Pre-Engineering

Evaluation Form

2025 Curricular Materials Review

# Publisher information

* Publisher Name:
* Title:
* ISBN #:
* Author:
* Copyright:
* Most Recently Published Edition and Website:
* Materials provided for evaluation:
* Intended Teacher Audience(s):
* Intended Student Audience(s):
* Is this curriculum in a digital format, print format, or both?

# Instruction

## Publishing Company

* Complete the curriculum evaluation form below. Please provide written justification as to how the material meets the criterion along with location references. If a justification requires additional space, please submit a response on an additional document.

## Review Team Member:

* Please use information and attachments to complete the curriculum evaluation form.
* Explain any discrepancies between your findings and the provided information.
* Findings, explanations, and comments should directly reflect the rubric.

Scoring for Alignment to Program Standards:

To evaluate each course’s materials for alignment to [**Pre-Engineering**](https://cte.idaho.gov/wp-content/uploads/2024/08/pre-engineering-standards-2024.pdf), analyze the materials against the relevant criteria in the tables below. Instructional materials must meet most criteria and metrics to align with program standards.

| 0 Points  No Alignment | 1 Point  Partial Alignment | 2 Points  High Alignment | NA  Not Applicable |
| --- | --- | --- | --- |
| Standard for Pre-Engineering is not evident. | There is some evidence of the Standard for Pre-Engineering. | Materials explicitly align to and support the Standard for Pre-Engineering through regular and authentic engagement opportunities for students. |  |

# CONTENT STANDARD CTE PE.1.0: Professional Organizations and Leadership

### Performance Standard CTE PE.1.1 Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.1.1.1 Explore the role of professional organizations and/or associations in the engineering industry. | 0 1 2 N/A |  |
| 1. CTE PE.1.1.2 Define the value, role, and opportunities provided through career technical student organizations. | 0 1 2 N/A |  |
| 1. CTE PE.1.1.3 Engage in career exploration and leadership development. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.2.0: lab workplace safety and tool use

### Performance Standard CTE PE.2.1 Safety

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.2.1.1 Describe the role of the Occupational Safety and Health Administration (OSHA). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.2 Comply with requirements for personal protection equipment (PPE). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.3 Describe material handling, storage, use, and disposal requirements. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.4 Interpret safety data sheets (SDS) before using materials (i.e., handling, storage use, disposal requirements). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.5 Interpret safety signage for hazards, evacuation routes, and safety areas. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.6 Identify the location and the types of fire extinguishers and other fire equipment. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.7 Describe procedures for using fire extinguishers and other fire safety equipment. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.8 Describe the requirements for using eye-wash stations. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.9 Describe electrical hazards and the effects of electrical shock on the human body. | 0 1 2 N/A |  |

### Performance Standard CTE PE.2.2 Tool Identification and Safe Use

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.2.2.1 Identify hand tools and power tools, including precision measuring tools. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.2 Maintain tools. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.3 Match tools to their intended use and purpose. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.4 Perform a safety check before using tools. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.3.0: impact of engineering

### Performance Standard CTE PE.3.1 Engineering Careers

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.3.1.1 Define engineering. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.2 Research career opportunities and the educational requirements for a given engineering field. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.3 Create an education and career plan for a career in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.4 Describe the importance of collaboration in the engineering industry | 0 1 2 N/A |  |

### Performance Standard CTE PE.3.2 Ethics in Engineering

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.3.2.1 Identify current engineering codes of ethics and their purpose. | 0 1 2 N/A |  |
| 1. CTE PE.3.2.2 Describe ethical engineering issues. | 0 1 2 N/A |  |
| 1. CTE PE.3.2.3 Analyze the ethical issues involved in an engineering failure. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.4.0: engineering design process

### Performance Standard CTE PE.4.1 Design Process Concepts

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.4.1.1 Apply the steps of the design process to solve a design problem (i.e., 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). | 0 1 2 N/A |  |
| 1. CTE PE.4.1.2 Describe how social, environmental, regulatory, and financial constraints influence the design process. | 0 1 2 N/A |  |
| 1. CTE PE.4.1.3 Describe the evolution and lifecycle of a product (i.e., introduction, growth, maturity, decline). | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.2 Measuring and Scaling

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.2.1 Identify imperial/standard and metric/SI units of measure and level of accuracy requirements for an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.2 Convert between imperial/standard and metric/SI units of measure in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.3 Determine scale on a blueprint. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.4 Apply algebraic and geometric calculations to determine size, mass, volume, and surface area in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.5 Convert between fractions and decimals in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.6 Report measurements by using and reading precision measuring tools. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.3 Technical Sketching and Drawing

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.3.1 Communicate ideas, using freehand sketching (e.g., pictorial, multi-view) and annotations. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.2 Produce drawings from sketches. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.3 Identify the six primary orthographic views. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.4 Identify the alphabet of lines (i.e., styles, weights) and line conventions. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.5 Apply basic elements (e.g., title block information, dimensions, and line types) in a technical drawing. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.6 Identify basic industry standard symbols on sketches, drawings, and blueprints. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.7 Produce various types of drawings (e.g., part, assembly, pictorial, orthographic, isometric, and schematic), given an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.8 Arrange dimensions and annotations, using ANSI and ISO standards for an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.9 Create a bill of materials or schedule from blueprints and specifications. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.4 Engineering Documentation

