

# STUDENT STUDY PACKET

## for Mr Circuit “Ohm’s Law and More!” Multimeter Lab # 1201

Date \_\_\_\_\_

Student Name: \_\_\_\_\_

Period or Student Number \_\_\_\_\_



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Complete all of the 6 Assignment Sheets and hand this packet to your instructor for grading.

**LAB 1201**

**STUDENT ASSIGNMENT SHEET #1 & QUIZ #1**

**LAB 1201**

**for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals**


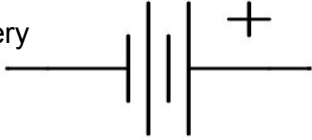

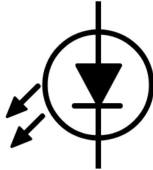
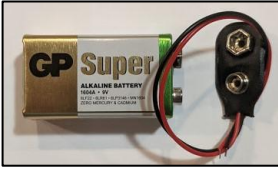
**Check Off**

- (1) Do **Lesson 1 and Activity 1b** in the Lab Manual - pages 6 and 7.
- (2) Do **Lesson 2 and Activity 2b** in the Lab Manual - pages 8 and 9.
- (3) Do **Lesson 3 and Activity 3b** in the Lab Manual - pages 10 and 11.
- (4) Do **Lesson 4 and Activity 4b** in the Lab Manual - pages 12 and 13.
- (5) Do **Lesson 5 and Activity 5b** in the Lab Manual - pages 14 and 15.
- (6) Circle the question answers below on the left and right columns.

**STUDENT INSTRUCTIONS:**

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A	<p><b>#1</b> What is the name of this component?</p> <div style="text-align: center;">  </div> <p>A. resistor B. LED C. capacitor D. transistor</p>	A	<p><b>#6</b> An LED generally has one lead longer than the other. That lead is connected to _____.</p> <p>A. the anode of the LED B. a resistor C. the cathode of the LED D. ground</p>	A
B	<p><b>#2</b> What does this electronic symbol stand for?</p> <div style="text-align: center;">  </div> <p>A. a multi-cell battery B. a capacitor C. an LED D. a resistor</p>	B	<p><b>#7</b> How many color bands does a ±5% resistor have?</p> <div style="text-align: center;">  </div> <p>A. 5 B. 4 C. 7 D. 10</p>	B
C	<p><b>#3</b> What does this electronic symbol stand for?</p> <div style="text-align: center;">  </div> <p>A. an LED B. a single-cell battery C. a battery snap D. a resistor</p>	C	<p><b>#8</b> What is the purpose of the Resistor Color Code?</p> <p>A. to see if you are color blind B. it tells us the value &amp; tolerance of a resistor C. it tells us the wattage of a resistor D. it hides the value in ohms of the resistor</p>	C
D	<p><b>#4</b> A nine-volt battery has how many 1 ½ volt single cells inside of it?</p> <div style="text-align: center;">  </div> <p>A. 8 B. 6 C. 4 D. 3</p>	D	<p><b>#9</b> On a ±5% resistor, what does the third color band tell you?</p> <p>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</p>	D
A	<p><b>#5</b> The beveled edge on an LED is also referred to as _____.</p> <p>A. the near side B. the outside C. flat side D. the far side</p>	A	<p><b>#10</b> Resistors are measured in _____ and _____.</p> <p>A. microvolts and milliamps B. farads and henries C. volts and amps D. ohms and watts</p>	A

<b>Score</b>	
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**LAB 1201**

**STUDENT ASSIGNMENT SHEET & QUIZ #2**

**LAB 1201**

**for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals**

**Check Off**

- (1) Do **Lesson 6 and Activity 6b** in the Lab Manual - pages 16 and 17.
- (2) Do **Lesson 7 and Activity 7b** in the Lab Manual - pages 18 and 19.
- (3) Do **Lesson 8 and Activity 8b** in the Lab Manual - pages 20 and 20.
- (4) Do **Lesson 9 and Activity 9b** in the Lab Manual - pages 22 and 23.
- (5) Do **Lesson 10 and Activity 10b** in the Lab Manual - pages 24 and 25.
- (6) Circle the question answers below on the left and right columns.

