

Electronics Application / Electronics Technology Blueprint

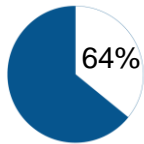
This Blueprint contains the subject matter content for the Career Essentials - Assessment.

Note: To fully prepare for the [Electronics Technology](#) 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

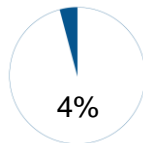
Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Demonstrate knowledge of general electronics



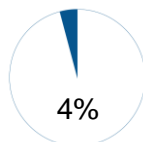
- Demonstrate knowledge of the principles of Ohm's Law
- Demonstrate knowledge of the principles of DC Circuits
- Demonstrate knowledge of the principles of AC circuits
- Demonstrate knowledge, characteristics, and uses of Discrete Solid State Devices
- Demonstrate knowledge of the characteristics of Analog Circuits
- Demonstrate knowledge of the characteristics of Digital Circuits

Analyze a microprocessor system using digital technology

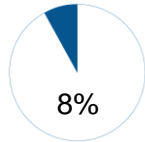


- Describe ASCII code
- Identify each basic digital gate
- Construct truth tables for common gates
- Explain how counters operate
- Explain the purpose of flip flops, and list common types
- Explain the purpose of a digital bus
- List types of display circuitry, and describe how numbers and letters are activated digitally
- Explain the purpose of computer clocks
- Show how pulsers are used for digital signal tracing and how logic probes are used to verify states in digital equipment
- Describe digital clock usage and circuitry
- Describe how microprocessors function, and identify the basic components and pinouts
- Describe the major sections of a computer
- Demonstrate how the computer block diagram and flow charts are utilized
- Identify the major blocks contained in a microprocessor chip
- Describe different types of computer memory
- Describe basic programming concepts
- Describe the reasons for different computer languages and their relationships
- Define the word peripheral and list various types
- Explain the reasons for using interface devices/chips/cards and name common types

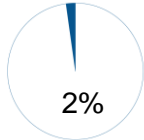
Demonstrate knowledge and understanding of computers



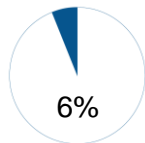
- Demonstrate knowledge of computer electronics
- Demonstrate understanding of computer applications
- Demonstrate understanding of numbering systems

Demonstrate knowledge and understanding of audio/video systems

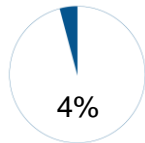
- Demonstrate knowledge of audio/video systems
- Demonstrate understanding of audio/video systems

Demonstrate knowledge and understanding of optical electronics

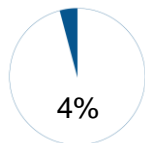
- Demonstrate knowledge of optical electronics and safe usage
- Demonstrate understanding of optical applications

Demonstrate knowledge and understanding of soldering

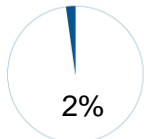
- Demonstrate knowledge of soldering safety
- List types of solder and reasons for choosing each
- Demonstrate the use of solder removers
- Demonstrate knowledge of soldering tools

Demonstrate knowledge of electronic test equipment

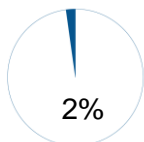
- Demonstrate knowledge of test equipment
- Demonstrate safe use of test equipment

Demonstrate understanding of servicing and troubleshooting techniques

- Demonstrate safety while troubleshooting
- Diagnose electrical equipment malfunctions

Demonstrate safety and ESD procedures

- Demonstrate knowledge of safety precautions
- Demonstrate understanding of ESD procedures

Demonstrate knowledge and characteristics of good customer service

- Demonstrate good customer service



Committee Identified Academic Skills

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

Math Skills

- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Simplify numerical expressions
- Use scientific notation
- Solve practical problems involving percents
- Solve single variable algebraic expressions
- Solve multiple variable algebraic expressions
- Measure angles
- Make comparisons, predictions and inferences using graphs and charts
- Organize and describe data using matrixes
- Graph linear equations
- Solve problems using proportions, formulas and functions
- Use laws of exponents to perform operations
- Solve practical problems involving complementary, supplementary and congruent angles

Science Skills

- Plan and conduct a scientific investigation
- Use knowledge of carbon, water and nitrogen cycles
- Use knowledge of the particle theory of matter
- Describe and recognize elements, compounds, mixtures, acids, bases and salts
- Describe and recognize solids, liquids and gases
- Describe characteristics of types of matter based on physical and chemical properties
- Describe phases of matter
- Describe and identify physical changes to matter
- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point, color)
- Use knowledge of chemical properties (acidity, basicity, combustibility, reactivity)
- Understand the modern model of atomic structure
- Understand Law of Conservation of Matter and Energy
- Use knowledge of classification of elements as metals, metalloids and nonmetals
- Use knowledge of potential and kinetic energy
- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of heat, light and sound energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of sound and technological applications of sound waves
- Use knowledge of speed, velocity and acceleration
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices
- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of magnetic fields and electromagnets
- Use knowledge of motors and generators
- Use knowledge of work, force, mechanical advantage, efficiency and power



Language Arts Skills

- Provide information in conversations and in group discussions
- Demonstrate use of verbal communication skills: word choice, pitch, feeling, tone and voice
- Demonstrate comprehension of a variety of informational texts
- Use text structures to aid comprehension
- Understand source, viewpoint and purpose of texts
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases and online resources to access information in books and articles
- Demonstrate narrative writing
- Demonstrate expository writing
- Demonstrate informational writing

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
- Data analysis and probability
- Problem solving and proof
- Reasoning and proof
- 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
- Understands the scientific enterprise

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

Language Arts Standards

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works
- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)



**Career
Essentials:
Assessments**

- 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 employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes
- Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience
- 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)
- Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and non-print texts

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