

**Florida Department of Education
Specifications for the 2017-18 Florida Instructional Materials Adoption
Science**

Introduction

This document specifies the requirements for the 2017-18 Florida instructional materials adoption for Science. Publishers should review this information carefully. The criteria contained in this document will serve as the basis for the evaluation of instructional materials bid for adoption.

The Science call for adoption is comprised of the courses listed in Tables 1-3 of this document. Each course has an updated course description available online at www.cpalms.org (the course numbers in Tables 1-3 link to the appropriate course page in CPALMS).

- Materials bids for adoption must clearly and completely align to each of the standards included in the applicable course description to be deemed acceptable for adoption.
- Materials will be thoroughly evaluated to ensure the content is accurate, appropriately rigorous, and comprehensive in their coverage of each of the standards in the course description and the additional criteria outlined in this document.
- Special attention should be given to both the version description and any additional notes that are contained in each course description.

This adoption is for materials to be utilized in the classroom in the 2018-19 academic year and later. As such, publishers must be sure to select the course description for the latest available academic year. The latest version of each course description, which should be utilized for developing materials for the 2017-18 Science adoption, is indicated in Tables 1-3 below.

2017-18 Science Adoption

Florida will only accept bids for materials designed to serve as the major tool of instruction (which may include ancillary materials) for the courses listed in the three tables below.

Table 1 Elementary Science:
(To be bid as a series only)

Course Number	Grade Level	Course Title	Course Version
5020010	K	Science Grade K	2015 and beyond
5020020	1	Science Grade 1	2015 and beyond
5020030	2	Science Grade 2	2015 and beyond
5020040	3	Science Grade 3	2015 and beyond
5020050	4	Science Grade 4	2015 and beyond
5020060	5	Science Grade 5	2015 and beyond

Table 2 Middle Grades Science:**(Comprehensive Science and Comprehensive Science Advanced to be bid as series only)**

Course Number	Grade Level	Course Title	Course Version
2000010	6-8	M/J Life Science	2015 and beyond
2000020	6-8	M/J Life Science, Advanced	2015 and beyond
2001010	6-8	M/J Earth/Space Science	2015 and beyond
2001020	6-8	M/J Earth/Space Science, Advanced	2015 and beyond
2002040	6-8	M/J Comprehensive Science 1	2015 and beyond
2002070	6-8	M/J Comprehensive Science 2	2015 and beyond
2002100	6-8	M/J Comprehensive Science 3	2015 and beyond
2002050	6-8	M/J Comprehensive Science 1, Advanced	2015 and beyond
2002080	6-8	M/J Comprehensive Science 2, Advanced	2015 and beyond
2002110	6-8	M/J Comprehensive Science 3, Advanced	2015 and beyond
2003010	6-8	M/J Physical Science	2015 and beyond
2003020	6-8	M/J Physical Science, Advanced	2015 and beyond

Table 3 High School Science:**(Integrated Science to be bid as a series only)**

Course Number	Grade Level	Course Title	Course Version
2000310	9-12	Biology 1	2015 and beyond
2000320	9-12	Biology 1 Honors	2015 and beyond
2000350	9-12	Anatomy and Physiology	2015 and beyond
2000360	9-12	Anatomy and Physiology Honors	2015 and beyond
2001310	9-12	Earth/Space Science	2015 and beyond
2001320	9-12	Earth/Space Science Honors	2015 and beyond
2001330	9-12	Meteorology Honors	2015 and beyond
2001340	9-12	Environmental Science	2015 and beyond
2001341	9-12	Environmental Science Honors	2015 and beyond
2002500	9-12	Marine Science 1	2015 and beyond
2002510	9-12	Marine Science 1 Honors	2015 and beyond
2002400	9-12	Integrated Science 1	2015 and beyond
2002420	9-12	Integrated Science 2	2015 and beyond
2002440	9-12	Integrated Science 3	2015 and beyond
2002480	9-12	Forensic Science 1	2015 and beyond
2003310	9-12	Physical Science	2015 and beyond
2003320	9-12	Physical Science Honors	2015 and beyond
2003340	9-12	Chemistry 1	2015 and beyond
2003350	9-12	Chemistry 1 Honors	2015 and beyond
2003380	9-12	Physics 1	2015 and beyond
2003390	9-12	Physics 1 Honors	2015 and beyond

PROGRAM DESIGN

It is important that the program meets the needs of Florida's students and teachers. A number of different components included in the evaluation document capture the overall quality of the program's design. It is important that the program design include access for all students including English Language Learners (ELL) and students with disabilities.

For ELLs, features are important in establishing the readability of instructional material language and concepts including:

- language that clarifies, simplifies, and explains information
- transition words such as "yet," "also," "next," "for example," "moreover," or "however"
- words with concrete and specific images
- active rather than passive voice
- varied sentence structures and avoidance of both choppy sentences and unnecessary words
- specific questions or directions to guide student attention to visuals or key information
- chunking text
- visuals that are relevant, clear, vivid, and simple enough for students to understand
- quantity of visuals suitable for the intended students
- visuals that contain information in a form different from the text
- graphs, charts, maps, and other visual representations integrated at their point of use

Instructional materials should include multilingual glossaries/dictionaries with content area vocabulary translated into Florida's primary languages: Spanish, Haitian-Creole, Portuguese, Vietnamese, French, Arabic, Chinese, Russian, Tagalog and Urdu.

For ESE students, all special education students are entitled to grade level accessible instructional materials, therefore publishers who submit material for consideration will be required to incorporate strategies, materials, activities, accessibility, etc. that consider the special needs of these students. In providing for students with special needs, Florida evaluators should consider the guidelines and information provided by the National Center on Universal Design for Learning at www.UDLCenter.org.

Providing access in a timely manner to both appropriate and accessible instructional materials (AIM) is an inherent component of the provision of a free and appropriate public education (FAPE) under the Individuals with Disabilities Education Act of 2004 (IDEA) for students with disabilities (34 Code of Federal Regulations [CFR] 300.210(b)(3)). The individual educational plan (IEP) team is responsible for determining if a student needs accessible instructional materials, the format of such materials, and the necessary related accommodations for the student to participate in the general curriculum. One way to provide AIM is by ensuring that programs include flexible digital instructional materials.

