

**PROCLAMATION 2005
OF THE
STATE BOARD OF EDUCATION
ADVERTISING FOR
BIDS ON
INSTRUCTIONAL MATERIALS**

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*Texas Education Agency
Austin, Texas*

**PROCLAMATION 2005 OF THE STATE BOARD OF EDUCATION
ADVERTISING FOR BIDS ON INSTRUCTIONAL MATERIALS**

Proclamation 2005 Schedule of Adoption Procedures..... ii

Statutory Citation..... 1

Chapter 111. Texas Essential Knowledge and Skills for Mathematics..... 2

Subchapter A. Elementary 2

 §111.11. Implementation of Texas Essential Knowledge and Skills for
 Mathematics, Grades K-5. 2

 §111.12. Mathematics, Kindergarten..... 2

*Capítulo 111. Conocimientos y destrezas esenciales en Texas (TEKS) para
matemáticas*..... 6

Subcapítulo A. Primaria..... 6

 §111.11. Implementación de los conocimientos y destrezas esenciales en Texas
 para matemáticas, de K a 5° grado..... 6

 §111.12. Matemáticas, Kindergarten. 6

Chapter 111. Texas Essential Knowledge and Skills for Mathematics..... 10

Subchapter A. Elementary 10

 §111.12. Implementation of Texas Essential Knowledge and Skills for
 Mathematics, Grades 1-5. 10

 §111.13. Mathematics, Grade 1. 10

 §111.14. Mathematics, Grade 2. 14

 §111.15. Mathematics, Grade 3. 18

 §111.16. Mathematics, Grade 4. 22

 §111.17. Mathematics, Grade 5. 26

Capítulo 111. Conocimientos y destrezas esenciales en Texas (TEKS) para matemáticas
..... 31

Subcapítulo A. Primaria..... 31

 §111.12. Implementación de los conocimientos y destrezas esenciales en Texas
 para matemáticas, de 1 a 5° grado. 31

 §111.13. Matemáticas, 1^{er} grado..... 31

 §111.14. Matemáticas, 2° grado. 34

 §111.15. Matemáticas, 3er grado..... 38

 §111.16. Matemáticas, 4° grado. 42

 §111.17. Matemáticas, 5° grado. 46

Accessibility Information for Proclamation 2005..... 50

NIMAS 1.1 The Technical Standard..... 55

Maximum Cost Estimated First-Year Purchases 63

Proclamation 2005 Schedule of Adoption Procedures

- November 2005**
SBOE Meeting
- Commissioner of Education presents the Proclamation 2005 (for 2007 state adoption and for implementation in the 2008-2009 school year) to State Board of Education (SBOE) committees for action.
 - Instructional Materials and Educational Technology staff presents the maximum cost for Proclamation 2005 (for 2007 state adoption and for implementation in the 2008-2009 school year) to SBOE committees for action.
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- November 2005**
SBOE Meeting
- SBOE issues Proclamation 2005.
SBOE issues maximum cost.
- January 2006**
- Proclamation 2005 and procedures relating to instructional materials adoption program made available to interested publishers and persons.
- October 2006**
- Publisher orientation conducted by Instructional Materials and Educational Technology staff for publisher's contract staff interested in submitting statements of intent to bid.
- Nomination forms for state review panels distributed to the SBOE, Texas State Officials, parents, school districts and open enrollment charter schools, Universities, and regional education service centers (RESCs).
- October - December 2006**
- Receipt and review of nominations to state review panels that will be appointed to review instructional materials submitted under Proclamation 2005.
 - Nominees to state review panels, upon initial contact by a representative of the Texas Education Agency, begin a period of no-contact (either directly or indirectly) with any person having an interest in the content of instructional materials to be evaluated by the panel.
- December 1, 2006**
- Final date for publishers to file Statements of Intent to Bid Instructional Materials. Statements of Intent shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. Publishers shall provide detailed specifications regarding price data, hardware, software, and/or special equipment needed to review any item included in an instructional materials submission.
- Note: Only publishers who submit a Statement of Intent to Bid by December 1, 2006 will be allowed to participate in the adoption process. Please see SBOE rules 19 TAC §66.48 (a-e) for additional information.**
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- February 9, 2007**
- Each RESC designates the person who will supervise sample shipments, the address at which sample instructional materials will be received, and a schedule designating hours and dates sample materials may be reviewed by the public.

- Each RESC publishes a news release and notifies area schools concerning sample instructional materials. The notice shall include the person to be contacted regarding sample instructional materials and the hours and dates samples will be available for review by the public.

March 30, 2007

- With the exception of Spanish submissions, final date for publishers to file two complete official sample copies of instructional materials submitted for adoption; correlations to Texas Essential Knowledge and Skills (TEKS); and Forms B, M, and Warranty. Samples, correlations, and Forms B, M, and Warranty shall be filed with designated representatives of the Texas Education Agency by 5:00 p.m. All samples submitted shall be complete as to content and representative of the finished product.
- Final date for publishers to submit to the Texas Education Agency a signed affidavit certifying that each individual whose name is listed as an author or contributor of instructional materials contributed to the development of the textbook. The affidavit shall also state in general terms each author's involvement in the development of the instructional materials.

Note: The Texas Education Agency may require additional samples for use by contracted reviewers, members of the SBOE, and others.

- With the exception of Spanish submissions, final date for publishers to file complete official sample copies of instructional materials submitted for adoption and correlations to TEKS with each of the twenty RESCs. All samples submitted shall be complete as to content and representative of the finished product.

April 27, 2007

- Information provided to publishers regarding delivery of official sample copies of instructional materials submitted for adoption and correlations to TEKS for state review panel members. All samples submitted shall be complete as to content and representative of the finished product. A publisher whose instructional materials require hardware or special equipment for review will be required to provide appropriate hardware or equipment to state review panel members during the review.

May 7, 2007

- Final date for publishers to withdraw an instructional materials submission without SBOE approval. Requests to withdraw an instructional materials submission shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
- Beginning date for sample instructional materials to be available for review at the RESCs.

May 25, 2007

- Final date for publishers to file two complete official sample copies of Spanish instructional materials submitted for adoption; correlations to TEKS; and Forms B, M, and Warranty. Samples, correlations, and Forms B, M, and Warranty shall be filed with designated representatives of the Texas Education Agency by 5:00 p.m. All samples submitted shall be complete as to content and representative of the finished product.

- Final date for publishers to file complete official sample copies of Spanish instructional materials submitted for adoption and correlations to TEKS with each of the twenty RESCs. All samples submitted shall be complete as to content and representative of the finished product.
- June – July, 2007**
- Orientation and training sessions for state review panels. Panel members conduct evaluation of instructional materials submitted for consideration for adoption. A publisher whose instructional materials require hardware or special equipment for review will be required to provide appropriate hardware or equipment to state review panel members.
 - Preliminary recommendations on conforming/nonconforming will be provided to publishers as soon as possible after adjournment of each panel.
- 10 calendar days following receipt of preliminary reports by publishers**
- Publishers have 10 calendar days to submit new content to address missing TEKS only. Publishers may also choose to submit documentation disputing the findings of the state review panels. New content submitted shall only address missing TEKS or correct factual or editorial errors.
- July 2007
SBOE Meeting**
- SBOE may hold public hearing on instructional materials submitted for adoption.
- July 6, 2007**
- Final date for publishers to file lists of corrections necessary in instructional materials submitted for adoption. Lists of corrections shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
- August 24, 2007**
- Final date for Texas residents to request to appear at the public hearing before the SBOE. Requests shall identify subjects, titles, and publishers of instructional materials to be addressed and shall be filed in writing with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
 - Date for receipt of official written comments concerning instructional materials submitted for consideration. Official written comments shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. Written comments filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology will be distributed to the SBOE and publishers prior to the September hearing.
 - Final date for evaluating new content submitted to address missing TEKS as determined by state textbook review panels.
- September 7, 2007**
- Final date for publishers who elect to protest the Commissioner of Education’s preliminary recommendation that instructional materials be placed on the conforming list, placed on the nonconforming list, or be rejected to file request for show-cause hearings. Requests shall be filed with the Texas Education Agency by 5:00 p.m.
 - Commissioner of education publishes schedule and procedures for the public hearing before the SBOE.

- Copies of official written comments are available for distribution electronically to state review panels, RESCs, affected publishers, and to members of the public via the Instructional Materials and Educational Technology website: <http://www.tea.state.tx.us/textbooks/archives/index.html>.
- Final date for Texas residents to submit lists of alleged factual errors in instructional materials under consideration for adoption. Lists of alleged factual errors shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

**September 2007
SBOE Meeting**

September 17-21, 2007

- SBOE holds public hearing on instructional materials submitted for adoption.
- Show-cause hearings held with publishers who elect to protest the Commissioner's preliminary recommendations.

14 calendar days after receipt of transcript by publishers

- Final date for receipt of responses to official written comments and to testimony presented at the public hearing. Responses shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

September 28, 2007

- Publishers file three signed original copies of the *Official Bid Form* with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
- Final date for publishers to file titles of ancillary materials that will be provided at no cost to school districts to accompany instructional materials adopted under Proclamation 2005. Titles of ancillary materials shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

Note: Publishers will be responsible for providing the titles of ancillary materials to school districts and open-enrollment charter schools at the time information is sent that fully describes the program (January 5, 2008).

October 1, 2007

- Final date for publishers to file certification that instructional materials have been edited for accuracy, content, and compliance with requirements of the proclamation. Certification shall be filed by 5:00 p.m. with the Texas Education Agency, Division of Instructional Materials and Educational Technology.
- Final date for persons to file complaints of violations of statutes, rules, or procedural irregularities. Complaints shall be filed in writing with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. Written comments filed with the Texas Education Agency Division of Instructional Materials and Educational Technology, by 5:00 p.m. will be distributed to the SBOE and publishers prior to the November adoption meeting.

- October 12, 2007**
- Commissioner of education issues final recommendations that instructional materials under consideration be placed on the conforming list, placed on the nonconforming list, or rejected.
 - Commissioner of education issues report on required corrections of factual errors in instructional materials under consideration for adoption.
- November 2007
SBOE Meeting**
- SBOE committee considers report of the commissioner of education concerning instructional materials under consideration for adoption. SBOE considers adoption of instructional materials.
- December 7, 2007**
- Final date for publishers of adopted instructional materials to submit three copies of designated printed student materials and NIMAS computer files that have been pre-validated with the National Instructional Materials Accessibility Center (NIMAC) automated validator. Printed student materials and NIMAS computer files shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
 - Final date for publishers to provide each school district and open-enrollment charter school with information that fully describes adopted instructional materials.
- December 21, 2007**
- Publishers file registers of any contacts with members of the SBOE. Registers shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
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- January 11, 2008**
- Final date for publishers to provide each school district and open-enrollment charter school with the titles of ancillary materials that will be provided at no cost to school districts to accompany instructional materials adopted under Proclamation 2005.
- January 25, 2008**
- Date for publishers to submit camera ready copy for curriculum approval of instructional materials adopted under Proclamation 2005 that incorporate all required corrections of factual errors. Camera ready copy of instructional materials shall be filed with the Texas Education Agency, Instructional Materials and Educational Technology Division, by 5:00 p.m.
- April 2008**
- School districts and open enrollment charter schools submit orders for new instructional materials to the Division of Instructional Materials and Educational Technology.
- May 2, 2008**
- Final date for publishers to file for approval two copies of instructional materials adopted under Proclamation 2005 that incorporate all required corrections. Corrected instructional materials shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
 - Final date for publishers to file two corrected copies of student components of adopted instructional materials with Braille producers that incorporate all required corrections. Corrected student components shall be filed with Braille producers designated by the Texas Education Agency.

- Final date for publishers to file an affidavit verifying that all required corrections have been made. Affidavits shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
- Final date for publishers to file two corrected copies of adopted instructional materials with each RESC and other designated parties by 5:00 p.m.
- Publishers distribute adopted instructional materials from depositories to school districts and open enrollment charter schools.

June - August 2008

Statutory Citation

Texas Education Code, §31.002, Definitions:

In this chapter:

- (1) "Electronic textbook" means computer software, interactive videodisc, magnetic media, CD-ROM, computer courseware, on-line services, an electronic medium, or other means of conveying information to the student or otherwise contributing to the learning process through electronic means.
- (2) "Publisher" includes an on-line service or a developer or distributor of an electronic textbook.
- (3) "Textbook" means a book, a system of instructional materials, or a combination of a book and supplementary instructional materials that conveys information to the student or otherwise contributes to the learning process, or an electronic textbook.
- (4) "Technological equipment" means hardware, a device, or equipment necessary for:
 - (A) instructional use in the classroom, including to gain access to or enhance the use of an electronic textbook; or
 - (B) professional use by a classroom teacher.

Notes

Late Submissions

The agency cannot guarantee that submissions of sample copies of instructional materials that are received after the established deadlines will be reviewed. Late submissions that cannot be accommodated will not be recommended for adoption. All late submissions (to the agency, to the Education Service Centers, and/or to state textbook review panel members) will be reported to the board when instructional materials are considered for adoption.

Systems Bid in Lieu of Student Editions

Publishers who bid systems rather than student editions will be paid by the state, based on the student edition maximum price as called for in Proclamation 2005.

For example, if the State Board of Education establishes a maximum cost of \$50 for a student edition in a given subject, and a publisher bids a \$1,000 system, at least 20 students must be served in order for the publisher to be paid the entire \$1,000. If the district has less than 20 students in the class(es), the publisher will be responsible for collecting a portion of the cost from the district.

Chapter 111. Texas Essential Knowledge and Skills for Mathematics

Subchapter A. Elementary

Statutory Authority: The provisions of this Subchapter A issued under the Texas Education Code, §28.002, unless otherwise noted.

§111.11. Implementation of Texas Essential Knowledge and Skills for Mathematics, Grades K-5.

The provisions of this subchapter shall be implemented by school districts beginning with the 2006-2007 school year.

Source: The provisions of this §111.11 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

§111.12. Mathematics, Kindergarten.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Kindergarten are developing whole-number concepts and using patterns and sorting to explore number, data, and shape.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical language and symbols. Students use objects to create and identify patterns and use those patterns to express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students progress from informal to formal language to describe two- and three-dimensional geometric figures and likenesses in the physical world. Students begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Throughout mathematics in Kindergarten-Grade 2, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Kindergarten-Grade 2 use basic number sense to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 2, students know basic addition and subtraction facts and are using them to work flexibly, efficiently, and accurately with numbers during addition and subtraction computation.
- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (K.1) **Number, operation, and quantitative reasoning.** The student uses numbers to name quantities.

