connections without soldering

#6 Each hole in the Solderless Circuit Board is designed to accept how many wires or leads?

A. 1
 B. 5
 C. 3
 D. 14

A
B
C
D

A
B
C
D

#2 What is the purpose of the channel down the middle of the solderless circuit board?

A. to be able to install Integrated Circuits
 B. to release moisture from the circuit
 C. to separate resistors from capacitors
 D. to count the components in the circuit

#7 On the Solderless Circuit Board, an Integrated Circuit is installed _____ .

A. anywhere you like
 B. on one side of the other
 C. hanging off the edge of the board
 D. straddling the center channel

A
B
C
D

A
B
C
D

#3 Each hole in a 'vertical group' or set of 5 holes is _____ .

A. not connected electrically
 B. full of high resistance
 C. electrically connected
 D. has a high voltage

#8 Inside the holes in the Solderless Circuit Board are clips made of _____ .

A. plastic
 B. wood
 C. metal
 D. pvc material

A
B
C
D

A
B
C
D

#4 A Solderless Circuit Board is _____ .

A. not reusable
 B. reusable
 C. never used by technicians and engineers
 D. difficult to find

#9 Why are there numbers and letters on the Solderless Circuit Board?

A. for decoration
 B. to practice counting
 C. to identify each and every hole
 D. for no real purpose

A
B
C
D

A
B
C
D

#5 How many sets of 5 holes are there on the Solderless Circuit Board provided?

A. 22
 B. 660
 C. 500
 D. 60

#10 The 5 holes in a vertical group on a Solderless Circuit Board are all _____ .

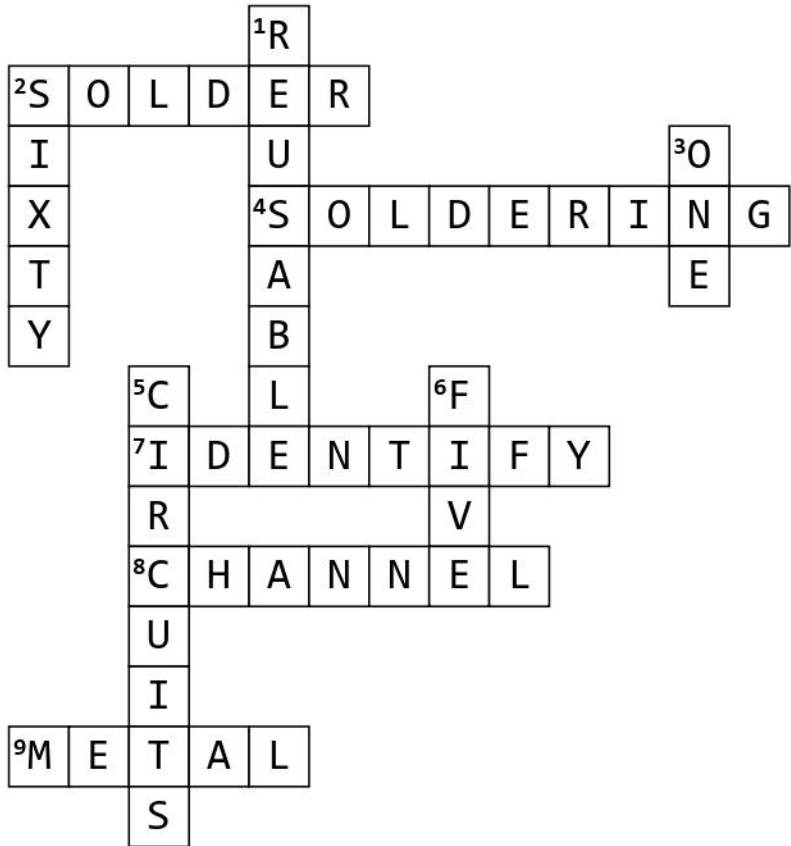
A. shorted together
 B. not shorted together
 C. are insulated from each other
 D. are glued together

A
B
C
D

Score	
-------	--

ANSWERS FOR CROSSWORD

Lesson 4 - "SOLDERLESS CIRCUIT BOARD"



Across

2. The SOLDERLESS CIRCUIT BOARD was created to be able to build circuits without using _____.
4. With a SOLDERLESS CIRCUIT BOARD, you can build circuits without _____.
7. There are numbers and letters on the SOLDERLESS CIRCUIT BOARD to _____ each and every hole.
8. Integrated Circuits are installed on a SOLDERLESS CIRCUIT BOARD across a center _____.
9. Inside the holes on a SOLDERLESS CIRCUIT BOARD are _____ strips.

