IDAHO
Division of Career Technical Education

# 2023-2024 Technical Skills Assessment
## Pre-Engineering

## Results by Standard

| Legend (%) | | |
|---|---|---|
| 0-50% | 51-75% | 76-100% |

| **Assessment:** Pre-Engineering<br>**Number tested: 129** | % Correct 20-21 | % Correct 21-22 | % Correct 22-23 | % Correct 23-24 |
|---|---|---|---|---|
| **CONTENT STANDARD 1.0: LAB ORGANIZATION AND SAFETY PROCEDURES** | 79.94% | 81.52% | 82.72% | 82.72% |
| **Performance Standard 1.1: General Lab Safety Rules and Procedures** | 84.91% | 85.42% | 87.16% | 86.54% |
| 1.1.1 Describe general shop safety rules and procedures. | 84.03% | 85.25% | 87.30% | 85.19% |
| 1.1.2 Demonstrate knowledge of OSHA and its role in workplace safety. | 94.12% | 96.72% | 92.86% | 95.56% |
| 1.1.3 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment, (PPE)). | 88.66% | 88.52% | 90.48% | 89.63% |
| 1.1.4 Operate lab equipment according to safety guidelines. | 79.83% | 81.42% | 82.28% | 81.73% |
| 1.1.6 Utilize proper ventilation procedures for working within the lab/shop area. | 96.64% | 95.90% | 98.41% | 97.04% |
| 1.1.7 Identify marked safety areas and safety signage. | 93.28% | 90.16% | 88.10% | 91.11% |
| 1.1.8 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. | 74.79% | 66.39% | 72.22% | 76.30% |
| 1.1.9 Identify the location and use of eye wash stations. | 95.80% | 94.26% | 98.41% | 96.30% |
| 1.1.10 Identify the location of the posted evacuation routes. | 97.48% | 96.72% | 98.41% | 96.30% |
| 1.1.11 Identify and wear appropriate clothing for lab/shop activities. | 94.54% | 94.67% | 95.24% | 93.70% |
| 1.1.12 Secure hair and jewelry for lab/shop activities. | 97.90% | 96.31% | 98.81% | 97.04% |
| 1.1.13 Understand knowledge of the safety aspects of low and high voltage circuits. | 30.25% | 38.11% | 40.87% | 43.33% |
| 1.1.14 Locate and interpret safety data sheets (SDS). | 88.24% | 92.62% | 96.83% | 91.11% |
| 1.1.16 Follow verbal instructions to complete work assignments. | 94.96% | 95.90% | 95.24% | 97.04% |
| 1.1.17 Follow written instructions to complete work assignments. | 93.70% | 93.03% | 96.03% | 93.33% |
| **Performance Standard 1.2: Hand Tools** | 75.35% | 81.97% | 78.84% | 84.94% |
| 1.2.3 Demonstrate the proper techniques when using hand tools. | 58.82% | 72.95% | 65.08% | 86.67% |
| 1.2.4 Demonstrate safe handling and use of appropriate tools. | 83.61% | 86.48% | 85.71% | 84.07% |
| **Performance Standard 1.3: Power Tools and Equipment** | 59.83% | 63.28% | 64.60% | 63.85% |
| 1.3.3 Demonstrate the proper techniques when using power tools and equipment. | 54.06% | 58.47% | 60.05% | 60.99% |