The student is expected to:

- (A) use one-to-one correspondence and language such as more than, same number as, or two less than to describe relative sizes of sets of concrete objects;
- (B) use sets of concrete objects to represent quantities given in verbal or written form (through 20); and
- (C) use numbers to describe how many objects are in a set (through 20) using verbal and symbolic descriptions.

- (K.2) **Number, operation, and quantitative reasoning.** The student describes order of events or objects.

The student is expected to:

- (A) use language such as before or after to describe relative position in a sequence of events or objects; and
- (B) name the ordinal positions in a sequence such as first, second, third, etc.

- (K.3) **Number, operation, and quantitative reasoning.** The student recognizes that there are quantities less than a whole.

The student is expected to:

- (A) share a whole by separating it into two equal parts; and
- (B) explain why a given part is half of the whole.

- (K.4) **Number, operation, and quantitative reasoning.** The student models addition (joining) and subtraction (separating).

The student is expected to model and create addition and subtraction problems in real situations with concrete objects.

- (K.5) **Patterns, relationships, and algebraic thinking.** The student identifies, extends, and creates patterns.

The student is expected to identify, extend, and create patterns of sounds, physical movement, and concrete objects.

- (K.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to make predictions.

The student is expected to:

- (A) use patterns to predict what comes next, including cause-and-effect relationships; and
- (B) count by ones to 100.

- (K.7) **Geometry and spatial reasoning.** The student describes the relative positions of objects.

The student is expected to:

- (A) describe one object in relation to another using informal language such as over, under, above, and below; and
- (B) place an object in a specified position.

(K.8) **Geometry and spatial reasoning.** The student uses attributes to determine how objects are alike and different.

The student is expected to:

- (A) describe and identify an object by its attributes using informal language;
- (B) compare two objects based on their attributes; and
- (C) sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted.

(K.9) **Geometry and spatial reasoning.** The student recognizes attributes of two- and three-dimensional geometric figures.

The student is expected to:

- (A) describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures;
- (B) recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures; and
- (C) describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle).

(K.10) **Measurement.** The student directly compares the attributes of length, area, weight/mass, capacity, and/or relative temperature. The student uses comparative language to solve problems and answer questions.

The student is expected to:

- (A) compare and order two or three concrete objects according to length (longer/shorter than, or the same);
- (B) compare the areas of two flat surfaces of two-dimensional figures (covers more, covers less, or covers the same);
- (C) compare two containers according to capacity (holds more, holds less, or holds the same);
- (D) compare two objects according to weight/mass (heavier than, lighter than or equal to); and
- (E) compare situations or objects according to relative temperature (hotter/colder than, or the same as).

(K.11) **Measurement.** The student uses time to describe, compare, and order events and situations.

The student is expected to:

- (A) compare events according to duration such as more time than or less time than;
- (B) sequence events (up to three); and

(C) read a calendar using days, weeks, and months.

(K.12) **Probability and statistics.** The student constructs and uses graphs of real objects or pictures to answer questions.

The student is expected to:

- (A) construct graphs using real objects or pictures in order to answer questions; and
- (B) use information from a graph of real objects or pictures in order to answer questions.

(K.13) **Underlying processes and mathematical tools.** The student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify mathematics in everyday situations;
- (B) solve problems with guidance that incorporates the processes of understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(K.14) **Underlying processes and mathematical tools.** The student communicates about Kindergarten mathematics using informal language.

The student is expected to:

- (A) communicate mathematical ideas using objects, words, pictures, numbers, and technology; and
- (B) relate everyday language to mathematical language and symbols.

(K.15) **Underlying processes and mathematical tools.** The student uses logical reasoning.

The student is expected to justify his or her thinking using objects, words, pictures, numbers, and technology.

Source: The provisions of this §111.12 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

Capítulo 111. Conocimientos y destrezas esenciales en Texas (TEKS) para matemáticas.

Subcapítulo A. Primaria

Autoridad estatutaria: las estipulaciones de este subcapítulo A publicadas bajo el Código de Educación de Texas, sección §28.002, a menos que de otra manera se especifique.

§111.11. Implementación de los conocimientos y destrezas esenciales en Texas para matemáticas, de K a 5° grado.

Las estipulaciones de este subcapítulo serán implementadas por los distritos escolares a partir del año 2006-2007.

Fuente: las estipulaciones de esta sección §111.11 adoptadas para entrar en vigor el 1° de septiembre de 1998, 22 TexReg 7623.

§111.12. Matemáticas, Kindergarten.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en kindergarten son el desarrollo de los conceptos de números enteros, del uso de patrones y de la clasificación para explorar números, datos y figuras.
- (2) A través de las matemáticas de kindergarten a 2° grado, los estudiantes forman una base de conocimientos fundamentales acerca de los números, las operaciones y el razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los estudiantes utilizan números para ordenar, clasificar y expresar cantidades y relaciones para resolver problemas y para transferir el lenguaje informal al lenguaje matemático y a los símbolos matemáticos. Los estudiantes utilizan objetos para crear e identificar patrones y usan esos patrones para expresar relaciones, hacer predicciones y resolver problemas, conforme van entendiendo los conceptos de números, operaciones, formas y espacio. Los estudiantes avanzarán del lenguaje informal al lenguaje formal para describir figuras geométricas de dos y tres dimensiones y sus semejanzas en el mundo físico. Los estudiantes empiezan a desarrollar conceptos de medición según identifican y comparan los atributos de objetos y situaciones. Los estudiantes reúnen, organizan y presentan datos y utilizan información de gráficas para contestar preguntas, hacer resúmenes y predicciones informales basándose en sus propias experiencias.
- (3) A través de las matemáticas de kindergarten a 2° grado, los estudiantes desarrollan fluidez (dominio) numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de kindergarten a 2° grado usan su lógica numérica básica para componer y descomponer números para resolver problemas que requieren de precisión, estimación y la capacidad de determinar lo que es razonable. Al final del 2° grado, los estudiantes saben realizar operaciones básicas de suma y resta, manipulando los números de una manera eficiente, precisa y flexible cuando realizan cálculos de suma y resta.
- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera

de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de kindergarten a 2º grado, los estudiantes utilizan estos procesos junto con tecnología y otras herramientas matemáticas tales como manipulativos con el fin de desarrollar su comprensión de conceptos y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza números para nombrar cantidades. Se espera que el estudiante:
 - (A) utilice relaciones tales como correspondencia uno a uno y lenguaje tal como más que, mismo número que o dos menos que para describir el tamaño relativo de conjuntos de objetos concretos;
 - (B) utilice conjuntos de objetos concretos para representar cantidades dadas en forma verbal o escrita (hasta el 20); y
 - (C) utilice números para describir cuántos objetos hay en un conjunto (hasta el 20) utilizando descripciones verbales y simbólicas.
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante describe el orden de eventos u objetos. Se espera que el estudiante:
 - (A) utilice expresiones tales como antes o después para describir posición relativa en una secuencia de eventos u objetos; y
 - (B) diga las posiciones de los números ordinales en secuencia, tales como primero, segundo, tercero, etc.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante reconoce que hay cantidades menores que un entero. Se espera que el estudiante:
 - (A) parta un entero separándolo en dos partes iguales; y
 - (B) explique por qué una determinada parte es la mitad de un entero.
- (4) Números, operaciones y razonamiento cuantitativo. El estudiante demuestra ejemplos de la suma (uniendo) y de la resta (separando). Se espera que el estudiante dé ejemplos y genere problemas de suma y resta en situaciones reales usando objetos concretos.
- (5) Patrones, relaciones y razonamiento algebraico. El estudiante identifica, extiende y genera patrones. Se espera que el estudiante identifique, extienda y genere patrones de sonidos, de movimientos físicos y de objetos concretos.
- (6) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones para hacer predicciones. Se espera que el estudiante:
 - (A) utilice patrones para predecir lo que sigue, incluyendo relaciones de causa y efecto; y
 - (B) cuente de uno en uno hasta el 100.
- (7) Geometría y razonamiento espacial. El estudiante describe la posición relativa de objetos. Se espera que el estudiante:
 - (A) describa un objeto en relación con otro utilizando lenguaje informal tal como sobre, debajo, arriba de y debajo de; y
 - (B) coloque un objeto en una posición determinada.
- (8) Geometría y razonamiento espacial. El estudiante utiliza atributos para determinar de qué manera los objetos son iguales y diferentes. Se espera que el estudiante:

- (A) describa e identifique un objeto por sus atributos utilizando lenguaje informal;
 - (B) compare dos objetos basándose en sus atributos; y
 - (C) clasifique una variedad de objetos, incluyendo figuras geométricas de dos y tres dimensiones, de acuerdo con sus atributos y describa cómo se clasifican éstos.
- (9) Geometría y razonamiento espacial. El estudiante reconoce atributos de figuras geométricas de dos y tres dimensiones. Se espera que el estudiante:
- (A) describa y compare los atributos de objetos de la vida real tales como pelotas, cajas, latas y conos o modelos de figuras geométricas de tres dimensiones ;
 - (B) reconozca formas en figuras geométricas de tres dimensiones de la vida real o modelos de figuras geométricas de tres dimensiones; y
 - (C) describa, identifique y compare círculos, triángulos, rectángulos y cuadrados (un tipo especial de rectángulo).
- (10) Medición. El estudiante compara directamente los atributos de longitud, área, peso/masa, capacidad, y/o temperatura relativa. El estudiante utiliza lenguaje comparativo para resolver problemas y contestar preguntas. Se espera que el estudiante:
- (A) compare y ordene dos o tres objetos concretos de acuerdo a su longitud (más largo que, más corto que o igual);
 - (B) compare el área de dos superficies planas de figuras de dos dimensiones (cubre más, cubre menos o cubre la misma);
 - (C) compare dos recipientes de acuerdo a su capacidad (le cabe más, le cabe menos o le cabe igual cantidad);
 - (D) compare dos objetos de acuerdo a su peso/masa (más pesado que, más liviano que, igual que); y
 - (E) compare situaciones u objetos según su temperatura relativa (más caliente que, más frío que o igual que).
- (11) Medición. El estudiante utiliza el tiempo para describir, comparar y ordenar eventos y situaciones. Se espera que el estudiante:
- (A) compare eventos según su duración, como, por ejemplo, más tiempo que o menos tiempo que;
 - (B) ponga eventos en secuencia (hasta tres); y
 - (C) lea un calendario utilizando días, semanas y meses.
- (12) Probabilidad y estadística. El estudiante genera y utiliza gráficas de objetos reales o dibujos para contestar preguntas. Se espera que el estudiante:
- (A) genere gráficas utilizando objetos reales o dibujos para contestar preguntas; y
 - (B) utilice información de una gráfica de objetos reales o dibujos para contestar preguntas.
- (13) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las matemáticas de kindergarten para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:

- (A) identifique las matemáticas en situaciones diarias;
 - (B) resuelva problemas con apoyo que incorporen los procesos de comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - (C) seleccione o desarrolle una estrategia de resolución de problemas apropiada en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente o haga una dramatización para resolver el problema; y
 - (D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (14) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas de kindergarten utilizando un lenguaje informal. Se espera que el estudiante:
- (A) comunique ideas matemáticas utilizando objetos, palabras, dibujos, números y tecnología; y
 - (B) relacione el lenguaje diario con el lenguaje y los símbolos matemáticos.
- (15) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante justifique sus ideas utilizando objetos, palabras, dibujos, números y tecnología.

Fuente: las estipulaciones de esta sección §111.12 adoptadas para entrar en vigor el 1° de septiembre de 2006-2007.

Chapter 111. Texas Essential Knowledge and Skills for Mathematics

Subchapter A. Elementary

Statutory Authority: The provisions of this Subchapter A issued under the Texas Education Code, §28.002, unless otherwise noted.

§111.12. Implementation of Texas Essential Knowledge and Skills for Mathematics, Grades 1-5.

The provisions of this subchapter shall be implemented by school districts beginning September 1, 1998, and at that time shall supersede §75.27(a) – (f) of this title (relating to Mathematics).

Source: The provisions of this §111.12 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.13. Mathematics, Grade 1.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 1 are building number sense through number relationships, adding and subtracting whole numbers, organizing and analyzing data, and working with two- and three-dimensional geometric figures.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical language and symbols. Students use objects to create and identify patterns and use those patterns to express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students progress from informal to formal language to describe two- and three-dimensional geometric figures and likenesses in the physical world. Students begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Throughout mathematics in Kindergarten-Grade 2, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Kindergarten-Grade 2 use basic number sense to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 2, students know basic addition and subtraction facts and are using them to work flexibly, efficiently, and accurately with numbers during addition and subtraction computation.

- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (1.1) **Number, operation, and quantitative reasoning.** The student uses whole numbers to describe and compare quantities.

The student is expected to:

- (A) compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models;
- (B) create sets of tens and ones using concrete objects to describe, compare, and order whole numbers;
- (C) identify individual coins by name and value and describe relationships among them; and
- (D) read and write numbers to 99 to describe sets of concrete objects.

- (1.2) **Number, operation, and quantitative reasoning.** The student uses pairs of whole numbers to describe fractional parts of whole objects or sets of objects.

The student is expected to:

- (A) separate a whole into two, three, or four equal parts and use appropriate language to describe the parts such as three out of four equal parts; and
- (B) use appropriate language to describe part of a set such as three out of the eight crayons are red.

- (1.3) **Number, operation, and quantitative reasoning.** The student recognizes and solves problems in addition and subtraction situations.

The student is expected to:

- (A) model and create addition and subtraction problem situations with concrete objects and write corresponding number sentences; and
- (B) use concrete and pictorial models to apply basic addition and subtraction facts (up to $9 + 9 = 18$ and $18 - 9 = 9$).

- (1.4) **Patterns, relationships, and algebraic thinking.** The student uses repeating patterns and additive patterns to make predictions.

The student is expected to identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems.

- (1.5) **Patterns, relationships, and algebraic thinking.** The student recognizes patterns in numbers and operations.

The student is expected to:

- (A) use patterns to skip count by twos, fives, and tens;
- (B) find patterns in numbers, including odd and even;
- (C) compare and order whole numbers using place value;
- (D) use patterns to develop strategies to solve basic addition and basic subtraction problems; and
- (E) identify patterns in related addition and subtraction sentences (fact families for sums to 18) such as $2 + 3 = 5$, $3 + 2 = 5$, $5 - 2 = 3$, and $5 - 3 = 2$.

