White Paper on

**CompassLearning Odyssey® Mathematics Curriculum**

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**Introduction**

As we begin a new millennium, we face the challenging task of ensuring our students are able to use mathematics effectively in school and in everyday life. To support that mission, the *No Child Left Behind Act* (NCLB) has focused on making states, schools, educators, and students accountable for student performance. Educators must prove that their students are making **Adequate Yearly Progress** and that they can demonstrate mastery in standards-based, high-stakes assessments. This requires a curriculum that captures the interests of 21st century learners; that is customized to meet the special learning needs of a wide array of students, including English Language Learners; and that is delivered via multiple methods (U.S. Department of Education, NCLB 2004d).

Throughout its 30-year history, CompassLearning has been guided by the best practices only recently delineated in NCLB. CompassLearning understands the significance of scientifically based research as the basis for student assessment and as the practice that ultimately leads to student achievement. This paper describes how the CompassLearning Odyssey Mathematics curriculum reflects the research base and demonstrates replicable and sustainable effectiveness.

The research base for the Odyssey Mathematics solution may be organized into five areas of focus that reflect best practices in mathematics instruction and software design. (See Appendix for the type of online learning activities in Odyssey Math.)
I. Learning Theory

The Research
Research in cognitive development, learning theory, and literacy theory has combined to create a complex set of guidelines regarding instructional strategies and content. These guidelines are based on classic cognitive learning theory of recognized authorities such as Jean Piaget, David Ausubel, Lev Vygotsky, and Jerome Bruner.

Piaget's theory is based on the idea that the child develops cognitive structures (builds mental "maps") or concepts for understanding and responding to physical experiences within his or her environment (On Purpose Associates 2001b). This structure increases in sophistication with development. Educators must plan a developmentally appropriate curriculum that enhances their students' logical and conceptual growth. Teachers must emphasize the critical role that experiences play in student learning.

Ausubel was influenced by Piaget's cognitive development theory. He theorized that what the student already knows is the most important single factor influencing learning. He called this primary process in learning a subsumption in which new material is related to relevant ideas in the student’s existing cognitive structures. Ausubel proposed the use of advance organizers. Unlike overviews and summaries, which simply emphasize key ideas and details, advance organizers act as a "subsuming bridge" between new learning material and existing related ideas (Bowen 2004).

Vygotsky emphasized that there is a condition or “zone of proximal development” wherein students perform challenging tasks with support (scaffolding) from other competent people (Funderstanding 2001). Bruner’s constructivist theory espouses the idea that learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge. This concept of the spiraled curriculum suggests that basic skills and ideas are first presented in a form and language that can be grasped by the child, and then revisited at subsequent grade levels in greater depth. If curriculum is organized in a spiraled manner, the student continually builds upon what he or she has already learned (Kearsley 2004).

Vygotsky contributed several insights that are relevant to mathematics educators:

- **Affect and motivation** are centrally important in understanding educational processes.
- **Dialogue** between student and teacher or technology-based tools or agents is crucial to understanding.
- The child's zone of proximal development can be "bridged" by opportunities for practice with external support called scaffolding.
- **Skills** are learned through modeling and successive practice. After observing an expert execute an activity, the learner practices it with coaching or guidance. The expert provides reminders ("scaffolding") which are removed once the task can be completed by the student on his or her own.
• Exposure to **multiple ways** of accomplishing a task and varying degrees of skill helps the learner recognize that there is no one embodiment of expertise and encourages them to view learning as a continuing process.

• **Learning environments** are important elements of instruction, but students cannot be thrown into complex settings and left to themselves. They need the kind of help or scaffolding that comes from interaction with relevant tools and information. There is thus a continuing dialectic or tension between student-initiated exploration and guidance (Kearsley 2004).

Emphasis on memorizing rules as pieces of knowledge is not always the most effective learning strategy. If students forget the rule, they are unable to do the problem on their own. Not only do students need to know the rule, they also need to know how and when to apply the rule. Simply demonstrating what they have learned by showing the instructor what they have temporarily remembered on a test is not an effective measure of mastery (Wilson et al 1993).

Professional problem solvers are experts at acquiring just the required information, when it is needed (just-in-time), and using it for the achievement of a goal. Tools such as reference manuals, monographs, charts, tables, blueprints, case studies, formulas, and facts are readily available in libraries and online when information is needed to complete a task.

Students must learn basics but have situation-specific competencies and context-based reasoning in order to deal with society's economic realities. Educators are warned against creating young adults who are experts at memorizing inert knowledge, performing simplistic or brittle skills, and listening passively instead of instilling in them the notion that much of the knowledge needed to perform tasks outside school can be found in the tools of the workplace (Wilson et al 1993).

Math educators know that students should remember chunks of information that are used frequently and that are well-understood. Teachers should place great importance on building connections, and should "...represent mathematics as a network of interconnected concepts and procedures; and emphasize connections between mathematics, other disciplines, and daily life" (Wilson et al 1993). Memorization and application methods should be blended by teachers who develop a strong conceptual framework while encouraging and developing students' skills and their natural desire to solve problems (Wilson et al 1993).

Within the last 30 years the National Council of Teachers of Mathematics has established standards for teaching mathematics. NCTM believes that mathematics teachers need to reach all children by offering a variety of instructional strategies that encourage students to learn the concepts that lie under the algorithms they are learning (National Council of Teachers of Mathematics 2004a).

The **Six Principles** for school mathematics provided by the National Council for the Teachers of Mathematics provide guidance in making these decisions about math curriculum and standards:

• **Equity.** Excellence in mathematics education requires equity—high expectations and strong support for all students
• **Curriculum.** A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.

• **Teaching.** Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.

• **Learning.** Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.

• **Assessment.** Assessment should support the learning of important mathematics and furnish useful information to both teachers and students (NCTM 2004a).

