

Everyday Mathematics 4th Edition Component Framework



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THE *EVERYDAY MATHEMATICS* 4TH EDITION COMPONENT FRAMEWORK

In order to understand how teachers implement *Everyday Mathematics*, it is important to become familiar with the different components, or elements, of EM. Over 40 different components comprise EM, including specific materials, activities, lesson content, lesson organization, tools and strategies for assessment and differentiation, and pedagogical practices for facilitating student engagement.

The EM Component Framework clearly defines each EM component and provides examples of each component across different grade levels. The framework categorizes similar components into groups, making it easier to compare components and recognize the different ways in which EM may be related to learning.

About the Framework

The EM Component Framework was developed with support from the National Science Foundation (#06280052, 2007-2010) as part of a larger study to measure the enactment of six reform-based K-8 mathematics and science instructional materials programs, including *Everyday Mathematics*. In this foundational study, developers and teachers from each of the six programs identified and described their programs' essential components. These descriptions were synthesized and organized into a comprehensive, general framework.

The EM-specific component framework was updated and refined through the support of a second National Science Foundation study (#1109595, 2011-2015) to understand the implementation, spread and sustainability of *Everyday Mathematics* within multiple school district contexts. The EM framework, updated both for EM 3rd Edition and EM 4th Edition, guided the development of multiple research instruments to measure the implementation of *Everyday Mathematics*, including a teacher questionnaire, a teacher log, and a classroom observation protocol.

To learn more about the development of the EM Component Framework and its application in the context of *Everyday Mathematics*, please visit the following publications:

Century, J., Rudnick, M., & Freeman, C. (2010). A framework for measuring fidelity of implementation: A foundation for shared language and accumulation of knowledge. *American Journal of Evaluation*, 31(2), 199-218.

Century, J., & Cassata A. (2014). Conceptual foundations for measuring the implementation of educational innovations. In L.M.H. Sanetti & T.R. Kratochwill (Eds.), *Treatment Integrity: A Foundation for Evidence-Based Practice in Applied Psychology*. Washington, DC: American Psychological Association.

For additional resources for using the framework to measure EM implementation, please visit our website:

http://everydaymath.uchicago.edu/research/implementation_measurement/

Framework Overview

The EM 4th Edition components are organized into four main groups:

- Structural Procedural Components include the guidelines for lesson organization and management.
- Educative Components provide resources that describe what teachers need to know and/or prepare to teach with EM.
- Pedagogical Components describe expected teacher interactions with students during instruction that explicitly support student learning.
- Student Engagement Components reflect the different ways that students are expected to participate (behave and interact) during learning activities.

Overview of Everyday Mathematics Components

STRUCTURAL COMPONENTS		INTERACTIONAL COMPONENTS	
STRUCTURAL PROCEDURAL COMPONENTS	EDUCATIVE COMPONENTS	PEDAGOGICAL COMPONENTS	STUDENT ENGAGEMENT COMPONENTS
<p>Organization</p> <ul style="list-style-type: none"> Units Lessons Standard Lesson Parts and Activities Differentiation Activities <p>Order</p> <ul style="list-style-type: none"> Unit Order Lesson Order Order of Lesson Parts and Activities <p>Assessments</p> <ul style="list-style-type: none"> Program Specific Assessment <p>Instructional Time</p> <ul style="list-style-type: none"> Unit Duration Frequency of Class Period Duration of Instruction <p>Student Materials</p> <ul style="list-style-type: none"> Reading Materials Writing Materials Hands-on Materials Games Homework Materials Multimedia Materials* 	<p>Background Information</p> <ul style="list-style-type: none"> Content Pedagogy National Standards & Benchmarks Lesson Planning Resources Spiral Resources* Goals for Student Learning Lesson Overview Lesson Preparation Assessment Resources Differentiation Resources 	<p>Teacher Facilitation of Student Participation in Learning Activities</p> <ul style="list-style-type: none"> Small Group Participation Cognitively Demanding Work Student Autonomy Students Taking Risks Student Interest <p>Teacher Customization of Instruction for Student Needs</p> <ul style="list-style-type: none"> Teacher Use of Assessment to Inform Instruction Teacher Use of Differentiation 	<p>Student Participation in Learning Activities</p> <ul style="list-style-type: none"> Students Contribute to Small Group Work Students Engage in Cognitively Demanding Work Students Work Autonomously Students Take Risks Students Do Assigned Activities

*EM4 Only

Structural Procedural Components

Structural procedural components include the guidelines for lesson organization and management.