- (1.6) **Geometry and spatial reasoning.** The student uses attributes to identify two- and three-dimensional geometric figures. The student compares and contrasts two- and three-dimensional geometric figures or both.

The student is expected to:

- (A) describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle);
- (B) describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones;
- (C) describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language; and
- (D) use concrete models to combine two-dimensional geometric figures to make new geometric figures.

- (1.7) **Measurement.** The student directly compares the attributes of length, area, weight/mass, capacity, and temperature. The student uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length.

The student is expected to:

- (A) estimate and measure length using nonstandard units such as paper clips or sides of color tiles;
- (B) compare and order two or more concrete objects according to length (from longest to shortest);
- (C) describe the relationship between the size of the unit and the number of units needed to measure the length of an object;
- (D) compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least);
- (E) compare and order two or more containers according to capacity (from holds the most to holds the least);
- (F) compare and order two or more objects according to weight/mass (from heaviest to lightest); and

- (G) compare and order two or more objects according to relative temperature (from hottest to coldest).
- (1.8) **Measurement.** The student understands that time can be measured. The student uses time to describe and compare situations.
- The student is expected to:
- (A) order three or more events according to duration; and
- (B) read time to the hour and half-hour using analog and digital clocks.
- (1.9) **Probability and statistics.** The student displays data in an organized form.
- The student is expected to:
- (A) collect and sort data; and
- (B) use organized data to construct real-object graphs, picture graphs, and bar-type graphs.
- (1.10) **Probability and statistics.** The student uses information from organized data.
- The student is expected to:
- (A) draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar-type graphs; and
- (B) identify events as certain or impossible such as drawing a red crayon from a bag of green crayons.
- (1.11) **Underlying processes and mathematical tools.** The student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
- The student is expected to:
- (A) identify mathematics in everyday situations;
- (B) solve problems with guidance that incorporates the processes of understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.
- (1.12) **Underlying processes and mathematical tools.** The student communicates about Grade 1 mathematics using informal language.
- The student is expected to:
- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

- (1.13) **Underlying processes and mathematical tools.** The student uses logical reasoning.

The student is expected to justify his or her thinking using objects, words, pictures, numbers, and technology.

Source: The provisions of this §111.13 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

§111.14. Mathematics, Grade 2.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 2 are developing an understanding of the base-ten place value system, comparing and ordering whole numbers, applying addition and subtraction, and using measurement processes.
- (2) Throughout mathematics in Kindergarten-Grade 2, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use numbers in ordering, labeling, and expressing quantities and relationships to solve problems and translate informal language into mathematical language and symbols. Students use objects to create and identify patterns and use those patterns to express relationships, make predictions, and solve problems as they build an understanding of number, operation, shape, and space. Students progress from informal to formal language to describe two- and three-dimensional geometric figures and likenesses in the physical world. Students begin to develop measurement concepts as they identify and compare attributes of objects and situations. Students collect, organize, and display data and use information from graphs to answer questions, make summary statements, and make informal predictions based on their experiences.
- (3) Throughout mathematics in Kindergarten-Grade 2, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Kindergarten-Grade 2 use basic number sense to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 2, students know basic addition and subtraction facts and are using them to work flexibly, efficiently, and accurately with numbers during addition and subtraction computation.
- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Kindergarten-Grade 2, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (2.1) **Number, operation, and quantitative reasoning.** The student understands how place value is used to represent whole numbers.

The student is expected to:

- (A) use concrete models of hundreds, tens, and ones to represent a given whole number (up to 999) in various ways;
- (B) use place value to read, write, and describe the value of whole numbers to 999; and
- (C) use place value to compare and order whole numbers to 999 and record the comparisons using numbers and symbols (<, =, >).

- (2.2) **Number, operation, and quantitative reasoning.** The student describes how fractions are used to name parts of whole objects or sets of objects.

The student is expected to:

- (A) use concrete models to represent and name fractional parts of a whole object (with denominators of 12 or less);
- (B) use concrete models to represent and name fractional parts of a set of objects (with denominators of 12 or less); and
- (C) use concrete models to determine if a fractional part of a whole is closer to 0, $\frac{1}{2}$, or 1.

- (2.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts whole numbers to solve problems.

The student is expected to:

- (A) recall and apply basic addition and subtraction facts (to 18);
- (B) model addition and subtraction of two-digit numbers with objects, pictures, words, and numbers;
- (C) select addition or subtraction to solve problems using two-digit numbers, whether or not regrouping is necessary;
- (D) determine the value of a collection of coins up to one dollar; and
- (E) describe how the cent symbol, dollar symbol, and the decimal point are used to name the value of a collection of coins.

- (2.4) **Number, operation, and quantitative reasoning.** The student models multiplication and division.

The student is expected to:

- (A) model, create, and describe multiplication situations in which equivalent sets of concrete objects are joined; and
- (B) model, create, and describe division situations in which a set of concrete objects is separated into equivalent sets.

- (2.5) **Patterns, relationships, and algebraic thinking.** The student uses patterns in numbers and operations.

The student is expected to:

- (A) find patterns in numbers such as in a 100s chart;
- (B) use patterns in place value to compare and order whole numbers through 999; and
- (C) use patterns and relationships to develop strategies to remember basic addition and subtraction facts. Determine patterns in related addition and subtraction number sentences (including fact families) such as $8 + 9 = 17$, $9 + 8 = 17$, $17 - 8 = 9$, and $17 - 9 = 8$.

- (2.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to describe relationships and make predictions.

The student is expected to:

- (A) generate a list of paired numbers based on a real-life situation such as number of tricycles related to number of wheels;
- (B) identify patterns in a list of related number pairs based on a real-life situation and extend the list; and
- (C) identify, describe, and extend repeating and additive patterns to make predictions and solve problems.

- (2.7) **Geometry and spatial reasoning.** The student uses attributes to identify two- and three-dimensional geometric figures. The student compares and contrasts two- and three-dimensional geometric figures or both.

The student is expected to:

- (A) describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.;
- (B) use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different; and
- (C) cut two-dimensional geometric figures apart and identify the new geometric figures formed.

- (2.8) **Geometry and spatial reasoning.** The student recognizes that a line can be used to represent a set of numbers and its properties.

The student is expected to use whole numbers to locate and name points on a number line.

- (2.9) **Measurement.** The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length, area, capacity, and weight/mass. The student recognizes and uses models

that approximate standard units (from both SI, also known as metric, and customary systems) of length, weight/mass, capacity, and time.

The student is expected to:

- (A) identify concrete models that approximate standard units of length and use them to measure length;
- (B) select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface;
- (C) select a non-standard unit of measure such as a bathroom cup or a jar to determine the capacity of a given container; and
- (D) select a non-standard unit of measure such as beans or marbles to determine the weight/mass of a given object.

(2.10) **Measurement.** The student uses standard tools to estimate and measure time and temperature (in degrees Fahrenheit).

The student is expected to:

- (A) read a thermometer to gather data;
- (B) read and write times shown on analog and digital clocks using five-minute increments; and
- (C) describe activities that take approximately one second, one minute, and one hour.

(2.11) **Probability and statistics.** The student organizes data to make it useful for interpreting information.

The student is expected to:

- (A) construct picture graphs and bar-type graphs;
- (B) draw conclusions and answer questions based on picture graphs and bar-type graphs; and
- (C) use data to describe events as more likely or less likely such as drawing a certain color crayon from a bag of seven red crayons and three green crayons.

(2.12) **Underlying processes and mathematical tools.** The student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) solve problems with guidance that incorporates the processes of understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

- (2.13) **Underlying processes and mathematical tools.** The student communicates about Grade 2 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
 - (B) relate informal language to mathematical language and symbols.
- (2.14) **Underlying processes and mathematical tools.** The student uses logical reasoning.

The student is expected to justify his or her thinking using objects, words, pictures, numbers, and technology.

Source: The provisions of this §111.14 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

§111.15. Mathematics, Grade 3.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 3 are multiplying and dividing whole numbers, connecting fraction symbols to fractional quantities, and standardizing language and procedures in geometry and measurement.
- (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify two- or three-dimensional geometric figures; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
- (3) Throughout mathematics in Grades 3-5, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Grades 3-5 use knowledge of the base-ten place value system to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 5, students know basic addition, subtraction, multiplication, and division facts and are using them to work flexibly, efficiently, and accurately with numbers during addition, subtraction, multiplication, and division computation.

- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (3.1) **Number, operation, and quantitative reasoning.** The student uses place value to communicate about increasingly large whole numbers in verbal and written form, including money.

The student is expected to:

- (A) use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999;
- (B) use place value to compare and order whole numbers through 9,999; and
- (C) determine the value of a collection of coins and bills.

- (3.2) **Number, operation, and quantitative reasoning.** The student uses fraction names and symbols (with denominators of 12 or less) to describe fractional parts of whole objects or sets of objects.

The student is expected to:

- (A) construct concrete models of fractions;
- (B) compare fractional parts of whole objects or sets of objects in a problem situation using concrete models;
- (C) use fraction names and symbols to describe fractional parts of whole objects or sets of objects; and
- (D) construct concrete models of equivalent fractions for fractional parts of whole objects.

- (3.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts to solve meaningful problems involving whole numbers.

The student is expected to:

- (A) model addition and subtraction using pictures, words, and numbers; and
- (B) select addition or subtraction and use the operation to solve problems involving whole numbers through 999.

- (3.4) **Number, operation, and quantitative reasoning.** The student recognizes and solves problems in multiplication and division situations.

The student is expected to:

- (A) learn and apply multiplication facts through 12 by 12 using concrete models and objects;
- (B) solve and record multiplication problems (up to two digits times one digit); and

- (C) use models to solve division problems and use number sentences to record the solutions.
- (3.5) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.
- The student is expected to:
- (A) round whole numbers to the nearest ten or hundred to approximate reasonable results in problem situations; and
- (B) use strategies including rounding and compatible numbers to estimate solutions to addition and subtraction problems.
- (3.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to solve problems.
- The student is expected to:
- (A) identify and extend whole-number and geometric patterns to make predictions and solve problems;
- (B) identify patterns in multiplication facts using concrete objects, pictorial models, or technology; and
- (C) identify patterns in related multiplication and division sentences (fact families) such as $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 2 = 3$, $6 \div 3 = 2$.
- (3.7) **Patterns, relationships, and algebraic thinking.** The student uses lists, tables, and charts to express patterns and relationships.
- The student is expected to:
- (A) generate a table of paired numbers based on a real-life situation such as insects and legs; and
- (B) identify and describe patterns in a table of related number pairs based on a meaningful problem and extend the table.
- (3.8) **Geometry and spatial reasoning.** The student uses formal geometric vocabulary.
- The student is expected to identify, classify, and describe two- and three-dimensional geometric figures by their attributes. The student compares two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary.
- (3.9) **Geometry and spatial reasoning.** The student recognizes congruence and symmetry.
- The student is expected to:
- (A) identify congruent two-dimensional figures;
- (B) create two-dimensional figures with lines of symmetry using concrete models and technology; and
- (C) identify lines of symmetry in two-dimensional geometric figures.

- (3.10) **Geometry and spatial reasoning.** The student recognizes that a line can be used to represent numbers and fractions and their properties and relationships.

The student is expected to locate and name points on a number line using whole numbers and fractions, including halves and fourths.

- (3.11) **Measurement.** The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass.

The student is expected to:

- (A) use linear measurement tools to estimate and measure lengths using standard units;
- (B) use standard units to find the perimeter of a shape;
- (C) use concrete and pictorial models of square units to determine the area of two-dimensional surfaces;
- (D) identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass;
- (E) identify concrete models that approximate standard units for capacity and use them to measure capacity; and
- (F) use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure.

- (3.12) **Measurement.** The student reads and writes time and measures temperature in degrees Fahrenheit to solve problems.

The student is expected to:

- (A) use a thermometer to measure temperature; and
- (B) tell and write time shown on analog and digital clocks.

- (3.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

- (A) collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data;
- (B) interpret information from pictographs and bar graphs; and
- (C) use data to describe events as more likely than, less likely than, or equally likely as.

- (3.14) **Underlying processes and mathematical tools.** The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;

- (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
 - (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
 - (D) use tools such as real objects, manipulatives, and technology to solve problems.
- (3.15) **Underlying processes and mathematical tools.** The student communicates about Grade 3 mathematics using informal language.
- The student is expected to:
- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
 - (B) relate informal language to mathematical language and symbols.
- (3.16) **Underlying processes and mathematical tools.** The student uses logical reasoning.
- The student is expected to:
- (A) make generalizations from patterns or sets of examples and nonexamples; and
 - (B) justify why an answer is reasonable and explain the solution process.

Source: The provisions of this §111.15 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

§111.16. Mathematics, Grade 4.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 4 are comparing and ordering fractions and decimals, applying multiplication and division, and developing ideas related to congruence and symmetry.
- (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify two- or three-dimensional

geometric figures; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.

- (3) Throughout mathematics in Grades 3-5, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Grades 3-5 use knowledge of the base-ten place value system to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 5, students know basic addition, subtraction, multiplication, and division facts and are using them to work flexibly, efficiently, and accurately with numbers during addition, subtraction, multiplication, and division computation.
- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (4.1) **Number, operation, and quantitative reasoning.** The student uses place value to represent whole numbers and decimals.

The student is expected to:

- (A) use place value to read, write, compare, and order whole numbers through 999,999,999; and
- (B) use place value to read, write, compare, and order decimals involving tenths and hundredths, including money, using concrete objects and pictorial models.

- (4.2) **Number, operation, and quantitative reasoning.** The student describes and compares fractional parts of whole objects or sets of objects.

The student is expected to:

- (A) use concrete objects and pictorial models to generate equivalent fractions;
- (B) model fraction quantities greater than one using concrete objects and pictorial models;
- (C) compare and order fractions using concrete objects and pictorial models; and
- (D) relate decimals to fractions that name tenths and hundredths using concrete objects and pictorial models.

- (4.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts to solve meaningful problems involving whole numbers and decimals.

The student is expected to:

- (A) use addition and subtraction to solve problems involving whole numbers; and
- (B) add and subtract decimals to the hundredths place using concrete objects and pictorial models.

(4.4) **Number, operation, and quantitative reasoning.** The student multiplies and divides to solve meaningful problems involving whole numbers.

The student is expected to:

- (A) model factors and products using arrays and area models;
- (B) represent multiplication and division situations in picture, word, and number form;
- (C) recall and apply multiplication facts through 12×12 ;
- (D) use multiplication to solve problems (no more than two digits times two digits without technology); and
- (E) use division to solve problems (no more than one-digit divisors and three-digit dividends without technology).

(4.5) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.

The student is expected to:

- (A) round whole numbers to the nearest ten, hundred, or thousand to approximate reasonable results in problem situations; and
- (B) use strategies including rounding and compatible numbers to estimate solutions to multiplication and division problems.

(4.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns in multiplication and division.

The student is expected to:

- (A) use patterns and relationships to develop strategies to remember basic multiplication and division facts (such as the patterns in related multiplication and division number sentences (fact families) such as $9 \times 9 = 81$ and $81 \div 9 = 9$); and
- (B) use patterns to multiply by 10 and 100.

(4.7) **Patterns, relationships, and algebraic thinking.** The student uses organizational structures to analyze and describe patterns and relationships.

The student is expected to describe the relationship between two sets of related data such as ordered pairs in a table.

(4.8) **Geometry and spatial reasoning.** The student identifies and describes attributes of geometric figures using formal geometric language.

The student is expected to:

- (A) identify and describe right, acute, and obtuse angles;

- (B) identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models; and
 - (C) use essential attributes to define two- and three-dimensional geometric figures.
- (4.9) **Geometry and spatial reasoning.** The student connects transformations to congruence and symmetry.
- The student is expected to:
- (A) demonstrate translations, reflections, and rotations using concrete models;
 - (B) use translations, reflections, and rotations to verify that two shapes are congruent; and
 - (C) use reflections to verify that a shape has symmetry.
- (4.10) **Geometry and spatial reasoning.** The student recognizes the connection between numbers and their properties and points on a line.
- The student is expected to locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths.
- (4.11) **Measurement.** The student applies measurement concepts. The student is expected to estimate and measure to solve problems involving length (including perimeter) and area. The student uses measurement tools to measure capacity/volume and weight/mass.
- The student is expected to:
- (A) estimate and use measurement tools to determine length (including perimeter), area, capacity and weight/mass using standard units SI (metric) and customary;
 - (B) perform simple conversions between different units of length, between different units of capacity, and between different units of weight within the customary measurement system;
 - (C) use concrete models of standard cubic units to measure volume;
 - (D) estimate volume in cubic units; and
 - (E) explain the difference between weight and mass.
- (4.12) **Measurement.** The student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius).
- The student is expected to:
- (A) use a thermometer to measure temperature and changes in temperature; and
 - (B) use tools such as a clock with gears or a stopwatch to solve problems involving elapsed time.
- (4.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

- (A) use concrete objects or pictures to make generalizations about determining all possible combinations of a given set of data or of objects in a problem situation; and
- (B) interpret bar graphs.

- (4.14) **Underlying processes and mathematical tools.** The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

- (4.15) **Underlying processes and mathematical tools.** The student communicates about Grade 4 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

- (4.16) **Underlying processes and mathematical tools.** The student uses logical reasoning.

The student is expected to:

- (A) make generalizations from patterns or sets of examples and nonexamples; and
- (B) justify why an answer is reasonable and explain the solution process.

Source: The provisions of this §111.16 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

§111.17. Mathematics, Grade 5.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 5 are comparing and contrasting lengths, areas, and volumes of two- or three-dimensional geometric figures; representing and interpreting data in graphs, charts, and tables; and applying whole number operations in a variety of contexts.
- (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify two- or three-dimensional geometric figures; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
- (3) Throughout mathematics in Grades 3-5, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Grades 3-5 use knowledge of the base-ten place value system to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 5, students know basic addition, subtraction, multiplication, and division facts and are using them to work flexibly, efficiently, and accurately with numbers during addition, subtraction, multiplication, and division computation.
- (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.

(b) Knowledge and skills.

- (5.1) **Number, operation, and quantitative reasoning.** The student uses place value to represent whole numbers and decimals.

The student is expected to:

- (A) use place value to read, write, compare, and order whole numbers through the 999,999,999,999; and
- (B) use place value to read, write, compare, and order decimals through the thousandths place.

- (5.2) **Number, operation, and quantitative reasoning.** The student uses fractions in problem-solving situations.

The student is expected to:

- (A) generate a fraction equivalent to a given fraction such as $\frac{1}{2}$ and $\frac{3}{6}$ or $\frac{4}{12}$ and $\frac{1}{3}$;
- (B) generate a mixed number equivalent to a given improper fraction or generate an improper fraction equivalent to a given mixed number;
- (C) compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators; and
- (D) use models to relate decimals to fractions that name tenths, hundredths, and thousandths.

(5.3) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, and divides to solve meaningful problems.

The student is expected to:

- (A) use addition and subtraction to solve problems involving whole numbers and decimals;
- (B) use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology);
- (C) use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology), including interpreting the remainder within a given context;
- (D) identify common factors of a set of whole numbers; and
- (E) model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, words, and numbers.

(5.4) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.

The student is expected to use strategies, including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems.

(5.5) **Patterns, relationships, and algebraic thinking.** The student makes generalizations based on observed patterns and relationships.

The student is expected to:

- (A) describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams; and
- (B) identify prime and composite numbers using concrete objects, pictorial models, and patterns in factor pairs.

(5.6) **Patterns, relationships, and algebraic thinking.** The student describes relationships mathematically.

The student is expected to select from and use diagrams and equations such as $y = 5 + 3$ to represent meaningful problem situations.

- (5.7) **Geometry and spatial reasoning.** The student generates geometric definitions using critical attributes.

The student is expected to identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures.

- (5.8) **Geometry and spatial reasoning.** The student models transformations.

The student is expected to:

- (A) sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid; and
- (B) identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid.

- (5.9) **Geometry and spatial reasoning.** The student recognizes the connection between ordered pairs of numbers and locations of points on a plane.

The student is expected to locate and name points on a coordinate grid using ordered pairs of whole numbers.

- (5.10) **Measurement.** The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems.

The student is expected to:

- (A) perform simple conversions within the same measurement system (SI (metric) or customary);
- (B) connect models for perimeter, area, and volume with their respective formulas; and
- (C) select and use appropriate units and formulas to measure length, perimeter, area, and volume.

- (5.11) **Measurement.** The student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius).

The student is expected to:

- (A) solve problems involving changes in temperature; and
- (B) solve problems involving elapsed time.

- (5.12) **Probability and statistics.** The student describes and predicts the results of a probability experiment.

The student is expected to:

- (A) use fractions to describe the results of an experiment;
- (B) use experimental results to make predictions; and
- (C) list all possible outcomes of a probability experiment such as tossing a coin.

- (5.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

- (A) use tables of related number pairs to make line graphs;
- (B) describe characteristics of data presented in tables and graphs including median, mode, and range; and
- (C) graph a given set of data using an appropriate graphical representation such as a picture or line graph.

- (5.14) **Underlying processes and mathematical tools.** The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

- (5.15) **Underlying processes and mathematical tools.** The student communicates about Grade 5 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

- (5.16) **Underlying processes and mathematical tools.** The student uses logical reasoning.

The student is expected to:

- (A) make generalizations from patterns or sets of examples and nonexamples; and
- (B) justify why an answer is reasonable and explain the solution process.

Source: The provisions of this §111.17 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 7471.

Capítulo 111. Conocimientos y destrezas esenciales en Texas (TEKS) para matemáticas

Subcapítulo A. Primaria

Autoridad estatutaria: las estipulaciones de este subcapítulo A publicadas bajo el Código de Educación de Texas, sección §28.002, a menos que de otra manera se especifique.

§111.12. Implementación de los conocimientos y destrezas esenciales en Texas para matemáticas, de 1 a 5º grado.

Las estipulaciones de este subcapítulo serán implementadas por los distritos escolares a partir del 1º de septiembre de 1998, y en esa fecha reemplazarán las secciones §75.27(a)-(f) de este título (relacionado con matemáticas).

Fuente: las estipulaciones de esta sección §111.12 adoptadas para entrar en vigor el 1º de septiembre de 2006-2007.

§111.13. Matemáticas, 1º grado.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en el 1er grado son el desarrollo de una lógica numérica por medio de relaciones de números, la suma y la resta de números enteros, la organización y el análisis de datos, y el trabajo con figuras geométricas de dos y tres dimensiones.
- (2) A través de las matemáticas de kindergarten a 2º grado, los estudiantes forman una base de conocimientos fundamentales acerca de los números, las operaciones y el razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los estudiantes utilizan números para ordenar, clasificar y expresar cantidades y relaciones para resolver problemas y para transferir el lenguaje informal al lenguaje matemático y a los símbolos matemáticos. Los estudiantes utilizan objetos para crear e identificar patrones y usan esos patrones para expresar relaciones, hacer predicciones y resolver problemas, conforme van entendiendo los conceptos de números, operaciones, formas y espacio. Los estudiantes avanzarán del lenguaje informal al lenguaje formal para describir figuras geométricas de dos y tres dimensiones y sus semejanzas en el mundo físico. Los estudiantes empiezan a desarrollar conceptos de medición según identifican y comparan los atributos de objetos y situaciones. Los estudiantes reúnen, organizan y presentan datos y utilizan información de gráficas para contestar preguntas, hacer resúmenes y predicciones informales basándose en sus propias experiencias.
- (3) A través de las matemáticas de kindergarten a 2º grado, los estudiantes desarrollan dominio numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de kindergarten a 2º grado usan su lógica numérica básica para componer y descomponer números para resolver problemas que requieren de precisión, estimación y la capacidad de determinar lo que es razonable. Al final de 2º grado, los estudiantes saben realizar operaciones básicas de suma y resta, manipulando los números de una manera eficiente, precisa y

flexible cuando realizan cálculos de suma y resta.

- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de kindergarten a 2º grado, los estudiantes utilizan estos procesos junto con tecnología y otras herramientas matemáticas tales como manipulativos con el fin de desarrollar su comprensión conceptual y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza números enteros para describir y comparar cantidades. Se espera que el estudiante:
- (A) compare y ordene números enteros hasta el 99 (menor que, mayor que o igual que) utilizando conjuntos de objetos concretos y modelos pictóricos;
 - (B) agrupe decenas y unidades utilizando objetos concretos para describir, comparar y ordenar números enteros;
 - (C) identifique monedas individuales por sus nombres y valores, y describa las relaciones entre éstas; y
 - (D) lea y escriba los números hasta el 99 para describir conjuntos de objetos concretos.
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza pares de números enteros para describir partes fraccionarias de objetos enteros o conjuntos de objetos. Se espera que el estudiante:
- (A) separe un entero en dos, tres o cuatro partes iguales y utilice lenguaje apropiado para describir estas partes, tal como tres de cuatro partes iguales; y
 - (B) utilice lenguaje apropiado para describir parte de un conjunto como, por ejemplo, tres de los ocho crayones son rojos.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante reconoce y resuelve problemas en situaciones de suma y resta. Se espera que el estudiante:
- A) dé ejemplos y genere situaciones de problemas de suma y resta con objetos concretos y escriba las oraciones numéricas correspondientes; y
 - B) utilice modelos concretos y pictóricos para aplicar la suma y la resta (hasta $9 + 9 = 18$ y $18 - 9 = 9$).
- (4) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones que se repiten y patrones aditivos para hacer predicciones. Se espera que el estudiante identifique, describa y extienda patrones concretos y pictóricos para hacer predicciones y resolver problemas.
- (5) Patrones, relaciones y razonamiento algebraico. El estudiante reconoce patrones en números y operaciones. Se espera que el estudiante:
- A) utilice patrones para contar de dos en dos, de cinco en cinco y de diez en diez;
 - B) encuentre patrones en los números, incluyendo pares e impares;
 - C) compare y ordene números enteros utilizando valor de posición;

- D) utilice patrones para desarrollar estrategias para resolver problemas básicos de suma y resta; e
 - E) identifique patrones en oraciones relacionadas de suma y resta (familias de operaciones de la suma hasta el 18) tales como $2+3=5$, $3+2=5$, $5-2=3$ y $5-3=2$.
- (6) Geometría y razonamiento espacial. El estudiante utiliza atributos para identificar figuras geométricas de dos y tres dimensiones. El estudiante compara y contrasta figuras geométricas de dos y tres dimensiones o ambas. Se espera que el estudiante:
- A) describa e identifique figuras geométricas de dos dimensiones incluyendo círculos, triángulos, rectángulos y cuadrados (un tipo especial de rectángulo);
 - B) describa e identifique figuras geométricas de tres dimensiones, incluyendo esferas, prismas rectangulares (incluyendo cubos), cilindros y conos;
 - C) describa e identifique figuras geométricas de dos y tres dimensiones para clasificarlas según determinado atributo utilizando lenguaje informal y formal; y
 - D) utilice modelos concretos para combinar figuras geométricas de dos dimensiones para hacer nuevas figuras geométricas.
- (7) Medición. El estudiante compara directamente los atributos de longitud, área, peso/masa, capacidad y temperatura. El estudiante utiliza lenguaje comparativo para resolver problemas y contestar preguntas. El estudiante selecciona y utiliza unidades no estándares para describir longitud. Se espera que el estudiante:
- A) estime y mida la longitud, utilizando unidades no estándares como, por ejemplo, sujetapapeles o lados de mosaicos de color;
 - B) compare y ordene dos o más objetos concretos según su longitud (de más largo a más corto);
 - C) describa la relación entre el tamaño de la unidad y el número de unidades que se necesitan para medir la longitud de un objeto;
 - D) compare y ordene el área de dos o más superficies de dos dimensiones (de la que cubre más de a la que cubre menos);
 - E) compare y ordene dos o más recipientes según su capacidad (de el que contiene más a el que contiene menos);
 - F) compare y ordene dos o más objetos según su masa/peso (del más pesado al más ligero); y
 - G) compare y ordene dos o más objetos según su temperatura relativa (del más caliente al más frío).
- (8) Medición. El estudiante entiende que el tiempo se puede medir. El estudiante utiliza el tiempo para describir y comparar situaciones. Se espera que el estudiante:
- A) ordene tres o más eventos según su duración; y
 - B) diga la hora de relojes analógicos y digitales utilizando medias horas y horas completas.
- (9) Probabilidad y estadística. El estudiante exhibe datos en forma organizada. Se espera que el estudiante:

- A) reúna y clasifique datos; y
 - B) utilice datos organizados para hacer gráficas de objetos reales, pictografías y gráficas de barras.
- (10) Probabilidad y estadística. El estudiante utiliza información de datos organizados. Se espera que el estudiante:
- A) saque conclusiones y conteste preguntas utilizando información organizada en gráficas de objetos reales, pictografías y gráficas de barras; e
 - B) identifique eventos como seguros o imposibles como, por ejemplo, sacar un crayón rojo de una bolsa de crayones verdes.
- (11) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las matemáticas de 1er grado para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:
- A) identifique las matemáticas en situaciones diarias;
 - B) resuelva problemas con apoyo, que incorporen los procesos de comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - (C) seleccione o desarrolle una estrategia o un plan de resolución de problemas apropiado en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente o haga una dramatización para resolver el problema; y
 - (D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (12) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas del 1er grado utilizando un lenguaje informal. Se espera que el estudiante:
- A) explique y anote observaciones utilizando objetos, palabras, dibujos, números y tecnología; y
 - B) relacione el lenguaje informal con el lenguaje y los símbolos de matemáticas.
- (13) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante justifique sus ideas utilizando objetos, palabras, dibujos, números y tecnología.