**Instructional programs from pre-kindergarten through grade 12 should enable all students to** (NCTM 2004a):

• Build new mathematical knowledge through problem solving.
• Solve problems that arise in mathematics and in other contexts.
• Recognize reasoning and proof as fundamental aspects of mathematics.
• Make and investigate mathematical conjectures.
• Develop and evaluate mathematical arguments and proofs.
• Select and apply and adapt a variety of appropriate strategies to solve problems.
• Monitor and reflect on the process.
• Organize and consolidate their mathematical thinking through communication.
• Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
• Analyze and evaluate the mathematical thinking and strategies of others.
• Use the language of mathematics to express mathematical ideas precisely.
• Recognize and use connections among mathematical ideas.
• Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
• Recognize and apply mathematics in contexts outside mathematics.
• Create and use representations to organize, record, and communicate mathematical ideas.
• Select, apply, and translate among mathematical representations to solve problems.
• Use representations to model and interpret physical, social, and mathematical phenomena.
• Organize and consolidate their mathematical thinking through communication.
• Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
• Analyze and evaluate the mathematical thinking and strategies of others.
• Use the language of mathematics to express mathematical ideas precisely.

**Communication, Problem Solving, and Higher-Order Thinking**

In addition to symbols, language should be used to foster the learning of mathematics. Communicating about mathematical ideas is a way for students to articulate, clarify, and organize their thinking. Language is as important to learning mathematics as it is to learning to read. Students' evolving communication skills can be used to consolidate their mathematical thinking. Teachers should help students learn how to talk about mathematics, to explain their answers, to describe their strategies, and to develop metacognitive skills by “talking about talking about math” (Ehrenfeld n.d.).

**CompassLearning Odyssey Math (Levels K–8)**

CompassLearning Odyssey Math Levels K–8 offers students the opportunity to explore the world of mathematics. Odyssey Math is a mixture of interactive activities with animated graphics that engage students, increase their comprehension of key concepts, and enhance the learning process. The components of CompassLearning Odyssey Math are based on the key content and key process standards developed by the National Council of Teachers of Mathematics. To meet these high standards, CompassLearning Odyssey Math provides rich, varied, and relevant content; essential mathematics processes; and a mathematically rich environment, while taking into consideration students’ prior knowledge and abilities.

Odyssey Math provides educators a blended approach to math education that supports a variety of instructional strategies and learning styles. It offers a complete learning experience, including direct instruction, exploratory activities, opportunities for targeted practice; interactive self-paced learning; online and offline activities; and consistent feedback and guidance to ensure students stay on the learning path to achievement.

The primary focus is to create engaging, content-rich activities with easy and intuitive features. The online activities provide an opportunity for the students to practice and explore. Manipulatives and tools are incorporated throughout the activities. The offline activities afford another medium to practice and learn the skills, create projects, and authentically assess students.

Online activities support a variety of instructional strategies and learning styles, from practicing prerequisite skills to connecting multiple mathematical concepts. The activities fuse best
practices in teaching with technological tools to provide a thorough and well-rounded environment for learning.

**Odyssey Math Level K**

CompassLearning Odyssey Math Level Kindergarten is focused on developing foundational skills that prepare students for later learning in mathematics.

Mathematics learning builds on the curiosity and enthusiasm of children and grows naturally from their experiences. Mathematics at this age, if appropriately connected to a child's world, is more than getting them “ready” for school or accelerating them into elementary arithmetic. Appropriate mathematical experiences challenge young children to explore ideas related to patterns, shapes, numbers, and space with increasing sophistication.

**Odyssey Math Level K:**
- Builds on and extends students' intuitive and informal mathematics knowledge.
- Is grounded in knowledge of child development and creates an environment that encourages students to be active learners and accept new challenges.
- Develops a strong conceptual framework while encouraging and developing students' skills and their natural inclination to solve problems.
- Presents a coherent curriculum that effectively organizes and integrates important mathematical ideas so that students can see how the ideas build on or connect with other ideas, thus enabling them to develop new understandings and skills.
- Includes much more than short-term learning of rote procedures. All students have adequate time and opportunity to develop, construct, test, and reflect on their increasing understanding of mathematics.
- Teaches with applications to real world experiences.
- Maintains a balance, helping students develop both conceptual understanding and skill.

**Odyssey Math Levels 1–2**

CompassLearning Odyssey Math Levels 1–2 provides rich, relevant content and promotes essential mathematics processes while considering students’ prior knowledge and abilities. It builds the mathematics foundation that is vital to helping students solve problems, make decisions, and translate the abstract into the concrete. It encourages students to question, predict, and experiment, launching them into a lifetime of learning.

Odyssey Math Levels 1–2 builds on the principle that all students can learn significant mathematics, by providing all students with high-quality programs that include significant mathematics presented in a manner that respects both the mathematics and the nature of young children.

**Odyssey Math Levels 1–2:**
- Develops students’ math skills and helps them recognize the relatedness of math to their everyday lives.
- Provides meaningful context within which to apply ideas.
• Allows students to develop their problem-solving and math reasoning skills.

**Odyssey Math Levels 3–4**

CompassLearning Odyssey Math Levels 3–4 features best practices for mathematics concept development and instruction, blending skill building with a problem-based approach and allowing students to expand their knowledge and gradually increase their problem-solving skills. Throughout Odyssey Math Levels 3–4, students with various learning styles and intelligences benefit from the individual and collective components of the assorted online activities: mission context, sound effects, a diverse set of interactive activities, progress indicators, audio repeat reinforcement, navigational control, manipulatives and tools, explore mode, help screen, and tiered feedback.

Odyssey Math Levels 3–4 provides students:

- A real world problem to solve.
- An opportunity to solve the problem.
- A reteach screen after an incorrect response.

