



ELECTRICAL CONSTRUCTION WIRING BLUEPRINT

This Blueprint contains the subject matter content of this Skill Connect Assessment. This Blueprint does **NOT** contain the information one would need to fully prepare for a SkillsUSA Championships contest. Please refer to the *SkillsUSA Championships Technical Standards* CD-ROM for the current year or purchase and download the relevant "Contest Singles." Both are available through www.skillsusa.org > Shop > Educational Materials Catalog.

Standards and Competencies

Define and apply safety rules and practices in residential wiring according to 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
- Algebra
- Geometry
- Measurement
- Problem solving
- Communication
- Connections
- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: standards.nctm.org/document/chapter7/index.htm. 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.