Programming & Software Development Evaluation Tool

2020 Curricular Materials Review

Idaho Engineering and Technology Education (ETE) Programming & Software Development Program Standards[[1]](#footnote-1)

**Publisher information**

* Publisher Name:
* Title:
* Grade Level:
* ISBN #:
* Author:
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# Instructions:

Complete the Publisher Standards Alignment Report below. Please provide written justification as to how the material meets the standard along with location references. If a justification requires additional space, please submit response on an additional document.

# Publisher STANDARDS ALIGNMENT Report:

## Standard PGRM.1.0: Understand Programming Principles

### Performance Standard PGRM.1.1 Demonstrate Critical Thinking and Problem-Solving Skills as They Apply to Programming

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.1.1.1 Apply basic programming principles. |  |
| CTE PGRM.1.1.2 Describe and differentiate procedural and object-oriented programming. |  |
| CTE PGRM.1.1.3 Apply the features of object-oriented programming languages. |  |
| CTE PGRM.1.1.4 Write a program that produces output. |  |
| CTE PGRM.1.1.5 Select identifiers to use within programs. |  |
| CTE PGRM.1.1.6 Improve programs by adding comments. |  |
| CTE PGRM.1.1.7 Write and run a program. |  |

## Standard PGRM.2.0: Problem Solving Through Programming

### Performance Standard PGRM.2.1 Demonstrate Ability to Use Variables, Data Types, and String Manipulation to Solve Computer Problems Programmatically

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.2.1.1 Demonstrate the process of declaring variables. |  |
| CTE PGRM.2.1.2 Display variable values. |  |
| CTE PGRM.2.1.3 Apply integral data types. |  |
| CTE PGRM.2.1.4 Apply floating-point data types. |  |
| CTE PGRM.2.1.5 Apply arithmetic operators. |  |
| CTE PGRM.2.1.6 Apply Boolean data type. |  |
| CTE PGRM.2.1.7 Apply numeric type conversion. |  |
| CTE PGRM.2.1.8 Apply char data type. |  |
| CTE PGRM.2.1.9 Apply string data type. |  |
| CTE PGRM.2.1.10 Define named constants and enumerations. |  |

## Standard PGRM.3.0: Use Logic in Programming

### Performance Standard PGRM.3.1 Demonstrate Effective Use of Selection Structures to Add Logic to Programs

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.3.1.1 Demonstrate logic-planning tools and decision-making. |  |
| CTE PGRM.3.1.2 Make decision using the if statement. |  |
| CTE PGRM.3.1.3 Make decisions using the if-else statement. |  |
| CTE PGRM.3.1.4 Apply compound expressions in if statements. |  |
| CTE PGRM.3.1.5 Make decisions using the switch statement. |  |
| CTE PGRM.3.1.6 Apply the conditional operator. |  |
| CTE PGRM.3.1.7 Apply the NOT operator. |  |
| CTE PGRM.3.1.8 Describe how to avoid common errors when making decisions, and apply problem-solving skills in context. |  |

## Standard PGRM.4.0: Programming and Validation

### Performance Standard PGRM.4.1 Demonstrate Ability to Test, Debut, and Validate Programming Applications

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.4.1.1 Locate a logic error by stepping through the code. |  |
| CTE PGRM.4.1.2 Locate logic errors using breakpoints. |  |
| CTE PGRM.4.1.3 Fix syntax and logic errors. |  |
| CTE PGRM.4.1.4 Select appropriate test data for an application. |  |

## Standard PGRM.5.0: Understand Repetition in Programming

### Performance Standard PGRM.5.1 Differentiate Between the Various Types of Repetition

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.5.1.1 Apply the loop structure. |  |
| CTE PGRM.5.1.2 Create loops using the while statement. |  |
| CTE PGRM.5.1.3 Create loops using the *for* statement. |  |
| CTE PGRM.5.1.4 Create loops using the do statement. |  |
| CTE PGRM.5.1.5 Apply nested loops. |  |
| CTE PGRM.5.1.6 Apply accumulators. |  |
| CTE PGRM.5.1.7 Understand and describe how to improve loop performance. |  |

## Standard PGRM.6.0: Demonstrate Programming Functionality

### Performance Standard PGRM.6.1 Use Methods to Increase Functionality and to Modularize Programs

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.6.1.1 Describe methods and implementation hiding. |  |
| CTE PGRM.6.1.2 Write methods with no parameters and no return value. |  |
| CTE PGRM.6.1.3 Write methods that require a single argument. |  |
| CTE PGRM.6.1.4 Write methods that require multiple arguments. |  |
| CTE PGRM.6.1.5 Write a method that returns a value. |  |
| CTE PGRM.6.1.6 Pass an array to a method. |  |
| CTE PGRM.6.1.7 Overload methods. |  |
| CTE PGRM.6.1.8 Demonstrate how to avoid methods. |  |

