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MR CIRCUIT Multimeter Fundamentals LAB 1201

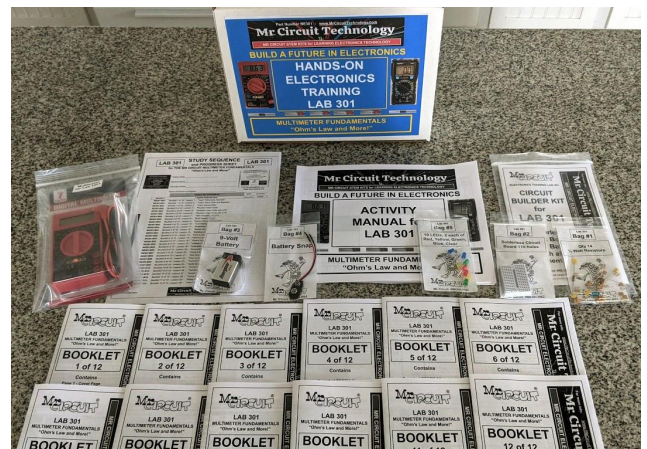
TEACHER PACKET For LAB 1201

for Mr Circuit "Ohm's Law and More!"
Multimeter Fundamentals Lab # 1201

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QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #1 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals Lab # 1201

Place this sheet over top of the STUDENT ASSIGNMENT SHEET #1 (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.



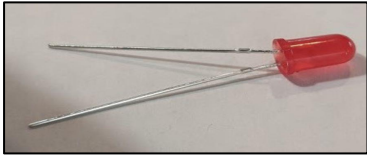
A #1 What is the name of this component?

B A. resistor

C B. LED

D C. capacitor

D. transistor



#6 An LED generally has one lead longer than the other. That lead is connected to _____.

A. the anode of the LED

B. a resistor

C. the cathode of the LED

D. ground

A

B

C

D

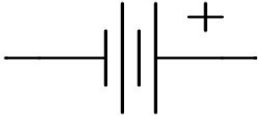
A #2 What does this electronic symbol stand for?

B A. a multi-cell battery

C B. a capacitor

D C. an LED

D. a resistor




#7 How many color bands does a ±5% resistor have?

A. 5

B. 4

C. 7

D. 10



A

B

C

D

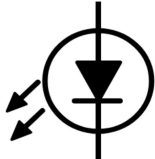
A #3 What does this electronic symbol stand for?

B A. an LED

C B. a single-cell battery

D C. a battery snap

D. a resistor



#8 What is the purpose of the Resistor Color Code?

A. to see if you are color blind

B. it tells us the value & tolerance of a resistor

C. it tells us the wattage of a resistor

D. it hides the value in ohms of the resistor

A

B

C

D

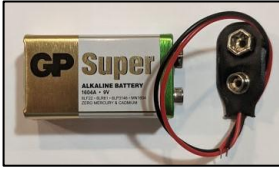
A #4 A nine-volt battery has how many 1 ½ volt single cells inside of it?

B A. 8

C B. 6

D C. 4

D. 3



#9 On a ±5% resistor, what does the third color band tell you?

A. what a resistor is made of

B. what power you can connect to it

C. how many zeroes to add

D. none of the above

A

B

C

D

A #5 The beveled edge on an LED is also referred to as _____.

B A. the near side

C B. the outside

D C. flat side

D. the far side

#10 Resistors are measured in _____ and _____.

A. microvolts and milliamps

B. farads and henries

C. volts and amps

D. ohms and watts

A

B

C

D


**QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #2 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals Lab # 1201**

Place this sheet over top of the STUDENT ASSIGNMENT SHEET #2 (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 #1 How many color bands do $\pm 1\%$ resistors have?
B
A. 5
B. 8
C. 3
D. 4



#6 The small 'stub' on a 9-volt battery is the _____ .
A. negative pole
B. positive pole
C. neutral pole
D. last pole



- A**
B
C
D

A #2 When determining the value of a $\pm 1\%$ resistor, if the 2nd to last color is silver you _____ .
B
A. move the decimal back 2 places
B. you move the decimal forward 5 places
C. you move the decimal to the left 1 place
D. you multiply by 2

