



# Electronics

## Merit Badge Workbook



This workbook can help you but you still need to read the merit badge pamphlet.

This Workbook can help you organize your thoughts as you prepare to meet with your merit badge counselor.

You still must satisfy your counselor that you can demonstrate each skill and have learned the information.

You should use the work space provided for each requirement to keep track of which requirements have been completed, and to make notes for discussing the item with your counselor, not for providing full and complete answers.

If a requirement says that you must take an action using words such as "discuss", "show", "tell", "explain", "demonstrate", "identify", etc, that is what you must do.

**Merit Badge Counselors may not require the use of this or any similar workbooks.**

No one may add or subtract from the official requirements found in Scouts BSA Requirements (Pub. 33216 – SKU 653801).

The requirements were last issued or revised in 2018 • This workbook was updated in June 2020.

Scout's Name: \_\_\_\_\_ Unit: \_\_\_\_\_

Counselor's Name: \_\_\_\_\_ Phone No.: \_\_\_\_\_ Email: \_\_\_\_\_

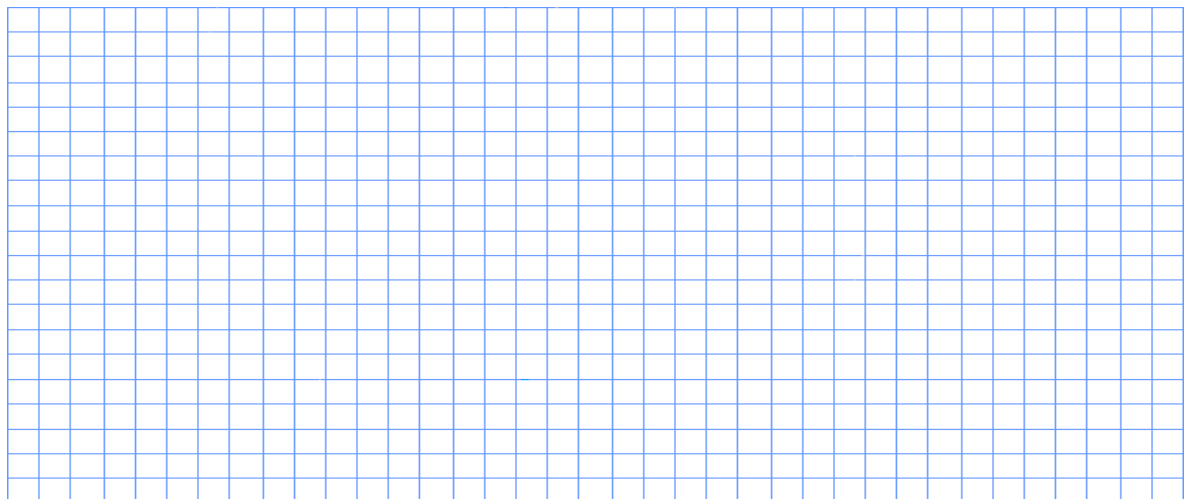
<http://www.USScouts.Org> • <http://www.MeritBadge.Org>

Please submit errors, omissions, comments or suggestions about this **workbook** to: [Workbooks@USScouts.Org](mailto:Workbooks@USScouts.Org)

Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: [Merit.Badge@Scouting.Org](mailto:Merit.Badge@Scouting.Org)

1. Describe the safety precautions you must exercise when using, building, altering, or repairing electronic devices.


2. Do the following:
  - a. Draw a simple schematic diagram. It must show resistors, capacitors, and transistors or integrated circuits. Use the correct symbols. Label all parts.



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b. Tell the purpose of each part.

Resistor:


Capacitor:


Transistor:


Integrated circuit:


Other?:


3. Do the following:

- a. Show the right way to solder and desolder.
- b. Show how to avoid heat damage to electronic components.
- c. Tell about the function of a printed circuit board.


Tell what precautions should be observed when soldering printed circuit boards.


4. Do the following:

a. Discuss each of the following with your merit badge counselor,

i. How to use electronics for a control purpose.


ii. The basic principles of digital techniques


iii. How to use electronics for three different audio applications.


- b. Show how to change three decimal numbers into binary numbers and three binary numbers into decimal numbers.


- c. Choose ONE of the following three projects. For your project, find or create a schematic diagram. To the best of your ability, explain to your counselor how the circuit you built operates.

- i. A control device
- ii. A digital circuit.
- iii. An audio circuit.


5. Do the following:

- a. Show how to solve a simple problem involving current, voltage, and resistance using Ohm's law.
- b. Tell about the need for and the use of test equipment in electronics.


Name three types of test equipment. Tell how they operate.

1.	
2.	

3.


6. Find out about three career opportunities in electronics that interest you.

1.  
2.  
3.


Discuss with and explain to your counselor what training and education are needed for each position.

1. Training:


Education:


2. Training:


Education:


3. Training:


Education:


**When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088). Important excerpts from that publication can be downloaded from <http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf>. You can download a complete copy of the *Guide to Advancement* from <http://www.scouting.org/filestore/pdf/33088.pdf>.**