§111.14. Matemáticas, 2º grado.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en el 2º grado son el desarrollo de la comprensión del sistema de valor posicional de base diez, el comparar y ordenar números enteros, aplicar la suma y la resta y utilizar procesos de medición.
- (2) A través de las matemáticas de kindergarten a 2º grado, los estudiantes forman una base de conocimientos fundamentales acerca de los números, las operaciones y el razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los

estudiantes utilizan números para ordenar, clasificar y expresar cantidades y relaciones para resolver problemas y para transferir el lenguaje informal al lenguaje matemático y a los símbolos matemáticos. Los estudiantes utilizan objetos para crear e identificar patrones y usan estos patrones para expresar relaciones, hacer predicciones y resolver problemas, conforme van entendiendo los conceptos de números, operaciones, formas y espacio. Los estudiantes avanzarán del lenguaje informal al lenguaje formal para describir figuras geométricas de dos y tres dimensiones y sus semejanzas en el mundo físico. Los estudiantes empiezan a desarrollar conceptos de medición según identifican y comparan los atributos de objetos y situaciones. Los estudiantes reúnen, organizan y presentan datos y utilizan información de gráficas para contestar preguntas, hacer resúmenes y predicciones informales basándose en sus propias experiencias.

- (3) A través de las matemáticas de kindergarten a 2º grado, los estudiantes desarrollan fluidez (dominio) numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de kindergarten a 2º grado usan su lógica numérica básica para componer y descomponer números para resolver problemas que requieren de precisión, estimación y capacidad de determinar lo que es razonable. Al final de 2º grado, los estudiantes saben realizar operaciones básicas de suma y resta, manipulando los números de una manera eficiente, precisa y flexible cuando realizan cálculos de suma y resta.
- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de kindergarten a 2º grado, los estudiantes utilizan estos procesos junto con tecnología y otras herramientas matemáticas tales como manipulativos con el fin de desarrollar su comprensión conceptual y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante entiende cómo el valor de posición se utiliza para representar números enteros. Se espera que el estudiante:
 - A) utilice modelos concretos de centenas, decenas y unidades para representar un número entero dado (hasta el 999) de varias maneras;
 - B) utilice valor posicional para leer, escribir y describir el valor de números enteros hasta el 999; y
 - C) utilice valor posicional para comparar y ordenar números enteros hasta el 999 y anotar las comparaciones usando números y símbolos ($<$, $=$, $>$).
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante describe cómo utilizar las fracciones para nombrar las partes de objetos enteros o de conjuntos de objetos. Se espera que el estudiante:
 - A) utilice modelos concretos para representar y nombrar las partes fraccionarias de un objeto entero (con denominadores de 12 o menos) ;
 - B) utilice modelos concretos para representar y nombrar las partes fraccionarias de un conjunto de objetos (con denominadores de 12 o menos); y

- C) utilice modelos concretos para determinar si una parte fraccionaria de un entero se acerca más a 0, $\frac{1}{2}$ ó 1.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante suma y resta números enteros para resolver problemas. Se espera que el estudiante:
- A) recuerde y aplique la suma y la resta (hasta el 18);
- B) dé ejemplos de la suma y la resta de números de dos dígitos utilizando objetos, dibujos, palabras y números;
- C) seleccione la suma o la resta para resolver problemas utilizando números de dos dígitos, ya sea o no necesario reagrupar;
- D) determine el valor de un grupo de monedas hasta un dólar; y
- E) describa cómo se utilizan los símbolos de centavo y dólar y el punto decimal para decir el valor de un grupo de monedas.
- (4) Números, operaciones y razonamiento cuantitativo. El estudiante da ejemplos de la multiplicación y división. Se espera que el estudiante:
- A) dé ejemplos, genere y describa situaciones de multiplicación en las que se unen conjuntos equivalentes de objetos concretos; y
- B) dé ejemplos, genere y describa situaciones de división en las que un conjunto de objetos concretos se separa en conjuntos equivalentes.
- (5) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones en números y operaciones. Se espera que el estudiante:
- A) encuentre patrones de números como, por ejemplo, en una tabla de números hasta el 100;
- B) utilice patrones de valor de posición para comparar y ordenar números enteros hasta el 999; y
- C) utilice patrones y relaciones para desarrollar estrategias que ayuden a recordar las operaciones básicas de la suma y la resta. Determine patrones en oraciones numéricas relacionadas de suma y resta (incluyendo familias de operaciones) como, por ejemplo, $8+9=17$, $9+8=17$, $17-8=9$ y $17-9=8$.
- (6) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones para describir relaciones y hacer predicciones. Se espera que el estudiante:
- A) genere una lista de pares de números basada en situaciones de la vida real como, por ejemplo, la relación entre el número de triciclos y el número de ruedas de los triciclos;
- B) identifique patrones en una lista de pares relacionados de números que se basen en la vida real, y extienda la lista; e
- C) identifique, describa y extienda patrones aditivos y patrones que se repiten para hacer predicciones y resolver problemas.
- (7) Geometría y razonamiento espacial. El estudiante utiliza atributos para identificar figuras geométricas de dos y tres dimensiones. El estudiante compara y contrasta figuras geométricas de dos y tres dimensiones o ambas. Se espera que el estudiante:
- A) describa atributos (número de vértices, caras, aristas, lados) de figuras geométricas de dos y tres dimensiones tales como círculos, polígonos, esferas, conos, cilindros, prismas, pirámides, etc.;

- B) utilice atributos para describir cómo 2 figuras de dos dimensiones o 2 figuras geométricas de tres dimensiones son semejantes o diferentes; y
 - C) corte figuras geométricas de dos dimensiones en partes e identifique las nuevas figuras geométricas que se forman.
- (8) Geometría y razonamiento espacial. El estudiante reconoce que una línea se puede usar para representar un conjunto de números y sus propiedades. Se espera que el estudiante utilice números enteros para localizar y nombrar puntos en una recta numérica.
- (9) Medición. El estudiante compara directamente los atributos de longitud, área, peso/masa y capacidad, y usa lenguaje comparativo para resolver problemas y contestar preguntas. El estudiante selecciona y utiliza unidades no estándares para describir longitud, área, capacidad y peso/masa. El estudiante reconoce y utiliza modelos que se aproximen a unidades estándares (tanto del sistema internacional {SI}, también conocido como el sistema métrico, como del sistema inglés {usual}) de longitud, peso/masa, capacidad y tiempo. Se espera que el estudiante:
- A) identifique modelos concretos que se aproximen a unidades estándares de longitud y los utilice para medir longitud;
 - B) seleccione una unidad de medida no estándar, como, por ejemplo, mosaicos cuadrados para determinar el área de una superficie de dos dimensiones;
 - C) seleccione una unidad de medida no estándar, tal como un vaso o una jarra para determinar la capacidad de un recipiente dado; y
 - D) seleccione una unidad de medida no estándar, como, por ejemplo, frijoles o canicas para determinar el peso/masa de un objeto dado.
- (10) Medición. El estudiante utiliza herramientas comunes para estimar y medir el tiempo y la temperatura (en grados Fahrenheit). Se espera que el estudiante:
- A) lea un termómetro para reunir datos;
 - B) diga y escriba la hora de relojes análogos y digitales utilizando incrementos de cinco minutos; y
 - C) describa actividades que toman aproximadamente un segundo, un minuto y una hora.
- (11) Probabilidad y estadística. El estudiante organiza datos para que sean útiles en la interpretación de información. Se espera que el estudiante:
- A) construya pictografías y gráficas de barras;
 - B) saque conclusiones y conteste preguntas basándose en pictografías y gráficas de barras; y
 - C) utilice datos para describir eventos que tengan más o menos probabilidad de ocurrir, como, por ejemplo, sacar un crayón de cierto color de una bolsa que contiene siete crayones rojos y tres crayones verdes.
- (12) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las matemáticas del 2° grado para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:
- A) identifique las matemáticas en situaciones diarias;

- B) resuelva problemas con apoyo que incorporen los procesos de comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - C) seleccione o desarrolle una estrategia o plan de resolución de problemas apropiado en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente o haga una dramatización para resolver un problema; y
 - D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (13) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas del 2º grado utilizando un lenguaje informal. Se espera que el estudiante:
- A) explique y anote observaciones utilizando objetos, palabras, dibujos, números y tecnología; y
 - B) relacione el lenguaje informal con el lenguaje y los símbolos matemáticos.
- (14) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante justifique sus razonamientos utilizando objetos, palabras, dibujos, números y tecnología.

§111.15. Matemáticas, 3er grado.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en el 3er grado son multiplicar y dividir números enteros, relacionar símbolos de fracciones y cantidades fraccionarias, y estandarizar el lenguaje y procedimientos en geometría y medición.
- (2) A través de las matemáticas de 3er a 5º grado, los estudiantes forman una base de conocimientos básicos acerca de los números, las operaciones y el razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los estudiantes utilizan algoritmos para sumar, restar, multiplicar y dividir como generalizaciones relacionadas con experiencias concretas; y desarrollan de forma concreta los conceptos básicos de fracciones y decimales. Los estudiantes utilizan lenguaje apropiado y estructuras de organización tales como tablas para representar y comunicar relaciones, hacer predicciones y resolver problemas. Los estudiantes seleccionan y utilizan un lenguaje formal para describir su razonamiento al identificar, comparar y clasificar figuras geométricas de dos y tres dimensiones; y utilizan números, unidades estándares e instrumentos de medición para describir y comparar objetos, hacer estimaciones y resolver problemas contextualizados. Los estudiantes organizan datos, eligen un método apropiado para presentarlos e interpretan los datos para tomar decisiones, hacer predicciones y resolver problemas.
- (3) A través de las matemáticas de 3er a 5º grado, los estudiantes desarrollan fluidez (dominio) numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de 3er a 5º grado usan sus conocimientos sobre el sistema de

valor posicional en base diez para componer y descomponer números para resolver problemas que requieren de precisión, estimación y la capacidad de determinar lo que es razonable. Al final del 5° grado, los estudiantes saben realizar operaciones básicas de suma, resta, multiplicación y división, y las utilizan para manipular los números de una manera eficiente, precisa y flexible cuando realizan cálculos de suma, resta, multiplicación y división.

- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de 3er a 5° grado, los estudiantes utilizan estos procesos, junto con tecnología y otros instrumentos de matemáticas, tales como manipulativos, con el fin de desarrollar su comprensión conceptual y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza el valor de posición para expresar en forma oral y escrita números enteros cada vez más grandes, incluyendo el dinero. Se espera que el estudiante:
- A) utilice el valor de posición para leer, escribir (con símbolos y palabras) y describir el valor de números enteros hasta el 999,999;
 - B) utilice el valor de posición para comparar y ordenar números enteros el hasta el 9,999; y
 - C) determine el valor de un grupo de billetes y monedas.
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza nombres y símbolos de fracciones (con denominadores de 12 o menos) para describir partes fraccionarias de objetos enteros o de conjuntos de objetos. Se espera que el estudiante:
- A) construya modelos concretos de fracciones;
 - B) compare partes fraccionarias de objetos enteros o de conjuntos de objetos en un problema utilizando modelos concretos;
 - C) utilice nombres y símbolos de fracciones para describir las partes fraccionarias de un entero o de grupos de enteros; y
 - D) construya modelos concretos de fracciones equivalentes para partes fraccionarias de objetos enteros.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante suma y resta para resolver problemas relevantes en los que se usan números enteros. Se espera que el estudiante:
- A) dé ejemplos de la suma y la resta utilizando dibujos, palabras y números; y
 - B) seleccione la suma o la resta y utilice la operación para resolver problemas en los que se usan números enteros hasta el 999.
- (4) Números, operaciones y razonamiento cuantitativo. El estudiante reconoce y resuelve problemas en situaciones de multiplicación y división. Se espera que el estudiante:
- A) aprenda y aplique las tablas de multiplicación hasta 12 por 12 utilizando modelos concretos y objetos;

- B) resuelva y anote problemas de multiplicación (hasta dos dígitos por un dígito); y
 - C) utilice modelos para resolver problemas de división y utilice oraciones numéricas para anotar las soluciones.
- (5) Números, operaciones y razonamiento cuantitativo. El estudiante estima para determinar resultados razonables. Se espera que el estudiante:
- A) redondee números enteros a la decena o centena más cercana para aproximar resultados razonables de problemas; y
 - B) utilice estrategias que incluyen el redondeo y los números compatibles para estimar soluciones a problemas de suma y resta.
- (6) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones para resolver problemas. Se espera que el estudiante:
- A) identifique y extienda patrones de números enteros y patrones geométricos para hacer predicciones y resolver problemas;
 - B) identifique patrones en las tablas de multiplicación utilizando objetos concretos, modelos pictóricos o tecnología; e
 - C) identifique patrones en oraciones relacionadas de multiplicación y división (familias de operaciones), tales como $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 2 = 3$ y $6 \div 3 = 2$.
- (7) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza listas y tablas para expresar patrones y relaciones. Se espera que el estudiante:
- A) genere una tabla de pares de números basada en la vida real, por ejemplo, los insectos y sus patas; e
 - B) identifique y describa patrones en una tabla de pares de números relacionados que se basan en un problema relevante, y extienda la tabla.
- (8) Geometría y razonamiento espacial. El estudiante utiliza vocabulario formal de la geometría. Se espera que el estudiante identifique, clasifique y describa figuras geométricas de dos y tres dimensiones basándose en sus atributos. El estudiante compara figuras de dos dimensiones, de tres dimensiones o ambas según sus atributos usando vocabulario formal de la geometría.
- (9) Geometría y razonamiento espacial. El estudiante reconoce la congruencia y la simetría. Se espera que el estudiante:
- A) identifique figuras congruentes de dos dimensiones;
 - B) forme figuras de dos dimensiones con ejes de simetría utilizando modelos concretos y tecnología; e
 - C) identifique ejes de simetría en figuras geométricas de dos dimensiones.
- (10) Geometría y razonamiento espacial. El estudiante reconoce que una línea se puede usar para representar números y fracciones y sus propiedades y relaciones. Se espera que el estudiante localice y nombre puntos en una recta numérica utilizando números enteros y fracciones, incluyendo un medio y un cuarto.
- (11) Medición. El estudiante compara directamente los atributos de longitud, área, peso/masa y capacidad, y utiliza lenguaje comparativo para resolver problemas y contestar preguntas. El estudiante selecciona y utiliza unidades estándares para describir longitud, área, capacidad/volumen y peso/masa. Se espera que el estudiante:

- A) utilice instrumentos de medición lineal para estimar y medir longitudes utilizando unidades de medida estándares;
 - B) utilice unidades estándares para encontrar el perímetro de una figura;
 - C) utilice modelos concretos y pictóricos de unidades cuadradas para determinar el área de superficies de dos dimensiones;
 - D) identifique modelos concretos que aproximan unidades estándares de peso/masa y los utilice para medir peso/masa;
 - E) identifique modelos concretos que aproximan unidades estándares de capacidad y los utilice para medir capacidad; y
 - F) utilice modelos concretos que aproximan unidades cúbicas para determinar el volumen de un recipiente dado u otra figura geométrica de tres dimensiones.
- (12) Medición. El estudiante lee y escribe la hora, y mide la temperatura en grados Fahrenheit para resolver problemas. Se espera que el estudiante:
- A) utilice un termómetro para medir la temperatura; y
 - B) diga y escriba la hora en relojes análogos y digitales.
- (13) Probabilidad y estadística. El estudiante resuelve problemas reuniendo, organizando, presentando e interpretando conjuntos de datos. Se espera que el estudiante:
- A) reúna, organice, anote y presente datos en pictografías y gráficas de barras, en donde cada dibujo o elemento pueda representar más de un dato;
 - B) interprete información de pictografías y gráficas de barras; y
 - C) utilice datos para describir eventos como más probable que, menos probable que o igual de probable que.
- (14) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las matemáticas del 3er grado para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:
- A) identifique las matemáticas en situaciones diarias;
 - B) resuelva problemas que incorporen la comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - C) seleccione o desarrolle un plan o una estrategia de resolución de problemas apropiado en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente, haga una dramatización, elabore una tabla, resuelva un problema más sencillo o trabaje desde el final hasta el principio para resolver un problema; y
 - D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (15) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas del 3er grado utilizando un lenguaje informal. Se espera que el estudiante:
- A) explique y anote observaciones utilizando objetos, palabras, dibujos, números y tecnología; y

- B) relacione el lenguaje informal con el lenguaje y los símbolos matemáticos.
- (16) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante:
 - A) haga generalizaciones de patrones o de conjuntos de ejemplos y contraejemplos; y
 - B) justifique por qué una respuesta es razonable y explique el proceso de solución.

§111.16. Matemáticas, 4° grado.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en el 4° grado son comparar y ordenar fracciones y decimales, aplicar la multiplicación y la división y desarrollar ideas relacionadas con simetría y congruencia.
- (2) A través de las matemáticas de 3er a 5° grado, los estudiantes forman una base de conocimientos básicos acerca de los números, las operaciones y el razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los estudiantes utilizan algoritmos para sumar, restar, multiplicar y dividir como generalizaciones relacionadas con experiencias concretas; y desarrollan de forma concreta los conceptos básicos de fracciones y decimales. Los estudiantes utilizan un lenguaje apropiado y estructuras de organización tales como tablas para representar y comunicar relaciones, hacer predicciones y resolver problemas. Los estudiantes seleccionan y utilizan un lenguaje formal para describir su razonamiento al identificar, comparar y clasificar figuras geométricas de dos y tres dimensiones; y utilizan números, unidades estándares e instrumentos de medición para describir y comparar objetos, hacer estimaciones y resolver problemas contextualizados. Los estudiantes organizan datos, eligen un método apropiado para presentarlos e interpretan los datos para tomar decisiones, hacer predicciones y resolver problemas.
- (3) A través de las matemáticas de 3er a 5° grado, los estudiantes desarrollan fluidez (dominio) numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de 3er a 5° grado usan sus conocimientos sobre el sistema de valor posicional en base diez para componer y descomponer números para resolver problemas que requieren de precisión, estimación y la capacidad de determinar lo que es razonable. Al final del 5° grado, los estudiantes saben realizar operaciones básicas de suma, resta, multiplicación y división, y las utilizan para manipular los números de una manera eficiente, precisa y flexible cuando realizan cálculos de suma, resta, multiplicación y división.
- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de 3er a 5° grado, los estudiantes utilizan estos procesos junto con tecnología y otras herramientas matemáticas, tales como manipulativos, con el

fin de desarrollar su comprensión conceptual y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza el valor de posición para representar números enteros y decimales. Se espera que el estudiante:
 - A) utilice el valor de posición para leer, escribir, comparar y ordenar números enteros hasta el 999,999,999; y
 - B) utilice el valor de posición, para leer, escribir, comparar y ordenar decimales usando los décimos y centésimos incluyendo el dinero, con objetos concretos y modelos pictóricos.
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante describe y compara partes fraccionarias de objetos enteros o de conjuntos de objetos. Se espera que el estudiante:
 - A) genere fracciones equivalentes utilizando objetos concretos y modelos pictóricos;
 - B) dé ejemplos de fracciones cuyas cantidades son mayores que uno utilizando objetos concretos y modelos pictóricos;
 - C) compare y ordene fracciones utilizando objetos concretos y modelos pictóricos; y
 - D) relacione decimales con fracciones que representan décimos y centésimos utilizando objetos concretos y modelos pictóricos.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante suma y resta para resolver problemas relevantes en los que se usan números enteros y decimales. Se espera que el estudiante:
 - A) utilice la suma y resta para resolver problemas en los que se usan números enteros; y
 - B) sume y reste decimales hasta el lugar de los centésimos utilizando objetos concretos y modelos pictóricos.
- (4) Números, operaciones y razonamiento cuantitativo. El estudiante multiplica y divide para resolver problemas relevantes en los que se usan números enteros. Se espera que el estudiante:
 - A) dé ejemplos de factores y productos utilizando arreglos y modelos de área;
 - B) represente situaciones en que se usa la multiplicación y la división, usando dibujos, palabras y números;
 - C) recuerde y aplique las tablas de multiplicación hasta el 12 x 12;
 - D) utilice la multiplicación para resolver problemas (no más de dos dígitos multiplicados por dos dígitos y sin tecnología); y
 - E) utilice la división para resolver problemas (divisores de no más de un dígito y dividendos de tres dígitos sin tecnología).
- (5) Números, operaciones y razonamiento cuantitativo. El estudiante estima para determinar resultados razonables. Se espera que el estudiante:

- A) redondee números enteros a la decena, centena o millar más cercanos para aproximar resultados razonables en la resolución de problemas; y
 - B) utilice estrategias que incluyen el redondeo y los números compatibles para estimar soluciones a problemas de multiplicación y división.
- (6) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza patrones en la multiplicación y división. Se espera que el estudiante:
- A) utilice patrones y relaciones para desarrollar estrategias para recordar operaciones básicas de multiplicación y división (tales como los patrones en oraciones numéricas relacionadas de multiplicación y división - familias de operaciones - tales como $9 \times 9 = 81$ y $81 \div 9 = 9$); y
 - B) utilice patrones para multiplicar por 10 y por 100.
- (7) Patrones, relaciones y razonamiento algebraico. El estudiante utiliza estructuras de organización para analizar y describir patrones y relaciones. Se espera que el estudiante describa la relación entre dos conjuntos relacionados de datos, por ejemplo, pares ordenados en una tabla.
- (8) Geometría y razonamiento espacial. El estudiante identifica y describe atributos de figuras geométricas utilizando lenguaje geométrico formal. Se espera que el estudiante:
- A) identifique y describa los ángulos rectos, agudos y obtusos;
 - B) identifique y describa líneas paralelas e intersecantes (incluyendo líneas perpendiculares) usando objetos concretos y modelos pictóricos; y
 - C) utilice atributos esenciales para definir figuras geométricas de dos y tres dimensiones.
- (9) Geometría y razonamiento espacial. El estudiante relaciona transformaciones con congruencia y simetría. Se espera que el estudiante:
- A) demuestre traslaciones, reflexiones y rotaciones utilizando modelos concretos;
 - B) utilice traslaciones, reflexiones y rotaciones para verificar que dos figuras sean congruentes; y
 - C) utilice reflexiones para verificar que una figura tenga simetría.
- (10) Geometría y razonamiento espacial. El estudiante reconoce la relación entre números y sus propiedades, y puntos en una recta. Se espera que el estudiante localice y nombre los puntos en una recta numérica utilizando números enteros; fracciones, como mitades y cuartos, y decimales como décimos.
- (11) Medición. El estudiante aplica los conceptos de medición. Se espera que el estudiante estime y mida para resolver problemas relacionados con longitud (incluyendo perímetro) y área. El estudiante usa instrumentos de medición para medir capacidad/volumen y peso/masa. Se espera que el estudiante:
- A) estime y utilice instrumentos de medición para determinar longitud (incluyendo perímetro), área, capacidad y peso/masa usando unidades del sistema internacional (SI o métrico) y el sistema inglés (usual);
 - B) realice conversiones sencillas entre diferentes unidades de longitud, entre diferentes unidades de capacidad y entre diferentes unidades de peso en el sistema de medida inglés (usual);

- C) utilice modelos concretos de unidades cúbicas estándares para medir volumen;
 - D) estime volumen en unidades cúbicas; y
 - E) explique la diferencia entre peso y masa.
- (12) Medición. El estudiante aplica los conceptos de medición. El estudiante mide el tiempo y la temperatura (en grados Fahrenheit y Celsius). Se espera que el estudiante:
- A) utilice un termómetro para medir temperatura y cambios en temperatura; y
 - B) utilice instrumentos tales como un reloj con engranajes o un cronómetro para resolver problemas relacionados con tiempo transcurrido.
- (13) Probabilidad y estadística. El estudiante resuelve problemas reuniendo, organizando, presentando e interpretando conjuntos de datos. Se espera que el estudiante:
- A) utilice objetos concretos o dibujos para hacer generalizaciones que determinen todas las combinaciones posibles de un conjunto de datos u objetos en un problema; y
 - B) interprete gráficas de barras.
- (14) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las matemáticas del 4º grado para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:
- A) identifique las matemáticas en situaciones diarias;
 - B) resuelva problemas que incorporen la comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - C) seleccione o desarrolle un plan o una estrategia de resolución de problemas apropiado en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente, haga una dramatización, elabore una tabla, resuelva un problema más sencillo o trabaje desde el final hasta el principio para resolver un problema; y
 - D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (15) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas del 4º grado utilizando un lenguaje informal. Se espera que el estudiante:
- A) explique y anote observaciones utilizando objetos, palabras, dibujos, números y tecnología; y
 - B) relacione el lenguaje informal con el lenguaje y los símbolos matemáticos.
- (16) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante:
- A) haga generalizaciones de patrones o de conjuntos de ejemplos y contraejemplos; y
 - B) justifique por qué una respuesta es razonable y explique el proceso de la solución.

§111.17. Matemáticas, 5° grado.

(a) Introducción.

- (1) Dentro de un plan de estudios de matemáticas balanceado, los principales puntos de enfoque en el 5° grado son comparar y contrastar longitudes, áreas y volúmenes de figuras geométricas de dos o tres dimensiones; representar e interpretar datos en gráficas y tablas y aplicar operaciones de números enteros en una variedad de contextos.
- (2) A través de las matemáticas de 3er a 5° grado, los estudiantes forman una base de conocimientos básicos en números, operaciones y razonamiento cuantitativo; patrones, relaciones y razonamiento algebraico; geometría y razonamiento espacial; medición; y probabilidad y estadística. Los estudiantes utilizan algoritmos para sumar, restar, multiplicar y dividir como generalizaciones relacionadas con experiencias concretas y desarrollan de forma concreta los conceptos básicos de fracciones y decimales. Los estudiantes utilizan un lenguaje apropiado y estructuras de organización tales como tablas para representar y comunicar relaciones, hacer predicciones y resolver problemas. Los estudiantes seleccionan y utilizan lenguaje formal para describir su razonamiento al identificar, comparar y clasificar figuras geométricas de dos y tres dimensiones; y utilizan números, unidades estándares e instrumentos de medición para describir y comparar objetos, hacer estimaciones y resolver problemas contextualizados. Los estudiantes organizan datos, eligen un método apropiado para presentarlos e interpretan los datos para tomar decisiones, hacer predicciones y resolver problemas.
- (3) A través de las matemáticas de 3er a 5° grado, los estudiantes desarrollan fluidez (dominio) numérico con entendimiento conceptual y precisión en sus cálculos. Los estudiantes de 3er a 5° grado usan sus conocimientos sobre el sistema de valor posicional en base diez para componer y descomponer números para resolver problemas que requieren de precisión, estimación y la capacidad de determinar lo que es razonable. Al final del 5° grado, los estudiantes saben realizar operaciones básicas de suma, resta, multiplicación y división, y las utilizan para manipular los números de una manera eficiente, precisa y flexible cuando realizan cálculos de suma, resta, multiplicación y división.
- (4) La resolución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de 3er a 5° grado, los estudiantes utilizan estos procesos junto con tecnología y otras herramientas matemáticas, tales como manipulativos, con el fin de desarrollar su comprensión conceptual y de resolver problemas relevantes a medida que practican las matemáticas.

(b) Conocimientos y destrezas.