#7 Electronic parts are sometimes referred to as _____ ?
A. resistance measurements
B. power sources
C. horses or cows
D. components


- A**
B
C
D

A #3 What do we call the group of parts that we use in this lab?
B
A. excess inventory
B. inventory parts
C. lost inventory parts
D. usable inventory excess

#8 What do the arrows on the LED symbol stand for?
A. the direction of the current
B. light being emitted by the LED
C. how to install an LED in a circuit
D. which side of the LED to stand on

- A**
B
C
D

A #4 A nine-volt battery snap has two wires? Generally, what two colors are the wires?
B
A. yellow and blue
B. black and white
C. green and yellow
D. black and red



#9 Before the invention of the solderless circuit board, how did we generally connect electronic components in a circuit?
A. we used solder
B. we used bubble gum
C. we used glue
D. we used cellophane tape

- A**
B
C
D

A #5 An electronic schematic diagram is made up of _____ .
B
A. schematic symbols
B. rope and wood
C. batteries and battery snaps
D. steel

#10 Solderless Circuit Boards are commonly used by _____ .
A. nurses and doctors
B. electronic engineers and technicians
C. plumbers while fixing pipes
D. carpenters while building a house


- A**
B
C
D

QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #3 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals Lab # 1201

Place this sheet over top of the STUDENT ASSIGNMENT SHEET #3 (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.

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<p>A #1 On a Solderless Circuit Board, there are groups of 5 vertical holes on either side of the channel that are _____ .</p> <p>B</p> <p><input checked="" type="radio"/> C</p> <p>D</p> <p>A. connected electrically B. are useless C. not electrically connected D. are hardly ever used for anything</p>	<p>#6 In order for the LED to light up, the lead on the beveled edge side of an LED is connected toward _____ .</p> <p>A. any part of the circuit you want to B. the negative pole of the battery C. the positive pole of the battery D. a resistor anywhere in the circuit</p>	<p>A <input checked="" type="radio"/> B C D</p>
<p>A #2 The purpose of the 'channel' in the center of the Solderless Circuit Board is so _____ .</p> <p>B</p> <p>C</p> <p><input checked="" type="radio"/> D</p> <p>A. we can use more jumper wires B. we can separate the capacitors C. we can remove moisture from the circuit D. we can insert certain integrated circuits</p>	<p>#7 Which one of these mathematical expressions does <u>not</u> represent OHM's Law?</p> <p>A. $W = V \times A$ B. $E = I \times R$ C. $I = E / R$ D. $R = E / I$</p>	<p><input checked="" type="radio"/> A B C D</p>
<p>A #3 How many holes does the Solderless Circuit Board used in the lab have?</p> <p>B</p> <p>C</p> <p><input checked="" type="radio"/> D</p> <p>A. 170 B. 360 C. 142 D. 340</p> 	<p>#8 If you know the value of the current in Amps and you know the resistance in Ohms, what formula do you use to find the Voltage?</p> <p>A. $I = P \times R \times T$ B. $I = E / R$ C. $E = I \times R$ D. $R = E / I$</p>	<p>A B <input checked="" type="radio"/> C D</p>
<p>A #4 A battery has polarity (it matters which way you connect it in a circuit) and a resistor _____ .</p> <p>B</p> <p>C</p> <p><input checked="" type="radio"/> D</p> <p>A. does not have polarity B. also has polarity C. has a double polarity D. has a negative and a positive side</p>	<p>#9 If two resistors are in series in a circuit, to get the total resistance, you _____ .</p> <p>A. subtract one resistor value from the other B. double the values of each resistor C. divide the two resistance values D. add the two resistor values</p>	<p>A B C <input checked="" type="radio"/> D</p>
<p>A #5 Which resistor in series with an LED and a 9-volt battery will make the LED light up more?</p> <p>B</p> <p>C</p> <p><input checked="" type="radio"/> D</p> <p>A. a 1000 ohm resistor B. a 6800 ohm resistor C. a million ohm resistor D. a 10,000 ohm resistor</p>	<p>#10 If the two resistors in a series circuit and they are both 500 ohms, and you have a 9 volt DC source, how much current will flow?</p> <p>A. 0.08 Amps (or 80 milliamps) B. 0.09 Amps (or 90 milliamps) C. 0.009 Amps (or 9 milliamps) D. too much to measure</p>	<p>A B <input checked="" type="radio"/> C D</p>

QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #4 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals Lab # 1201

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A #1 What is the formula for the total equivalent resistance of two resistors in parallel?