Flexible Digital Instructional Materials

All instructional materials must be provided in formats that are appropriate and accessible for students with disabilities and struggling students to ensure that all students can effectively and independently complete instructional activities addressing the common core standards. The following are features that should be available in all digital and online instructional materials.

Presentation Features

- Fonts can be adjusted in type and size.
- Font colors and background colors can be adjusted.
- High contrast color settings are available.
- Text-to-speech tools are included or text can be selected and used with text-to-speech utilities.
- Text-to-speech tools read math formulas correctly.
- All images have alt tags.
- All videos are captioned.
- Text, image tags, and captioning can be sent to refreshable Braille displays.

Navigation Features

- Non-text navigation elements (buttons, icons, etc.) can be adjusted in size.
- All navigation elements and menu items have keyboard shortcuts.
- All navigation information can be sent to refreshable Braille displays.

Study Tools

- Highlighters are provided in the 4 standard colors (yellow, rose, green, blue).
- Highlighted text can be automatically extracted into another document.
- Note taking tools are available for students to write ideas online as they are processing curriculum content.
- Resizable digital calculators are available in all math materials.

Assistive Technology Supports

- Assistive technology software can be run in the background. Examples include:
 1. Magnification
 2. Text-to-speech
 3. Text-to-American Sign Language
 4. On-screen keyboards
 5. Switch scanning controls
 6. Speech-to-text

Flexible digital materials can also support all students within a Universal Design for Learning framework, not just students with disabilities. A feature that supports a student with a disability can also be used by other students. For example, text-to-speech and text-to-audio tools can be used as a reading scaffold for any student who struggles with decoding text. These tools can also be used by gifted students to convert print to audio so they can listen to the content while multi-tasking. Being able to adjust the size of menus and navigation elements helps students who are using switch systems to control a computer as well as help any students use the instructional materials on smaller screens, such as a mobile device or tablet.

Major Priorities for Instructional Materials - Content, Presentation, Learning

The priorities as described in this specification document were developed from research findings about what makes instructional materials effective. These priorities have undergone review by individuals who have served on state and district committees, by curriculum specialists, by instructional designers, by evaluation specialists, and by administrators of the statewide adoption system.

Instructional materials must be effective in three major priority areas: content, presentation, and learning. The following sections describe essential features for each of these priority areas. These features generally apply to all formats of instructional materials, whether print or other media/multiple media formats.

Content

Some features of content coverage have received progressively more attention over the past decade. These features include:

- A. Alignment with Curriculum Requirements**
- B. Level of Treatment of Content**
- C. Expertise for Content Development**
- D. Accuracy of Content**
- E. Currentness of Content**
- F. Authenticity of Content**
- G. Multicultural Representation**
- H. Humanity and Compassion**

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS

Content must align with the state’s standards for the subject, grade level, and learning outcomes. See Sections 1006.34(2)(b); 1006.38(3)(b); 1006.31(2), Florida Statutes.

Correlations: Publishers are expected to provide correlation reports in the provided form to show exactly where and to what extent (mentioned or in-depth) the instructional materials cover each required standard.

Scope: The content should address Florida’s required curriculum standards for the subject, grade level, and learning outcomes, including thinking and learning skills.

Completeness: The content of the major tool should be complete enough to stand on its own. To be useful for classroom instruction, instructional materials must be adaptable to the instructional goals and course outlines for individual school districts, as well as the state standards. Content should have no major omissions in the required content coverage and be free of unrelated facts and information that would detract from achievement of Florida’s standards.

B. LEVEL OF TREATMENT OF CONTENT

The level of complexity or difficulty of content must be appropriate for the standards, student abilities and grade level, and time periods allowed for teaching. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Objectives: Content should be simple, complex, technical, or nontechnical enough for the intended objectives.

Students: Content should be developmentally appropriate for the age and maturity level of the intended students. It should contain sufficient details for students to understand the significance of the information presented and to engage in reflection and discussion.

Time: The level of complexity or difficulty of content also should allow for its coverage during the time periods available for teaching the subject.

C. EXPERTISE FOR CONTENT DEVELOPMENT

Expertise in the content area and in education of the intended students must be reflected in the authors, reviewers, and sources that contributed to the development of the materials. See Section 1006.38(14), Florida Statutes.

Authorship: The authors, consultants, and reviewers must have actually contributed to the development of the instructional materials and should have credentials that reflect expertise in the subject area, course, course category, grade level, pedagogy, education, teaching, or classroom instruction. Qualifications may include expertise in educational psychology or instructional design.

Sources: Primary and secondary sources should reflect expert information for the subject, such as relevant data from research journals, and other recognized scientific sources. The type of sources considered appropriate will vary with the particular subject area.

D. ACCURACY OF CONTENT

Content must be accurate in historical context and contemporary facts and concepts. See Sections 1006.38(8); 1006.31(2); 1006.35, Florida Statutes.

Objectivity: Content that is included in the materials should accurately represent the domain of knowledge and events. It should be factual and objective. It should be free of mistakes, errors, inconsistencies, contradictions within itself, and biases of interpretation. It should be free of the biased selection of information. Materials should distinguish between facts and possible interpretations or opinions expressed about factual information. Visuals or other elements of instruction should contribute to the accuracy of text or narrative.

Representativeness: The selection of content should not misrepresent the domain of knowledge and events. It should include the generally accepted and prevalent theories, major concepts, laws, standards, and models used within the discipline of the subject area.

Correctness: Presentation of content should be free of typographical and visual errors. It should include correct grammar, spelling, linguistics, terminology, definitions, descriptions, visuals, graphs, sounds, videos, and all other components of the instructional materials.

E. CURRENTNESS OF CONTENT

Content must be up-to-date for the academic discipline and the context in which the content is presented. See Sections 1006.38(8); 1006.31(2), Florida Statutes.

Dates or editions: Copyright dates for photographs and other materials and editions should suggest sufficient currentness of content. Copyright dates and editions serve as indicators about currentness. However, neither the copyright date nor the edition guarantees currentness. Subsequent editions should reflect more up-to-date information than earlier editions.

Informed examination of the text, narrative, and visuals contained in the materials provides the most direct information about currentness of the materials.