Odyssey Math Levels 3–4 online activities support a variety of instructional strategies and learning styles, from practicing prerequisite skills to connecting multiple mathematical concepts. The activities fuse best practices in teaching with technological tools to provide a thorough and well-rounded environment for learning.

**Odyssey Math Levels 5–6**

CompassLearning Odyssey Math Levels 5–6 provides educators a balanced approach to math education that supports a variety of instructional strategies and learning styles. It offers a complete learning experience, including direct instruction, exploratory activities, opportunities for targeted practice; interactive self-paced learning; online and offline activities; and consistent feedback and guidance to ensure students stay on the learning path to achievement.

Many offline learning activities provide follow-up and review to complete the learning cycle. Students explore mathematical ideas and solve problems using a variety of manipulatives. The manipulatives or tools may include, but are not limited to, pattern blocks, tangrams, base-ten and attribute blocks, spreadsheets and graphs, color tiles, protractors, graph paper, spinners, and number cubes.

**Odyssey Math Levels 5–6:**

- Engages students in learning activities that challenge and motivate them to seek information and construct knowledge as it relates to the real world.
- Provides interactive learning activities incorporating cross-curricular connections through themes and real world contexts incorporating students' prior knowledge.
- Optimizes interactive multimedia to illustrate the challenging concepts with such features as on-screen manipulatives, video, and audio.
Focuses on learning activities that allow the teacher to prescribe direct instruction, exploration, hands-on, and investigation/experimentation using tools/manipulatives.

**Odyssey Math Levels 7–8**

CompassLearning Odyssey Math Levels 7–8 helps students learn fundamental skills and develop processes for inquiry and exploration, and provides a meaningful context to apply ideas and tools that give students the opportunity to explore the world of mathematics through engaging activities. It provides individual instruction not only by allowing students to work at their own pace, but also with reteach activities that launch automatically if the student does not master the activity with a score of 80% or better. An online calculator is available at all times within every learning activity. Odyssey Math Levels 7–8 may be used in a variety of ways to work with students who need enrichment activities, remediation, or a supplement to regular classroom instruction.

**Odyssey Math Levels 7–8:**
- Promotes higher-order thinking skills through embedded critical thinking and problem solving.
- Explores mathematical ideas and problem solving using a variety of online tools and manipulatives.
- Engages students in thinking and understanding how to communicate mathematical concepts using an online writing tool.

**Online Assessment**
Assessment is an integral part of the learning process, providing a means for identifying a student’s strengths and weaknesses and driving classroom instruction. With CompassLearning Odyssey Math, learning activities, quizzes, and chapter tests are scored and reported to the student’s portfolio. Each test question is matched to the corresponding lesson to allow construction of prescriptive learning pathways.

**Offline Materials**
Each performance standard has an offline activity sheet that provides additional practice and reinforcement, projects, writing prompts, and connection activities. An answer key is also available for the teacher.

**II. High-Interest, Age-Appropriate Content**

**The Research**
Educators believe it is more effective for students to develop deep knowledge about a few "big ideas" rather than a superficial knowledge of a broader range of ideas and information. Demonstrating coherent connections that allow a transfer of learning from one context and one subject to another helps students grasp the relation of content to process, facilitating the acquisition of an integrated knowledge (Ritter 1999).
The newest NCTM standards are oriented to performance-based assessments and skills as well as real-world problems. NCTM has developed a clear sequence of 10 standards that explain what skills students should acquire in each of four grade-level bands and in each discipline of mathematics. As part of Project 2000, NCTM has defined what areas of math instruction need change (NCTM 2004b).

\textit{Mathematics Standards Overview}

\textbf{STANDARD 1: NUMBER AND OPERATION}
Mathematics instructional programs should foster the development of number and operation sense.

\textbf{STANDARD 2: PATTERNS, FUNCTIONS, AND ALGEBRA}
Mathematics instructional programs should include attention to patterns, functions, symbols, and models.

\textbf{STANDARD 3: GEOMETRY AND SPATIAL SENSE}
Mathematics instructional programs should include attention to geometry and spatial sense.

\textbf{STANDARD 4: MEASUREMENT}
Mathematics instructional programs should include attention to measurement.

\textbf{STANDARD 5: DATA ANALYSIS, STATISTICS, AND PROBABILITY}
Mathematics instructional programs should include attention to data analysis, statistics, and probability.

\textbf{STANDARD 6: PROBLEM SOLVING}
Mathematics instructional programs should focus on solving problems as part of understanding mathematics.

\textbf{STANDARD 7: REASONING AND PROOF}
Mathematics instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics.

\textbf{STANDARD 8: COMMUNICATION}
Mathematics instructional programs should use communication to foster understanding of mathematics.

\textbf{STANDARD 9: CONNECTIONS}
Mathematics instructional programs should emphasize connections to foster understanding of mathematics.

\textbf{STANDARD 10: REPRESENTATION}
Mathematics instructional programs should emphasize mathematical representations to foster understanding of mathematics. (NCTM 2004a).

The National Assessment of Education Progress (NAEP) also clearly defines the standards in some alternate categories:
Overview of Mathematical Content Strands

- Number sense, properties, operations
- Measurement
- Geometry and spatial sense
- Data analysis, statistics, probability
- Algebra and functions

NAEP Mathematical Abilities

- Conceptual understanding
- Procedural knowledge
- Problem solving

NAEP Mathematical Power

- Reasoning
- Communication
- Connection
  - Mathematical power is a function of students’ prior knowledge and experiences and the ability to connect that knowledge in productive ways to new contexts (NCES 2003).