## Standard PGRM.7.0: Understand Arrays and Structure Concepts

### Performance Standard PGRM.7.1 Demonstrate Understanding of Arrays and Structure, and Apply Concepts in Program Development

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.7.1.1 Declare an array and assign values to array elements. |  |
| CTE PGRM.7.1.2 Access array elements. |  |
| CTE PGRM.7.1.3 Search an array using a loop. |  |
| CTE PGRM.7.1.4 Apply multidimensional arrays. |  |

## Standard PGRM.8.0: Understand Arrays and Structure Concepts

### Performance Standard PGRM.8.1 Students Will Demonstrate Understanding of Object-Oriented Programming Concepts

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.8.1.1 Describe and apply class concepts. |  |
| CTE PGRM.8.1.2 Create classes from which objects can be instantiated. |  |
| CTE PGRM.8.1.3 Create objects. |  |
| CTE PGRM.8.1.4 Create properties, including auto-implemented properties. |  |
| CTE PGRM.8.1.5 Use public fields and private methods. |  |
| CTE PGRM.8.1.6 Define the "this" reference. |  |
| CTE PGRM.8.1.7 Write constructors. |  |
| CTE PGRM.8.1.8 Use object initializers. |  |
| CTE PGRM.8.1.9 Overload operators. |  |
| CTE PGRM.8.1.10 Declare an array of objects. |  |
| CTE PGRM.8.1.11 Use sorting methods with an array of objects. |  |
| CTE PGRM.8.1.12 Write destructors. |  |
| CTE PGRM.8.1.13 Describe and demonstrate inheritance. |  |
| CTE PGRM.8.1.14 Extend classes. |  |
| CTE PGRM.8.1.15 Override base class methods. |  |
| CTE PGRM.8.1.16 Describe how a derived class object "is an" instance of the base class. |  |
| CTE PGRM.8.1.17 Define the object class. |  |
| CTE PGRM.8.1.18 Use base class constructors. |  |
| CTE PGRM.8.1.19 Create abstract classes. |  |
| CTE PGRM.8.1.20 Create use interfaces. |  |
| CTE PGRM.8.1.21 Apply extension methods. |  |
| CTE PGRM.8.1.22 Describe the benefits of inheritance. |  |
| CTE PGRM.8.1.23 Recognize inheritance in GUI applications. |  |

## Standard PGRM.9.0: Understand Programming and Exceptions

### Performance Standard PGRM.9.1 Demonstrate Exception-Handling in Program Development

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.9.1.1 Compare and demonstrate traditional and object-oriented error-handling methods. |  |
| CTE PGRM.9.1.2 Cast data types. |  |
| CTE PGRM.9.1.3 Catch multiple exceptions. |  |
| CTE PGRM.9.1.4 Apply the finally block. |  |
| CTE PGRM.9.1.5 Handle exceptions thrown from outside methods. |  |
| CTE PGRM.9.1.6 Trace exceptions through the call stack. |  |
| CTE PGRM.9.1.7 Create exception classes. |  |
| CTE PGRM.9.1.8 Re-throw exceptions. |  |

## Standard PGRM.10.0: Understand Programming and Exceptions

### Performance Standard PGRM.10.1 Use Event Handlers in Programs

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.10.1.1 Define and apply event handling. |  |
| CTE PGRM.10.1.2 Define and describe delegates. |  |
| CTE PGRM.10.1.3 Declare own events and handlers. |  |
| CTE PGRM.10.1.4 Use built-in event handlers. |  |
| CTE PGRM.10.1.5 Handle control component events. |  |
| CTE PGRM.10.1.6 Handle mouse and keyboard events. |  |
| CTE PGRM.10.1.7 Manage multiple controls. |  |
| CTE PGRM.10.1.8 Explain how to find more information on controls and events. |  |

## Standard PGRM.11.0: Systems Planning and Development

### Performance Standard PGRM.11.1 Apply Concepts and Principles of Systems Planning and Development

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.11.1.1 Describe the information systems development life cycle (SDLC). |  |
| CTE PGRM.11.1.2 Discuss how to evaluate off-the-shelf software. |  |
| CTE PGRM.11.1.3 Explain reuse and its role in software development. |  |
| CTE PGRM.11.1.4 Describe the skills required to be an effective project manager. |  |
| CTE PGRM.11.1.5 List and describe the skill and activities of a project manager during project initiation, planning, execution, and closedown. |  |
| CTE PGRM.11.1.6 Describe the steps for identifying and selecting projects and initiating and planning projects. |  |
| CTE PGRM.11.1.7 Explain the need for and contents of a project scope statement. |  |
| CTE PGRM.11.1.8 Compare various methods for assessing project feasibility. |  |