Context. Text or narrative, visuals, photographs, and other features should reflect the time periods appropriate for the objectives and the intended learners.

- Sometimes context should be current. For example, a photograph used to show stages of human growth and development will be more relevant when the clothing, hairstyles, and activities reflect present-day styles.
- Sometimes context should be historical. For example, illustrations and photographs of historical events should reflect the historical time period.
- Sometimes context should be both current and historical. For example, historic images alongside modern ones would convey changes in styles over time.
- At all times the context should be relevant to the learner, to the Curriculum Frameworks, and to the concept presented.

F. AUTHENTICITY OF CONTENT

Content should include problem-centered connections to life in a context that is meaningful to students. See Sections 1006.31(2); 1006.34(2)(b); 1003.42, Florida Statutes.

Life connections: Instructional materials should include connections to the student's life situations in order to make the content meaningful. Students might be expected to deal with time constraints, consider risks and trade-offs in decision-making, and work with teams. Connections may be made to situations of daily home life, careers, vocation, community events and services, and leisure or recreation.

Interdisciplinary treatment: Instructional materials also should include interdisciplinary connections in order to make content meaningful. Examples of situations that connect a variety of subject areas include building projects, playing sports, retrieving information or objects, balancing budgets, creating products, and researching information. In addition to subject area connections, instructional materials should connect the course or course category to other disciplines. Examples of approaches to interdisciplinary connections include: explanations and activities for using skills and knowledge from other academic disciplines; assignments that require students to relate learning from other disciplines rather than to isolate knowledge or skills; the focus on common themes across several subject areas (infusion, parallel, transdisciplinary, or multidisciplinary instruction).

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and various social groups must include multicultural

fairness and advocacy. See Sections 1003.42; 1006.31(2)(a); 1006.34(2)(b), Florida Statutes.

Multicultural fairness: Through balanced representation of cultures and groups in multiple settings, occupations, careers, and lifestyles, the materials should support equal opportunity without regard for age, color, gender, disability, national origin, race, or religion. It is not the number of pages devoted to diversity, equity, or work roles, but the substance of what is stated and portrayed that matters most. For this reason, it can be misleading to count the number of pages or illustrations devoted to a social issue or group. It is more important to focus on the integration of social diversity throughout a set of instructional materials.

In addition to balanced representations, the portrayal of individuals and situations must exclude biases and stereotypes. These portrayals must promote an understanding and appreciation of the importance and contributions of diverse cultures and heritage.

Multicultural advocacy: The understanding and appreciation of multiple cultures extends beyond fair representation. It involves embracing a multicultural context, not just through pictures, but through information about ways to honor differences and deal with conflicts, promote a positive self-image for members of all groups, and provide for the development of healthy attitudes and values.

Effective treatment of multicultural issues requires consideration of the age and ability levels of students and whether or not it is appropriate to include multicultural issues in the study of a particular topic, such as the memorization of a formula or equation. Overall, however, materials should reflect both multicultural fairness and advocacy.

H. HUMANITY AND COMPASSION

Portrayal of the appropriate care and treatment of people and animals must include compassion, sympathy, and consideration of their needs and values and exclude hard-core pornography and inhumane treatment. See Sections 1003.42; 1006.31(2)(c); 1006.34(2)(b), Florida Statutes.

Inclusion of compassion: When providing examples in narrative or visuals, materials sometimes depict the care and treatment of people and animals. Generally, this means showing in some way a measure of compassion, sympathy, or consideration of their needs and feelings.

Exclusion of inhumanity: In the context of personal and family values, Florida expressly prohibits material containing *hard-core pornography*. In addition, although the definition of *inhumane treatment* can sometimes appear to be controversial, as in science research, there is general agreement that instructional materials should not advocate any form of inhumane treatment.

As with the evaluation of multicultural representation, it is important to consider the context of the subject and the age and abilities of the students.

Presentation

Features of presentation affect the practical usefulness of materials and the ease of finding and understanding content. These features include:

- A. Comprehensiveness of student and Teacher Resources**
- B. Alignment of Instructional Components**
- C. Organization of Instructional Components**

- D. **Readability of Instructional Materials**
- E. **Pacing of Content**
- F. **Ease of Use of Materials**

The following sections describe the presentation features expected for each of these areas.

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES

Resources must be complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course. See Sections 1006.29(2); 1006.34(2)(b), Florida Statutes.

Materials should contain support for students in completing instructional activities and assessments and for teachers in implementing all of the instructional elements. A variety of components can accomplish this purpose. Typically, materials will include test items, study guides, outlines and strategies for teaching, media supplements, learning activities, and projects.

The major components generally expected for student and teacher resources are listed below.

Student resources: Student materials typically include the major resource or program with text or narration, visuals, assignments, and assessments. Formats may include print, audio, visual, computer, or other media like CDs, DVDs, PPTs, or software adaptable for Smart Boards.

Effective instructional materials generally integrate the use of reference aids (e.g., index, glossary, maps, bibliography, graphic organizers, and pictures) with the topic being studied. Items that guide students through materials might include clearly labeled materials, directions and explanations, and assignments with menus of choices.

Review and practice activities might include participation activities such as digital simulations, role-playing situations, investigations, and hands-on practice assignments. Review activities might include self-checks or quizzes. Formats might include digital education games, student tutorials, worksheets, workbooks, journals, lab books, lab logs, charts, or maps. Feedback might be in the form of answer keys in student materials or in teacher materials.

Review works best as a logical extension of content, goals, objectives, and lessons, with increased similarity to real-life situations. Review activities should require students to recall or apply previously taught knowledge and skills. Frequent short reviews over time or space improve learning more than a concentrated review. Assignments and stages of small practice improve speed and accuracy.

Other components might include enrichment and remediation activities, additional resources, and tests and assessment tools either in the student materials or in the teacher’s guide or edition.

Teacher resources: Teacher materials typically include a teacher’s edition with the annotated student text and copies of supplementary materials (print or digital) with answer keys, worksheets, tests, diagrams, etc., so that the teacher has to use only one guide. In-service training, workshops, and consulting services should be made available by publishers to support teachers in implementing instructional materials. Professional development is essential to the success of any program, especially when a program contains non-traditional elements. Publishers should clearly indicate the recommended

amount and types of professional development that they will provide, and they should work with districts and schools to ensure that teachers receive the support that they need. The materials for the teacher should support continued teacher learning.

