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[www.michigan.gov/mde](http://www.michigan.gov/mde)



# A Parent's Guide to MATHEMATICS GRADE LEVEL CONTENT EXPECTATIONS

WHAT YOUR CHILD NEEDS  
TO KNOW BY THE END OF

## THIRD GRADE





## Glossary Terms, continued

**polygon** – a closed shape with three or more sides such as a triangle or square

**product** – the answer when you multiply two numbers

**pyramid** – a three-dimensional solid with one base that is a polygon (other sides are all triangles that come together at a point)

**quotient** – the answer when you divide two numbers

**range** – the difference between the biggest (maximum) and the smallest (minimum) numbers in a set of data

**rhombus** – a four sided polygon that has parallel sides of the same length

**trapezoid** – a closed shape in which two of its sides are parallel

**vertex (plural, vertices)** – the point where 2 lines, 2 sides of a polygon come together



Questions to ask your child's teacher...

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## A Parent's Guide to Grade Level Content Expectations

### Michigan Sets High Academic Standards – for ALL

This booklet is a part of Michigan's Mathematics and English Language Arts Grade Level Content Expectations (GLCE). It is just one in a series of tools available for schools and families. The Michigan Department of Education (MDE) will provide similar booklets for families of children in kindergarten through eighth grade by June, 2005.

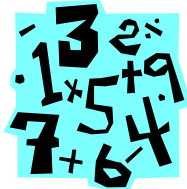
Teacher versions of the Grade Level Content Expectations are finished for grades Kindergarten through eight. They state in clear and measurable terms what students in each grade are expected to know and be able to do. They also guide the design of the state's grade level MEAP tests required in the No Child Left Behind (NCLB) legislation.

Educators and classroom teachers from Michigan school districts have been involved in the development and/or review of Michigan's GLCE. The expectations were designed to ensure that students receive seamless instruction, from one grade to the next, leaving no gaps in any child's education. More importantly, they set high expectations in literacy and mathematics so we can better prepare all K-12 students for the challenges they will face in a global 21<sup>st</sup> century.

To learn more about the Michigan Curriculum Framework, visit [www.michigan.gov/mde](http://www.michigan.gov/mde) and click on "K-12 Curriculum."

**Third Grade Mathematics** is the science of patterns and relationships. It is the language and logic of our technological world. Mathematical power is the ability to explore, to imagine, to reason logically and to use a variety of mathematical methods to solve problems - all important tools for children's futures. A mathematically powerful person should be able to:

- reason mathematically.
- communicate mathematically.
- solve problems using mathematics.
- make connections within mathematics and between mathematics and other fields.



### Michigan's **Mathematics Grade Level Content**

**Expectations** (GLCE) are organized into five strands:

- Number and Operations
- Algebra
- Geometry
- Measurement
- Data and Probability

In the third grade, students gain proficiency in addition and subtraction of whole numbers, and continue to develop meaning and computational skill in multiplication. This culminates in knowledge of the 10x10 multiplication table. Students are introduced to decimals through money. Work in measurement is closely related to increased emphasis on ideas from geometry, including developing meaning for area and perimeter.

### **Glossary Terms**

Words that have asterisks (\*) are defined in the Glossary located in the back of this booklet.

### **Glossary Terms**



- area** – the amount of surface inside a shape found by covering with squares
- bar graph** – a graph that uses bars to represent numbers in the data
- base** – a name used for the side of a polygon and a face of a three-dimensional figure
- capacity** – the amount a container can hold
- cone** – a pyramid that has a circular base
- cube** – a three-dimensional six-sided figure (six faces) in the shape of squares (e.g., blocks, dice)
- edge** – a line or segment where the surfaces of a solid meet
- equivalent fractions** – different fractions that represent the same amount (e.g.,  $1/2=2/4$ )
- estimate** – a reasonable guess using number or spatial sense
- fluently** – the ability to calculate numbers with efficiency and accuracy
- line** – a straight path that goes on forever in both directions
- line segment** – a straight path between two endpoints
- maximum** – the largest number in a set of data
- minimum** – the smallest number in a set of data
- parallelogram** – a four sided polygon that has 2 pairs of parallel sides (sides are always the same length)
- perimeter** – the distance around a two-dimensional shape found by adding together the measured length of all the sides of the shape

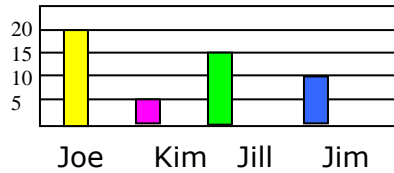
## DATA AND PROBABILITY

### Use Bar Graphs

- Read and interpret bar graphs\* in both forms (vertical and horizontal); identify the maximum, minimum and range of values.