Organization

EM is organized into units (largest sections) and lessons (sub-sections of units). Lessons may be further organized into smaller lesson parts and activities. Each of these may be taught (present) or omitted (absent).

Units

The largest section of organization overarching all daily lesson plans with connections among key topics, concepts, skills, and desired outcomes.

- K** In Kindergarten, EM units are called “sections.” Kindergarten includes 9 sections with 13 lessons in each session. Kindergarten sections are not labeled with an overarching topic or topics.
- 1-6** In grades 1-6, each grade includes 8 or 9 units and each unit includes approximately 10-15 lessons per unit (except Grade 3, which has several units with 8 or 9 lessons).

Lessons

Instructional materials targeting specific learning objectives designed to be taught in a designated time frame.

- K-6** Regular lessons. Most lessons in Grades K-6 are regular lessons. Each EM lesson introduces and develops content through varied activities and practice opportunities.
- 1-3** **Explorations** lessons. Explorations lessons include small-group activities that students complete with minimal teacher guidance. The Explorations activities often provide initial exposure to be developed more fully in later lessons.
- 1-6** **Progress Check** lessons. *Progress Check* lessons are at the end of each unit. They contain both formative and summative assessment activities.
- K-6** **Open Response and Reengagement** lessons. Open Response and Reengagement lessons are two-day lessons that occur once per unit at all grades (except in Section 1 of Kindergarten). On Day 1, students solve a challenging problem. On Day 2, students reengage in the problem by examining and discussing their own and others’ solutions.

Standard Lesson Parts and Activities

The smaller structures that comprise lessons.

- K-2** **Daily Routines.** In Grades K-2, *Daily Routines* are activities that integrate mathematics into the daily life of the classroom in a variety of real-world contexts. They should be done each day, but can be done separate from the rest of the lesson or as part of the lesson.

1-6 **Part 1/Warm Up.** *Mental Math and Fluency* activities are quick, leveled warm up exercises that students answer orally, with gestures or hand signals, or on slates or tablets.

K-6 **Part 2/Focus.** In Kindergarten, activities in this segment introduce new content, consolidate recent learning, provide problem-solving challenges, and provide opportunities for students to build procedural fluency or conceptual understanding.

In grades 1-6, activities in this segment introduce new content, consolidate recent learning, provide problem-solving challenges, and provide opportunities for students to build procedural fluency or conceptual understanding. They include *Math Message*, *Math Message Follow-Up*, games, and other activities that serve a variety of purposes.

K-6 **Part 3/Practice.** In Kindergarten, activities in this segment provide ongoing distributed practice of skills, concepts and applications from past lessons and units, including games.

In grades 1-6, activities in this segment provide ongoing distributed practice of skills, concepts and applications from past lessons and units, including games, journal pages, *Math Boxes* and *Home Links*.

Differentiation Activities

Optional program elements explicitly designed to meet the needs of a range of learners.

K **Connections.** In Kindergarten, *Connections* activities provide suggestions for linking or applying the mathematical content of the lesson to another curricular area or aspect of classroom life, such as Literacy, Art, Science, or Snack time.

K-6 **Readiness** activities. *Readiness* activities are generally meant to be directed by the teacher with small groups of students or the entire class before the lesson is completed. These activities introduce, review, or otherwise provide access to mathematical skills that are important for understanding the lesson.

K-6 **Enrichment** activities. Enrichment activities extend the mathematical content of the lesson and sometimes explicitly link Mathematics to other subject areas (e.g., Science, Social Studies).

K-6 **Extra Practice** activities. *Extra Practice* activities explicitly designed to provide students with additional practice for lesson content in addition to the core lesson activities.

K-6 **ELL Support** activities. *ELL Support* activities are optional program elements that provide support for students' language development, especially English language learners.

Order

Order includes the sequence of lessons, parts, or activities specified in the EM program.

Unit Order

The sequence of units specified in the program.