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.4.1 Describe documentation and communication methods used in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.2 Maintain documentation during the engineering design process. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.3 Describe the importance of proprietary documentation (e.g., copyright, patent) in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.4 Create project-management timelines for an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.5 Write a technical report for an engineering design. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.5 Modeling

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.5.1 Identify the areas of modeling (e.g., physical, conceptual, mathematical). | 0 1 2 N/A |  |
| 1. CTE PE.4.5.2 Create a scale model or a working prototype. | 0 1 2 N/A |  |
| 1. CTE PE.4.5.3 Evaluate the accuracy of a scale model or a working prototype. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.5.0: Materials

### Performance Standard CTE PE.5.1 Material Properties

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.5.1.1 Identify the major categories of materials (e.g., ceramics, composites, polymers, metals) and their applications. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.2 Describe the characteristics of materials by their applications in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.3 Describe the cost and environmental factors that affect choosing specific materials for a design process. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.4 Differentiate among raw material, standard stock, and finished products. | 0 1 2 N/A |  |

### Performance Standard CTE PE.5.2 Materials Strength

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.5.2.1 Describe the various forms of stress (e.g., compression, tension, torque, and shear) and how they affect materials selection for an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.2 Describe the fundamental principles of a stress-strain curve. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.3 Create free-body diagrams of objects, identifying all forces acting on the object. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.4 Differentiate between scalar and vector quantities. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.5 Define magnitude, direction, and sense of a vector. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.6 Measure the magnitude, direction, and sense of a vector. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.7 Define moment and torque forces. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.8 Calculate moment and torque forces in an engineering design. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.6.0: fundamental power systems and energy principles

### Performance Standard CTE PE.6.1 Basic Mechanical Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.1.1 Distinguish among the characteristics and components of the six simple machines. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.2 Measure forces and distances related to mechanisms in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.3 Determine efficiency in a mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.4 Calculate mechanical advantage and drive ratios of mechanisms. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.5 Calculate work, power, and torque/moment. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.6 Design a basic mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.7 Assemble a basic mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.8 Test a basic mechanical system. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.2 Power Systems and Energy Forms

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.2.1 Identify the types of basic power systems, components, and related terminology (e.g., energy, potential energy, kinetic energy, power, work, horsepower, watts). | 0 1 2 N/A |  |
| 1. CTE PE.6.2.2 Describe the factors that affect the choice of power system in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.3 Calculate the efficiency of power systems and conversion devices. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.4 Categorize major forms of energy (e.g., thermal, radiant, nuclear, chemical, electrical, mechanical, fluid). | 0 1 2 N/A |  |
| 1. CTE PE.6.2.5 Define units used to measure energy. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.6 Calculate conversions between common energy measurements in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.7 Describe the purpose and function of an energy conversion device (e.g., solar panel, windmill, battery, turbine). | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.3 Energy Sources and Applications

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.3.1 Categorize various energy sources as nonrenewable, renewable, or inexhaustible. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.2 Measure circuit values, using a multimeter. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.3 Calculate power in a system that converts energy from electrical to mechanical. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.4 Determine the efficiency of a system that converts an electrical input to a mechanical output. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.5 Describe the relationship of voltage, current, and resistance. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.6 Calculate values of current, resistance, and voltage in a circuit, using Ohm’s law. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.7 Create series and parallel circuits, using the basic laws of electricity and Kirchhoff’s law. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.4 Automation Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.4.1 Create detailed operational flowcharts and logic in a system-control program. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.2 Select appropriate input and output devices, based on system specifications and constraints. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.3 Differentiate between the attributes of digital and analog devices. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.4 Compare open and closed loop systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.5 Design a control system, based on specifications and constraints. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.5 Basic Fluid Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.5.1 Define fluid systems (e.g., hydraulic, pneumatic, vacuum). | 0 1 2 N/A |  |
| 1. CTE PE.6.5.2 Identify the components of fluid systems and their functions. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.3 Compare hydraulic and pneumatic systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.4 Identify the advantages and disadvantages of using fluid power systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.5 Describe the difference between gauge pressure and absolute pressure. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.6 Describe the safety concerns of working with liquids and gases under pressure. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.7 Calculate mechanical advantage, using Pascal’s law. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.8 Calculate values in a pneumatic system, using the ideal gas law (i.e., general gas equation). | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.7.0: analysis of designs and prototypes

### Performance Standard CTE PE.7.1 Statistics

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.7.1.1 Define statistical terminology (e.g., mean, mode, median, range, standard deviation). | 0 1 2 N/A |  |
| 1. CTE PE.7.1.2 Illustrate frequency distribution. | 0 1 2 N/A |  |
| 1. CTE PE.7.1.3 Calculate the central tendency of a data array to include mean, median, and mode. | 0 1 2 N/A |  |
| 1. CTE PE.7.1.4 Calculate data variation to include range, standard deviation, and variance. | 0 1 2 N/A |  |