Down

1. A SOLDERLESS CIRCUIT BOARD is designed to be _____ many times.
2. The SOLDERLESS CIRCUIT BOARD we show in this lesson has _____ sets of 5 holes.
3. Each hole on a SOLDERLESS CIRCUIT BOARD is designed to fit _____ wire.
5. The SOLDERLESS CIRCUIT BOARD was created to build _____ fast and easy.
6. The SOLDERLESS CIRCUIT BOARD is made of sets of _____ holes.

ANSWERS FOR WORD SEARCH

Lesson 3 - "RESISTOR COLOR CODE"

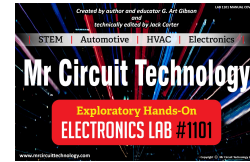
L R S R P F L E R P P X B I G K P Z T J
 J D B V F A W U D N X K A F B B N T X H
 J G P Q M F P R J X B C C R Y F C A L L
 Q C R T N R B H D X G Q P M P F I V K H
 V H I K C H A N N E L B K N V Q H V T Z
 S R N W H T G B R C I A R E M H T I E Z
 S O H F V N V E R H O V B A L J X T C N
 U T L V F C F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

1. Integrated Circuits are installed on a SOLDERLESS CIRCUIT BOARD across a center _____.
2. The SOLDERLESS CIRCUIT BOARD was created to be able to build circuits without using _____.
3. The SOLDERLESS CIRCUIT BOARD is made of sets of _____ holes.
4. Inside the holes on a SOLDERLESS CIRCUIT BOARD are _____ strips.
5. Each hole on a SOLDERLESS CIRCUIT BOARD is designed to fit _____ wire.
6. There are numbers and letters on the SOLDERLESS CIRCUIT BOARD to _____ each and every hole.
7. A SOLDERLESS CIRCUIT BOARD is designed to be _____ many times.
8. The SOLDERLESS CIRCUIT BOARD we show in this lesson has _____ sets of 5 holes.
9. The SOLDERLESS CIRCUIT BOARD was created to build _____ fast and easy.
10. With a SOLDERLESS CIRCUIT BOARD, you can build circuits without _____.

**QUICK-CHECK ANSWER KEY for Lesson 4 QUIZ
for Mr Circuit Electronics Training (“Solderless Circuit Board”)**

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.

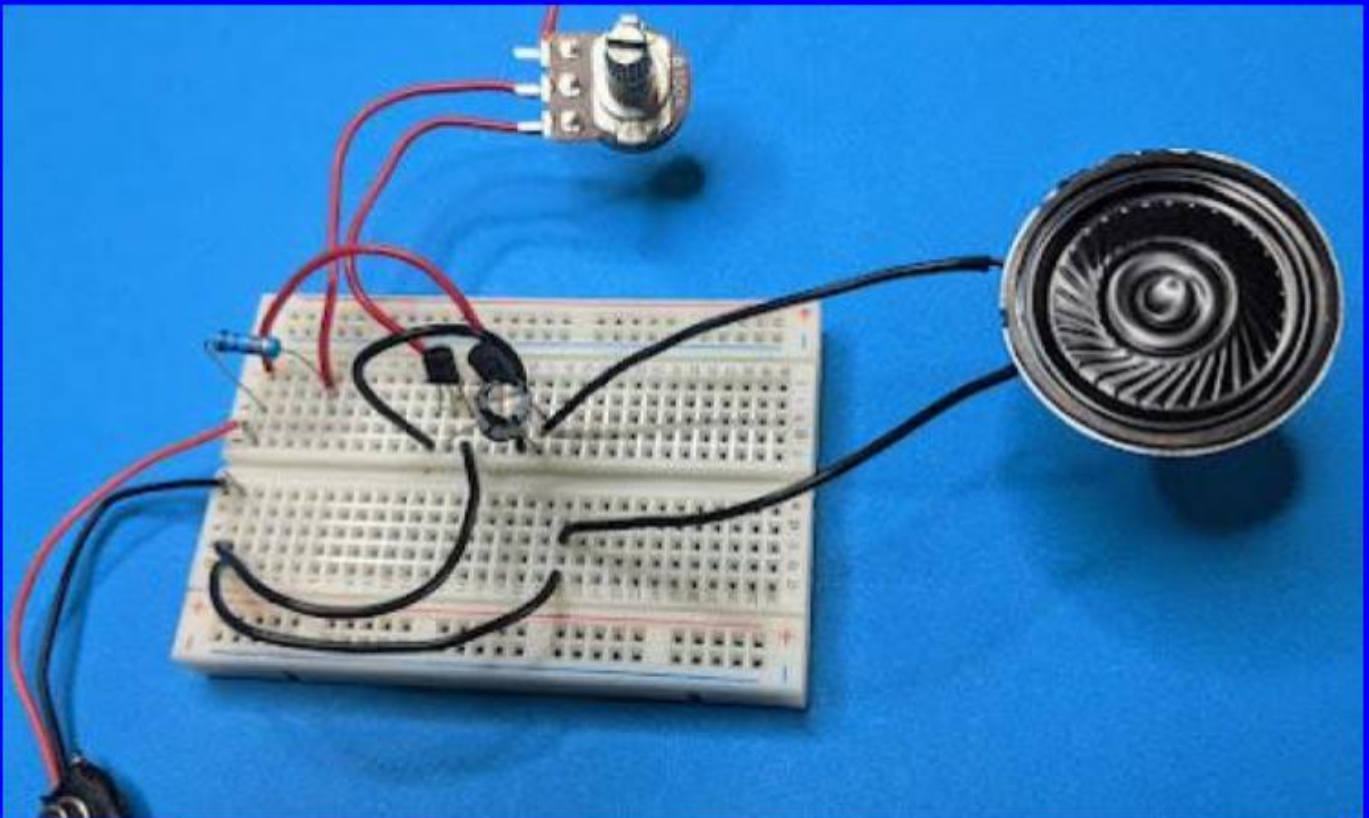
Count the right answers and record the score of right answers in your grade book.