- K-6** The units/sections are ordered to ensure adequate coverage of the major work of each grade level in the first half of the year. Units are also ordered to ensure that the mathematical content at each grade level progresses so that concepts build meaningfully on each other.
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Lesson Order

The sequence of lessons specified in the program.

- 1-6** The order of the lessons ensures that the content in the Focus part of the lesson progresses in such a way that the mathematical content builds on itself logically and practice is distributed intentionally and strategically.
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Order Of Lesson Parts And Activities

The sequence of lesson parts and activities specified in the program.

- K-6** Each lesson has the same parts presented in the same order.
In Kindergarten, while it is important to move through the Focus part of the lesson in the order in which it is presented, teachers do not necessarily need to teach the separate parts of the lesson in sequential order each day (the Practice activity could be done before the Focus activity, for example).
In grades 1-6, while it is important to teach the activities within the Focus part of the lesson in the order in which they are presented, teachers do not necessarily have to teach Parts 1, 2, and 3 of the lesson in sequential order each day (the Practice activities could be done before the Focus activities, for example).
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Assessments

Assessments within EM are explicitly designed to measure student knowledge and skills targeted in the program.

Program-specific assessments

Program-specific assessments are designed for understanding student learning at the end of instruction and informing subsequent instruction.

- K-6** The **Beginning-of-Year Assessment** provides information for planning instruction early in the year.
- K-6** The **Mid-Year Assessment** and **End-of-Year Assessment** provide snapshots of students' performance to provide information on students' levels of skill and understanding.
- K-6** **Assessment Check-Ins** (within daily lessons) indicate daily opportunities for assessing students and guidelines for what most students should know, understand, or be able to do at that point in the year. They can be used for both formative or summative purposes.
- K-6** Designated tasks or items within **Open Response and Reengagement** lessons can be used to monitor student progress and make instructional decisions.

- 1-6 Designated items within the *Progress Check* lessons can be used to monitor student progress or make instructional decisions. They can be used for both formative or summative purposes.
- 1-6 The unit-based assessments (in each *Progress Check* lesson) can be used to understand students' mastery of the concepts in the unit that students just completed.
- 1-6 The *Cumulative Assessment* (in *Progress Check* lessons from even-numbered units) can be used to assess students' understanding of the content covered up to that point in the year.

Instructional Time

Instructional Time is the amount of time that EM allocates for instruction.

Unit Duration

Length of time that a unit should be taught.

- K-6 Each EM unit/section takes approximately 3-5 weeks to complete.

Frequency of Class Period

Number of class periods per week that a unit should be taught to a single group of students.

- K-6 There are several approaches to support different schedules and classroom organization. One approach is to teach one regular EM lesson a day (five lessons per week). Another approach is to teach four regular EM lessons per week and reserve the fifth day for games, catch-up, or differentiation activities.

Duration of Instruction

Recommended instructional time per class period (can be in a single session or multiple sessions in a day).

- K-6 In Kindergarten, the recommended timeframe for EM is at least 45-60 minutes per day.
In Grades 1-6, it is recommended that EM be taught between 60-75 minutes per day.

Student Materials

Student Materials are EM components explicitly designed for student use. They may be required for particular lessons or used as optional resources.

Reading Materials

Written or printed works included or referenced in the program, containing informational or narrative text.

- (K-6) Examples of EM reading materials include: *My Reference Book* (Grades 1-2), *Student Reference Book* (Grades 3-6), and *Literature Connections* (recommended books).
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Writing Materials

Tools in a variety of formats, included or referenced in the program, that facilitate student writing of any kind.

- (K-6) Examples of EM writing materials include *My First Math Book* pages (Grade K), *Math Journal* pages (Grades 1-6), *Math Masters* pages (Grades K-5), marker and slate, tablet, and *Writing and Reasoning Prompt* (Grades 1-6).
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Hands-on Materials

Physical resources included or referenced in the program, that support learning.

- (K-6) In EM, hands-on materials are provided for students to model concepts concretely, make concepts clear and practice using new content knowledge. Examples include: calculators, rulers, protractors, base-10 blocks, pattern blocks, compasses, and other manipulatives.
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Games

Program-specific games designed to facilitate interactive play with other students.