- (1) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza el valor de posición para representar números enteros y decimales. Se espera que el estudiante:
 - A) utilice el valor de posición para leer, escribir, comparar y ordenar números enteros hasta el 999,999,999,999; y

- B) utilice el valor de posición para leer, escribir, comparar y ordenar decimales hasta el lugar de los milésimos.
- (2) Números, operaciones y razonamiento cuantitativo. El estudiante utiliza fracciones en situaciones de resolución de problemas. Se espera que el estudiante:
- A) genere una fracción equivalente a una fracción dada, tal como $1/2$ y $3/6$ ó $4/12$ y $1/3$;
- B) genere un número mixto equivalente a una fracción impropia dada o genere una fracción impropia equivalente a un número mixto dado;
- C) compare dos cantidades fraccionarias en situaciones de resolución de problemas utilizando una variedad de métodos, incluyendo denominadores comunes; y
- D) utilice modelos para relacionar decimales con fracciones que representan décimos, centésimos y milésimos.
- (3) Números, operaciones y razonamiento cuantitativo. El estudiante suma, resta, multiplica y divide para resolver problemas relevantes. Se espera que el estudiante:
- A) utilice la suma y la resta para resolver problemas en los que se usan números enteros y decimales;
- B) utilice la multiplicación para resolver problemas en los que se usan números enteros (no más de tres dígitos por dos dígitos, sin usar tecnología);
- C) utilice la división para resolver problemas en los que se usan números enteros (divisores de no más de dos dígitos y dividendos de tres dígitos, sin usar tecnología), incluyendo la interpretación del residuo en un contexto dado;
- D) identifique factores comunes de un conjunto de números enteros; y
- E) dé ejemplos de situaciones usando sumas y/o restas que utilizan fracciones del mismo denominador usando objetos concretos, dibujos, palabras y números.
- (4) Números, operaciones y razonamiento cuantitativo. El estudiante estima para determinar resultados razonables. Se espera que el estudiante utilice estrategias, incluyendo el redondeo y los números compatibles para estimar soluciones en problemas de suma, resta, multiplicación y división.
- (5) Patrones, relaciones y razonamiento algebraico. El estudiante hace generalizaciones basadas en relaciones y patrones observados. Se espera que el estudiante:
- A) describa la relación entre conjuntos de datos en organizadores gráficos, tales como listas, tablas y diagramas; e
- B) identifique números primos y compuestos utilizando objetos concretos, modelos pictóricos y patrones en pares de factores.
- (6) Patrones, relaciones y razonamiento algebraico. El estudiante describe relaciones matemáticamente. Se espera que el estudiante seleccione y utilice diagramas y ecuaciones, tales como $y = 5 + 3$ para representar problemas relevantes.
- (7) Geometría y razonamiento espacial. El estudiante genera definiciones

- geométricas utilizando atributos críticos. Se espera que el estudiante identifique atributos esenciales incluyendo partes paralelas, perpendiculares y congruentes de figuras geométricas de dos y tres dimensiones.
- (8) Geometría y razonamiento espacial. El estudiante da ejemplos de transformaciones. Se espera que el estudiante:
- A) dibuje los resultados de traslaciones, rotaciones y reflexiones en el primer cuadrante del plano coordenado; e
 - B) identifique la transformación que genera una figura a partir de otra cuando se dan dos figuras congruentes en el primer cuadrante del plano coordenado.
- (9) Geometría y razonamiento espacial. El estudiante reconoce la conexión entre pares ordenados de números y ubicaciones de puntos en un plano. Se espera que el estudiante ubique y nombre puntos en un plano de coordenadas utilizando pares ordenados de números enteros.
- (10) Medición. El estudiante aplica los conceptos de medición relacionados con longitud (incluyendo perímetro), área, capacidad/volumen, y peso/masa para resolver problemas. Se espera que el estudiante:
- (A) realice conversiones sencillas dentro del mismo sistema de medición (SI/métrico o inglés/usual);
 - (B) relacione los modelos de perímetro, área y volumen con sus respectivas fórmulas; y
 - (C) seleccione y utilice unidades y fórmulas apropiadas para medir longitud, perímetro, área y volumen.
- (11) Medición. El estudiante aplica conceptos de medición. El estudiante mide el tiempo y la temperatura (en grados Fahrenheit y Celsius). Se espera que el estudiante:
- (A) resuelva problemas en los que hay cambios en temperatura; y
 - (B) resuelva problemas relacionados con tiempo transcurrido.
- (12) Probabilidad y estadística. El estudiante describe y predice los resultados de un experimento de probabilidad. Se espera que el estudiante:
- A) utilice fracciones para describir los resultados de un experimento;
 - B) utilice resultados de experimentos para hacer predicciones; y
 - C) genere una lista de todos los posibles resultados de un experimento de probabilidad, tal como cuando se lanza una moneda al aire.
- (13) Probabilidad y estadística. El estudiante resuelve problemas reuniendo, organizando, presentando e interpretando conjuntos de datos. Se espera que el estudiante:
- A) utilice tablas de pares relacionados de números para hacer gráficas lineales;
 - B) describa características de datos presentados en tablas y gráficas incluyendo la mediana, la moda y el rango; y
 - C) haga una gráfica de un conjunto de datos utilizando una representación gráfica apropiada, tal como un dibujo o una gráfica lineal.
- (14) Procesos fundamentales y herramientas matemáticas. El estudiante aplica las

- matemáticas del 5° grado para resolver problemas relacionados con experiencias diarias y actividades dentro y fuera de la escuela. Se espera que el estudiante:
- A) identifique las matemáticas en situaciones diarias;
 - B) resuelva problemas en que incorporen la comprensión del problema, hacer un plan, llevarlo a cabo y evaluar lo razonable de la solución;
 - C) seleccione o desarrolle un plan o estrategia de resolución de problemas apropiado en el que haga un dibujo, busque un patrón, adivine y compruebe sistemáticamente, haga una dramatización, elabore una tabla, resuelva un problema más sencillo o trabaje desde el final hasta el principio para resolver un problema; y
 - D) utilice herramientas tales como objetos reales, manipulativos y tecnología para resolver problemas.
- (15) Procesos fundamentales y herramientas matemáticas. El estudiante es capaz de comunicar las matemáticas del 5° grado utilizando un lenguaje informal. Se espera que el estudiante:
- A) explique y anote observaciones utilizando objetos, palabras, dibujos, números y tecnología; y
 - B) relacione el lenguaje informal con el lenguaje y los símbolos matemáticos.
- (16) Procesos fundamentales y herramientas matemáticas. El estudiante utiliza razonamiento lógico. Se espera que el estudiante:
- A) haga generalizaciones de patrones o de conjuntos de ejemplos y contraejemplos; y
 - B) justifique por qué una respuesta es razonable y explique el proceso de la solución.

Fuente: las estipulaciones de esta sección §111.17 adoptadas para entrar en vigor el 1° de septiembre de 1998, 22 TexReg 7623.

Accessibility Information for Proclamation 2005

I. Electronic Instructional Materials

Publishing companies that offer electronic textbooks (e.g., CD-ROMs, DVDs or Web-based instructional materials) for adoption are required to offer these materials in an accessible format in accordance with the technical standards of the Federal Rehabilitation Act, Section 508, as shown at the following web page: www.section508.gov/index.cfm?FuseAction+Content&ID=12. These technical standards are as follows:

Accessibility Standards For Web-Based Textbooks

- a. A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
- b. Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
- c. Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
- d. Documents shall be organized so they are readable without requiring an associated style sheet.
- e. Redundant text links shall be provided for each active region of a server-side image map.
- f. Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- g. Row and column headers shall be identified for data tables.
- h. Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
- i. Frames shall be titled with text that facilitates frame identification and navigation.
- j. Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.
- k. A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, **when compliance cannot be accomplished in any other way**. The content of the text-only page shall be updated whenever the primary page changes.
- l. When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
- m. When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

- n. When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
- o. A method shall be provided that permits users to skip repetitive navigation links.
- p. When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

Accessibility Standards For CD-ROM and DVD-Based Textbooks

- a. When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.
- b. Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features, where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.
- c. A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.
- d. Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.
- e. When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.
- f. Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.
- g. Applications shall not override user selected contrast and color selections and other individual display attributes.
- h. When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.
- i. Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

- j. When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.
- k. Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.
- l. When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

Accessibility Information Resources For Publishers Of Electronic Textbooks

The following web links, publications and conferences offer essential information for publishers that are planning the development of accessible electronic textbooks.

General

1. Section 508: <http://www.section508.gov/>
2. Resources from the World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI): <http://www.w3.org/WAI/Resources/>
3. Making Educational Software and Web Sites Accessible: Design Guidelines Including Math and Science Solutions, The CPB/WGBH National Center for Accessible Media, January 2003: <http://ncam.wgbh.org/cdrom/guideline/>
4. Conference Proceedings, Annual Conference on “Technology and Persons with Disabilities,” California State University, Northridge (CSUN): <http://www.csun.edu/cod/conf/>
5. Texas Administrative Code, Chapter 206, Subchapter B, Section 206.50, Accessibility and Usability of State Web Sites: <http://www.dir.state.tx.us/standards/>

Resources for Designing Accessible Web Sites

1. Web Content Accessibility Guidelines (WCAG 1.0) – W3C: <http://www.w3.org/TR/WCAG10/>
2. Curriculum for WCAG 1.0: <http://www.w3.org/WAI/wcag-curric/>
3. Accessible Web Authoring Resources and Education (AWARE) Center for the HTML Writers Guild: <http://aware.hwg.org/>
4. Evaluation, Repair, and Transformation Tools for Web Content Accessibility: <http://www.w3.org/WAI/ER/existingtools.html>
5. HTML Kit (editor, validator, Word 2000 cleanup): <http://www.chami.com/html-kit/>
6. IBM Accessibility Checklist and Tutorial: <http://www-306.ibm.com/able/guidelines/web/accessweb.html>
7. Microsoft IE 5.x Developer Accessories (View partial source, view DOM, more): <http://www.microsoft.com/windows/ie/previous/webaccess/default.asp>
8. Microsoft IE 5.x Web Accessories (links list, toggle images, more): <http://www.microsoft.com/windows/ie/previous/webaccess/ie5wa.asp>
9. WGBH’s National Center for Accessible Media: <http://www.wgbh.org/wgbh/pages/ncam/>

10. CAST's Bobby Application (analyzes web sites for accessibility):
<http://webxact.watchfire.com/>
11. Trace Research and Development Center's Developing More Usable Web Sites:
<http://www.trace.wisc.edu/world/web/>

Resources for Closed Captioning and Audio Description

1. A directory of captioning service providers is available at:
<http://www.captions.org/services.cfm>
2. Media Access Group at WGBH, The Caption Center: <http://www.wgbh.org/caption>
3. National Captioning Institute: <http://www.ncicap.org>
4. VITAC: <http://www.vitac.com>
5. Media Access Group at WGBH, Descriptive Video Service:
<http://main.wgbh.org/wgbh/pages/mag/services/description/>
6. Metropolitan Washington Ear, Inc.: <http://www.washear.org>
7. Narrative Television Network: <http://www.narrativetv.com>

Lists of additional resources are available from the Instructional Materials and Education Technology Division.

II. Printed Instructional Materials

Electronic Files And Textbooks Required For Automated Production Of Braille

Computerized files of state adopted printed instructional materials as well as the printed textbooks are needed by the Texas Education Agency to ensure that Braille versions of the materials are produced and delivered to Braille readers at the same time that other students receive their printed versions.

Publishers are required to provide computer files for all printed student materials adopted by the State Board of Education under Proclamation 2005. These files must conform to the National Instructional Materials Accessibility Standard (NIMAS). A copy of the NIMAS Standard follows this discussion (see page 55 *NIMAS 1.1 – The Technical Standard, July 19, 2006, Final Standard*).

Procedures For Providing Electronic Files And Printed Materials To Braille Producers

- (1) **September 14, 2007:** Publishers provide to the Instructional Materials and Educational Technology Division the name, address, and telephone number of the production manager of each printed textbook or instructional material being prepared for submission. This information should be sent to Ms. Pat Hatcher, at e-mail address: pat.hatcher@tea.state.tx.us, fax number (512) 463-8728, or regular address: 1701 North Congress Avenue, Room 3-110, Austin, Texas 78701.
- (2) **October 12, 2007:** Publishers send a small NIMAS test file and associated print pages to the Instructional Materials and Educational Technology Division, Attention: Manager, Distribution and Special Materials. In the past, this procedure has proven to be extremely beneficial to publishers and Braille producers. It has significantly facilitated communication between publishers and Braille

producers. After receipt of the NIMAS test files, Braille producers designated by the Agency will need at least two weeks to evaluate the files and respond to publisher inquiries about usability.

- (3) **Week Following November SBOE Meeting:** Publishers of adopted printed instructional materials are informed of the designated Braille producers by Instructional Materials and Educational Technology Division.
- (4) **December 7, 2007:**
 - (a) Publishers provide three copies of all adopted printed instructional materials to the designated Braille producer. These will be used to assist Braille producers in rendering graphics and pictures included in the adopted textbooks. The printed copies should reflect the student components as they exist at the time of adoption.

Publishers are NOT required to provide printed copies or computer files of materials that are designed for use by teachers. If a teacher who is blind requires a Braille version during the adoption period, a publisher will be requested to provide the agency with two printed teacher editions, if applicable. Publishers are requested to provide two copies of printed items, such as blackline masters, that are clearly intended for student use even though they are included in the teacher component.
 - (b) Deliver usable textbook NIMAS files to designated Braille producers in accordance with the enclosed NIMAS standards.
- (5) **May 2, 2008:** Submit three copies of the corrected student components to the designated Braille producer.

NIMAS 1.1 The Technical Standard

July 19, 2006
Final Standard

PART 300—ASSISTANCE TO STATES FOR THE EDUCATION OF CHILDREN WITH DISABILITIES

1. The authority citation for part 300 continues to read as follows:

Authority: 20 U.S.C. 1411–1420, unless otherwise noted.

2. Part 300 is amended by adding an appendix D to part 300 to read as follows:

Appendix D Part 300—National Instructional Materials Accessibility Standard (NIMAS)

Under sections 612(a)(23)(A) and 674(e)(4) of the Individuals with Disabilities Education Act, as amended by the Individuals with Disabilities Education Improvement Act of 2004, the Secretary of Education establishes the NIMAS. Under section 674(e)(4) of the Act, the NIMAS applies to print instructional materials published after August 18, 2006. The purpose of the NIMAS is to help increase the availability and timely delivery of print instructional materials in accessible formats to blind or other persons with print disabilities in elementary and secondary schools.