K–4 Curriculum

According to NCTM, the K–4 curriculum should:

- Be conceptually oriented and emphasize the development of mathematical understandings and relationships. A conceptual approach enables children to acquire clear and stable concepts by constructing meanings in the context of physical situations and allows mathematical abstractions to emerge from empirical experience. A strong conceptual framework also provides anchoring for skill acquisition (NCTM 2004b).
- Actively involve children in doing mathematics.
- Emphasize the development of children's mathematical thinking and reasoning abilities.
- Emphasize the application of mathematics.
- Include a broad range of content. The inclusion of a broad range of content in the curriculum also allows children to see the interrelated nature of mathematical knowledge.
- Make appropriate use of a wide variety of tools
- Make appropriate and ongoing use of technology. Technology is critical for the improvement of both the quality of the curriculum and the quality of children's learning. Calculators do not replace the need to learn basic facts, to compute mentally, or to do
reasonable paper-and-pencil computation. Computer languages that are geometric in nature help young children become familiar with important geometric ideas. Computer simulations of mathematical ideas, such as modeling the renaming of numbers, are important aids in helping children identify the key features of the mathematics. Many software programs provide interesting problem-solving situations and applications (NCTM 2004b). However, data indicate a great need to help teachers learn how to incorporate technology in the mathematics classroom more effectively (Kerrigan 2004).

**K–4 Content**

K–4 content should include (NCTM 2004b):

**NUMBER**

- Number sense
- Place-value concepts
- Meaning of fractions and decimals
- Estimation of quantities

**OPERATIONS AND COMPUTATION**

- Meaning of operations
- Operation sense
- Mental computation
- Estimation and the reasonableness of answers
- Selection of an appropriate computational method
- Use of calculators for complex computation
- Thinking strategies for basic facts

**GEOMETRY AND MEASUREMENT**

- Properties of geometric figures
- Geometric relationships
- Spatial sense
- Process of measuring
- Concepts related to units of measurement
- Actual measuring
• Estimation of measurements
• Use of measurement and geometry ideas throughout the curriculum

PROBABILITY AND STATISTICS
• Collection and organization of data
• Exploration of chance

PATTERNS AND RELATIONSHIPS
• Pattern recognition and description
• Use of variables to express relationships

PROBLEM SOLVING
• Word problems with a variety of structures
• Use of everyday problems
• Applications
• Study of patterns and relationships
• Problem-solving strategies

INSTRUCTIONAL PRACTICES
• Use of manipulative materials
• Cooperative work
• Discussion of mathematics
• Questioning
• Justification of thinking
• Writing about mathematics
• Problem-solving approach to instruction
• Content integration
• Use of calculators and computers
In K–4 curriculum, decreased attention should be paid to:

**NUMBER**
- Early attention to reading, writing, and ordering numbers symbolically

**OPERATIONS AND COMPUTATION**
- Complex paper-and-pencil computations
- Isolated treatment of paper-and-pencil computations
- Addition and subtraction without renaming
- Isolated treatment of division facts
- Long division
- Long division without remainders
- Paper-and-pencil fraction computation
- Use of rounding to estimate

**GEOMETRY AND MEASUREMENT**
- Primary focus on naming geometric figures
- Memorization of equivalencies between units of measurement

**PROBLEM SOLVING**
- Use of clue words to determine which operation to use

**INSTRUCTIONAL PRACTICES**
- Rote practice
- Rote memorization of rules
- One answer and one method
- Use of worksheets
- Written practice
- Teaching by telling

**5–8 Curriculum, Content and Instruction**
According to NCTM (2004b), an ideal 5–8 mathematics curriculum should:
• Include a broad range of topics including number concepts, computation, estimation, functions, algebra, statistics, probability, geometry, and measurement. Although each of these areas is valid mathematics in its own right, they should be taught as an integrated whole, not as isolated topics. The connections among them should be a prominent feature of the curriculum.

• Expand students' knowledge of numbers, computation, estimation, measurement, geometry, statistics, probability, patterns and functions, and the fundamental concepts of algebra. Ineffective curriculum that rehashes material students already have seen promotes a negative image of mathematics and fails to give students an adequate background for secondary school mathematics.

• Shift the focus to a broader curriculum. The calculator renders obsolete much of the complex paper-and-pencil proficiency traditionally emphasized in mathematics courses. Topics such as geometry, probability, statistics, and algebra have become increasingly more important and accessible to students through technology.

• Decrease the emphasis on computational skills that has proven ineffective.

• Reflect the full breadth of relevant mathematics and its interrelationships with technology.

• Be built on five overall curricular goals for students: learning to value mathematics, becoming confident in their ability, becoming a mathematical problem solver, learning to communicate mathematically, and learning to reason mathematically.

• Include problem situations that establish the need for new ideas and motivate students

• Emphasize the application of mathematics to real-world problems as well as to other settings relevant to middle school students.

• Include communication with and about mathematics and mathematical reasoning

• Use technology, including calculators, computers, and video when appropriate. These devices and formats free students from tedious computations and allow them to concentrate on problem solving and other important content. They also give them new means to explore content. As paper-and-pencil computation becomes less important, the skills and understanding required to make proficient use of calculators and computers become more important.

**Instruction**

• Learning activities should incorporate topics and ideas across standards.

• All mathematics should be studied in contexts that give the ideas and concepts meaning. Problems should arise from situations that are not always well formed. Students should have opportunities to formulate problems and questions that stem from their own interests.
• Learning should engage students both intellectually and physically. They must become active learners, challenged to apply their prior knowledge and experience in new and increasingly more difficult situations.

• Curriculum must be interesting and relevant, must emphasize the usefulness of mathematics, and must foster a positive disposition toward mathematics.

• Instructional approaches should engage students in the process of learning rather than transmit information for them to receive. Middle grade students are especially responsive to hands-on activities in tactile, auditory, and visual instructional modes.

• Concrete experiences should continue to provide the means by which students construct knowledge. From these experiences they abstract more complex meanings and ideas. The use of language, both written and oral, helps students clarify their thinking and report their observations as they form and verify their mathematical ideas.

• Students’ cultural and economic backgrounds should be integrated into the learning experience. This is an important reason why communication is one of the overarching goals of these standards (NCTM 2004b).