- (K-6) EM games are useful for building procedural fluency, conceptual understanding, and problem-solving skills. Examples of games include: *Subtraction Top-It*, *Grab Bag*, *Name That Number*, *Array Bingo*.
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Homework Materials

Activities included or referenced in the program, explicitly designed to be done at home.

- (K-6) In Kindergarten, *Math at Home* books provide additional activities for families to do together. In grades 1-6, the *Home Links* (EM3 and EM4) and *Study Links* (EM3 only) allow students to practice school mathematics at home and help family members understand the school mathematics program.
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Digital/Multimedia Materials

Websites, online games, and other audio-visual media included or referenced in the program.

- (K-6) Examples of EM digital/multimedia materials for students include the *Sing Everyday! Music CD* (Grade K), *Geometer's Sketchpad*[®] activities referenced in the digital *Student Reference Book* (Grades 1-6), digital *Student Reference Book* tutorial videos (Grades 1-6), *EM Games Online*, and *eToolkit* (digital manipulatives).
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Student Grouping Strategies

Student grouping pertains to the physical organization of students during each lesson as specified in EM.

Whole Class

- (K-6) Students and teacher participating in/leading whole-class discussion and/or activity.

Small Group

- (K-6) Small group activities can be conducted by grouping students in small groups of 3 or more students who work together.

Partner

- (K-6) Partner activities include a component in which students work with or discuss with a partner.

Independent

- (K-6) Independent activities are designed to be completed by each student independently.

Centers

- (K-6) Teachers may use centers to allow individuals or small groups to work on different activities in different areas of the room.

Content

Content includes facts, concepts, processes, and procedures specified in EM.

Facts

Verifiable pieces of specific information.

- (K-6) Examples of facts in EM:
- Vocabulary such as “input,” “output,” “rule”
 - Basic addition and multiplication facts
 - A “degree” is $1/360^{\text{th}}$ of a full rotation

Concepts

Broad, abstract ideas that summarize or categorize information.



Examples of concepts in EM:

- Place value
 - Whole numbers
 - Equivalent fractions
 - Numeric relations (greater than/less than)
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Processes

Purposeful activities that involve reasoning and problem-solving.



Examples of processes in EM:

- Estimate
 - Analyze what is known
 - Seek out further data as necessary
 - Find the unknown
 - Consider whether the solution makes sense
 - Explain to your classmate
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Procedures

A series of steps taken to accomplish a task.



Examples of procedures in EM:

- Calculate money amounts
 - Make change by counting up
 - Practice strategies for adding 2-digit numbers
 - Model place value exchanges with base-ten blocks
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Educative Components

Educative Components communicate the EM developers' expectations for what teachers need to know and/or prepare in order to enact the program as intended.

Background Information

Background Information provided in EM includes generalizable information that could have been obtained outside the program (e.g., in a course, in professional development, in other publications).

Background Information on Content

Facts, concepts, processes, procedures, and principles.



The Teacher's Lesson Guide contains Unit Organizers to begin every unit. The last four pages (last two pages for K) of the Unit Organizer contain an essay called the *Mathematical Background*. This essay gives teachers information about the major content areas, including mathematical practices, addressed in the unit.

Background Information on Pedagogy

General pedagogical strategies (e.g. cooperative grouping, questioning).



The *Implementation Guide*, accessed online through the ConnectEd Teacher Center, contains essays that address ways in which the program supports teachers in building and maintaining effective mathematics classrooms.

National Standards and Benchmarks Information

Information on Standards and Benchmarks (e.g. the Common Core State Standards for Mathematical Content and Standards for Mathematical Practice).



In Kindergarten, each lesson activity, including the *Assessment Check-In*, is tagged with the relevant CCSS-M content and practice standards.

In grades 1–6, EM4 contains information about CCSS-M standards at the level of the lesson, unit, and grade.

- **Lesson:** In Grades 1–6, each lesson opener identifies the CCSS-M content standards and practice standards that are correlated to each activity in the lesson.
- **Unit:** The Unit Organizer explains how the content of the unit aligns to the CCSS-M content and practice standards.
- **Grade:** The CCSS-M content standards are listed in the back of each grade's Teacher's Lesson Guide. The CCSS-M practice standards are also listed in the back of each grade's Teacher's Lesson Guide.