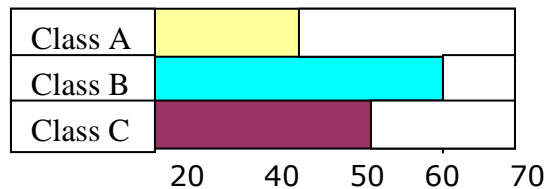
Example 1: Vertical bar graph

Number of books read by third grade students



Example 2: Horizontal bar graph

Number of books read by third grade classes



- Solve problems using information in bar graphs and compare bar graphs.

Examples:

Using the first bar graph, which child read the least number of books?

Using the second bar graph above, which class read the most books?

Using the first bar graph above, which child do you think is probably a member of Class B in the second bar graph?

- Identify the maximum\*, minimum\*, and range\* of values on a bar graph.

## NUMBERS AND OPERATIONS

### Understand and Use Number Notation and Place Value

- Read and write numbers to 10,000 in numerals and words and match them to quantities they stand for.
- Recognize and write numbers to 10,000 in expanded notation\* using place value\*.

Example: Expanded notation

2,517 is 2 thousands, 5 hundreds, 1 ten, and 7 ones

2,517 is  $2000 + 500 + 10 + 7$

Example: Using place value

The place value of a digit in a number

The 2 in the number 3,241 is in the hundreds place

- Compare and order numbers up to 10,000.

### Count in Steps and Understand Even and Odd Numbers

- Count orally by 6's, 7's, 8's and 9's starting with 0, making the connection between multiplication and repeated addition.  
Example:  $6 \times 3 \rightarrow 6 + 6 + 6 \rightarrow 0, 6, 12, 18$ ; so  $6 \times 3 = 18$ .
- Know that even numbers end with 0, 2, 4, 6, or 8.
  - can be shared in two equal groups
  - can be grouped into pairs with no remainder
  - are multiples of 2 (can be evenly divided by 2)
- Know that odd numbers end with 1, 3, 5, 7, or 9
  - will have one left over when paired
- Complete patterns involving even and odd numbers  
Examples: 17, 19, 21, \_\_\_\_, \_\_\_\_, \_\_\_\_  
22, 24, 26, \_\_\_\_, \_\_\_\_, \_\_\_\_

## Add and Subtract Whole Numbers

- Use mental strategies to fluently\* add and subtract two-digit numbers.



Examples:

Use multiples of 10 and 100.

$$\begin{aligned} 12 - 5 &= 7 \\ 120 - 50 &= 70 \\ 1200 - 500 &= 700 \end{aligned}$$

Use fact extensions.

$$\begin{aligned} 13 - 7 &= 6 & 15 + 8 &= 23 \\ 23 - 17 &= 6 & 15 + 18 &= 33 \end{aligned}$$

Add tens, then ones. Put them together.

$$\begin{aligned} 53 + 25 &= 78 \\ 50 + 20 &= 70 \\ 3 + 5 &= 8 \end{aligned}$$

$$70 + 8 = 78 = 53 + 25$$

- Fluently add and subtract two numbers up to and including:  
Two-digit numbers with regrouping (use numbers that require regrouping of the tens and/or ones)

Example:  $46 + 35 = 81$   
 $81 - 46 = 35$

Four-digit numbers without regrouping

Example:  $1234 + 2345 = 3579$

- Estimate\* the sum and difference of two numbers with three digits (sums to 1,000).

Example:

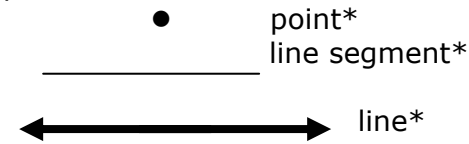
$$\begin{array}{r} 384 \approx 400 \\ +129 \approx +100 \\ \hline 500 \end{array} \qquad \begin{array}{r} 384 \approx 400 \\ -129 \approx -100 \\ \hline 300 \end{array}$$

## GEOMETRY\*

### Recognize the Basic Elements of Geometric Shapes and Objects and Their Properties

- Identify points, line segments, lines and distance.

Example:



- Recognize perpendicular (⊥) and parallel (∥) lines in familiar figures and places; recognize parallel faces in box-shaped items.

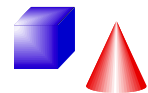
Example: Students know that the door is perpendicular to the floor; that the ceiling is parallel with floor.

- Name, describe and compare two-dimensional shapes such as parallelogram\*, trapezoid\*, circle, rectangle, square, and rhombus\* using terms such as angles, sides, vertices\* and line segments.
- Predict the results of putting together and taking apart two-dimensional and three-dimensional shapes.