Support, guidelines, resources, or features such as the ones described below should be available to help teachers effectively implement materials in classroom and school settings.

- (1) **Components and materials are easy to use:** Examples include clearance, license, or agreement for copying and use of materials; clear description and accurate directions for use of required equipment, facilities, resources, and environment; clearly labeled grade, lesson, content, and other information to identify components; and correct specifications for making instructional media and electronic programs work effectively.
- (2) **Materials support lesson planning, teaching, and learning:** Examples include overview of components and objectives; background for lectures and discussions; technical terminology, and reinforcement and review strategies; scope and sequence chart for activities and planning; sample lesson plans; suggestions for individualized study, small-group and large-group presentations and discussions, school-to-work activities, field or laboratory experiences, safety procedures, and other extension activities; suggestions for integrating themes across the subject area or course curriculum and forming connections to other disciplines; and suggestions for parental and community involvement.
- (3) **Suggestions are provided for adapting instruction for varying needs:** Examples include alternative approaches to teaching, pacing, and options for varied delivery of instruction such as media, tools, equipment, and emerging technology; strategies for engaging all students, such as open-ended questions to stimulate thinking, journals, hands-on investigations, explorations, and multisensory approaches; suggestions for addressing common student difficulties or adapting to multiple learning styles; and alternative reteaching, enrichment, and remediation strategies.
- (4) **Guidelines and resources are provided on how to implement and evaluate instruction:** Examples include answers to work assignments, practice activities, and tests; sample projects or research results; suggestions for using learning tasks for classroom assessment; and guidelines for alternative assessments, such as sample checklists, rubrics, peer or performance assessments, and portfolios.
- (5) **Resources are provided to use in classroom activities:** Examples include technology resources; lists of resources and references, reading strategies, materials to use for displays or photocopies, classroom management strategies and documentation on how to manage the entire instructional program; and in-service workshops or consultation support from the publisher.

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package must align with each other, as well as with the curriculum. See Sections 1006.34(2)(b), Florida Statutes.

All components of an instructional package—teacher’s edition and materials, student’s edition and materials, workbook, supplementary materials, and others—must be integrated and interdependent and

must correspond with each other. For example, support materials in the teacher’s edition should align with student activities or assignments. They must match in content and progression of instructional activities.

C. ORGANIZATION OF INSTRUCTIONAL MATERIALS

The structure and format of materials must have enough order and clarity to allow students and teachers to access content and explicitly identify ideas and sequences. See Section 1006.34(2)(b), Florida Statutes.

Providing an explicit and teachable structure can double the amount of information remembered. Clear organization allows students and teachers to discriminate important pieces of information through skimming, reading, or browsing. Clear organization may be accomplished through a combination of features, but generally not through one feature alone.

Access to content: Some features help in searching and locating information, such as a table of contents; pull-down menu or sitemap of content; directions on how to locate information or complete assignments; an index for quick reference; goals and/or objectives, outlines, lists, or checklists for major sections; bibliographies and lists of resources; glossaries for quick access to major terms; and introductions, key concepts and themes, visual cues, illustrations, labeled examples, and labeled reviews or summaries.

Visible structure and format: At-a-glance features should signal the organization of content. The following features are desirable:

- Chapter or unit titles and/or frames;
- Headings and subheadings;
- Typographic cues such as bold, italics, or changes in size of type;
- Divisions of content such as borders, boxes, circles, highlighting, visual signposts, icons, or color cues;
- Diagrams, labels, and visuals placed near the related content; and numbering of pages and other components.

Objectives or a content outline may serve a similar purpose by introducing main ideas, providing guideposts to use in searching for key information, or serving as a checklist for self-assessment. Certain types of brief narrative sections also contribute to clear organization. For example, the statement of a clear purpose with content organized around main ideas, principles, concepts, and logical relationships supports the unity and flow of information. Introductions also play a major role when they include anchoring ideas, a list of key points, or conceptual schemes such as metaphors. Summaries also can assist students in understanding the logical order of topics presented.

Logical organization: The pattern of organization of the content should be consistent and logical for the type of subject or topic. Patterns of organization may include comparison and contrast, time sequence, cause-effect or problem-solution-effect, concrete to abstract, introduction-review-extension (spiral structure), simple-to-complex, whole-part or part-whole, generalization-examples-review-practice, and conflict-inside view-structure.

D. READABILITY OF INSTRUCTIONAL MATERIALS

Narrative and visuals should engage students in reading or listening as well as in understanding of the

content at a level appropriate to the students' abilities. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Language style: Language style and visual features can influence the readability of materials. Yet, a popular tool for assessing readability has been the use of a *readability formula* of one type or another. These formulas tend to focus only on a few *countable* characteristics of language style such as the length of words, sentences, and/or paragraphs.

Other features are more important in establishing the readability of instructional materials, such as: organized, coherent text language and concepts familiar to the student; language that clarifies, simplifies, and explains information; transition words such as “yet,” “also,” “next,” “for example,” “moreover,” or “however;” other phrases that create logical connections; words with concrete and specific images; active rather than passive voice; varied sentence structures and avoid both choppy sentences and unnecessary words; and specific questions or directions to guide student attention to visuals or key information.

Visual features: Visual features that improve readability include print that is dark and clear, with good contrast paper with clean-cut edges without glare, or computer screens without glare margins wide enough on a page or screen to allow easy viewing of the text chunking (sentence ends on same page as it begins); visuals that are relevant, clear, vivid, and simple enough for students to understand quantity of visuals suitable for the intended students—both lower ability students and higher ability students tend to require more visuals; unjustified text (ragged on the right) rather than justified (lined up on the right); visuals that contain information in a form different from the text; graphs, charts, maps, and other visual representations integrated at their point of use; and colors, size of print, spacing, quantity, and type of visuals suitable for the abilities and needs of the intended students.

E. PACING OF CONTENT

The amount of content presented at one time or the pace at which it is presented must be of a size or rate that allows students to perceive and understand it. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

It is important that materials contain “bite-size” chunks or blocks of information. The chunks should not be so large, nor the pacing so fast, as to overwhelm students. Neither should the chunks be so small, nor the pacing so slow, as to bore them.