Lesson Planning Resources

Lesson Planning Resources provided in EM are resources that teachers may consult prior to teaching the lesson or unit for the purpose of planning for and/or guiding instruction.

Spiral Resources

Graphic organizers that show the development of content and standards across lessons and units within a grade.

-  The lesson opener contains the *Spiral Snapshot*, a tool highlighting one of the EM goals addressed in the lesson activities, and indicating where that goal has previously been a focus of instruction or practice and when it will be a focus of instruction or practice in the future.
-  The Unit Organizer contains the *Spiral Trace*, which shows the bigger picture of how unit content develops as well as what most student should know, understand, or be able to do at that point in the year.
-  The *Spiral Tracker*, accessed online through the ConnectEd Teacher Center, allows the teacher to see every activity that is tagged to a particular standard at a grade level.

Goals for Student Learning

Fine-grained learning objectives that correspond to the Common Core's Standards for Mathematical Content and Standards for Mathematical Practice.

-  *EM Goals for Mathematical Content* (GMCs) are listed in the back of each grade's Teacher's Lesson Guide. They are also noted in each lesson's Spiral Snapshot, Assessment Check-In, and Progress Check lesson, and are displayed within the online Spiral Tracker. GMCs are provided for every instructional item and assessment item within the EM materials.
-  Each regular lesson targets one to three EM Goals for Mathematical Practice (GMPs). In these lessons, GMPs are identified for activities and questions that engage students in the targeted practices.

Lesson Overview

The portion of the lesson that typically provides the teacher with specific information about what students will do during the lesson, the goals for the lesson, and the materials they will use.

-  In Kindergarten, much of this information is included in a box at the top of the first page. In Grades 1–6, the lesson opener is the first page of the lesson (EM3) or the first two pages of the lesson (EM4). It provides a snapshot of the lesson, including the key concepts and skills to be learned and all lesson parts and activities, including differentiation activities.

Lesson Preparation

The portion of a lesson that tells the teacher requirements for lesson materials preparation, management and organization that must take place prior to a given lesson.

-  Lesson Preparation information can be found in the *Before You Begin* section of the lesson opener in the Teacher's Lesson Guide.

Assessment Resources

Information and tools to guide and support the assessment process.

In all grades, assessment checklists (within the *Assessment Handbook*) may be used for tracking performance on the on the mathematical practices in Open Response problems. In addition, blank checklists for tracking progress on content and/or practice standards are provided. In Kindergarten, assessment checklists may also be used to track performance on the *Beginning of Year, Mid-Year* and *End-of-Year Assessments*.

-  **Ongoing Assessment** suggestions are provided in the *Daily Routines*.
 -  Rubrics for assessing the focus Goal for Mathematical Practice in Open Response tasks are found in the Teacher's Lesson Guide.
 -  Digital assessment resources (tools allowing teachers to review work, make comments, and create tests, quizzes, or worksheets) are available on the ConnectEd Teacher Center, which also contains a data entry and reports system.
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Differentiation Resources

Information and tools to guide and support differentiated instruction.

-  **Adjusting the Activity** notes (within daily lessons) provide point-of-use instructional guidance.
 -  **Academic Language Development** notes and **Common Misconception** notes (within daily lessons) provide point-of-use instructional guidance.
 -  **Differentiation Support** pages found in the ConnectEd Teacher Center that offer specific suggestions for each part of the lesson.
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Pedagogical Components

Pedagogical components describe expected teacher interactions with students during instruction that explicitly support student learning.

Teacher Facilitation of Student Participation in Learning Activities

Teachers use a variety of instructional practices and strategies during instruction to facilitate student participation in learning activities.

Teacher Facilitation of Small Group Participation

Strategies that promote productive formal group interactions.

- 1-6 Indicators (when students are working in groups or pairs):
- Calling attention to guidelines for group interaction, encouraging all group members to contribute, and ensuring all group members understand the task at hand.
 - Encouraging group members to take turns, divide up work into different roles or duties.
 - Encouraging group members to ask each other questions, work together to solve problems, help one another, listen to one another, and share ideas respectfully.