<p>A B C D</p>	<p>#1 Why do we use a Solderless Circuit Board to assemble circuits?</p> <p>A. to make the circuit more permanent B. to add more resistance to the circuit C. to slow down the electrons D. to make connections without soldering</p>	<p>#6 Each hole in the Solderless Circuit Board is designed to accept how many wires or leads?</p> <p>A. 1 B. 5 C. 3 D. 14</p>	<p>A B C D</p>
<p>A B C D</p>	<p>#2 What is the purpose of the channel down the middle of the solderless circuit board?</p> <p>A. to be able to install Integrated Circuits B. to release moisture from the circuit C. to separate resistors from capacitors D. to count the components in the circuit</p>	<p>#7 On the Solderless Circuit Board, an Integrated Circuit is installed _____ .</p> <p>A. anywhere you like B. on one side of the other C. hanging off the edge of the board D. straddling the center channel</p>	<p>A B C D</p>
<p>A B C D</p>	<p>#3 Each hole in a ‘vertical group’ or set of 5 holes is _____ .</p> <p>A. not connected electrically B. full of high resistance C. electrically connected D. has a high voltage</p>	<p>#8 Inside the holes in the Solderless Circuit Board are clips made of _____ .</p> <p>A. plastic B. wood C. metal D. pvc material</p>	<p>A B C D</p>
<p>A B C D</p>	<p>#4 A Solderless Circuit Board is _____ .</p> <p>A. not reusable B. reusable C. never used by technicians and engineers D. difficult to find</p>	<p>#9 Why are there numbers and letters on the Solderless Circuit Board?</p> <p>A. for decoration B. to practice counting C. to identify each and every hole D. for no real purpose</p>	<p>A B C D</p>
<p>A B C D</p>	<p>#5 How many sets of 5 holes are there on the Solderless Circuit Board provided?</p> <p>A. 22 B. 660 C. 500 D. 60</p>	<p>#10 The 5 holes in a vertical group on a Solderless Circuit Board are all _____ .</p> <p>A. shorted together B. not shorted together C. are insulated from each other D. are glued together</p>	<p>A B C D</p>

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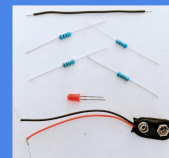
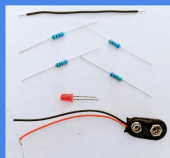
ON A SOLDERLESS CIRCUIT BOARD

BASIC ELECTRONICS LAB 1

“SOLDERLESS CIRCUIT BOARD”

(Poster MC1-004-P01)

(Page 13)



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