



# ELECTRONICS

## Merit Badge Requirements

- 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.
  - B) Tell the purpose of each part.
- 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) Discuss each of the following with your merit badge counselor, and then choose ONE of the following and build a circuit to show the techniques used:
  - A) Tell how you can use electronics for a control purpose, and then build a control device circuit.
  - B) Tell about the basic principles of digital techniques, and then build a digital circuit. Show how to change three decimal numbers into binary numbers, and three binary numbers into decimal numbers.
  - C) Tell about three audio applications of electronics, and then build an audio circuit.

Show how to read the schematic diagram of the project you choose and, to the best of your ability, explain to your counselor how the circuit you built operates.
- 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.
- 6) Find out about three career opportunities in electronics that interest you. Discuss with and explain to your counselor what training and education are needed for each position.

### Requirement 1

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

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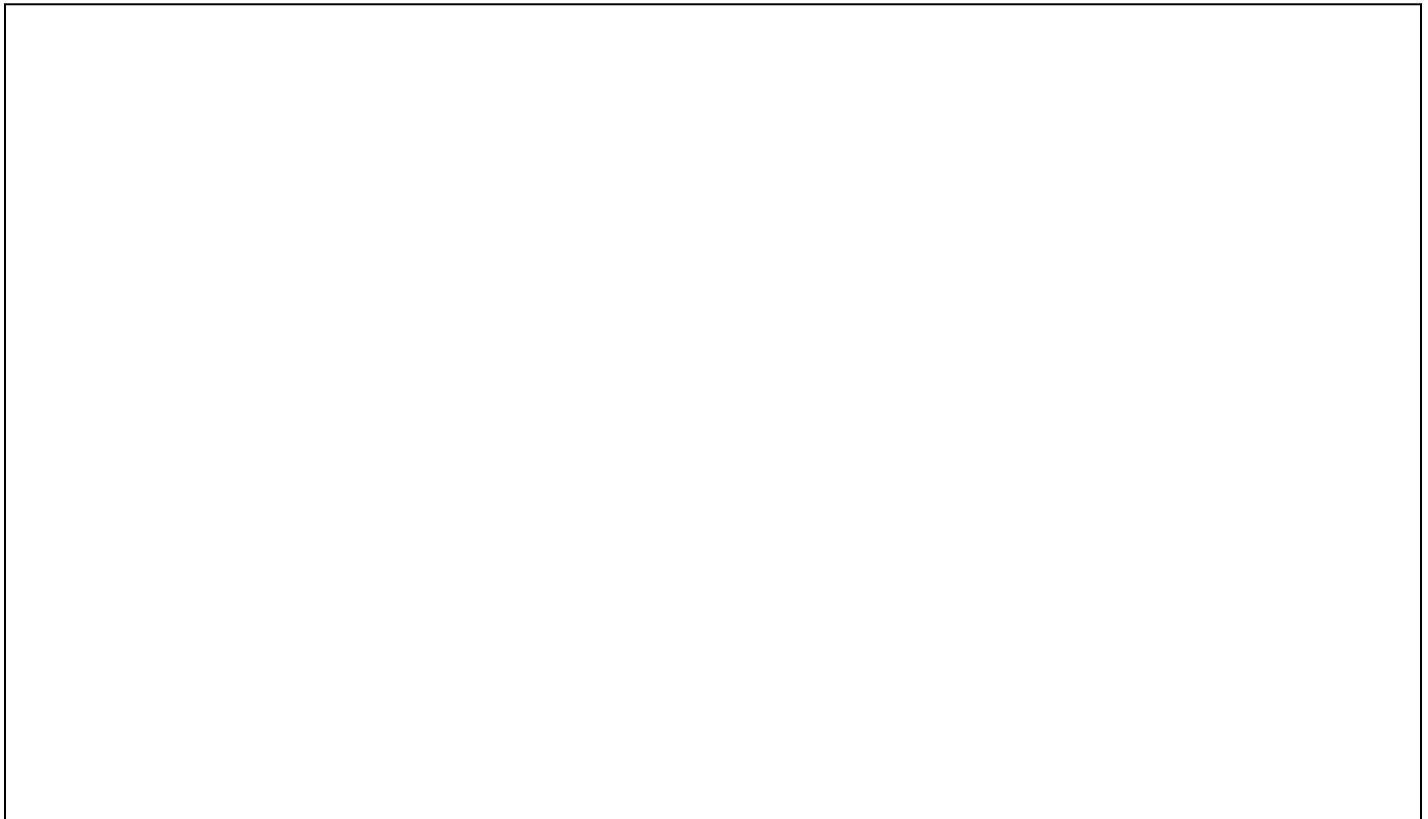
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### Requirement 2

In the area below draw a simple schematic diagram. It must show resistors, capacitors, and transistors or integrated circuits. Use correct symbols. Label all parts.



List the main parts you used in the diagram above and give the use or purpose of each:

Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

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Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

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Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

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Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

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Scout Name: \_\_\_\_\_ Unit #: \_\_\_\_\_ Date: \_\_\_\_\_

Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

Part: \_\_\_\_\_ Purpose: \_\_\_\_\_

### Requirement 3

Demonstrate to your counselor the correct way to solder. Briefly explain/describe the process: \_\_\_\_\_

Demonstrate to your counselor the correct way to desolder. Briefly explain/describe the process: \_\_\_\_\_

Tell how to avoid heat damage to components: \_\_\_\_\_

Tell about the function of a printed circuit board: \_\_\_\_\_

Tell what precautions should be observed when soldering printed circuit boards: \_\_\_\_\_

### Requirement 4

You have been given three options for this requirement. Discuss each of them with your counselor then complete one of them.

If you selected *Option A*:

Tell how you can use electronics for a control purpose: \_\_\_\_\_

Build a circuit to show this. Describe the circuit that you built: \_\_\_\_\_

Scout Name: \_\_\_\_\_ Unit #: \_\_\_\_\_ Date: \_\_\_\_\_

If you selected **Option B**:

Tell about the basic principles or digital techniques: \_\_\_\_\_

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Build a circuit to show digital techniques. Describe the circuit: \_\_\_\_\_

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Tell how you would change three decimal numbers into binary numbers: \_\_\_\_\_

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Tell how you would change three binary numbers into decimal numbers: \_\_\_\_\_

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If you selected **Option C**:

Tell about three audio applications of electronics:

Application 1: \_\_\_\_\_

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Application 2: \_\_\_\_\_

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Application 3: \_\_\_\_\_

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Build a circuit to show audio techniques. Describe the circuit: \_\_\_\_\_

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**After completing option A, B, or C**, describe how to read the schematic diagram of the project \_\_\_\_\_

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Scout Name: \_\_\_\_\_ Unit #: \_\_\_\_\_ Date: \_\_\_\_\_

Describe how your project works and to the best of your ability, tell how it operates: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Requirement 5

Tell how to solve a simple problem involving current, voltage, and resistance using Ohm's law: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Tell about the need for and the use of test equipment in electronics: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name three types of test equipment and tell how each operates:

Name: \_\_\_\_\_ Operation: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Operation: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Operation: \_\_\_\_\_  
\_\_\_\_\_

### Requirement 6

Tell about three jobs in electronics and tell what training is needed for each job.

Job Title: \_\_\_\_\_ Description: \_\_\_\_\_  
\_\_\_\_\_

Training Needed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Job Title: \_\_\_\_\_ Description: \_\_\_\_\_  
\_\_\_\_\_

Training Needed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Job Title: \_\_\_\_\_ Description: \_\_\_\_\_  
\_\_\_\_\_

Training Needed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_