Teacher Facilitation of Cognitively Demanding Work

Strategies that promote student use of thinking and process skills.

- 1-6 Indicators:
- Asking students to organize, process, manipulate, or evaluate data.
 - Asking students to explain how they solve a problem.
 - Asking students to consider other students' ideas in comparison to their own.
 - Asking students to demonstrate reasoning.
 - Asking students to solve problems in more than one way.
 - Asking students to communicate their thought process to others.
 - Asking students to make connections between different mathematical topics, representations, or ideas.
 - Asking students to make connections between topics, representations, or ideas in math and other subjects.

Teacher Facilitation of Student Autonomy

Strategies that promote student ownership and self-direction in the learning process.

- 1-6 Indicators:
- Giving students opportunities to work without teacher oversight.

- Encouraging students to independently get the help they need to solve problems, and reminding them of available resources.
- Providing students ample time to attempt their own solutions.
- Refraining from telling students what to do or how to do it before they have had a chance to try solving problems on their own.
- Encouraging students to check their work.

Teacher Facilitation of Students Taking Risks

Strategies that promote student willingness to take intellectual or emotional chances.

1-6

Indicators:

- Encouraging students to answer a question even if they are unsure.
- Encouraging students to try new things even if they might make mistakes.
- Encouraging students to raise their hand if they don't understand a concept.
- Encouraging students to share their ideas even if they are different from others.

Teacher Facilitation of Student Interest

Strategies to promote student enthusiasm and curiosity.

1-6

Indicators:

- Connecting lesson content with current events and real world phenomena.
- Making lesson content relevant to students (e.g., by asking about past experiences, applying content to students' daily lives).
- Engaging student interest through other means (e.g., telling an interesting story, using humor, bringing in a guest speaker).

Teacher Customization of Instruction for Student Needs

Teachers may customize instruction for student needs *before, during, or after instruction*.

Teacher Use of Assessment to Inform Instruction

Strategies for using information about the students' current understanding of the content to alter a lesson.

K-6

Indicators:

- Changing the instructional approach based on students' work and/or responses.
 - Suggesting alternate problem-solving strategies based on students' work and/or responses.
 - Revisiting concepts based on students' work and/or responses.
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Teacher Use of Differentiation

Strategies for customizing instruction to special or unique needs of individual or small groups of students.



Indicators

- Scaffolding ideas and activities for individual students.
 - Giving students activities based on ability or learning differences.
 - Grouping students based on their ability, learning differences, or need.
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Student Engagement Components

Student engagement components reflect the different ways that students are expected to participate (behave and interact) during learning activities.

Student Participation In Learning Activities

Students Contribute to Small Group Work

Students participate in and contribute to productive formal group interactions.

(K-6)

Indicators:

- Contributing to group work, managing time efficiently, working collaboratively with peers.
 - Taking turns and take on different roles and duties in the group.
 - Asking their peers questions, sharing ideas respectfully, listening to one another.
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Students Engage In Cognitively Demanding Work

Students use thinking and process skills.

(K-6)

Indicators:

- Explaining solution methods.
 - Comparing other students' ideas and explanations to their own.
 - Organizing, processing, manipulating, or evaluating data.
 - Demonstrating reasoning.
 - Noting relationships between math and other subjects.
 - Demonstrating that they know how to solve a problem using more than one strategy.
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Students Work Autonomously

Students demonstrate ownership and self-direction in the learning process.

(K-6)

Indicators:

- Working without expecting the teacher to tell them what to do at all times.
 - Engaging in problems or activities without seeking teacher input or approval.
 - Checking their work, attempting their own solutions and using available resources to help them solve problems.
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Students Take Risks

Students take intellectual or emotional chances.



Indicators:

- Answering questions even if they appear unsure.
 - Trying new strategies outside of their comfort zone.
 - Raising their hand to ask for help when they don't understand a concept.
 - Sharing their ideas even if they are different from others.
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Students Do Assigned Activities

Students engage in assigned program activities (e.g., Student Materials, Differentiation Activities, Assessments).



Indicators:

- Completing journal or *Math Masters* pages or other documentation of work
 - Participating in games, discussions, or other teacher-assigned activities
-