

Electrical Construction Wiring Blueprint

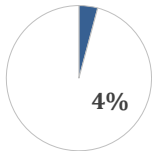
This Blueprint contains the subject matter content for the Career Essentials - Assessment.

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 accessing this benefit, contact the SkillsUSA Customer Care Team at 844-875-4557 or customercare@skillsusa.org

Standards and Competencies

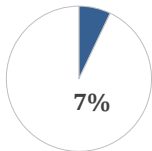
Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 45 questions per assessment.

Define and apply safety rules and practices in electrical construction wiring according to NEC standards



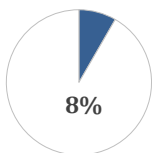
- Use electrical and hand tools correctly.
- Outline the safety requirements for installing temporary electrical services.

Apply knowledge of basic wiring theory according to NEC standards



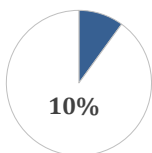
- Use wiring diagrams, schematic diagrams and prints successfully in a scenario.
- Apply math calculations to circuits and measurements.
- Discuss theory concepts for troubleshooting.

Discuss important trade information and standards according to the NEC



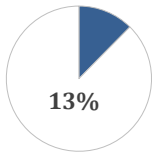
- Explain the purpose and use of the National Electric Code.
- Sketch and diagram effectively.
- Plan the layout of an electrical installation.
- Use trade catalogs and publications to solve electrical construction wiring problems.

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



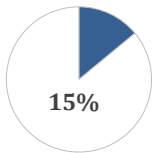
- Compute service loads.
- Calculate individual service loads.
- Determine the number of outlets permitted in a circuit.
- Compute the size of service entrance conductors.
- Use any wire types listed in NEC 310.16.

Install a service entrance to meet NEC standards



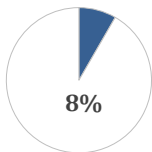
- Install a main service panel and sub-panel
- Install circuit breakers in a panel.
- Install a service entrance cable to service drop.
- Install temporary electrical service.
- Install equipment disconnect.
- Install meter bases.

Install switch boxes and outlet boxes to meet NEC standards



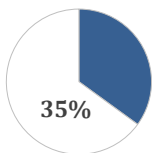
- Install box hangers.
- Install recess boxes for outlets.
- Install hangable boxes.
- Install octagon boxes.
- Install surface mount boxes.
- Install recessed fixture housing in a ceiling.
- Install outlet boxes in drywall, lath plaster or paneled walls.

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 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.
- Rough in, connect and install occupancy sensor.
- Rough in, connect and install motion sensor.

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
- Algebra
- Geometry
- Measurement
- Problem-solving
- Communication
- Connections
- 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.