F. EASE OF USE OF MATERIALS

Both print and other media formats of instructional materials must be easy to use and replace and be durable enough for multiple uses over time. See Sections 1006.29(4); 1006.38(3)(a); 1006.34(2)(b); 1006.38(5); 1006.38(6)(7)(8)(9), Florida Statutes.

Warranty: The actual physical and technical qualities of materials should match the description contained in the publisher’s warranty.

Use: Materials must be designed for practical use in the classroom and school environments. They must be easy to identify and store. Teachers and students must be able to access and use the materials. Some of the factors influencing their ease of use include number of components, size of components, packaging, quality of materials, equipment requirements, and cost to purchase or replace components.

The best choice about weight, size, and number of volumes depends on several factors, such as the organization of the content, how well separate volumes may fit time periods for instruction, and the ages

of students. Technical production requirements, such as page limits or different types of bindings, may lead to multiple volumes.

Examples of classroom use include repeated copying of consumable materials and repeated use of other materials by students over time. Students should be able to easily use the materials and take home, in a convenient form, most of the material they need to learn for the course.

Technology-rich resources should work properly without the purchase of additional software and run without error. Electronic media for student use should be encoded to prevent accidental or intentional erasure or modification. As with textbooks, electronic media should allow students to easily access and interact with them without extensive supervision or special assistance.

The physical and technical qualities of materials should match with the resources of the schools. Materials such as videos, software, CDs, Internet sites, and transparencies may serve instructional purposes well but have little value unless they can be implemented with the school's equipment. Publishers should include training, in-service, and consultation to help in effective use of the materials.

Durability: Students and teachers should be able to have materials that will be durable under conditions of expected use. For example, boxes, books, or other materials should not fall apart after normal classroom use. The packaging and form of materials should be flexible and durable enough for multiple uses over time. Durability includes considerations such as high-quality paper, ink, binding, and cover back, joints, body block and individual pages; worry-free technology that runs properly, with easy to hear, see, and control audio and visuals; and the publisher's guarantee for replacement conditions and agreements for reproduction needed to effectively use the materials.

Cost: *Florida's Commissioner of Education will consider the impact of cost in making final decisions.* Cost, while not a direct factor in ease of use, influences the ease with which materials can be obtained or replaced. The impact of cost can be complex to estimate. It requires considering the number of materials available at no additional cost with the purchase of the major program or text, the cost over the adoption period of several years, and the number of free materials to support implementation. Attractive features such as higher quality paper and visuals and greater use of color may escalate cost, without enhancing learning effectiveness.

Learning

The following features have been found to promote learning and apply to most types of learning outcomes.

- A. Motivational Strategies**
- B. Teaching a Few "Big Ideas"**
- C. Explicit Instruction**
- D. Guidance and Support**
- E. Active Participation**
- F. Targeted Instructional Strategies**
- G. Targeted Assessment Strategies**

The following sections describe the learning features expected for each of these priority areas.

A. MOTIVATIONAL STRATEGIES

Instructional materials must include features to maintain learner motivation. See Sections 1006.31(2); 1006.34(2)(b); 1006.38(4), Florida Statutes.

Expectations: Materials should positively influence the expectations of students. Examples include: positive expectations for success; novel tasks or other approaches to stimulate intellectual curiosity; meaningful tasks related to student interests, cultural backgrounds, and developmental levels; activities with relevance to the student’s life; thought-provoking challenges such as paradoxes, dilemmas, problems, controversies, and questioning of traditional ways of thinking; challenges that are neither too difficult to achieve nor so easy that students become bored; hands-on tasks in a concrete context, and images, sounds, analogies, metaphors, or humorous anecdotes; and variety, including the opportunity for students to ask their own questions, set their own goals, and make other choices during learning.

Feedback: Materials should include informative and positive feedback on progress. Examples include: frequent checks on progress, including testing; explanatory feedback with information about correctness of responses, how to avoid or correct common mistakes, and/or different approaches to use; and varied forms of assessments (self-assessment, peer assessment, and some learning tasks without formal assessments).

Appearance: Materials should have an appearance generally considered attractive to the intended students.

B. TEACHING A FEW “BIG IDEAS”

Instructional materials should thoroughly teach a few important ideas, concepts, or themes. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Focus: Thoroughly teaching a few big ideas provides focus for the learner’s attention. It provides an organizing framework for integrating new information.

Completeness: The thorough teaching of a few big ideas may focus on developing a deeper and more complete understanding of the major themes of a discipline, the content of the subject area, relationships to other disciplines, and the thinking and learning skills required for achieving the specified learning outcomes.

C. EXPLICIT INSTRUCTION

Instructional materials must contain clear statements of information and outcomes. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Clarity of directions and explanations: To support success in learning, instructional materials should include clear presentation and explanations of purposes, goals and expected outcomes, concepts, rules, information and terms, models, examples, questions, and feedback.

For example, development of specific thinking skills requires an explicit statement of the particular *thinking skills* to be learned, along with the *strategies* or *steps to follow*. Explicit instruction for thinking skills might also involve showing *examples* of successful thinking contrasted with examples of poor thinking processes.

Similarly, the development of learning skills requires explicit directions about *when* and *how* to do activities such as note taking, outlining, paraphrasing, abstracting and analyzing, summarizing, self-coaching, memory strategies, persistence, preview and questioning, reading and listening, reflecting, and reciting.

Exclusion of ambiguity: Instructional materials should avoid terms and phrases with ambiguous meanings, confusing directions or descriptions, and inadequate explanations.

D. GUIDANCE AND SUPPORT

Instructional materials must include guidance and support to help students safely and successfully become more independent learners and thinkers. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Level: The type of guidance and support that helps students to become more independent learners and thinkers is sometimes referred to as *scaffolding*. Scaffolding is a solid structure of support that can be removed after a job has been completed. As students gain proficiency, support can diminish, and students can encounter more complex, life-centered problems. Information and activities should provide guidance and support at the level that is needed—no more and no less. Too much support can squelch student interest and too little can lead to failure.