NCTM is recommending major changes in emphasis for both the mathematical content and instruction in grades 5–8.

**Curriculum and instruction should increase attention to:**

• Problem solving
• Communication - discussing, reading and listening to mathematical ideas
• Reasoning - solving problems reasoning inductively and deductively
• Connections of topics within math and to other subjects
• Number operations and computations - using estimation, creating algorithms and procedures, understanding ratio, proportion and percent
• Patterns and Functions - Interpreting among different mathematical representations and identifying and using functional relationships
• Algebra - Use a variety of methods to solve problems and understand variables, expressions and equations
• Statistics - Using statistical methods to describe, analyze, evaluate, and make decisions
• Probability - Creating experimental and theoretical models of situations involving probabilities
• Geometry - Developing an understanding of geometric objects and relationships and using geometry in solving problems
• Measurement - Estimating and using measurement to solve problems
• Actively involving students individually and in groups in exploring, conjecturing, analyzing, and applying mathematics in both a mathematical and a real-world context
• Using appropriate technology for computation and exploration
• Using concrete materials
• Being a facilitator of learning
• Assessing learning as an integral part of instruction

**Curriculum and instruction should decrease attention to:**

• Practicing routine, one-step problems
• Practicing problems categorized by types (e.g., coin problems, age problems)
• Doing fill-in-the-blank worksheets
• Answering questions that require only yes, no, or a number as responses
• Relying on outside authority (teacher or an answer key)
• Learning isolated topics
• Developing skills out of context
• Memorizing rules and algorithms
• Practicing tedious paper-and-pencil computations
• Finding exact forms of answers
• Memorizing procedures, such as cross-multiplication, without understanding
• Practicing rounding numbers out of context
• Topics seldom in the current curriculum
• Manipulating algebraic symbols
• Memorizing algebraic procedures and drilling on equation solving
• Memorizing statistical formulas
• Memorizing formulas for probability
• Memorizing geometric vocabulary
• Memorizing facts and relationships for geometry
• Memorizing and manipulating formulas
• Converting within and between measurement systems
• Teaching computations out of context
• Drilling on paper-and-pencil algorithms
• Teaching topics in isolation
• Stressing memorization
• Being the dispenser of knowledge
• Testing for the sole purpose of assigning grades

Algebraic Concepts

According to the National Center for Education Statistics (2003), America’s schools are not producing the math excellence required for global economic leadership and homeland security in the 21st century. All students need higher-level math and reasoning skills in order to be successful in today’s technological society. The NCTM standards indicate that All students need to develop reasoning and problem-solving skills built upon exploration, modeling, describing/conjecturing, explaining and generalizing (Pennsylvania Council of Teachers of Mathematics 2004). As such, understanding of algebraic concepts is essential.

Pre-algebra and algebra courses provide a foundation for more advanced mathematics and science study. Research has shown that a function-centered and geometry-rich algebra curriculum infused with technology and based on investigation and exploration of challenging problems in a non-threatening environment can be a big help in the movement to make algebra accessible to all—without sacrificing mathematical rigor and challenge (PCTM 2004).

CompassLearning Odyssey Math K–8

CompassLearning Odyssey Math is based on NCTM standards and provides a high-interest, age-appropriate curriculum for students K–8. Curriculum and instruction reflect those areas listed above that NCTM has recommended for increased attention.

Odyssey math solutions:
• Harnesses the power of technology to create a stimulating learning environment.
• Offer a high level of interactive experience.
• Encourage higher-order thinking and problem-solving skills.
• Help students develop and maintain mathematical skills.
• Introduce students to collecting and analyzing data.
• Introduce algebraic and geometric concepts.
• Help students make the connection between math and other content areas.

Pre-Algebra Concepts in Odyssey Math
Pre-algebra concepts are introduced throughout the Odyssey Math curriculum using real-world content to demonstrate concepts and develop students’ mathematical skills.
Students explore the world of math with stimulating activities that relate to and build upon their prior experience or knowledge. Lessons integrate a skill building and a problem solving approach with procedural and conceptual knowledge. A variety of online tools include but are not limited to graph paper, geoboards, number lines, protractors, spreadsheets, and rulers. Many offline learning activities provide follow-up and review to complete the learning cycle.

**CompassLearning Algebra**

CompassLearning Odyssey Algebra is a part of the total math solution for middle level and secondary education. It helps educators provide a balanced approach to math education that supports a variety of instructional strategies and learning styles. Odyssey Algebra offers a complete learning experience, including direct instruction, exploratory activities, opportunities for targeted practice, interactive self-paced learning, online and offline activities, and consistent feedback and guidance to ensure students stay on the learning path to achievement.

Odyssey Algebra is geared toward middle school students and remediated secondary students. The activities—as a whole, equivalent to a course—parallel the material in the AGS Publishing Algebra textbook (Haenisch 2004). Odyssey Algebra may be used in conjunction with the AGS textbook or as a standalone course.

Odyssey Algebra integrates direct instruction with self-paced learning, independent navigation with motivational purpose, and specific strategy cards. Strategy cards are “pop-up” onscreen text and visuals and are included to address the different learning styles of students. They include a variety of high-interest mathematical facts, tips, reminders in various manners, and provide additional support and assistance as well as keeping students focused. They assist in creating a rich and meaningful learning environment.

Odyssey Algebra is divided into 13 chapters; each chapter contains 6–12 lessons, including an “application of content” lesson. Although the chapters and lessons are organized in an instructional sequence according to the AGS textbook, the activities are modular and can be used individually at any time.

The course addresses 131 objectives. Each objective has at least one corresponding online activity, a downloadable student packet and teacher’s key, and a randomly generated quiz. There are scored and exploratory instructional activities, writing prompts as well as sections from the AGS Algebra textbook. Students with various learning modalities benefit from the individual and collective components of the online activities: warm-up exercise, “lesson-at-a-glance,” a contextual introduction, guided instruction and practice, a summary, and challenge questions.