**STUDENT INSTRUCTIONS:**


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- A
- B
- C
- D


**#1** How many color bands do  $\pm 1\%$  resistors have?

- 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
- B
- C
- D

**#2** When determining the value of a  $\pm 1\%$  resistor, if the 2nd to last color is silver you \_\_\_\_\_.

- 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
- B
- C
- D

**#3** What do we call the group of parts that we use in this lab?

- 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
- B
- C
- D

**#4** A nine-volt battery snap has two wires? Generally, what two colors are the wires?

- 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
- B
- C
- D

**#5** An electronic schematic diagram is made up of \_\_\_\_\_.

- 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

Score	
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**LAB 1201****STUDENT ASSIGNMENT SHEET & QUIZ #3****LAB 1201****for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals****Check Off**

- (1) Do **Lesson 11 and Activity 11b** in the Lab Manual- pages 26 and 27.
- (2) Do **Lesson 12 and Activity 12b** in the Lab Manual- pages 28 and 29.
- (3) Do **Lesson 13 and Activity 13b** in the Lab Manual- pages 30 and 31.
- (4) Do **Lesson 14 and Activity 14b** in the Lab Manual- pages 32 and 33.
- (5) Do **Lesson 15 and Activity 15b** in the Lab Manual- pages 34 and 35.
- (6) Circle the question answers below on the left and right columns.

**STUDENT INSTRUCTIONS:**
  
  
  
  



A  
B  
C  
D

**#1** On a Solderless Circuit Board, there are groups of 5 vertical holes on either side of the channel that are \_\_\_\_\_ .

A. connected electrically

B. are useless

C. not electrically connected

D. are hardly ever used for anything

**#6** In order for the LED to light up, the lead on the beveled edge side of an LED is connected toward \_\_\_\_\_ .

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

A  
B  
C  
D

A  
B  
C  
D

**#2** The purpose of the 'channel' in the center of the Solderless Circuit Board is so \_\_\_\_\_ .

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

**#7** Which one of these mathematical expressions does not represent OHM's Law?

A.  $W = V \times A$

B.  $E = I \times R$

C.  $I = E / R$

D.  $R = E / I$

A  
B  
C  
D

A  
B  
C  
D

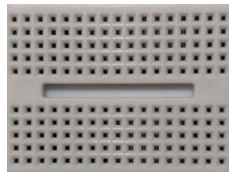
**#3** How many holes does the Solderless Circuit Board used in the lab have?

A. 170

B. 360

C. 142

D. 340



**#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?

A.  $I = P \times R \times T$

B.  $I = E / R$

C.  $E = I \times R$

D.  $R = E / I$

A  
B  
C  
D

A  
B  
C  
D

**#4** A battery has polarity (it matters which way you connect it in a circuit) and a resistor \_\_\_\_\_ .

A. does not have polarity

B. also has polarity

C. has a double polarity

D. has a negative and a positive side

**#9** If two resistors are in series in a circuit, to get the total resistance, you \_\_\_\_\_ .

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

A  
B  
C  
D

A  
B  
C  
D

**#5** Which resistor in series with an LED and a 9-volt battery will make the LED light up more?

A. a 1000 ohm resistor

B. a 6800 ohm resistor

C. a million ohm resistor

D. a 10,000 ohm resistor

**#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?

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

A  
B  
C  
D

LAB 1201

STUDENT ASSIGNMENT SHEET & QUIZ #4

LAB 1201

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

Check Off

- (1) Do Lesson 16 and Activity 16b in the Lab Manual- pages 16 and 17.
- (2) Do Lesson 17 and Activity 17b in the Lab Manual- pages 16 and 17.
- (3) Do Lesson 18 and Activity 18b in the Lab Manual- pages 16 and 17.
- (4) Do Lesson 19 and Activity 19b in the Lab Manual- pages 16 and 17.
- (3) Do Lesson 20 on pages 44, 45, & 46 and Activity 20b2 on Page 47.
- (4) Fill in Tolerance Charts 20a3, 20b3, 20a4, and 20b4 on pages 48 - 51.
- (5) Circle the question answers below on the left and right columns.