# INDICATORS OF QUALITY RUBRIC:

**Access and Equity:**

| **Standards** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** | **Rating (Reviewer Only):** |
| --- | --- | --- |
| 1. Materials are provided in a way that ensures all students have the opportunity to achieve success in the program of study, including by meeting Title IX, Americans with Disabilities Act and other accessibility requirements. |  |  |
| 1. Materials and assessments are free from bias, inclusive and non-discriminatory, and offered in a way that ensures all students have the opportunity to achieve success in the program of study. |  |  |
| 1. Contains guidance to support differentiated and culturally responsive (i.e., purposefully represents diverse cultures, linguistic backgrounds, learning styles and interests) instruction in the classroom so that every student’s need are addressed by including:    1. Suggestions for how to promote equitable instruction by making connections to culture, home, neighborhood, and community as appropriate.    2. Appropriate scaffolding, interventions, and supports, including integrated and appropriate reading, writing, listening, and speaking alternatives (e.g., translations, picture support, graphic organizers) that neither sacrifice content nor avoid language development for English language learners, special needs, or below grade level readers.    3. Digital and print resources that provide various levels of readability.    4. Modifications and extensions for all students, including those performing above their grade level, to deepen understanding of the content.    5. Materials in multiple language formats. |  |  |

**Student Focus:**

| **Standards** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** | **Rating (Reviewer Only):** |
| --- | --- | --- |
| 1. The material supports the sequential and cumulative development of foundational skills and progresses in specificity to build students’ depth of knowledge and skills. Those skills are necessary for a student’s independent comprehension of grade-level complex texts and mastery of tasks called for by the standards. |  |  |
| 1. Content and standards within the program of study are non-duplicative and vertically aligned to prepare students to transition seamlessly to the next level of education. |  |  |
| 1. The material provides many and varied opportunities for students to work with each standard within the grade level. |  |  |
| 1. The material cross-references and integrates other content areas. |  |  |
| 1. The material has a balance of text types and lengths that encourage close, in-depth reading and rereading, analysis, comparison, and synthesis of texts. |  |  |
| 1. The material includes sufficient supplementary activities or assignments that are appropriately integrated into the text. |  |  |
| 1. The material has activities and assignments that develop problem-solving skills and foster synthesis and inquiry at both an individual and group level. |  |  |
| 1. The material has activities and assignments that reflect varied learning styles of students. |  |  |
| 1. The material includes appropriate instructional strategies. |  |  |
| 1. Project-based learning and related instructional approaches, such as problem-based, inquiry-based and challenge-based learning, are fully integrated into the material. |  |  |

**Pedagogical Approach:**

| **Standards** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** | **Rating (Reviewer Only):** |
| --- | --- | --- |
| 1. Provides guidance for teachers throughout for how learning experiences build on each other to support students in developing a deep understanding of the content. |  |  |
| 1. Provides scaffolded supports for teachers to facilitate learning of the content so that students are increasingly responsible for making sense of the content. |  |  |
| 1. The material provides opportunities for supporting English language learners to regularly and actively participate with grade-level text. |  |  |
| 1. The material gives clear and concise instruction to teachers and students. It is easy to navigate and understand. |  |  |
| 1. Includes appropriate academic and content-specific vocabulary in the context of the learning experience that is accessible, introduced, reinforced, reviewed, and augmented with visual representations when appropriate. |  |  |
| 1. Allows teachers to access, revise, and print form digital resources (e.g., readings, labs, assessments, rubrics). |  |  |
| 1. Uses varied modes (selected, constructed, project-based, extended response, and performance tasks) of instruction-embedded pre-, formative, summative, peer, and self-assessment measures of learning. |  |  |
| 1. Includes editable and aligned rubrics, scoring guidelines, and exemplars that provide guidance for assessing student performance and to support teachers in planning instruction and providing ongoing feedback to students. |  |  |
| 1. Provides multiple opportunities for students to demonstrate and receive feedback on performance of practices connected with their understanding of concepts. |  |  |

**Presentation and Design:**

| **Standards** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** | **Rating (Reviewer Only):** |
| --- | --- | --- |
| 1. The material has an aesthetically appealing appearance. |  |  |
| 1. Digital and print materials are consistently formatted, visually focused, and uncluttered for efficient use. |  |  |
| 1. The material has a reasonable and appropriate balance between text and illustration. The material has grade-appropriate font size. |  |  |
| 1. The illustrations clearly cross-reference the text, are directly relevant to the content (not simply decorative), and promote thinking, discussion, and problem solving. |  |  |
| 1. Non-text content (performance clips, images, maps, globes, graphs, pictures, charts, databases, and models) is accurate and well-integrated into the text. |  |  |

**Technology:**

| **Standards** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** | **Rating (Reviewer Only):** |
| --- | --- | --- |
| 1. Technology and digital media support, extend, and enhance learning experiences. |  |  |
| 1. The material has “platform neutral” technology (i.e., cloud based) and availability for networking. |  |  |
| 1. The material has a user-friendly and interactive interface allowing the user to control (shift among activities). |  |  |

For Questions Contact

Content & Curriculum – Curricular Materials

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