**III. Student-Centered Instruction**

**The Research**

Traditionally, instructional design has centered on ensuring the content of a subject was presented effectively. Today, however, much research exists about the effectiveness of student-
centered instruction, which focuses on presenting material in a way that ensures students of all learning abilities and styles are able to learn and understand the content.

Howard Gardner proposed the concept that different students learn in different ways. This theory of **multiple intelligences** identifies eight kinds of “intelligences”:

- **Verbal-Linguistic**—The ability to use words and language.
- **Logical-Mathematical**—The capacity for inductive and deductive thinking and reasoning, as well as the use of numbers and the recognition of abstract patterns.
- **Visual-Spatial**—The ability to visualize objects and spatial dimensions and create internal images and pictures.
- **Body-Kinesthetic**—The wisdom of the body and the ability to control physical motion.
- **Musical-Rhythmic**—The ability to recognize tonal patterns and sounds, as well as sensitivity to rhythms and beats.
- **Interpersonal**—The ability to discern other people’s moods and communicate with others.
- **Intrapersonal**—The ability to know one’s own strengths and weaknesses.
- **Naturalist**—The ability to understand nature and the environment (On Purpose Associates 2001).

Content-centered and student-centered instruction can complement each other to ensure that instructional strategies provide content and instruction in ways that support students’ multiple intelligences.

Robert Gagne (1985) proposed a traditional instructional design that works seamlessly with today’s technology to promote learning across intelligences:
Gagne’s Principles of Instructional Design
1. Gaining attention—Give the learner a stimulus.
2. Telling learners the learning objective—Tell the learners what they will be able to do because of the instruction.
3. Stimulating recall of prior learning—Ask for recall of existing relevant knowledge.
4. Presenting the stimulus—Display the content.
5. Providing learning guidance—Help understanding by providing organization and relevance.
7. Providing feedback—Give informative feedback about the learner's performance.
9. Enhancing retention and transfer to other contexts—Provide varied practice to generalize the capability.

Direct Instruction is also an essential strategy for many struggling students. The Madeline Hunter model is one framework for direct instruction (Allen 1998a). The main components of direct instruction include:

2. Anticipatory Set—Relate experiences of students to objectives of lesson.
3. Teaching/Presentation—Input necessary information.
   a. Model the application of the information.
   b. Check for understanding.
   c. Provide practice in non-scored activity.
   d. Close.
4. Independent Practice—Reinforcement and scored practice.

Differentiated Instruction is a more current instructional theory that focuses on the individual student’s learning style and suggests that instruction be “differentiated” or varied by difficulty and method of presentation to challenge students at different readiness levels. This differentiation should occur through three modes (Hall n.d.):

Content
- Several elements and materials are used to support instructional content.
- Tasks and objectives are aligned to learning goals.
- Instruction is concept-focused and principle-driven.

Process
- Flexible grouping is consistently used.
- Classroom management benefits students and teachers using differentiated instruction.
Products
- Initial and on-going assessment of student readiness and growth are essential.
- Students are active and responsible explorers.
- Expectations and requirements for student responses vary.

**Tiered Instruction** is another method that addresses learning differences. Several groups of students work on the same concept or outcome but at different ability levels. Students may be asked to complete different tasks or the same tasks with varying degrees of assistance from the teacher.

Critical thinking skills are also crucial to successful learning. **Benjamin Bloom’s Taxonomy of Educational Objectives** is often used as guideline for promoting questioning/critical thinking strategies (Allen 1998b):

1. Knowledge—Asks student to recognize or recall information.
2. Comprehension—Asks student to demonstrate student has sufficient understanding to organize and arrange material mentally.
3. Application —Asks student to apply previously learning information to reach an answer.
4. Analysis—Requires student to think critically and in depth (higher order).
5. Synthesis—Asks student to perform original and creative thinking (higher order).
6. Evaluation—Does not have a single correct answer (higher order).

**Scaffolding** provides a structure for student research and understanding. According to Jamie McKenzie (2004), scaffolding:

- Provides clear directions.
- Clarifies objectives and standards.
- Keeps students on task. Scaffolded lessons provide examples of quality work done by others.
- Offers assessment (rubrics) to clarify expectations.
- Points students to worthy sources.
- Reduces uncertainty, surprise, and disappointment through rubrics and examples.
- Delivers content efficiently to eliminate distractions and frustration.
- Creates momentum, channels energy.

**McCarthy 4-MAT Cycle of Learning**
Odyssey Math incorporates the McCarthy 4-MAT cycle of learning in its design. McCarthy (1996) provides an explicit articulation of the cycle of learning and the phases required for effective instruction. McCarthy approached this idea from a consideration of student learning styles but concluded that while learners may have preference for various approaches to learning, effective instruction requires students to be involved in the whole cycle of learning activities.
The 4-MAT system uses both right and left brain processing techniques and meets the needs of all learners by teaching in more than one way.

Phase 1— Activation
Students share what they know and try to find meaning related to the new material they will learn.

Phase 2— Demonstration
Students acquire new knowledge and relate it to what they already know.

Phase 3— Application
Students use what they know to do something, make something, or play with the ideas.

Phase 4— Integration
Students make the knowledge their own.

David Merrill’s Instruction Transaction theory is a linear model of instructional design that includes diagnostic testing at the unit level more supplementary instruction, and more learner control over the selection of instructional strategies. Basing his theory on Reigeluth’s Elaboration Theory, Merrill believes learning is best when there is a progression of problems to solve and when the problems start easy and then get harder and harder (Merrill 2001). The Elaboration Theory is a model advocating a progression of successively more complex problems (Reigeluth 1999).