Guidance and support can be accomplished by a combination of the following features: organized routines; advance organizers or models such as condensed outlines or overviews, simplified views of information, visual representations of new information during initial instruction, sample problems, questions to focus on key ideas or important features; examples of solved problems; explanations of how the problems were solved; examples of finished products or sample performances; analogies, metaphors, or associations to compare one idea to another; prompts or hints during initial practice; step-by-step instructions; immediate and corrective feedback on the accuracy of performance of each step or task, on how to learn from mistakes, and on how to reach the correct answer; simulations with features for realistic practice; and opportunities for students to do research; and to organize and communicate results.

Adaptability: Guidance and support must be adaptable to developmental differences and various learning styles. For example, young children tend to understand concepts in concrete terms and over-generalize new concepts. Some students need more time, some tend to be more impulsive than reflective, some have trouble distinguishing relevant from irrelevant information, and some have better written than spoken language skills.

Approaches for developmental differences and learning styles of students include a variety of *activities* such as structured and unstructured activities; independent and group work, teacher-directed and discovery learning, visual and narrative instruction, hands-on activities, open-ended activities, practice without extrinsic rewards or grades; simple, complex, concrete, and abstract examples; variable pacing or visual breaks; and a variety of *modalities* for the various learning styles of students, such as linguistic-verbal, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist.

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials must engage the physical and mental activity of students during the learning process. See Sections 1006.31(2); 1006.34(2)(b), Florida Statutes.

Assignments: Instructional materials should include organized activities of periodic, frequent, short assignments that are logical extensions of content, goals, and objectives.

Student responses: Assignments should include questions and application activities during learning that give students opportunities to respond. Active participation of students can be accomplished in a variety of ways. For example, information and activities might require students to accomplish types of activities that include: respond orally or in writing; create visual representations (charts, graphs, diagrams, and illustrations); generate products; generate their own questions or examples; think of new situations for applying or extending what they learn; complete discovery activities; add details to big ideas or concepts from prior knowledge; form their own analogies and metaphors; practice lesson-related tasks, procedures, behaviors, or skills; and/or choose from a variety of activities.

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials should include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements. See Sections 1006.31(2); 1006.34(2)(b); 1003.42, Florida Statutes.

Alignment: Research has documented the strategies that effectively teach different types of learning outcomes. The learning strategies included in instructional materials should match the findings of research for the targeted learning outcomes. Different types of learning outcomes require different strategies. For example, a strategy for memorizing verbal information might be helpful, but it would not align with the strategies required for learning a concept or for learning how to solve a problem.

Completeness: Not only should strategies be aligned, they also should be complete enough to effectively teach the targeted outcomes. For example, while the explanation of a problem-solving method or model would be appropriate, other strategies also would be necessary in order for students to learn how to resolve different types of problems.

Research summary: Researchers sometimes use different terms for some similar outcomes. For example, *thinking skills* and *metacognition* refer to some of the same types of skills. The following alphabetical list includes terms as they appeared in research, even though some terms clearly overlap with each other.

- attitudes
- cognitive strategies
- comprehension/understanding
- concepts
- creativity
- critical thinking
- insight
- metacognition
- motor skills
- multiple intelligences
- problem solving
- procedural knowledge, principles, and rules
- scientific inquiry
- thinking skills
- verbal information, knowledge, or facts

The following section summarizes the research findings for each of these types of learning outcomes.

Effective Teaching Strategies

Teach *Attitudes*

- Explain and show consequences of choices, actions, or behaviors.
- Provide relevant human or social models that portray the desired choices, actions, or behaviors.

Teach *Reading*

- Monitor and reflect upon the effectiveness of the reading process used.
- Provide appropriate reading strategies.
- Link instruction to effective reading.

Teach *Cognitive Strategies*

- Monitor and reflect upon the effectiveness of the reading process used.
- Encourage and/or teach:
 - Organizing and summarizing information;
 - Self-questioning, self-reflection, and self-evaluation;
 - Reference skills; and
 - When and how to use these different skills.

Teach *Comprehension/Understanding*

- Outline, explain, or visually show what will be read/learned in a simple form.
- Explain with concrete examples, metaphors, questions, or visual representations.
- Require students to relate new readings to previously learned information.
- Require students to paraphrase or summarize new information as it is read.
- Require students to construct a visual representation of main ideas (map, table, graphs, Venn diagram, etc.).
- Give students opportunities to add details, explanations, or examples to basic information.
- Require application of knowledge or information.

Teach *Concepts*

- Provide clear understanding of each concept.
- Point out important and features or ideas.
- Point out examples of the concept, showing similarities and differences.
- Include practice in organizing and classifying concepts.
- Include a wide range of examples in a progressive presentation from simple to more complex examples.
- Emphasize relationships between concepts.

Teach *Creativity*

- Provide examples of creativity.
- Include models, metaphors, and analogies.
- Encourage novel approaches to situations and problems.
- Show and provide practice in turning a problem upside down or inside out or by changing perceptions.
- Encourage brainstorming.

- Include open-ended questions and problems.
- Provide opportunities of ungraded, unevaluated creative performance and behavior.

Teach *Critical Thinking*

- Create conflict or perplexity by using paradoxes, dilemmas, or other situations to challenge concepts, beliefs, ideas, and attitudes.
- Focus on how to recognize and generate proof, logic, argument, and criteria for judgments.
- Include practice in detecting mistakes, false analogies, relevant vs. irrelevant issues, contradictions, discrepant events, and predictions.
- Provide practice in drawing inferences from observations and making predictions from limited information.
- Explain and provide practice in recognizing factors or biases that may influence choice and interpretations such as culture, experience, preferences, desires, interests, and passions, as well as systematic thinking.
- Require students to explain how they form new conclusions and how and why present conclusions may differ from previous ones.

Teach *Inquiry*

- Emphasize technological design as inquiry and include discovery activities.
- Provide opportunities for experimental design.
- Provide opportunities for critical thinking.
- Facilitate the collection, display, and interpretation of data.
- Promote careful observation, analysis, description, and definition.

Teach *Metacognition*

- Explain different types of thinking strategies and when to use them.
- Encourage self-evaluation and reflection.
- Include questions that challenge students to wonder why they are doing what they are doing.
- Guide students in how to do systematic inquiry, detect flaws in thinking, and adjust patterns of thinking.