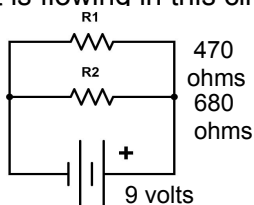
- B**
- C** A. $R(\text{total}) = R1 \times R2 \times R2$
- B. $R(\text{total}) = R1 / R2 + R1$
- C. $R(\text{total}) = (R1 \times R2) / (R1 + R2)$
- D. $R(\text{total}) = R1 \times R2 \times R1 \times R2$

#6 If you want to light up multiple LEDs, you would connect them _____.

- A. across a big resistor
- B. in series
- C. in parallel
- D. one on top of the other

A #2 How much current is flowing in this circuit?

- B**
- C
- D
- A. 0.49 Amps
- B. 0.032 Amps
- C. 2 Amps
- D. 0.120 Amps



#7 According to Lesson 20a1, before you connect a multimeter to a circuit, what is the first thing you should do?

- A. count to 10
- B. clean your meter dial thoroughly
- C. plug the probes into the meter
- D. adjust the meter dial to the correct position

A #3 Red, Green, and Yellow LEDs are designed to drop approximately _____ volts and conduct how much current.

- B
- C
- D
- A. 2 volts, 18 milliamps
- B. 9 volts, 4 milliamps
- C. 12 volts, 8 milliamps
- D. 4 volts, 10 milliamps



#8 You never touch the meter probes to a 'live' circuit when the meter dial is set to measure _____.

- A. battery voltage
- B. ohms or resistance
- C. heat or cold
- D. AC or DC voltage

A #4 Blue and Clear LEDs are designed to drop approximately _____ volts and conduct _____ milliamps.

- B**
- C
- D
- A. 18 volts, 9 milliamps
- B. 3 volts, 14 milliamps
- C. 7 volts, 7 milliamps
- D. 2 volts, 36 milliamps



#9 What do we mean by the 'nominal value' of a resistor?

- A. the actual resistance in ohms we measure
- B. the value the color code says the resistor is
- C. how much out of tolerance the resistor is
- D. the normal value of a resistor

A #5 If you want to use a 9-volt battery to power a red LED, how much resistance would you need to put in series with the LED?

- B
- C**
- D
- A. 240 ohms
- B. 642 ohms
- C. 389 ohms
- D. 748 ohms



#10 When you measure the value of a resistor on a digital multimeter, the display will read differently depending on the _____.

- A. sun
- B. resistance range
- C. capacitance setting
- D. range of voltage

QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #5 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals Lab # 1201

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A #1 When you convert 2000 microamps to milliamps, you move the decimal place _____.

- B
 A. three places to the right
 C B. three places to the left
 D C. two places to the left
 D. four places to the right

#6 If you set the meter dial to the 20 milliamp position and the display shows 18.23, what are you seeing?

- A. 18.23 amps
 B. 18.23 milliamps
 C. 18.23 microamps
 D. 18.23 volts

A

 B

C

D

A #2 2000 microamps equals how many milliamps?

- B
 A. 5.6 milliamps
 C B. 200 milliamps
 D C. 20 milliamps
 D. 2 milliamps

#7 When measuring current, you put the black probe wire into the _____ of the meter.

- A. AC socket
 B. COM socket
 C. V Ω mA socket
 D. DC socket

A

 B

C

D

A #3 0.015 Amps equals how many milliamps?