Sometimes it is difficult to find a simple version of a complex problem. In this situation the teacher must actually do some of the problem solving for the students (model and guided learning) and help the students accomplish the remaining tasks or operations. Each successive problem requires students to do more and more of the operations and tasks.

Merrill believes that:
- Learning is facilitated when learners are engaged in solving real-world problems.
- Learning is facilitated when existing knowledge is activated as a foundation for new knowledge.
- Learning is facilitated when new knowledge is demonstrated to the learner.
- Learning is facilitated when new knowledge is applied by the learner.
- Learning is facilitated when learners are engaged at the problem or task level not just the operation or action level.
- Learning is facilitated when learners solve a progression of problems that are explicitly compared to one another (Merrill 2001).

CompassLearning Odyssey Mathematics
- Direct Instruction—specifically the Hunter Model—is an essential component of Odyssey Math. Before reading a selection, students have an opportunity to activate prior knowledge about the topic so they can link new information in the selection with a known concept. Odyssey Math provides students with an engaging, audio and graphics-
rich preloader activity that allows them to participate in interactive activities that appeal to their multiple intelligences.

- **The 9 Principles of Instructional Design** (Gagne 1985) provide the basis for overall instructional design. Objectives are clearly stated, directions are broken into parts/steps, and a maximum of three are presented at a time. The instructions are given in the correct sequence immediately before the activity. In the primary grades, they are given visually as well as orally. To check for understanding, comprehension questions follow that relate directly to the main idea.

- **Bloom’s Taxonomy** of Educational Objectives is the basis for the questioning techniques, which require students to think critically.

- **Skill and mechanics mastery** are provided in intermediate grades as a way to improve comprehension. Opportunities for exploration, discovery, and problem solving as well as guided work are included to ensure retention.

- **Differentiated instruction** varies by difficulty and method of presentation to challenge students at different readiness levels. Text, graphics, and sound accompany most activities for visual and auditory learners.

- **Scaffolding** prepares students to complete learning tasks on their own by developing problem-solving skills and decreasing assistance as their ability improves. Writing prompts in various content areas require higher-order thinking skills.

- **Tiering** modifies instruction and level of difficulty based on results of the Explorer or custom assessment.

- **A spiraled curriculum** ensures that important skills and concepts are reintroduced throughout different levels with increasing difficulty to ensure mastery and retention.

- **Technology and active learning lessons** address the wide variety of learning modalities—visual, auditory, tactile, and kinesthetic—characteristic of today’s learners.

- **Merrill’s Instruction transaction theory** is also one basis of instructional design used in creating individual activities and learning paths in Odyssey Math. Odyssey Math activities are designed in a sequence that supports student learning and guides them through progressively more difficult processes and problems. Guided practice follows a sequence from frame to frame: 1) Gain attention of the learner (animated title screen, short music loop); 2) State instructional outcome so the student knows the goal of the lesson; 3) Model a sample problem using metacognition strategies (thinking about thinking) to have children analyze problems step by step during instruction; 4) Provide guided practice in which the student practices on 5 to 7 questions with corrective feedback; 5) Closure via a summary that explains what the student learned in the lesson.

- **Online and offline** activities provide materials in various media to address students’ different learning styles.

### IV. Standards-Based Assessment and Reporting for Data-Driven, Informed Instruction

**The Research**
No Child Left Behind is designed to change the culture of America's schools by closing the achievement gap, offering more flexibility, giving parents more options, and teaching students based on what works. Under the act's accountability provisions, states must describe how they will close the achievement gap and make sure all students, including those who are disadvantaged, achieve academic proficiency. They must produce annual state and school district report cards that inform parents and communities about state and school progress. Curricular materials must be developed based on scientific research. Student progress must be closely monitored and detailed reporting of performance must be available (U.S. Department of Education, NCLB 2004d).

Odyssey Math
CompassLearning Odyssey Math solutions are part of the Odyssey total solution, a three-part solution that 1) assesses student performance through standards-based Explorer or state customized tests; 2) automatically prescribes appropriate, sequentially designed learning path of curriculum activities and assessment; and 3) reports the progress of students individually and in groups. Odyssey Manager unites the three parts into a cohesive whole by managing all student, assessment, curriculum, and reporting data to inform the classroom teacher of student progress.

In a classroom of developing mathematicians, teachers must constantly monitor performance to provide appropriate instruction. With the Odyssey solution, both students and teachers can easily track mastery through initial assessment with CompassLearning Explorer or customized tests, and embedded assessment throughout activities. Odyssey Manager provides users with a variety of reports that indicate student progress. The management system frees up teacher and administrator time for more one-on-one contact with students. Disaggregated reporting, as well as multi-school administration reports, keep administrators abreast of areas of weakness and address them through curriculum and professional development solutions within the school.

- CompassLearning Explorer assessment test or customized state tests assess student mastery.
- Each student is then automatically placed in a carefully sequenced, individualized, prescribed learning path of activities and assessment via Odyssey Manager.
- The assessment is standards-based to address each state’s standards, and is based on the custom Explorer objectives and teacher practice items in addition to continuously updated state and national assessment objectives. This significant feature helps prepare students for high-stakes testing.
- An abundance of scored activities follow to provide practice for the student, and data for the teacher to make informed instructional decisions. Exploratory activities that are not scored, scoring embedded within activities, scored lesson quizzes, and scored chapter tests are provided.

V. Technology as a Strategy for Creating Literate Students
Technology plays an important role in education as a means to deliver information and instruction. When used appropriately, technology can help create effective learning environments and support student achievement. Technology’s dynamic, visual, and spatial format allows students to explore the world from multiple perspectives (Wilson et al 1993).