Teach *Technology*

- Provide a mental and physical model of desired performance.
- Describe steps in the performance.
- Provide practice with kinesthetic and corrective feedback (coaching).

Teach *Multiple Intelligences/Learning Modalities*

- Visual learning modality focuses on seeing, watching and looking.
- Auditory learning modality focuses on hearing and responding to verbal information and instructions.
- Motor/kinesthetic learning modality focuses on active involvement and hands-on activities.
- Verbal-linguistic dimension focuses on reasoning with language, rhythms, and inflections, such as determining meaning and order of words (stories, readings, humor, rhyme, and song).
- Logical-mathematical dimension focuses on reasoning with patterns and strings of symbols (pattern blocks, activities to form numbers and letters).
- Musical dimension focuses on appreciation and production of musical pitch, melody, and tone.
- Spatial dimension focuses on activities of perceiving and transforming perceptions.

- Bodily kinesthetic dimension focuses on use and control of body and objects.
- Interpersonal dimension focuses on sensing needs, thoughts, and feelings of others.
- Intrapersonal dimension focuses on recognizing and responding to one's own needs, thoughts, and feelings.
- Naturalist dimension focuses on appreciation of nature and the environment and on comparing, contrasting, and classifying attributes.

Teach *Problem Solving*

- Assure student readiness by diagnosing and strengthening related concept, rule, and decision-making skills.
- Provide broad problem-solving methods and models.
- Include practice in solving different types of problems.
- Begin with highly structured problems and then gradually move to less structured ones.
- Use questions to guide thinking about problem components, goals, and issues.
- Provide guidance in observing and gathering information, asking appropriate questions, and generating solutions.
- Include practice in finding trouble, inequities, contradictions, or difficulties and in reframing problems.

Teach *Procedural Knowledge, Principles, and Rules*

- Define context, problems, situations, or goals and appropriate procedures.
- Explain reasons that procedures work for different types of situations.
- Define procedures—procedures include rules, principles, and/or steps.
- Provide vocabulary and concepts related to procedures.
- Demonstrate step-by-step application of procedures.
- Explain steps as they are applied.
- Include practice in applying procedures.

Teach *Scientific Inquiry*

- Explain process and methods of scientific inquiry.
- Explain and provide examples of (a) hypotheses formation, (b) valid procedures, (c) isolating variables, (d) interpretation of data, and (e) reporting findings.
- Encourage independent thinking and avoidance of dead ends or simplistic answers.
- Require students to explain, verify, challenge, and critique the results of their inquiry.

Teach *Thinking Skills*

- Introduce different types of thinking strategies.
- Explain context or conditions of applying different strategies.
- Provide definitions, steps, and lists to use in strategies.
- Include examples of different types of thinking strategies, including how to think with open-mindedness, responsibility, and accuracy.
- Emphasize persisting when answers are not apparent.
- Provide practice in applying, transferring, and elaborating on thinking strategies.
- Integrate metacognitive, critical, and creative-thinking skills.

Teach *Verbal Information, Knowledge, or Facts*

- Provide a meaningful context to link new information and past knowledge.

- Organize information into coherent groups or themes.
- Use devices to improve memory such as mnemonic patterns, maps, charts, comparisons, groupings, highlighting of key words or first letters, visual images, and rhymes.
- Identify main ideas, patterns, or relationships within information or sets of facts.

G. TARGETED ASSESSMENT STRATEGIES

Instructional materials should include assessment strategies that are known to be successful in determining how well students have achieved the targeted learning outcomes. See Sections 1006.31(2); 1006.34(2)(b); 1006.38(4), Florida Statutes.

Alignment: The assessment strategies should match the learner performance requirements for the types of learning outcomes that have been targeted for the subject matter, course, or course category. Different strategies are appropriate for assessing different types of learning outcomes. For example, a strategy for testing the acquisition of verbal information would not match the requirements for testing whether or not a student has learned a concept or learned how to solve a problem.

The term “assessment,” as used in this section, refers to testing or other strategies that assess student progress as a result of learning activities. The results of such assessment provide information about where to strengthen instruction. But it is very important to ask the right questions. If the type of question matches the type of learning outcome, then students and teachers have relevant information about learning progress.

Completeness: In addition to including assessment strategies that align with the performance requirements of the targeted learning outcomes, the strategies should be complete enough to effectively assess the learner’s performance with regard to the targeted outcome. For example, a test item that requires the student to state a rule does not assess whether or not the student knows how to *use* the rule.

Research summary: The research summary for effective assessment strategies for different types of learning outcomes follows the same alphabetical sequence as the previous section.

Effective Assessment Strategies

Assess Attitudes:

- Provide various situations.
- Require choices about behaviors.

Assess Cognitive Strategies:

- Provide learning tasks.
- Require students to choose good strategies for learning and/or to learn new materials without teacher guidance.
- Require students to discuss and explain methods used for various learning tasks.

Assess Comprehension/Understanding:

- Provide topic.
- Require summary or restatement of information.
- Provide new context.
- Require application of information.
- Provide several statements using words different from the initial teaching.
- Require identification of the correct meaning.

Assess Concepts:

- Provide new examples and non-examples.
- Require identification or classification into the correct categories.

Assess Creativity:

- Provide new problems to “turn upside down,” study, or resolve—these could be performances, presentations, or products.
- Require products or solutions to fit within the particular functions and resources.
- Provide situations requiring novel approaches.

Assess Critical Thinking:

- Require students to evaluate information or results.
- Require the use of analysis and research.

Assess Insight:

- Provide situations for inquiry and discovery.
- Provide situations for manipulation.

Assess Metacognition:

- Provide different situations or problems.
- Require students to identify types of thinking strategies to analyze and evaluate their own thinking.

Assess Multiple Intelligences/Learning Modalities:

- Provide situations in the multiple intelligence/learning modalities that are targeted, e.g., verbal-linguistic, musical, or other learning modalities.
- Provide situations in several multiple intelligence/learning modalities, to allow choice.
- Require performance in the targeted or chosen multiple intelligence/learning modality.

Assess Motor Skills:

- Provide situations and resources for performance of the skill.
- Include checklist for evaluation.

Assess Problem Solving:

- Require students to choose types of problem-solving strategies for different situations.
- Require solutions to structured and unstructured, simple and complex problems.

