

Electrical Construction Wiring (Residential Wiring) Blueprint

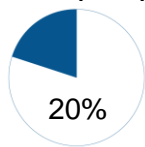
This Blueprint contains the subject matter content for the Career Essentials - Assessment.

Note: To fully prepare for the [Residential Wiring](#) SkillsUSA Championships contest, refer to the current year's SkillsUSA Championships Technical Standard, now included with your SkillsUSA Professional Membership. If you need help in accessing this benefit, contact the SkillsUSA Customer Care Team at 844-875-4557 or customercare@skillsusa.org

Standards and Competencies

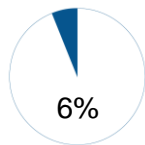
Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Define and apply safety rules and practices in residential wiring according to National Electrical Code (NEC) standards



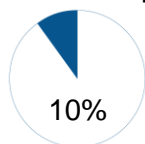
- Apply shop rules and regulations to work stations
- List the techniques and practices used to prevent fires
- Use electrical and hand tools correctly
- Discuss the appropriate methods for lifting and climbing ladders
- Explain appropriate clothing for residential wiring
- Outline the safety requirements for installing temporary electrical services

Apply knowledge of basic wiring theory according to NEC standards



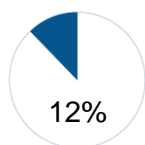
- Use wiring diagrams, schematic diagrams and prints successfully in a scenario
- Apply math calculations to circuits and measurements
- Discuss theory concepts for troubleshooting

Discuss important trade information and standards according to the NEC



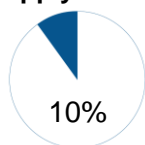
- Explain the purpose and use of the National Electric Code
- Sketch and diagram effectively
- Plan the layout of an electrical installation
- Use trade catalogs and publications to solve residential wiring problems
- Correlate specifications, prints and job sites

Use basic equipment and procedures defined by industry standards



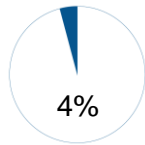
- Discuss techniques of residential and light commercial wiring
- Demonstrate wire pulling techniques

Apply knowledge of service loads and electrical safety to residential wiring situations



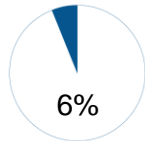
- Compute service loads
- Calculate individual service loads
- Determine the number of outlets permitted in a circuit
- Compute the size of service entrance conductors
- Use all types of cables including NM, MC, and service

Install a service entrance to meet NEC standards



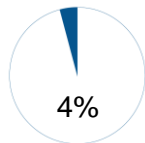
- Install a main service panel
- Install circuit breakers in a panel
- Install a service entrance cable to service drop
- Install temporary electrical service

Install switch boxes and outlet boxes to meet NEC standards



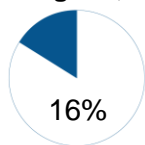
- Install box hangers
- Install recess boxes for outlets
- Install hangable boxes
- Install octagon boxes
- Install surface mount boxes
- Install recessed fixture housing in a ceiling
- Install outlet boxes in dry wall, lath plaster or paneled walls

Maintain already existing wiring to meet NEC standards



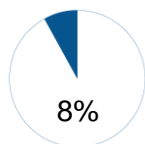
- Diagnose and repair incandescent lights
- Replace existing receptacles and switches
- Troubleshoot a branch circuit
- Test wiring for correct voltages

Rough in, connect, and install electrical devices to meet NEC standards



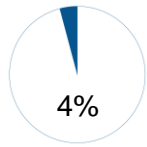
- Rough in, connect and install a single pole switch
- Rough in, connect and install a three-way switch
- Rough in, connect and install a four-way switch
- Rough in, connect and install a duplex grounded receptacle
- Rough in, connect, and install a 120-240 volt distribution panel
- Rough in, connect and install a door chime system
- Rough in, connect and install a ground fault interrupting device
- Rough in, connect and install an emergency warning system
- Rough in, connect and install a photoelectric cell control
- Rough in, connect and install a surface raceway
- Rough in, connect and install an exterior lighting fixture
- Rough in, connect and install lighting dimmers
- Rough in, connect and install TV outlets
- Rough in, connect and install telephone outlets
- Rough in, connect and install emergency lighting systems
- Rough in, connect and install appliance circuits

Install PVC and EMT conduit to meet NEC standards



- Make 90-degree bends from measurements
- Make offset bends from measurements
- Make back-to-back bends from measurements
- Make saddle bends from measurements
- Determine correct conduit measurements

Install residential telecommunications infrastructure to meet current TIA/EIA 570 standards



- Install a coaxial cable with “F” type connectors and terminating hardware
- Install unshielded twisted-pair cable, connectors and terminating hardware
- Install 110-type terminating hardware

Demonstrate professional development skills in a simulated customer service or employment situation. Examples may include:

- Job interview
- Customer service scenario
- Communications
- Decision making, problem solving and/or critical thinking

Committee Identified Academic Skills

The SkillsUSA national technical committee has identified that the following academic skills are embedded in the residential wiring training program and assessment:

Math Skills

- Use fractions to solve practical problems
- Measure angles
- Find surface area and perimeter of two-dimensional objects
- Apply Pythagorean Theorem
- Solve problems using proportions, formulas and functions

Science Skills

- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity, and circuits

Language Arts Skills

- Provide information in conversations and in group discussions
- Demonstrate use of verbal communication skills, such as word choice, pitch, feeling, tone and voice
- Demonstrate use of nonverbal communication skills, such as eye contact, posture and gestures using interviewing techniques to gain information
- Demonstrate comprehension of a variety of informational texts
- Use text structures to aid comprehension
- Identify words and phrases that signal an author’s organizational pattern to aid comprehension
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases and online resources to access information in books and articles

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- | | |
|--------------------------|-------------------|
| • Numbers and operations | • Problem solving |
| • Algebra | • Communication |
| • Geometry | • Connections |
| • Measurement | • Representation |

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: <http://www.nctm.org/standards/content.aspx?id=16909>. Select “Standards” from menu.



Science Standards

- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks/.

Language Arts Standards

- Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.