Title II of the No Child Left Behind Act addresses the important role technology plays in student achievement as well as in preparing students for their future roles in society. Use of technology by teachers is crucial (U.S. Department of Education 2004c). The primary goal of the Enhancing Education through Technology Act of 2001 also aims at improving student achievement (U.S. Department of Education 2004a):

- Through the use of technology as a teaching strategy in elementary and secondary schools.
- By helping every student become technologically literate by the end of the eighth grade.

The International Society for Technology in Education (ISTE) has detailed the standards for technology proficiency required in education for both teachers and students (ISTE 2004). The significance of technology as a learning strategy is also supported by research into modern learning styles that have evolved due to technology. Educator David Thornburg calls today’s students the “Millennial Generation.” This generation was born within the 10 years around “Y2K” and has grown up in the Information Age. Consequently, they often exhibit the following characteristics.

- Lower threshold of boredom
- Used to doing things more quickly
- Used to multitasking
- Used to using more of their senses simultaneously with multimedia
- Used to using critical thinking in games
- Used to constant feedback and high interactivity of games
- Used to competition and immediate gratification
- Used to immersive simulation and role playing
- Like digital jewelry—wearable and portable technology such as ipods, portable CD and DVD players, Mp3 players, mobile phones with cameras, and handhelds.

Instructional technology is an effective strategy for teaching these students because technology:

1. Makes learning more interactive, more enjoyable, more customizable.
2. Improves students’ attitudes toward content and their interest in learning.
3. Offers opportunities for learner control, increased motivation, and connections to the real world.
4. Helps students investigate and answer complex questions; develop thinking skills; and learn to access, sort, evaluate, and synthesize information. It is a powerful tool for assembling, modifying, assessing, manipulating data, and generating deep understanding.
5. Helps students set goals, form and test hypotheses, and make discoveries on their own.
6. Offers tools to share knowledge and learn cooperatively instead of individually, which is important for students of all learning styles.
7. Makes students more efficient and more organized.
8. Helps students clarify their questions, find answers, and determine validity, appropriateness, and perspective.
9. Enables students to communicate in new ways with peers, experts, and others in the world.
10. When used to support classroom instruction, improves student achievement as indicated by increased standardized tests scores (Thornburg 2004).

Technology also provides writers a tool in the composing process, the flexible use of texts, and in presenting new knowledge in combination with other media. Equitable access to technology is a key variable in student experience with and use of this tool (NCTE 2004).

Odyssey Math
CompassLearning Odyssey project-based, hands-on activities tap into students’ curiosity and promote problem-solving and higher order thinking skills. Odyssey solutions address the characteristics of today’s young people by offering a rich learning environment that provides the visual, audio, and intellectual stimulation they need to stay focused, stay motivated, and achieve.

Odyssey Math provides:
- **Automatic assessment** and placement into appropriate learning paths.
- Automatic branching to remediation in discrete activities and in learning paths for students who need additional instruction.
- **Active Learning Lessons** that address the wide variety of learning modalities: visual, auditory, tactile, and kinesthetic that are characteristic of today’s learners.
- **Preloader** screen with audio and graphics that provide an “anticipatory set” for students who able to participate in interactive activities that appeal to multiple intelligences.
- **An abundance non-scored activities** that provide guided practice for the student, and then are followed by scored practice for reinforcement and to provide data for the teacher to make informed instructional decisions.
- Opportunities for exploration, discovery and problem-solving as well as guided work to ensure retention.
- A balance of online and offline activities to provide a wide variety of media to meet students’ individual learning styles.
- **Multiple real-time reports** for students, parents, teachers, and administrators

Combining the knowledge about math learning with the advantages of the technology increases the benefits for administrators, instructors, and students. Technology allows automatic branching of students to prescribed, individualized, theory-based instruction and allows a wide
variety of instructional approaches because they are prepared and administered electronically and do not require intensive preparation by the teacher. This allows a seamless blending of theories that tend to complement each other when combined through technology. Such a wide utilization of methods to meet individual student needs would be impossible without the aid of computer-based curriculum and assessment.
## CompassLearning Odyssey Math
### Online Learning Activities

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CompassLearning, Inc.
References


http://www.aboutlearning.com/

http://www.fno.org/dec99/scaffold.html

Merrill, M. (2001) First principles on instruction. Utah State University. Available online: 
http://www.id2.usu.edu/Papers/5FirstPrinciples.PDF


National Center for Education Statistics. (NCES) (2003). The nation’s report card. Available online: 

National Council of Teachers of English. (2004). Writing initiative. What research says about writing. Available online: 
http://www.ncte.org/prog/writing/research

http://standards.nctm.org


http://www.ncrel.org/sdrs/areas/issues/envrmnt/drugfree/sa3const.htm

http://www.funderstanding.com/multiple_intelligence.cfm

http://funderstanding.com/piaget.cfm

http://www.papert.org/articles/ComputersInClassroom.html

http://www.pctm.org/AlgebraForAll.htm


Biography

Dr. Gloria Moss, an English, drama and teacher education instructor for over two decades, has taught grades pre-school through graduate school in urban and suburban schools in Pennsylvania, New York and Florida. Dr. Moss has served as a high school English Department Chairperson, ESOL trainer, education technology specialist and new teacher supervisor for the School Board of Broward County Florida. At the university level, she has served as an adjunct university professor in the undergraduate and graduate schools of Barry University and Florida Atlantic University, and Broward Community College. In addition, she was the Director of the South Florida Writing Project, a cooperative professional development project between the College of Liberal Arts at Florida Atlantic University and the Curriculum Department of the School Board of Broward County. At present she serves as the Director of Product Marketing for CompassLearning.

Dr. Moss received her Ph.D. from New York University and her certification in Education Administration from Florida Atlantic University. Her doctoral research on the effectiveness of instruction through use of the arts in education received an award from the Children’s Theatre Association. She has published articles on English, drama and cross-curricular education in journals of the National Council of Teachers of English, the Children’s Theatre Association and the National Council of the Social Studies.