Assess Procedural Knowledge, Principles, and Rules:

- Provide situations that require students to recognize the correct use of procedures, principles, or rules with routine problems.
- Require students to state procedures, principles, or rules.
- Require students to choose which procedures, principles, or rules to apply in different situations.
- Provide situations that require students to demonstrate the correct use of procedures, principles, or rules with routine problems.

Assess Scientific Inquiry:

- Provide situations or problems that require speculation, inquiry, and hypothesis formation.
- Provide research, hands-on activities, and conclusions.

Assess Thinking Skills:

- Require students to summarize different types of thinking strategies.
- Provide situations that require students to choose the best type of thinking strategy to use.
- Require students to detect instances of open vs. closed-mindedness.

- Require students to detect instances of responsible vs. irresponsible and accurate vs. inaccurate applications of thinking strategies.
- Provide situations that require the student's persistence in order to discover or analyze information to obtain answers to specific questions.
- Require students to apply specific thinking strategies to different real-world situations.

Assess Verbal Information, Knowledge, or Facts:

- Require students to recall information.
- Require students to restate information.
- Require students to understand information.

Requirements for Production of Accessible Instructional Materials

Instructions for Preparing Electronic Files Required for Production of Instructional Materials in Braille and Other Accessible Formats in a Timely Fashion

Statutory Authorization

Section 1003.55(5), Florida Statutes states that, "...any publisher of a textbook adopted pursuant to the state instructional materials adoption process shall furnish the Department of Education with a computer file in an electronic format specified by the Department at least 2 years in advance that is readily translatable to Braille and can be used for large print or speech access. Any textbook reproduced pursuant to the provisions of this subsection shall be purchased at a price equal to the price paid for the textbook as adopted. The Department of Education shall not reproduce textbooks obtained pursuant to this subsection in any manner that would generate revenues for the department from the use of such computer files or that would preclude the rightful payment of fees to the publisher for use of all or some portion of the textbook."

Section 1006.29(3), Florida Statutes states that, "Beginning in the 2015-2016 academic year, all adopted instructional materials for students in kindergarten through grade 12 must be provided in an electronic or digital format. For purposes of this section, the term: (a) 'Electronic format' means text-based or image-based content in a form that is produced on, published by, and readable on computers or other digital devices and is an electronic version of a printed book, whether or not any printed equivalent exists. (b) 'Digital format' means text-based or image-based content in a form that provides the student with various interactive functions; that can be searched, tagged, distributed, and used for individualized and group learning; that includes multimedia content such as video clips, animations, and virtual reality; and that has the ability to be accessed at anytime and anywhere. The terms do not include electronic or computer hardware even if such hardware is bundled with software or other electronic media, nor does it include equipment or supplies."

Section 1006.38(15), Florida Statutes states that, "Grant, without prior written request, for any copyright held by the publisher or its agencies automatic permission to the department or its agencies for the reproduction of instructional materials and supplementary materials in braille, large print, or other appropriate format for use by visually impaired students or other students with disabilities that would benefit from use of the materials."

Objective

Electronic formats are needed to accelerate the production of instructional materials in Braille, large print and other appropriate accessible formats. These accessible formats are used by visually impaired students or other students with disabilities utilizing specialized translation software and peripheral devices. Access to Braille, enlarged print, audio, and digital materials including web-based online applications is crucial to the successful inclusion of students with disabilities in the classroom. The objective of these statutes is to prompt publishers to provide instructional materials data in an electronic format that will be useful to Braille and other accessible format producers while at the same time allowing each publisher the flexibility of providing files in the current version of: EPub3, HTML5, or MathML3 (as appropriate). Instructional materials that contain mathematical and scientific instructional content are to be marked up by using the MathML3 module of the DAISY/NIMAS Structure Guidelines as

posted and maintained at the DAISY Consortium web site: <http://www.daisy.org/z3986/structure/SG-DAISY3/index.html>.

By April 1, of each year, publishers of adopted student textbooks for instructional materials must be able to provide the approved electronic formats UPON REQUEST. The requested electronic files shall be provided to the Florida Instructional Materials Center for the Visually Impaired (FIMC-VI), 4210 West Bay Villa Avenue, Tampa, Florida 33611; (813) 837-7826; in Florida WATS (800) 282-9193 or (813) 837-7979 (FAX). The center will contact each publisher of an adopted textbook and provide delivery instructions.

Federal Requirements for the National Instructional Materials Accessibility Standard (NIMAS)

National Instructional Materials Accessibility Standard (NIMAS) guides the production and electronic distribution of digital versions of textbooks and other instructional materials so they can be more easily converted to accessible formats, including Braille and text-to-speech. A National Instructional Materials Access Center (NIMAC) has been established to receive and catalog publishers' electronic files of print instructional materials in the NIMAS format.

These files will be used for the production of alternate formats as permitted under the law for students with print disabilities. Under these guidelines, “textbook” means the principal tool of instruction such as state-adopted instructional materials used in the classroom. It is a printed book or books that contain most, if not all, of the academic content a student needs to learn to meet the State or Local Education Agency’s curriculum requirements for that subject area. “Related core materials” are printed materials, other than textbooks, designed for use by students in the classroom in conjunction with a textbook and which, together with the state adopted textbook, are necessary to meet the curriculum requirements for the intended course. The materials should be directly related to the textbook and wherever possible they should be published by the publisher of the textbook. Related core materials do not include materials that are not written and published primarily for use by students in the classroom (e.g., trade books not bundled with the textbook, newspapers, and reference works) or ancillary or supplemental materials that are not necessary to meet the curriculum requirements for the intended course. For purposes of these definitions, the term “curriculum requirements for the intended course” refers to relevant curriculum standards and requirements as established by a state educational agency or local educational agency.

The details of the metadata elements required as part of the NIMAS File set will be found at http://www.nimac.us/pdf/NIMAC_Metadata1.pdf. Please note that some elements are required, while others are optional. Some fields also allow for multiple entries (e.g., subject terms).

Complete information concerning NIMAS and NIMAC can be found at <http://aim.cast.org> and <http://www.nimac.us>. (IDEA-2004).

Questions from publishers concerning electronic files in Florida can be directed to Leanne Grillot at Leanne.Grillot@fldoe.org