- B
 A. 150 milliamps
 C B. 15 milliamps
 D C. 1500 milliamps
 D. 105 milliamps

#8 When measuring current with your meter, always set the _____ first.

- A. meter dial to the correct voltage range
 B. meter dial to the correct resistance range
 C. meter dial to the correct capacitance range
 D. meter dial to the correct current range

A

B

C

 D

A #4 When you measure current with a meter, the meter is connected _____.

- B
 A. in series with the circuit
 C B. in parallel with the circuit
 D C. outside the circuit
 D. from left to right

#9 When measuring DC current, the black probe (negative probe) is always connected to _____.

- A. negative side of the circuit
 B. the positive side of the circuit
 C. the neutral side of the circuit
 D. the upper side of the circuit

 A

B

C

D

A #5 If the current exceeds the setting limit you set the dial to, it may _____.

- B
 A. cause permanent damage to the meter
 C B. do nothing to damage the meter
 D C. give you an erroneous reading
 D. measure volage instead of current

#10 When measuring current, it is always best to _____.

- A. make a permanent connection
 B. use one hand
 C. just 'tap' the probe to complete the circuit
 D. use a volt meter

A

B

 C

D

QUICK-CHECK ANSWER KEY for ASSIGNMENT SHEET #6 (of 6)
for Mr Circuit "Ohm's Law and More!" Multimeter Lab # 1201

Place this sheet over top of the STUDENT ASSIGNMENT SHEET #6 (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 When measuring current flowing from an LED to a resistor, the black probe touches the _____ . A. the resistor B. the anode of the LED C. the cathode of the LED D. the battery negative pole</p>	<p>#6 When measuring DC voltage with the meter, what is the first thing you do? A. set the dial to a range of resistance B. turn the dial around and around C. set the dial to the correct DC range D. set the dial to measure AC volts</p>	<p>A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D</p>
<p>A <input type="radio"/> B <input type="radio"/> C <input checked="" type="radio"/> D</p>	<p>#2 If your circuit has a red LED lighting up, how much current would you expect to be flowing through the LED. A. 0.5 A B. 180 mA C. 2 A D. 0.018 A</p>	<p>#7 If the display on the meter shows 8.63 and the dial is set on the 20 volt range, how much voltage are you reading? A. 8.63 amps B. 8.63 milliamps C. 8.63 volts D. 8.6 microamps</p>	<p>A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D</p>
<p><input checked="" type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D</p>	<p>#3 As you change the value in ohms of a resistor in series with an LED, how does that affect the LED's brightness? A. the more ohms, the dimmer the LED B. the less ohms, the dimmer the LED C. the more ohms, the brighter the LED D. the ohms do not affect the LED's brightness</p>	<p>#8 In order to determine the amount of watts that a resistor must be able to dissipate, you first have to find out _____ . A. how much capacitance is in the circuit B. how much current will be flowing through it C. if there are too many resistors D. if you have DC or AC</p>	<p>A <input checked="" type="radio"/> B <input type="radio"/> C <input type="radio"/> D</p>
<p>A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D</p>	<p>#4 If you increase the value in ohms of a resistor in series with an LED, the current flowing in the circuit will _____ . A. increase B. remain the same C. decrease D. change to a voltage</p>	<p>#9 What is the formula for finding the watts of heat that will need to be dissipated by an electronic device in a circuit? A. Watts = Resistance x Amps B. Watts = Volts x Amps C. Watts = Resistance x Resistance D. Watts = Amps x Amps</p>	<p>A <input checked="" type="radio"/> B <input type="radio"/> C <input type="radio"/> D</p>
<p><input checked="" type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D</p>	<p>#5 If your 9-volt battery is 'weak', how will that affect the brightness of the LED.? A. the LED will be dimmer B. it will have no effect on the LED's brightness C. it will cause the LED to blink on and off D. the LED will be brighter and then dimmer</p>	<p>#10 If the physical size of resistor #1 is larger than the physical size of resistor #2, then resistor #1 can _____ . A. use less electricity B. fit into a smaller space C. dissipate more watts D. have a higher ohm value</p>	<p>A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D</p>