GRADE LEVEL CONTENT EXPECTATIONS

2 MATH

v.12.05

NUMBER & OPERATIONS

ALGEBRA

MEASUREMENT

GEOMETRY

DATA & PROBABILITY

Welcome to Michigan's K-8 Grade Level Content Expectations

Purpose & Overview

In 2004, the Michigan Department of Education embraced the challenge of creating Grade Level Content Expectations in response to the federal No Child Left Behind Act of 2001. This act mandated the existence of a set of comprehensive state grade level assessments that are designed based on rigorous grade level content.

In this global economy, it is essential that Michigan students possess personal, social, occupational, civic, and quantitative literacy. Mastery of the knowledge and essential skills defined in Michigan's Grade Level Content Expectations will increase students' ability to be successful academically, contribute to the future businesses that employ them and the communities in which they choose to live.

The Grade Level Content Expectations build from the Michigan Curriculum Framework and its Teaching and Assessment Standards. Reflecting best practices and current research, they provide a set of clear and rigorous expectations for all students and provide teachers with clearly defined statements of what students should know and be able to do as they progress through school.

Why Create a 12.05 Version of the Expectations?

The Office of School Improvement is committed to creating the best possible product for educators. This commitment served as the impetus for the revision of the 6.04 edition that was previously released in June of 2004. This new version, v.12.05, refines and clarifies the original expectations, while preserving their essence and original intent. As education continues to evolve, it is important to remember that each curriculum document should be considered as a work in progress, and will continue to be refined to improve the quality.

The revision process greatly improved the continuity from one grade to the next, and better ensured coherence both in content and pedagogy. To obtain more specific details about the revisions, please refer to the addendum included in this document. The forward of the *Across the Grades v.12.05* companion document also clarifies the types of changes made. Educators can access the *Across the Grades* companion document by visiting the Michigan Department of Education Grade Level Content Expectations web page at www.michigan.gov/glce.

Assessment

The Grade Level Content Expectations document is intended to be a state assessment tool with the expectations written to convey expected performances by students. The Office of Assessment and Accountability was involved in the development of version 12.05 and has incorporated the changes in the construction of test and item specifications for the K-8 Michigan Education Assessment Program (MEAP) and MI-Access. This updated version will assist us in the creation of companion documents, content examples, and to guide program planners in focusing resources and energy.

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Curriculum

Using this document as a focal point in the school improvement process, schools and districts can generate conversations among stakeholders concerning current policies and practices to consider ways to improve and enhance student achievement. Together, stakeholders can use these expectations to guide curricular and instructional decisions, identify professional development needs, and assess student achievement.

Understanding the Organizational Structure

The expectations in this document are divided into strands with multiple domains within each, as shown below. The skills and content addressed in these expectations will in practice be woven together into a coherent, Mathematics curriculum. The domains in each mathematics strand are broader, more conceptual groupings. In several of the strands, the "domains" are similar to the "standards" in Principles and Standards for School Mathematics from the National Council of Teachers of Mathematics.

To allow for ease in referencing expectations, each expectation has been coded with a strand, domain, grade-level, and expectation number. For example, **M.UN.00.01** indicates:

> **M** - Measurement strand
>
> **UN** - Units & systems of measurement domain of the Measurement strand
>
> **00** - Kindergarten Expectation
>
> **01** - First Expectation in the Grade-Level view of the Measurement strand

Strand 1 **N**umber & Operations	Strand 2 **A**lgebra	Strand 3 **M**easurement	Strand 4 **G**eometry	Strand 5 **D**ata and **P**robability
Domains				
Meaning, notation, place value, and comparisons (ME) Number relationships and meaning of operations (MR) Fluency with operations and estimation (FL)	Patterns, relations, functions, and change (PA) Representation (RP) Formulas, expressions, equations, and inequalities (RP)	Units and systems of measurement (UN) Techniques and formulas for measurement (TE) Problem solving involving measurement (PS)	Geometric shape, properties, and mathematical arguments (GS) Location and spatial relationships (LO) Spatial reasoning and geometric modeling (SR) Transformation and symmetry (TR)	Data representation (RE) Data interpretation and analysis (AN) Probability (PR)

Preparing Students for Academic Success

Within the hands of teachers, the Grade Level Content Expectations are converted into exciting and engaging learning for Michigan's students. As we use these expectations to develop units of instruction and plan instructional delivery, it is critical to keep in mind that content knowledge alone is not sufficient for academic success. Students must be able to apply knowledge in new situations, to solve problems by generating new ideas, and to make connections between what they learn in class to the world around them. The art of teaching is what makes the content of learning become a reality.

Through the collaborative efforts of Michigan educators and creation of professional learning communities, we can enable our young people to attain the highest standards, and thereby open doors for them to have fulfilling and successful lives.

NUMBER AND	**Count, write, and order whole numbers**
OPERATIONS	

N.ME.02.01 Count to 1000 by 1's, 10's and 100's starting from any number in the sequence.

N.ME.02.02 Read and write numbers to 1000 in numerals and words, and relate them to the quantities they represent.

N.ME.02.03 Compare and order numbers to 1000; use the symbols > and <.