STUDENT INSTRUCTIONS:

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- A
- B
- C
- D

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

- 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.  $R(\text{total}) = R1 \times R2 \times R1 \times R2$

- A
- B
- C
- D

- A
- B
- C
- D

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

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

- A
- B
- C
- D

- A
- B
- C
- D

**#3** Red, Green, and Yellow LEDs are designed to drop approximately \_\_\_\_\_ volts and conduct how much current.

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

- A
- B
- C
- D

- A
- B
- C
- D

**#4** Blue and Clear LEDs are designed to drop approximately \_\_\_\_\_ volts and conduct \_\_\_\_\_ milliamps.

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

- A
- B
- C
- D

- A
- B
- C
- D

**#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?

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

- A
- B
- C
- D

**#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

**#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

**#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

**#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

**#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

Score	
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**LAB 1201****STUDENT ASSIGNMENT SHEET & QUIZ #5****LAB 1201****for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals****Check Off**

- (1) Do **Lesson 21 p.54 - 55** and **Activities 21a1, 21b1, & 21b2** on p.52 - 53.
- (2) Do **Lesson 22** and **Activity 22b** in the Lab Manual- pages **56** and **57**.
- (3) Do **Lesson 23** and **Activity 23b** in the Lab Manual- pages **58** and **59**.
- (4) Do **Lesson 24** and **Activity 24b** in the Lab Manual- pages **60** and **61**.
- (5) Do **Lesson 25** and **Activity 25b** in the Lab Manual- pages **62** and **63**.
- (6) Circle the question answers below on the left and right columns.

**STUDENT INSTRUCTIONS:**

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

**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

**#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  $\Omega$  mA socket

**D.** DC socket

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

**#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

**#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

**LAB 1201****STUDENT ASSIGNMENT SHEET & QUIZ #6****LAB 1201****for Mr Circuit "Ohm's Law and More!" Multimeter Fundamentals****Check Off**

- (1) Do **Lesson 26 and Activity 26b** in the Lab Manual- pages 64 and 65.
- (2) Do **Lesson 27 and Activity 27b** in the Lab Manual- pages 66 and 67.
- (3) Do **Lesson 28 and Activity 28b** in the Lab Manual- pages 68 and 69.
- (4) Do **Lesson 29 and Activity 29b** in the Lab Manual- pages 70 and 71.
- (5) Do **Lesson 30 and Activity 30b** in the Lab Manual- pages 72 and 73.
- (6) Circle the question answers below on the left and right columns.

**STUDENT INSTRUCTIONS:**
  
  
  
  



**A** #1 When measuring current flowing from an LED to a resistor, the black probe touches the \_\_\_\_\_.

- B** \_\_\_\_\_
- A.** the resistor
- B.** the anode of the LED
- C.** the cathode of the LED
- D.** the battery negative pole

**A** #6 When measuring DC voltage with the meter, what is the first thing you do?

- B** \_\_\_\_\_
- 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

**A** #2 If your circuit has a red LED lighting up, how much current would you expect to be flowing through the LED.

- B** \_\_\_\_\_
- A.** 0.5 A
- B.** 180 mA
- C.** 2 A
- D.** 0.018 A

**A** #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?

- B** \_\_\_\_\_
- A.** 8.63 amps
- B.** 8.63 milliamps
- C.** 8.63 volts
- D.** 8.6 microamps

**A** #3 As you change the value in ohms of a resistor in series with an LED, how does that affect the LED's brightness?

- B** \_\_\_\_\_
- 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

**A** #8 In order to determine the amount of watts that a resistor must be able to dissipate, you first have to find out \_\_\_\_\_.

- B** \_\_\_\_\_
- 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

**A** #4 If you increase the value in ohms of a resistor in series with an LED, the current flowing in the circuit will \_\_\_\_\_.

- B** \_\_\_\_\_
- A.** increase
- B.** remain the same
- C.** decrease
- D.** change to a voltage

**A** #9 What is the formula for finding the watts of heat that will need to be dissipated by an electronic device in a circuit?

- B** \_\_\_\_\_
- A.** Watts = Resistance x Amps
- B.** Watts = Volts x Amps
- C.** Watts = Resistance x Resistance
- D.** Watts = Amps x Amps

**A** #5 If your 9-volt battery is 'weak', how will that affect the brightness of the LED.?

- B** \_\_\_\_\_
- 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

**A** #10 If the physical size of resistor #1 is larger than the physical size of resistor #2, then resistor #1 can \_\_\_\_\_.

- B** \_\_\_\_\_
- A.** use less electricity
- B.** fit into a smaller space
- C.** dissipate more watts
- D.** have a higher ohm value

Score