## Standard PGRM.12.0: Systems Analysis

### Performance Standard PGRM.12.1 Demonstrate Competency with Systems Analysis Tools and Concepts

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.12.1.1 Compare options for designing and conducting interviews to determine system requirements. |  |
| CTE PGRM.12.1.2 Develop a plan for conducting an interview to determine system requirements. |  |
| CTE PGRM.12.1.3 Explain the advantages and pitfalls of observing workers and analyzing business documents to determine system requirements. |  |
| CTE PGRM.12.1.4 Plan a joint application design session. |  |
| CTE PGRM.12.1.5 Use prototyping during requirements determination. |  |
| CTE PGRM.12.1.6 Select appropriate methods to elicit system requirements. |  |
| CTE PGRM.12.1.7 Describe how requirements determination techniques apply to development of Internet applications. |  |
| CTE PGRM.12.1.8 Demonstrate the logical modeling of processes through studying examples of data-flow diagrams, pseudo code, and flowcharts. |  |

## Standard PGRM.13.0: Principles of Design

### Performance Standard PGRM.13.1 Demonstrate Knowledge of Application Design Principles

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.13.1.1 Explain the process of designing interfaces and dialogues and the deliverables for their creation. |  |
| CTE PGRM.13.1.2 Apply the general guidelines for interface design, including guidelines for layout design, structuring data-entry fields, providing feedback, and system help. |  |
| CTE PGRM.13.1.3 Concisely define each of the following key database design terms: relation, primary key, functional dependency, foreign key, referential integrity, field, data type, null value, demoralization, file organization, index, and secondary key. |  |
| CTE PGRM.13.1.4 Explain the role of designing databases in the analysis and design of an information system. |  |
| CTE PGRM.13.1.5 Transform an entity-relation (E-R) diagram into an equivalent set of well-structured (normalized) relations. |  |
| CTE PGRM.13.1.6 Merge normalized relations from separate user views into a consolidated set of well-structured relations. |  |
| CTE PGRM.13.1.7 Choose storage formats for fields in database tables. |  |
| CTE PGRM.13.1.8 Translate well-structured relations into efficient database tables. |  |
| CTE PGRM.13.1.9 Explain when to use different types of file organizations to store computer files. |  |
| CTE PGRM.13.1.10 Describe the purpose indexes and the important considerations in selecting attributes to be indexed. |  |

## Standard PGRM.14.0: Implementation and Support

### Performance Standard PGRM.14.1 Demonstrate Knowledge of Application Implementation and Identify the Need for Ongoing Application Support

| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| CTE PGRM.14.1.1 Describe the process of coding, testing, and converting an organizational information system. |  |
| CTE PGRM.14.1.2 Outline the deliverables and outcomes of an organizational information system. |  |
| CTE PGRM.14.1.3 List the deliverables for documenting the system and for training and supporting users. |  |
| CTE PGRM.14.1.4 Compare the many modes available for organizational information system training, including self-training and electronic performance support systems. |  |
| CTE PGRM.14.1.5 Discuss the issues of providing support for end users. |  |
| CTE PGRM.14.1.6 Explain why application implementation sometimes fails. |  |
| CTE PGRM.14.1.7 Describe several factors that influence the cost of maintaining an application. |  |

# Indicators of quality Rubric:

Standards aligned and Integrated Curriculum:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. The curriculum is based on industry-validated technical standards and competencies.
 |  |
| 1. The curriculum is aligned with relevant content and standards for core subjects, such as reading, math and science, including federal, state and/or local standards, as appropriate.
 |  |
| 1. The curriculum incorporates employability skill standards that help students succeed in the workplace, such as problem solving, critical thinking, teamwork, communications and workplace etiquette.
 |  |
| 1. The curriculum allows for student application of integrated knowledge and skills in authentic scenarios.
 |  |
| 1. Materials used reflect current workplace, industry and/or occupational practices and requirements.
 |  |

Access and Equity:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 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. |
| --- | --- |
| 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-refers 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. |
| --- | --- |
| 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. |
| --- | --- |
| 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) are 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. |
| --- | --- |
| 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

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1. [Idaho ETE Programming & Software Development Program Standards](https://cte.idaho.gov/wp-content/uploads/2018/03/Programming-Software-Development-Program-Standards..pdf) [↑](#footnote-ref-1)