N.ME.02.04 *Count orally by 3's and 4's starting with 0, and by 2's, 5's, and 10's starting from any whole number.* *

Understand place value

N.ME.02.05 *Express numbers through 999 using place value, e.g., 137 is 1 hundred, 3 tens, and 7 ones; use concrete materials.* *

Add and subtract whole numbers

N.FL.02.06 Decompose 100 into addition pairs, e.g., 99 + 1, 98 + 2…

N.MR.02.07 Find the distance between numbers on the number line, e.g., how far is 79 from 26?

N.MR.02.08 Find missing values in open sentences, e.g., $42 + \square = 57$; use relationship between addition and subtraction.

N.MR.02.09 *Given a contextual situation that involves addition and subtraction using numbers through 99: model using objects or pictures; explain in words; record using numbers and symbols; solve.* *

N.FL.02.10 *Add fluently two numbers through 99, using strategies including formal algorithms; subtract fluently two numbers through 99.* *

N.FL.02.11 *Estimate the sum of two numbers with three digits.* *

N.FL.02.12 Calculate mentally sums and differences involving: three-digit numbers and ones; three-digit numbers and tens; three-digit numbers and hundreds.

Understand meaning of multiplication and division

N.MR.02.13 Understand multiplication as the result of counting the total number of objects in a set of equal groups, e.g., 3 x 5 gives the number of objects in 3 groups of 5 objects, or 3 x 5 = 5 + 5 + 5 = 15.

N.MR.02.14 Represent multiplication using area and array models.

N.MR.02.15 Understand division (÷) as another way of expressing multiplication, using fact families within the 5 x 5 multiplication table; emphasize that division "undoes" multiplication, e.g., 2 x 3 = 6 can be rewritten as 6 ÷ 2 = 3 or 6 ÷ 3 = 2.

N.MR.02.16 *Given a situation involving groups of equal size or of sharing equally, represent with objects, words, and symbols; solve.* *

N.MR.02.17 *Develop strategies for fluently multiplying numbers up to 5 x 5.* *

Work with unit fractions

N.ME.02.18 Recognize, name, and represent commonly used unit fractions with denominators 12 or less; model $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ by folding strips.

N.ME.02.19 Recognize, name, and write commonly used fractions: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$.

N.ME.02.20 Place 0 and halves, e.g., $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, on the number line; relate to a ruler.

N.ME.02.21 For unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$ understand the inverse relationship between the size of a unit fraction and the size of the denominator; compare unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$.

N.ME.02.22 Recognize that fractions such as $\frac{2}{2}$, $\frac{3}{3}$, and $\frac{4}{4}$ are equal to the whole (one).

revised expectations in italics

MEASUREMENT	## Measure, add, and subtract length

M.UN.02.01 Measure lengths in meters, centimeters, inches, feet, and yards approximating to the nearest whole unit and using abbreviations: cm, m, in, ft, yd.

M.PS.02.02 Compare lengths; add and subtract lengths (no conversion of units).

Understand the concept of area

M.UN.02.03 Measure area using non-standard units to the nearest whole unit.

M.TE.02.04 Find the area of a rectangle with whole number side lengths by covering with unit squares and counting, or by using a grid of unit squares; write the area as a product.

Tell time and solve time problems

M.UN.02.05 Using both A.M. and P.M., tell and write time from the clock face in 5 minute intervals and from digital clocks to the minute; include reading time: 9:15 as nine-fifteen and 9:50 as nine-fifty. Interpret time both as minutes after the hour and minutes before the next hour, e.g., 8:50 as eight-fifty and ten to nine. Show times by drawing hands on clock face.

M.UN.02.06 Use the concept of duration of time, e.g., determine what time it will be half an hour from 10:15.

Record, add and subtract money

M.UN.02.07 Read and write amounts of money using decimal notations, e.g., $1.15.

M.PS.02.08 Add and subtract money in mixed units, e.g., $2.50 + 60 cents and $5.75 - $3, but not $2.50 + $3.10.

Read thermometers

M.UN.02.09 Read temperature using the scale on a thermometer in degrees Fahrenheit.

Solve measurement problems

M.PS.02.10 Solve simple word problems involving length and money.

*M.TE.02.11 Determine perimeters of rectangles and triangles by adding lengths of sides, recognizing the meaning of perimeter.**

GEOMETRY	## Identify and describe shapes

G.GS.02.01 Identify, describe, and compare familiar two-dimensional and three-dimensional shapes, such as triangles, rectangles, squares, circles, semi-circles, spheres, and rectangular prisms.

G.GS.02.02 Explore and predict the results of putting together and taking apart two-dimensional and three-dimensional shapes.

G.GS.02.04 Distinguish between curves and straight lines and between curved surfaces and flat surfaces.

G.SR.02.05 Classify familiar plane and solid objects, e.g., square, rectangle, rhombus, cube, pyramid, prism, cone, cylinder, and sphere, by common attributes such as shape, size, color, roundness, or number of corners and explain which attributes are being used for classification.

G.TR.02.06 Recognize that shapes that have been slid, turned, or flipped are the same shape, e.g., a square rotated 45° is still a square.

revised expectations in italics

Use coordinate systems

G.LO.02.07 Find and name locations using simple coordinate systems such as maps and first quandrant grids.

DATA AND
PROBABILITY

Create, interpret, and solve problems involving pictographs

D.RE.02.01 Make pictographs using a scale representation, using scales where symbols equal more than one.

D.RE.02.02 Read and interpret pictographs with scales, using scale factors of 2 and 3.

D.RE.02.03 Solve problems using information in pictographs; include scales such as each ■ represents 2 apples; avoid ▬ cases.