Example:



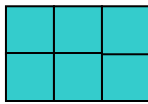
- Name, describe and build three-dimensional solids such as cube\*, rectangular prism, sphere, pyramid\* and cone\*.



- Name parts of three-dimensional shapes such as faces\*, surfaces, bases, edges, and vertices\*.

## Understand the Meaning of Area and Perimeter and Apply in Problems

- Know the difference between perimeter\* and area\*.
- Find/estimate the perimeter of a square or rectangle given the lengths of the sides.
- Find/estimate the area of a square or rectangle by counting the number of squares of a certain size that cover the inside of the shape.  
Example:



The area is equal to 6 sq. cm.

- Describe the sizes of one square inch and one square centimeter.

## Solve Measurement Problems

- Add and subtract lengths, weights, capacity\* and times.
- Add and subtract money in dollars and cents.

$$\begin{array}{r} \$4.25 \\ +\$2.50 \\ \hline \end{array}$$

$$\begin{array}{r} \$10.75 \\ -\$5.45 \\ \hline \end{array}$$



### Ways to praise your child...

**You figured it out!**  
**You are on your way!**  
**You are doing a wonderful job!**  
**I think this is terrific work!**

## Multiply and Divide Whole Numbers

- Use multiplication and division fact families to understand the relationship of the two operations.  
Example of fact family:  
Because  $3 \times 8 = 24$ , we know  $24 \div 8 = 3$  or  $24 \div 3 = 8$ .
- Understand that multiplication and division problems can be solved by thinking of "How many groups?" and "How many in each group?"  
Write number sentences for multiplication and division word problems.  
"How many packs of gum?"  $3 \times 5 = 15$   
"How many pieces of gum in each pack?"  $15 \div 5 = 3$   
"How much gum altogether?"  $3 \times 5 = 15$ .
- Find products fluently\* up to  $10 \times 10$ .
- Find answers to open sentences such as:  
 $7 \times \underline{\quad} = 42$   
"How many 7's are in 42?"  
 $12 \underline{\quad} = 4$   
"How many 4's are in 12?"
- Use mental math to calculate simple multiplication and division problems involving multiples of ten.  
Example:  $5 \times 3 = 15$ , so  $50 \times 3 = 150$ ,  $5 \times 30 = 150$ ,  $50 \times 30 = 1500$
- Solve simple division problems with remainders recognizing remainder as the "number left over".  
Example: There are 25 children. If you make groups of 4 children, how many groups would you have?  
Think: There would be 6 groups of children with 1 child left over.

### Ways to praise your child...

**You are a fast learner!**  
**Wonderful job!**  
**This is correct!**

## Problem Solving with Whole Numbers

- ❑ Solve and explain addition, subtraction, multiplication, or division problems using objects, pictures, words and/or numbers.

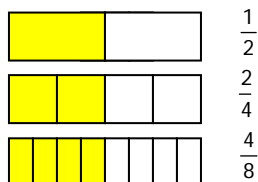
## Understand Simple Fractions, Relation to the Whole, and Addition and Subtraction of Fractions

- ❑ Understand fractions are parts of a whole unit.
- ❑ Recognize the numerator as the number above the line in a fraction and the denominator as the number below the line.

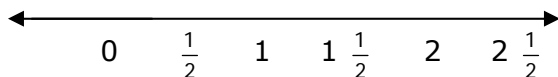
Example: In  $\frac{3}{5}$ , (3 is the numerator\*)  
(5 is the denominator\*)

- ❑ Recognize, name and show equivalent fractions\* by folding paper.

Example: Use denominators with 2, 4, or 8



Use the number line to develop understanding of fractions;



- ❑ Use the number line to add and subtract fractions.

## Understand Simple Decimal Fractions in Relation to Money

- ❑ Understand the value of \$0.50 and \$0.25

Example:  $\frac{1}{2}$  dollar = \$0.50  
 $\frac{1}{4}$  dollar = \$0.25



## MEASUREMENT

### Measure and Use Units for Length, Weight, Temperature and Time

- ❑ Know common units of measurement for length, weight and time and be able to measure in mixed units.
  - length ~ inches and feet, meters and centimeters
  - weight ~ grams and kilograms, pounds and ounces
  - length ~ meters and centimeters, inches and feet
  - time ~ hours and minutes, minutes and seconds, years and months
- ❑ Understand temperature is measured by degrees in Fahrenheit (F) and degrees in Celsius (C).
- ❑ Know temperatures indicating (32 degrees F) and (0 degrees C) is freezing; (212 degrees F) and (100 degrees C) is boiling.

### Study Tip...

**If possible, choose a quiet place to complete homework. Try to work on homework at the same time each day. Make sure the homework time is not just before bedtime.**