TECHNICAL SPECIFICATIONS—THE BASELINE ELEMENT SET

The Baseline Element Set details the minimum requirement that must be delivered to fulfill the NIMAS. It is the responsibility of publishers to provide this NIMAS-conformant XML content file, a package file (OPF), a PDF-format copy of the title page (*or whichever page(s) contain(s) ISBN and copyright information*), and a full set of the content's images. All of the images included within a work must be provided in a folder and placeholders entered in the relevant XML document indicating their location (all images must be included). The preferred image type is SVG, next is either PNG or JPG format. Images should be rendered in the same size/proportion as their originals at 300 dpi. Images should be named with relative path filenames in XML files (example: ``).

NIMAS-conformant content must be valid to the NIMAS 1.1 [see DAISY/NISO Z39.86 2005 or subsequent revisions]. In addition, files are required to use the tags from the Baseline Element Set when such tags are appropriate. Publishers are encouraged to augment the required Baseline Element Set with tags from the Optional Element Set (elements not included in the Standard) as applicable. For the purposes of NIMAS, appropriate usage of elements, both baseline and optional, is defined by the DAISY Structure Guidelines. Files that do not follow these guidelines in the selection and application of tags are not conformant to this Standard. Both optional elements and appropriate structure guidelines may be located within Z39.86-2002 and Z39.86-2005 available from <http://www.daisy.org/z3986/>. Use of the most current standard is recommended.

The Baseline Element Set

Document-level tags

Element	Description
dtbook	The root element in the Digital Talking Book DTD. <dtbook> contains metadata in <head> and the contents itself in <book>.
head	Contains metainformation about the book but no actual content of the book itself, which is placed in <book>.
book	Surrounds the actual content of the document, which is divided into <frontmatter>, <bodymatter>, and <rearmatter>. <head>, which contains metadata, precedes <book>.
meta	Indicates metadata about the book. It is an empty element that may appear repeatedly only in <head>. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

Structure and Hierarchy

Element	Description
frontmatter	Usually contains <doctitle> and <docauthor>, as well as preliminary material that is often enclosed in appropriate <level> or <level1> etc. Content may include a copyright notice, a foreword, an acknowledgements section, a table of contents, etc. <frontmatter> serves as a guide to the content and nature of a <book>.
bodymatter	Consists of the text proper of a book, as contrasted with preliminary material <frontmatter> or supplementary information in <rearmatter>.
rearmatter	Contains supplementary material such as appendices, glossaries, bibliographies, and indices. It follows the <bodymatter> of the book.
level1	The highest-level container of major divisions of a book. Used in <frontmatter>, <bodymatter>, and <rearmatter> to mark the largest divisions of the book (usually parts or chapters), inside which <level2> subdivisions (often sections) may nest. The class attribute identifies the actual name (e.g., part, chapter) of the structure it marks. Contrast with <level>.
level2	Contains subdivisions that nest within <level1> divisions. The class attribute identifies the actual name (e.g., subpart, chapter, subsection) of the structure it marks.
level3	Contains sub-subdivisions that nest within <level2> subdivisions (e.g., sub-subsections within subsections). The class attribute

	identifies the actual name (e.g., section, subpart, subsubsection) of the subordinate structure it marks.
level4	Contains further subdivisions that nest within <level3> subdivisions. The class attribute identifies the actual name of the subordinate structure it marks.
level5	Contains further subdivisions that nest within <level4> subdivisions. The class attribute identifies the actual name of the subordinate structure it marks.
level6	Contains further subdivisions that nest within <level5> subdivisions. The class attribute identifies the actual name of the subordinate structure it marks.
h1	Contains the text of the heading for a <level1> structure.
h2	Contains the text of the heading for a <level2> structure.
h3	Contains the text of the heading for a <level3> structure.
h4	Contains the text of the heading for a <level4> structure.
h5	Contains the text of the heading for a <level5> structure.
h6	Contains the text of the heading for a <level6> structure. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

Block elements

Element	Description
author	Identifies the writer of a work other than this one. Contrast with <docauthor>, which identifies the author of this work. <author> typically occurs within <blockquote> and <cite>.
blockquote	Indicates a block of quoted content that is set off from the surrounding text by paragraph breaks. Compare with <q>, which marks short, inline quotations.
list	Contains some form of list, ordered or unordered. The list may have an intermixed heading <hd> (generally only one, possibly with <prodnote>), and an intermixture of list items and <pagenum>. If bullets and outline enumerations are part of the print content, they are expected to prefix those list items in content, rather than be implicitly generated.
li	Marks each list item in a <list>. content may be either inline or block and may include other nested lists. Alternatively it may contain a sequence of list item components, <lic>, that identify regularly occurring content, such as the heading and page number of each

	entry in a table of contents.
hd	Marks the text of a heading in a <list> or <sidebar>.
note	Marks a footnote, endnote, etc. Any local reference to <note id="yyy"> is by <noteref idref="#yyy">. [Attribute id]
p	Contains a paragraph, which may contain subsidiary <list> or <dl>.
sidebar	Contains information supplementary to the main text and/or narrative flow and is often boxed and printed apart from the main text block on a page. It may have a heading <hd>.
cite	Marks a reference (or citation) to another document.
dd	Marks a definition of the preceding term <dt> within a definition list <dl>. A definition without a preceding <dt> has no semantic interpretation, but is visually presented aligned with other <dd>.
dl	Contains a definition list, usually consisting of pairs of terms <dt> and definitions <dd>. Any definition can contain another definition list.
dt	Marks a term in a definition list <dl> for which a definition <dd> follows. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

Inline Elements

Element	Description
em	Indicates emphasis. Usually is rendered in italics. Compare with .
q	Contains a short, inline quotation. Compare with <blockquote>, which marks a longer quotation set off from the surrounding text.
strong	Marks stronger emphasis than . Visually is usually rendered bold.
sub	Indicates a subscript character (printed below a character's normal baseline). Can be used recursively and/or intermixed with <sup>.
sup	Marks a superscript character (printed above a character's normal baseline). Can be used recursively and/or intermixed with <sub>.
br	Marks a forced line break.
line	Marks a single logical line of text. Often used in conjunction with <linenum> in documents with numbered lines. [Use only when line breaks must be preserved to capture meaning (e.g., poems, legal texts).]
linenum	Contains a line number, for example in legal text. [Use only when <line> is used, and only for lines numbered in print book.]
pagenum	Contains one page number as it appears from the print document, usually inserted at the point within the file immediately preceding the first item of content on a new page. [NB: Only valid when it includes an id attribute].
noteref	Marks one or more characters that reference a footnote or endnote <note>. Contrast with <annoref>. <noteref> and <note> are independently skippable. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

Tables

Element	Description
table	Contains cells of tabular data arranged in rows and columns. A <table> may have a <caption>. It may have descriptions of the columns in <col>s or groupings of several <col> in <colgroup>. A simple <table> may be made up of just rows <tr>. A long table crossing several pages of the print book should have separate <pagenum> values for each of the pages containing that <table> indicated on the page where it starts. Note the logical order of optional <thead>, optional <tfoot>, then one or more of either <tbody> or just rows <tr>. This order accommodates simple or large, complex tables. The <thead> and <tfoot> information usually helps identify content of the <tbody> rows. For a multiple-page print <table> the <thead> and <tfoot> are repeated on each page, but not redundantly tagged.
td	Indicates a table cell containing data.
tr	Marks one row of a <table> containing <th> or <td> cells. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

Images

Element	Description
imggroup	Provides a container for one or more and associated <caption>(s) and <prodnote>(s). A <prodnote> may contain a description of the image. The content model allows: 1) multiple if they share a caption, with the ids of each in the <caption imgref="id1 id2 ...">, 2) multiple <caption> if several captions refer to a single where each caption has the same <caption imgref="xxx">, 3) multiple <prodnote> if different versions are needed for different media (e.g., large print, braille, or print). If several <prodnote> refer to a single , each prodnote has the same <prodnote imgref="xxx">.
img	Points to the image to be rendered. An may stand alone or be grouped using <imggroup>.
caption	Describes a <table> or . If used with <table> it must follow immediately after the <table> start tag. If used with <imggroup> it is not so constrained. <i>For the most current usage guidelines, please refer to http://www.daisy.org/z3986/</i>

1. The Optional Elements and Guidelines for Use

Publishers are encouraged to apply mark-up beyond the baseline (required) elements. The complete DTBook Element Set reflects the tags necessary to create the six types of Digital Talking Books and Braille output. Because of the present necessity to subdivide the creation of alternate format materials into distinct phases, the Panel determined that baseline elements would be provided by publishers, and optional elements would be added to the NIMAS-conformant files by third-party conversion entities. In both circumstances the protocols for tagging digital files should conform to the most current DAISY/NISO Z39.86 specification. Content converters are directed to the most current DAISY Structure Guidelines (<http://www.daisy.org/z3986/>) for guidance on their use.

Since the publication of the original National File Format report from which the NIMAS technical specifications were derived, ANSI/NISO Z39.86-2002 was updated and is now DAISY/NISO Z39.86-2005. It may be best to avoid using the following optional elements which are no longer included in DAISY/NISO Z39.86-2005: <style>, <notice>, <hr>, and <levelhd>.

Also, the following new elements were introduced by DAISY/NISO Z39.86-2005 and should be considered optional elements for the NIMAS: <bridgehead>, <byline>, <covertitle>, <dateline>, <epigraph>, <linegroup>, and <poem>. Please refer to DAISY/NISO Z39.86-2005 for additional information regarding these elements. To access the DAISY/NISO Z39.86-2005 specification, go to <http://www.daisy.org/z3986/>.

2. Package File

A package file describes a publication. It identifies all other files in the publication and provides descriptive and access information about them. A publication must include a package file conforming to the NIMAS. The package file is based on the Open eBook Publication Structure 1.2 package file specification (For most recent detail please see <http://www.openebook.org/oebps/oebps1.2/download/oeb12-xhtml.htm#sec2>.) A NIMAS package file must be a valid XML OeBPS 1.2 package file instance and must meet the following additional standards:

The NIMAS Package File must include the following Dublin Core (dc:) metadata:

- dc:Title
- dc:Creator (if applicable)
- dc:Publisher
- dc>Date (Date of NIMAS-compliant file creation—yyyy-mm-dd)
- dc:Format (=“NIMAS 1.1”)
- dc:Identifier (a unique identifier for the NIMAS-compliant digital publication, e.g., print ISBN + “-NIMAS”—exact format to be determined)
- dc:Language (one instance, or multiple in the case of a foreign language textbook, etc.)
- dc:Rights (details to be determined)
- dc:Source (ISBN of print version of textbook)

And the following x-metadata items:

- nimas-SourceEdition (the edition of the print textbook)

- nimas-SourceDate (date of publication of the print textbook)

The following metadata were proposed also as a means of facilitating recordkeeping, storage, and file retrieval:

- dc:Subject (Language Arts, Social Studies, etc.)
- nimas-grade (specific grade level of the print textbook, e.g.; Grade 6)
- nimas gradeRange (specific grade range of the print textbook, e.g.; Grades 4–5)

An additional suggestion references the use of:

- dc:audience:educationLevel (for the grade and gradeRange identifiers, noting that Dublin Core recommends using educationLevel with an appropriate controlled vocabulary for context, and recommends the U.S. Department of Education’s Level of Education vocabulary online at <http://www.ed.gov/admin/reference/index.jsp>. Using educationLevel obviates the need for a separate field for gradeRange since dc elements can repeat more than once. A book used in more than one grade would therefore have two elements, for example, one with a value of “Grade 4” and another with a value of “Grade 5.”

A final determination as to which of these specific metadata elements to use needs to be clarified in practice. The package manifest must list all provided files (text, images, etc.). (Note: For purposes of continuity and to minimize errors in transformation and processing, the NIMAS-compliant digital text should be provided as a single document.)

3. Modular Extensions

The most current DAISY/NISO standard, formally the [DAISY/NISO Z39.86, Specifications for the Digital Talking Book](#) defines a comprehensive system for creating Digital Talking Books. A part of this standard is DTBook, an XML vocabulary that provides a core set of elements needed to produce most types of books. However, DTBook is not intended to be an exhaustive vocabulary for all types of books.

Guidelines for the correct approach to extend the DAISY/NISO standard have been established. Mathematics, video support, testing, workbooks, music, dictionaries, chemistry, and searching are some of the extensions that have been discussed. Visit <http://www.daisy.org/z3986/> to learn more about modular extensions.

Maximum Cost Estimated First-Year Purchases

PROCLAMATION 2005

CONTENT AREA	PROJECTED UNITS	MAXIMUM COST PER UNIT	MAXIMUM COST
Kindergarten			
§111.12. Mathematics, Kindergarten (per student) *	341,595	\$22.38	\$7,644,896
§111.12. Mathematics, Kindergarten, Spanish (per student) *	91,354	\$22.88	\$2,090,180
Subtotal, Kindergarten	432,949		\$9,735,076
Chapter 111. Mathematics			
Subchapter A. Elementary			
§111.13. Math, Grade 1, Pupil *	352,826	\$31.79	\$11,216,339
§111.14. Math, Grade 2, Pupil *	341,547	\$31.79	\$10,857,779
§111.15. Math, Grade 3, Pupil	347,802	\$58.05	\$20,189,906
§111.16. Math, Grade 4, Pupil	366,418	\$58.05	\$21,270,565
§111.17. Math, Grade 5, Pupil	382,099	\$57.85	\$22,104,427
Subtotal, Math, Grades 1-5	1,790,692		\$85,639,016
Chapter 111. Mathematics, Spanish			
Subchapter A. Elementary, Spanish			
§111.13. Math, Grade 1, Span. Pupil *	110,540	\$34.33	\$3,794,838
§111.14. Math, Grade 2, Span. Pupil *	104,128	\$34.33	\$3,574,714
§111.15. Math, Grade 3, Span. Pupil	93,465	\$63.32	\$5,918,204
§111.16. Math, Grade 4, Span. Pupil	70,655	\$63.43	\$4,481,647
§111.17. Math, Grade 5, Span. Pupil	56,731	\$63.84	\$3,621,707
Subtotal, Math, Grades 1-5	435,519		\$21,391,110
Total Instructional Materials-Proclamation 2005	2,659,160		\$116,765,202
			\$120,515,788
Cost of Continuing Contracts, Braille, Large Type, Freight			
TOTAL COST FOR SY 2008-2009 (FY 2009)			\$237,280,990

* Grades K-2 reflects a consumable price for instructional materials purchased on an annual basis.

For nonconforming products, the state will pay a percentage of the state maximum cost that reflects the percentage of TEKS addressed (e.g., the state will pay 70% of the state maximum cost for a product that addresses 70% of the TEKS).