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|---|---|---|---|---|
| 1.3.4 Demonstrate safe handling and use of appropriate power tools and equipment. | 68.49% | 70.49% | 71.43% | 68.15% |
| **CONTENT STANDARD 2.0: IMPACT OF ENGINEERING** | 90.76% | 87.70% | 87.30% | 86.67% |
| **Performance Standard 2.3: Ethics in Engineering** | 90.76% | 87.70% | 87.30% | 86.67% |
| 2.3.1 Knowledge of current professional engineering codes of ethics. | 90.76% | 87.70% | 87.30% | 86.67% |
| **CONTENT STANDARD 3.0: ENGINEERING DESIGN PROCESS** | 91.24% | 90.52% | 89.80% | 90.48% |
| **Performance Standard 3.1: Design Process** | 91.24% | 90.52% | 89.80% | 90.48% |
| 3.1.1 Identify and understand the common elements of a design process, including define the problem, generate concepts, develop a solution, develop a design proposal, construct and test a prototype, refine the design, evaluate a solution and communicate the processes and results. | 93.00% | 92.08% | 90.48% | 91.60% |
| 3.1.2 Apply the steps of the design process to solve a design problem. | 89.92% | 89.34% | 89.29% | 89.63% |
| **CONTENT STANDARD 4.0: ENGINEERING DOCUMENTATION** | 76.25% | 78.37% | 79.78% | 78.65% |
| **Performance Standard 4.2: Measuring and Scaling Techniques** | 79.74% | 80.72% | 82.75% | 81.33% |
| 4.2.1 Identify industry standard units of measure. | 79.83% | 82.38% | 83.33% | 80.19% |
| 4.2.2 Convert between industry standard units of measure. | 82.77% | 83.61% | 76.59% | 84.44% |
| 4.2.3 Determine appropriate engineering and metric scales. | 68.91% | 72.95% | 72.62% | 68.52% |
| 4.2.4 Measure speed, distance, object size, area, mass, volume, and temperature. | 75.00% | 71.31% | 80.36% | 79.44% |
| 4.2.5 Determine and apply the equivalence between fractions and decimals. | 89.75% | 89.51% | 91.75% | 87.70% |
| 4.2.6 Demonstrate proper use of precision measuring tools. | 71.85% | 79.10% | 80.16% | 81.11% |
| **Performance Standard 4.4: Technical Drawings** | 59.66% | 67.21% | 65.67% | 65.93% |
| 4.4.3 Identify industry standard symbols. | 62.75% | 69.40% | 66.14% | 68.15% |
| 4.4.4 Describe and construct various types of drawings (i.e., part, assembly, pictorial, orthographic, isometric, and schematic) using proper symbols. | 50.42% | 60.66% | 64.29% | 59.26% |
| **CONTENT STANDARD 5.0: MATERIAL PROPERTIES** | 67.65% | 67.21% | 71.83% | 72.78% |
| **Performance Standards 5.2: Materials Strength** | 67.65% | 67.21% | 71.83% | 72.78% |
| 5.2.1 Describe the various forms of stress (i.e., compression, tension, torque, and shear). | 67.65% | 67.21% | 71.83% | 72.78% |
| **CONTENT STANDARD 6.0: FUNDAMENTAL POWER SYSTEMS AND ENERGY PRINCIPLES** | 73.88% | 73.28% | 75.80% | 72.57% |
| **Performance Standard 6.1: Power Systems and Energy Forms** | 69.97% | 71.20% | 72.01% | 67.75% |
| 6.1.1 Define terms used in power systems (e.g., power, work, horsepower, watts, etc.). | 57.98% | 59.43% | 60.91% | 52.59% |
| 6.1.2 Identify the basic power systems. | 70.17% | 67.21% | 66.27% | 68.15% |
| 6.1.3 List the basic elements of power systems. | 68.07% | 78.69% | 75.40% | 77.78% |
| 6.1.4 Summarize the advantages and disadvantages of various forms of power. | 77.31% | 71.31% | 74.60% | 62.22% |
| 6.1.6 Define energy. | 70.03% | 74.59% | 74.34% | 69.14% |

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|---|---|---|---|---|
| 6.1.7 Define potential energy and kinetic energy. | 88.24% | 88.11% | 87.70% | 87.41% |
| 6.1.8 Identify forms of potential energy and kinetic energy. | 93.28% | 90.16% | 92.06% | 85.19% |
| 6.1.10 Identify units used to measure energy. | 52.10% | 55.74% | 63.49% | 62.22% |
| **Performance Standard 6.2: Basic Mechanical Systems** | 92.44% | 88.52% | 92.06% | 93.33% |
| 6.2.4 Calculate mechanical advantage and drive ratios of mechanisms. | 92.44% | 88.52% | 92.06% | 93.33% |
| **Performance Standard 6.3: Energy Sources and Applications** | 77.43% | 75.88% | 76.76% | 74.18% |
| 6.3.3 Measure circuit values using a multimeter. | 66.39% | 62.02% | 63.76% | 63.21% |
| 6.3.6 Compute values of current, resistance, and voltage using Ohms law. | 89.50% | 86.89% | 90.48% | 86.67% |
| 6.3.7 Solve series and parallel circuits using basic laws of electricity including Kirchhoffs laws. Test and apply the relationship between voltage, current, and resistance relating to a | 81.93% | 85.66% | 82.54% | 78.15% |
| **Performance Standard 6.4: Machine Control Systems** | 57.14% | 58.20% | 63.10% | 62.22% |
| 6.4.3 Select appropriate input and output devices based on system specifications and constraints. | 69.75% | 64.75% | 70.63% | 62.96% |
| 6.4.4 Differentiate between the characteristics of digital and analog devices. | 39.50% | 36.07% | 41.27% | 48.15% |
| 6.4.5 Compare and contrast open and closed loop systems. | 59.66% | 65.98% | 70.24% | 68.89% |
| **Performance Standard 6.5: Basic Fluid Systems** | 84.14% | 80.53% | 86.41% | 82.78% |
| 6.5.1 Define fluid systems (e.g., hydraulic, pneumatic, vacuum, etc.). | 95.80% | 89.34% | 95.24% | 85.93% |
| 6.5.5 Explain the difference between gauge pressure and absolute pressure. | 79.83% | 72.54% | 84.33% | 78.15% |
| 6.5.6 Discuss the safety concerns of working with liquids and gases under pressure. | 85.99% | 88.25% | 86.24% | 87.90% |