

Physics with Technology

Exam Information	Description
Exam number 6961 Items 33 National Career Cluster Digital Technology Certification available Yes	The Physics with Technology industry certification exam assesses a hands-on learning approach to studying the principles of force, work, rate, resistance, and energy as they relate to four energy systems: mechanical, fluid, electrical, and thermal. The exam evaluates learners' skills through lab activities that are designed to provide essential skills for technical and engineering professions. Learners demonstrate their understanding of these principles and their application in practical scenarios. Participation in the Technology Student Association (TSA) is encouraged but not required.

Exam Blueprint and Performance Skills

Standard	Percentage of exam score
1. Reporting & Interpreting Data*	11%
2. Measuring in Linear or Rotational Motion*	15%
3. Forces & Acceleration*	15%
4. Energy & Efficiency*	15%
5. Voltage & Current in Circuits*	22%
6. Characteristics of Waves*	11%
7. Thermal Properties*	11%

*Includes performance skill evaluation

Standard 1 - Reporting & Interpreting Data (11% of exam score)

Candidates will report and interpret data appropriately

Objective 1 Obey all applicable lab safety policies and precautions.

Objective 2 Successfully interpret and accurately follow technical instruction.

Objective 3 Correctly identify variables in experiments.

Objective 4 Select and correctly use appropriate measurement tools to measure physical properties.

Objective 5 Properly report and record measured data.

Objective 6 Create and appropriately label a graph of measured data.

Objective 7 Correctly interpret the graphical representation of data.

Objective 8 Follow a problem-solving method to form an appropriate conclusion.

Optional: Standard performance evaluations on the final page of this document

Standard 2 - Measuring in Linear or Rotational Motion (15%)

Candidates will measure and analyze objects in linear or rotational motion

Objective 1 Accurately measure time.

Objective 2 Accurately measure displacement.

Objective 3 Use an appropriate math formula to calculate velocity.

Optional: Standard performance evaluations on the final page of this document

Standard 3 - Forces & Acceleration (15%)

Candidates will correctly identify and measure forces and calculate acceleration

Objective 1 Create simple free body diagrams and identify the forces.

Objective 2 Measure mass and force.

Objective 3 Use an appropriate math formula to calculate acceleration.

Optional: Standard performance evaluations on the final page of this document

Standard 4 - Energy & Efficiency (15%)

Candidates will correctly identify and measure forces and calculate acceleration

Objective 1 Determine kinetic, gravitational, elastic, and dissipated energy.

Objective 2 Calculate work in, work out, and efficiency.

Objective 3 Explain energy loss in terms of the Law of Conservation of Energy.

Optional: Standard performance evaluations on the final page of this document

Standard 5 - Voltage & Current in Circuits (22%)

Candidates will determine both voltage and current in circuits

Objective 1 Diagram and analyze series and parallel circuits

Objective 2 Calculate voltage in parallel circuits.

Objective 3 Calculate amperage in series circuits.

Objective 4 Correctly measure resistance, voltage, and amperage in circuits using a multimeter.

Optional: Standard performance evaluations on the final page of this document

Standard 6 - Characteristics of Waves (11%)

Candidates will observe, analyze, and report characteristics of waves

Objective 1 Determine the amplitude of a wave using an oscilloscope or a simulator.

Objective 2 Determine the frequency of a wave using an oscilloscope or a simulator.

Objective 3 Use an appropriate formula to calculate the period of a wave.

Optional: Standard performance evaluations on the final page of this document

Standard 7 - Thermal Properties (11%)

Candidates will measure changes in thermal properties (heating or cooling)

Objective 1 Correctly use temperature measuring devices.

Objective 2 Accurately record temperature data over time in a graph, table, or chart.

Objective 3 Observe and record changes of state.

Objective 4 Calculate heat flow and heat loss/gain.

Optional: Standard performance evaluations on the final page of this document

Performance Skills Evaluation

Exam name: Physics with Technology

Candidate Name: _____

Performance assessments may be completed and evaluated any time before the certification is issued. The following performance skills can be used in connection with the associated standards and exam. The evaluator will function as the subject matter expert to determine if the candidate meets the skills requirements with a Yes/No for passing.

Standard 1 - Reporting & Interpreting Data - Obey all applicable lab safely policies and precautions - Successfully interpret and accurately follow technical instruction - Correctly identify variable in experiments - Select and correctly use appropriate measurement tools to measure physical properties - Properly report and record measured data - Create and appropriately label a graph of measured data - Follow a problem-solving method to form an appropriate conclusion	Pass:
Standard 2 - Measuring in Linear or Rotational Motion - Accurately measure time - Accurately measure displacement - Use an appropriate math formula to form an appropriate conclusion	Pass:
Standard 3 - Forces & Acceleration - Create simple free body diagrams and identify the forces - Measure mass and force - Use an appropriate math formula to calculate acceleration	Pass:
Standard 4 - Energy & Efficiency - Determine kinetic, gravitational, elastic, and dissipated energy - Calculate work in, work out, efficiency - Explain energy loss in terms of the Law of Conservation of Energy	Pass:
Standard 5 - Voltage & Current in Circuits - Diagram and analyze series and parallel circuits - Calculate voltage in parallel circuits - Calculate amperage in series circuits - Correctly measure resistance, voltage, and amperage in circuits	Pass:

using a multimeter

Standard 6 - Characteristics of Waves

- Determine the amplitude of a wave using an oscilloscope or a simulator
- Determine the frequency of a wave using an oscilloscope or a simulator
- Use an appropriate formula to calculate the period of a wave

Pass:

Standard 7 - Thermal Properties

- Correctly use temperature measuring devices
- Accurately record temperature data over time in graph, table, or chart
- Observe and record changes of state
- Calculate heat flow and heat loss/gain

Pass:

Evaluator Name:

Date:
