

**Grade: 8**    **Mathematics Lesson/Unit Title:**  
▶ **enVisionmath2.0 Grade 8**  
▶ **Topic 6 Congruence and Similarity**

## I. Alignment to the Depth of the CCSS

*The lesson/unit aligns with the letter and spirit of the CCSS:*

- Targets a set of grade-level CCSS mathematics standard(s) to the full depth of the standards for teaching and learning.
  - ▶ **enVisionmath2.0** Grade 8 Topic 6, Congruence and Similarity, focuses on analyzing transformations (translations, reflections, rotations, dilations), understanding congruent and similar figures, understanding angle relationships among angles formed by parallel lines and a transversal, the interior/exterior angles of a triangle, and Angle-Angle (AA) triangle similarity as called for in the Grade 8 Common Core Standards. Topic 6 focuses on Major Cluster 8.G.A – Understand congruence and similarity using physical models, transparencies, or geometry software.
  - ▶ In Lessons 6-1 through 6-4, students understand and describe translations, reflections, rotations, and sequences of transformations on two-dimensional figures. (8.G.A.1a, 8.G.A.1b, 8.G.A.1c, 8.G.A.3)
  - ▶ In Lesson 6-5, students understand and identify congruent figures using a series of transformations. (8.G.A.2, 8.G.A.3)
  - ▶ In Lessons 6-6 and 6-7, students understand dilations and similarity. Two-dimensional figures are similar if there is a sequence of translations, reflections, rotations, and dilations that map one figure onto the other. (8.G.A.3, 8.G.A.4)
  - ▶ In Lessons 6-8 through 6-10, students understand the relationships of angles formed by parallel lines and a transversal, understand the relationship of the interior angles of a triangle, and determine whether triangles are similar. They find unknown angle measures and solve problems involving similar triangles. (8.G.A.5)
- Standards for Mathematical Practice that are central to the lesson are identified, handled in a grade-appropriate way, and well connected to the content being addressed.
  - ▶ **enVisionmath2.0** (Grades K–8) infuses math practices during instruction, practice, and assessment and provides opportunities to focus on specific math practices. Math practices are habits of mind, processes, and dispositions that enable a learner to understand mathematics and to use mathematics with understanding. The program identifies questions for each math practice. Math practices are infused and discussed on a daily basis starting from Day 1. In Grades 6–8, special *3-Act Mathematical Modeling* lessons are also provided as opportunities to focus on specific math practices. Math practice boxes in the *Visual Learning Bridge* include questions and comments related to the math practices and specially flagged comments and problems in all lessons focus on specific math practices. Math practices are assessed with the content standards, and a rubric is provided for assessing students’ overall proficiency with each math practice.
  - ▶ **Math Practices and Problem Solving Handbook** This handbook at the front of the Student’s Edition provides instruction on math practices and problem solving. Refer students to appropriate parts of it anytime during a teachable moment. The Teacher’s Edition provides support for developing, connecting, and assessing each math practice. (See Student’s/Teacher’s Edition pp. F13–F27 and *Teacher’s Edition Program Overview* (Grades 6–8) pp. 44–47.)
  - ▶ **Math Practices Posters and Animations** There is a poster and animation for each math practice. They can be used anytime throughout core instruction as an aid to support discussion of a specific math practice.
  - ▶ **Core Instruction Driven by a Marriage of Content and Math Practices** Math practices are infused and explicitly highlighted in lesson instruction. First, comments related to math practices are given during problem-based learning. Then the thinking involved in math practices is modeled during direct instruction. (As an example, see Grade 8 Teacher’s Edition pp. 303A–305)
  - ▶ **3-Act Mathematical Modeling Lessons** Each Grade 6–8 topic includes a lesson that focuses on mathematical modeling and specifically applies math practices. To enhance proficiency with math practices, the lesson offers

opportunities to reflect on thinking related to math practices while solving a rich problem. (See Grade 8 Teacher's Edition p. 323–324)

- ▶ **Math Practices in Problems** All math tasks evoke the selection, use, and management of multiple math practices. In the Student's and Teacher's Editions, red type is used to highlight problems that lend themselves to a discussion of a specific math practice.
- ▶ **Math Practices in Assessment** The program assesses math practices with content standards and provides a rubric in the Teacher's Edition and in the *Assessment Sourcebook*. (See Grade 8 Teacher's Edition p. F14–F15) Math Practices are also assessed in *Topic Performance Assessments*. (See Grade 8 Teacher's Edition pp. 371C–371D)
- ▶ **Math Practices within Lessons** Math practices and content standards are connected within all lessons. The following are examples of how math practices are connected to content standards within Grade 8 Topic 5.
  - MP.1 Make sense of problems and persevere in solving them.** Students persevere as they reflect shapes and name coordinates of vertices. (e.g., p. 308, Item 11)
  - MP.2 Reason abstractly and quantitatively.** Students use reasoning to analyze figures and determine if a reflection has occurred. (e.g., p. 307, Item 8)
  - MP.3 Construct viable arguments and critique the reasoning of others.** Students construct arguments as they describe what happens to the side lengths and angle measures of translated figures. (e.g., p. 300, Item 2)
  - MP.4 Model with mathematics.** Students model with math when they use graphs to represent transformations including translations and rotations. (e.g., p. 319, Item 8)
  - MP.5 Use appropriate tools strategically.** Students choose appropriate tools to determine which angles have equal measures. (e.g., p. 345, Solve & Discuss It!)
  - MP.6 Attend to precision.** Students attend to precision when they describe angle measures and side lengths in similar figures. (e.g., p. 342, Item 2)
  - MP.7 Look for and make use of structure.** Students use structure when using angle measures to determine if two lines are parallel. (e.g., p. 349, Item 4)
  - MP.8 Look for and express regularity in repeated reasoning.** Students generalize when they describe what happens to each point of a figure and its image when translated. (e.g., p. 300, Item 3)

○ Presents a balance of mathematical procedures and deeper conceptual understanding inherent in the CCSS.

- ▶ **Conceptual Understanding: Understand Properties of Transformations** In Grade 8 Lesson 6-1, students understand the concept of translating figures and how the resulting images are related to the preimages. In Lesson 6-2, students understand the concept of reflecting figures and recognize how the image is a flip of the preimage and that the two figures are an equal distance away from the line of reflection. In Lesson 6-6, students develop their understanding of dilation when enlarging or reducing figures in a coordinate plane.
- ▶ **Conceptual Understanding: Identify Congruent Figures** In Grade 8 Lesson 6-5, students recognize that congruent images are created by a sequence of reflections, rotations, and translations.
- ▶ **Conceptual Understanding: Recognize Angle Relationships** In Grade 8 Lesson 6-8, students recognize that a transversal intersecting parallel lines forms a set of angles. They learn that within this set of angles, there are angle-pair relationships that can be used to categorize and determine the measurements of unknown angles. In Lesson 6-9, students apply these angle-pair relationships to understand and generalize the relationships among the interior and exterior angles of triangles.
- ▶ **Procedures: Find Missing Angle Measures** In Grade 8 Lessons 6-8 and 6-9, students use their understanding of angle-based relationships to determine missing angle measurements in different situations.

## II. Key Shifts in the CCSS

*The lesson/unit reflects evidence of key shifts that are reflected in the CCSS:*

- **Focus:** Lessons and units targeting the major work of the grade provide an especially in-depth treatment, with especially high expectations. Lessons and units targeting supporting work of the grade have visible connection to the major work of the grade and are sufficiently brief. Lessons and units do not hold students responsible for material from later grades.

- ▶ **Focus Within a Grade: Focus on Common Core Clusters** One or more topics in **enVisionmath2.0** (Grades K–8) focus on each Common Core cluster. Grade 8 Topic 6 focuses on Major Cluster 8.G.A: Understand Congruence and similarity using physical models, transparencies, or geometry software. Grade 8 Topic 6, Congruence and Similarity, focuses on analyzing transformations (translations, reflections, rotations, dilations), understanding congruent and similar figures, understanding angle relationships among angles formed by parallel lines and a transversal, the interior/exterior angles of a triangle, and Angle-Angle (AA) triangle similarity.
- ▶ **Focus Within a Topic: The Focus of a Topic** At the start of a topic, one or more *Essential Questions* help students focus on key ideas in the topic. The Grade 8 Topic 6 *Essential Question* is, “How can you show that two figures are either congruent or similar to one another?”
- ▶ **Focus Within a Lesson: The Focus of a Lesson** Some of the elements of a lesson that help teachers focus students’ attention on important lesson ideas include the *Lesson Essential Question*, the *Visual Learning Bridge* and its digital counterpart the *Visual Learning Animation Plus* and other interactive examples, *Try It!*, *Convince Me!*, and the *Key Concept*.

- **Coherence:** The content develops through reasoning about the new concepts on the basis of previous understandings. Where appropriate, provides opportunities for students to connect knowledge and skills within or across clusters, domains and learning progressions.

- ▶ *Essential Understandings* are the conceptual underpinnings of **enVisionmath2.0** (Grades K–8) and provide conceptual cohesion of the content. *Essential Understandings* connect throughout the program. Two *Essential Understandings* that connect most of the work in Grade 8 Topic 6 Major Cluster 8.G.A are that a sequence of translations, reflections, and rotations can map one figure to another without changing its shape or size (congruence) and two-dimensional figures are similar if there is a sequence of translations, reflections, rotations, and dilations that map one figure onto the other.

- ▶ **How does Grade 8 Topic 6 connect to what students learned in Grades 6 and 7?**

**Geometry** In Grade 6, students represented polygons on the coordinate plane. (6.G.A.3) In Grade 7, students drew, constructed, and described geometrical figures and the relationships between them. They solved real-life and mathematical problems involving angle measure, area, surface area, and volume. (7.G.A.1, 7.G.A.2, 7.G.B)

- ▶ **How is content connected within Grade 8 Topic 6?**

**Transformations** In Lesson 6-1, students learn to translate a figure. In Lesson 6-2, students verify the properties of a reflection while identifying and performing reflections. In Lesson 6-3, students apply the properties of center of rotation and angle of rotation to create images. In Lesson 6-4, students describe sequences of transformations applied to a variety of shapes. In Lesson 6-6, students understand dilations and make sense of scale factors. (8.G.A.1a, 8.G.A.1b, 8.G.A.1c, 8.G.A.3)

**Congruent and Similar Figures** In Lesson 6-5, students apply their understanding of translations, reflections, and rotations to determine congruency by identifying the transformations that produced two figures. In Lesson 6-7, students understand and verify similarity of figures. (8.G.A.2, 8.G.A.3, 8.G.A.4)

**Angle Measurements** In Lesson 6-8, students learn about the relationships of angles that are formed by parallel lines and a transversal. In Lesson 6-9, students apply that knowledge to determine missing measurements in the interior and exterior angles of a triangle. In Lesson 6-10, students find angle measurements using triangle similarity. (8.G.A.5)

- ▶ **How will Grade 8 Topic 6 connect to what students will learn in high school?**

**Transformations, Similarity, and Congruence** In high school geometry, students build on Grade 8 Topic 6 concepts to experiment with transformations in the plane, understand congruence in terms of rigid motions, and understand similarity in terms of similarity transformations. (HSG.CO.A, HSG.CO.B)

- **Rigor:** Requires students to engage with and demonstrate challenging mathematics with appropriate balance among the following:

- **Application:** Provides opportunities for students to independently apply mathematical concepts in real-world situations and solve challenging problems with persistence, choosing and applying an appropriate model or strategy to new situations.

- **Conceptual Understanding:** Develops students’ conceptual understanding through tasks, brief problems, questions, multiple representations and opportunities for students to write and speak about their understanding.
- **Procedural Skill and Fluency:** Expects, supports and provides guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately.

▶ **Rigor in enVisionmath2.0 Grade 8 Topic 6**

**Lesson 6-1, Analyze Translations** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students explore the relationship between translated figures and discover the rules that govern translations. Students translate two-dimensional figures and explore how the properties of the figures are affected or unaffected.

**Lesson 6-2, Analyze Reflections** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students will understand the concept of reflecting figures and how the resulting images are related to the preimages. Students will practice reflecting figures and explore the properties of the resulting images.

**Lesson 6-3, Analyze Rotations** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students will understand the concept of rotating figures and how the resulting images are related to the preimages. Students will practice rotating preimages into images, and consider and explore any changes in properties.

**Lesson 6-4, Compose Transformations** – This lesson emphasizes a blend of procedural skill and fluency and application. Students will practice transforming a preimage into its image through a sequence of steps and explore whether the order of the transformations leads to different answers. Students will apply their understanding of transformations and how to use them in sequence to solve problems involving floor plans.

**3-Act Mathematical Modeling: Tricks of the Trade** – This mathematical modeling lesson focuses on application of both math content and math practices and processes. Students draw on their understanding of geometry concepts to develop a representative model. Students apply their mathematical model to test and validate its applicability to similar problem situations.

**Lesson 6-5, Understand Congruent Figures** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students apply their understanding of translations, reflections, rotations, and sequences of transformations to identify congruent figures.

**Lesson 6-6, Describe Dilations** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students apply their understanding of preimage and image to learn the concept of dilation. Students find the scale factor of a dilation.

**Lesson 6-7, Understand Similar Figures** – This lesson emphasizes a blend of procedural skill and fluency and application. Students examine graphs of transformations to identify information to accurately solve problems. Students apply their understanding of graphs and coordinates to find required transformations.

**Lesson 6-8, Angles, Lines, and Transversals** – This lesson emphasizes a blend of conceptual understanding and procedural skill and fluency. Students understand that the intersection of parallel lines and a transversal creates sets of angles whose measures have a relationship. Students draw conclusions about angles formed when parallel lines are cut by a transversal.

**Lesson 6-9, Interior and Exterior Angles of Triangles** – This lesson emphasizes a blend of conceptual understanding and application. Students learn how the interior angle measures and exterior angle measures of triangles are related. Students apply the concept of triangle-angle relationships to solve problems.

**Lesson 6-10, Angle-Angle Triangle Similarity** – This lesson emphasizes a blend of procedural skill and fluency and application. Students become fluent in comparing angle measures in two triangles to determine if they are similar. Students apply the concepts of triangle similarity to find the measures of angles in similar triangles.

▶ **Rigor embedded in the enVisionmath2.0 (Grades 6–8) Instructional Model**

enVisionmath2.0 (Grades 6–8) lessons reflect a core instructional model that supports rigor.

**In Step 1 (Develop: Problem-Based Learning)**, the Solve & Discuss It!, Explain It!, or Explore It! problem helps students connect what they know to new ideas embedded in the problem. When students make these connections, conceptual understanding emerges. For example, in Grade 8 Lesson 6-5, p. 325, students extend their understanding of transformations to understand congruence.

**In Step 2 (Develop: Visual Learning)**, teachers use the *Visual Learning Bridge*, *Visual Learning Animation Plus* and other interactive examples, and the *Key Concept* to make important lesson concepts explicit by connecting them to students' thinking and solutions from Step 1. Students demonstrate procedural skill when the procedures make sense to them. Students have an opportunity to demonstrate **procedural skill** and also **apply** their understanding through *Do You Understand?*, *Do You Know How?*, and *Practice & Problem Solving*. **Application** opportunities are provided through rich, real-world problems in each lesson. For example, see Grade 8 Lesson 6-9, pp. 354–358.

**In Step 3 (Assess & Differentiate)**, teachers can assess student understanding in the *Lesson Quiz*, and provide students with a variety of opportunities to apply and reinforce understanding in the *Reteach to Build Understanding*, *Additional Vocabulary Support*, *Build Mathematical Literacy*, *Enrichment*, *Additional Practice*, *Math Tools Activities*, and *Games*. (See Grade 8 Teacher's Edition, pp. 358A–358B)

▶ **enVisionmath2.0 (Grades 6–8) Steps to Fluency Success**

Each *Fluency Practice* activity is in one of the following formats: *Pathfinder*, *Hidden Clue*, *Crisscrossed*, or *Riddle Rearranging*. These activities can be used for practice on fluency subskills, for maintenance, or for assessment. *Math Diagnosis and Intervention System 2.0* lessons provide remediation for students who struggle with a fluency standard. (See Grade 8 Teacher's Edition p. 371 and *Teacher's Edition Program Overview (Grades 6–8)* pp. 64–65)

### III. Instructional Supports

*The lesson/unit is responsive to varied student learning needs:*

- Includes clear and sufficient guidance to support teaching and learning of the targeted standards, including, when appropriate, the use of technology and media.

▶ **Grade 8 Topic 6 Teacher's Edition Topic Overview** (pp. 292A–292H) provides specific information on how the topic content supports Focus, Coherence, and Rigor. These pages support an in-depth understanding of the Common Core Standards for the topic.

▶ Each **Lesson Overview** (for example, Grade 8 Lesson 6-1, p. 297A) includes lesson-specific instructional support for Focus (Domain, Cluster, Content Standard, and Mathematical Practice), Coherence, and Rigor. Explicit ELL instruction to use with a specific part of each lesson is also provided. (For example, Grade 8 Teacher's Edition Lesson 6-1, p. 299)

▶ **Online lesson planning** supports lesson customization ability to upload content that is important to district initiatives.

▶ A **Professional Development Video** for each topic is provided online at PearsonRealize.com. In this *Topic Overview Video*, an author highlights and gives helpful perspectives on important mathematics concepts and skills in the topic.

▶ The online **Listen and Look For Lesson Videos** provide important information about lessons in the topic.

▶ **Extensive teaching notes** support every part of every daily lesson, all lesson and topic student resources, and assessments in the topic. These include blue guiding questions to stimulate classroom discourse, incorporating math practices, preventing misconceptions, supporting coherence, error intervention, and analyzing student work. Each lesson also includes comprehensive print and digital resources to assess and differentiate to keep all students engaged and on track. (For example, Grade 8 Teacher's Edition Lesson 6-2, pp. 303A–308B; Lesson 6-6, pp. 333A–338B)

- Uses and encourages precise and accurate mathematics, academic language, terminology and concrete or abstract representations (e.g., pictures, symbols, expressions, equations, graphics, models) in the discipline.

▶ **Vocabulary lists** for each topic are provided in the Student's Edition (Grade 8 Topic 6, p. 292). Students encounter new vocabulary in meaningful ways as they explore concepts in the lessons. The Teacher's Edition provides vocabulary activities at the start of topics (Grade 8 Teacher's Edition Topic 6, pp. 295–296). These include activities for vocabulary in *Review What You Know* and *Build Vocabulary*. Each lesson also includes an *Additional Vocabulary Support* Blackline Master.

▶ **Vocabulary review** is provided at the end of each topic, (Grade 8 Topic 6, p. 365). It reviews vocabulary used in the topic.



- ▶ A bilingual **glossary** is provided at the back of the Student’s Edition and online to build understanding of math vocabulary.
  - ▶ An **online vocabulary game** is available in the *Game Center*.
  - ▶ Students are encouraged to represent their thinking with concrete and abstract representations throughout Grade 8 Topic 6. Students use visual models including drawings and illustrations for understanding transformations. They use coordinate grids, triangles, parallel lines cut by a transversal, and equations to explore translations, reflections, rotations, dilations, congruency and similarity, and angle measures. (For an overview, see Teacher’s Edition pp. 292A–292F.)
- Engages students in productive struggle through relevant, thought-provoking questions, problems and tasks that stimulate interest and elicit mathematical thinking.
    - ▶ **enVisionmath2.0** Grade 8 Topic 6 Opener and STEM page (pp. 293–294) introduce a *STEM Project* that students will work on for several days. Students will examine the science of forestry as they use ratios and similar triangles to explore plant, animal, human, and other indicators of forest health.
    - ▶ **3-Act Mathematical Modeling Lessons** provide real-world tasks that elicit mathematical thinking and engage the Effective Mathematics Teaching Practice “Implement Tasks that Promote Reasoning and Problem Solving” as described in the Teacher’s Edition Program Overview (Grades 6–8). In Grade 8 Topic 6, students use mathematical modeling to represent a problem situation and propose a solution as they determine which shapes in each image are the same. Students test and verify the appropriateness of math models and explain why the results from mathematical models may not align exactly to problem situations as they explore possible sources of error inherent in using a math model in a real-world situation. (For example, Grade 8 Teacher’s Edition pp. 321A–324)
    - ▶ The **Step 1 Develop: Problem-Based Learning** activity for each lesson, *Solve & Discuss It!, Explain It! or Explore It!*, is designed to engage students with a problem in which new math ideas are embedded. Coherence is facilitated as students connect prior knowledge to the new math ideas. Students solve the problem in any way they choose; are given time to struggle; and as students think, conceptual understandings emerge. *Solve & Discuss It!, Explain It! or Explore It!* online utilizes the *DrawPad* to have students write and share their solutions on screen. (For example, Grade 8 Teacher’s Edition Lesson 6-2, p. 303) The questions in the Teacher’s Edition that support the *Solve & Discuss It!, Explain It!, or Explore It!* focus specifically on several of the Effective Mathematics Teaching Practices. (For example, Grade 8 Teacher’s Edition Lesson 6-5, p. 325)
    - ▶ **Visual Learning Bridge Step 2 Develop: Visual Learning** of each lesson or the online version, *Visual Learning Animation Plus* and other interactive examples, increase the cognitive level of instruction by connecting concrete and pictorial representations to abstract symbols. The questions provided in the Teacher’s Edition have students reflect on the work that is shown, make connections among ideas, and justify the steps. The *Try It!* and *Convince Me!* features in each lesson foster communication during visual learning. (For example, Grade 8 Teacher’s Edition Lesson 6-6, p. 334)
    - ▶ **Practice & Problem Solving** build proficiency as students work on their own. Each Practice & Problem Solving includes a Higher Order Thinking problem. (For example, Grade 8 Teacher’s Edition Lesson 6-6, p. 337–338)
    - ▶ Students communicate often about their thinking and work, using reasoning during **Differentiation Lesson Activities in Part 3** of each lesson through *Enrichment, Digital Math Tools Activities*, and online *Math Games*. (For example, Grade 8 Teacher’s Edition Lesson 6-6, p. 338B)
- Addresses instructional expectations and is easy to understand and use.
    - ▶ Clear, in-depth support for Focus, Coherence, and Rigor is found in the **Topic Overview** at the beginning of each topic in the Teacher’s Edition. (For example, Grade 8 Teacher’s Edition pp. 292A–292F)
    - ▶ Each **Lesson Overview** provides specific information about Focus, Coherence, and Rigor for the lesson. Online lesson planning provides customization opportunities for each lesson and an online calendar. (For example, Grade 8 Lesson 6-2, p. 303A)
    - ▶ The **Listen and Look For Videos** provide specific information about how the lesson’s Essential Understanding is implemented and what the teacher should look for in student work and discussions. (For example, Grade 8 Lesson 6-4, p. 315A)

- ▶ A clear, three-step lesson is provided with comprehensive teaching support for every part of the lesson – both for print and digital pathways.
- ▶ **Problem-Based Learning Solve & Discuss It!, Explain It! or Explore It!** teaching actions are provided with Before, During, and After the activity. Sample student work can be displayed online. Tips for facilitating *Problem-Based Learning* are provided and include:
  - Set Expectations – Make sure students know you expect them to do the thinking.
  - Foster communication – Have students share their thinking with a partner, small group, or the whole class.
  - Be encouraging – Show that you value students’ thinking even when they struggle.
  - Use the language of the math practices during discussions.
- ▶ **Online Visual Learning Animation Plus Online and Other Interactive Examples** provide direct, stepped-out instruction. The animations, interactives, and audio enhance learning. *Try It!* and *Convince Me!* are provided to help facilitate class discussion.
- ▶ **Guiding Questions** are provided for a question-driven classroom conversation about each part of the Visual Learning Bridge throughout each lesson.
- ▶ **Math Practices** are highlighted in red throughout the lesson.

○ Provides appropriate level and type of scaffolding, differentiation, intervention and support for a broad range of learners.

- Supports diverse cultural and linguistic backgrounds, interests and styles.
- Provides extra supports for students working below grade level.
- Provides extensions for students with high interest or working above grade level.

▶ **enVisionmath2.0** (Grades 6–8) meets the needs of all students and provides Response to Intervention in the following ways:

▶ **Ongoing Intervention, During the Lesson**

**Response to Intervention** during the *Visual Learning Bridge* provides additional assistance with one or more of the Examples.

**Enrichment** during the *Visual Learning Bridge* extends one or more of the Examples to challenge students.

**English Language Learners** during the *Visual Learning Bridge* develops and reinforces understanding of key terms and concepts.

**Prevent Misconceptions** during the *Do You Understand?* or *Do You Know How?* sections includes a remediation strategy to address a common misconception about the lesson concept.

**Error Intervention** during *Practice & Problem Solving* identifies a common error and provides remediation strategy.

**Challenge** during *Practice & Problem Solving* provides an extension of a problem’s concept to enrich students’ understanding.

**Learning Aids Online** in *MathXL for School* during the lesson includes personalized practice for *Practice & Problem Solving* for every lesson. *MathXL* is autoscored with on-screen help including *Help Me Solve This* and *View an Example*.

**Higher Order Thinking** problems in lesson practice challenge student thinking.

▶ **Strategic Intervention, at the End of the Lesson**

**Lesson Quiz** provides an assessment of the lesson’s concepts and a baseline for prescribing differentiated assignments.

**Reteach to Build Understanding** provides guided reteaching as a follow-up to the lesson.

**Additional Vocabulary Support** helps students develop and reinforce understanding of key terms and concepts.

**Build Mathematical Literacy** provides support for struggling readers to build mathematical literacy.

**Digital Math Tools Activities** reinforce lesson content or previously taught content.

**Online Math Games** reinforce lesson content or previously taught content and include thinking games rather than just drill games. Students learn concepts through the games.

**Leveled Practice & Problem Solving** offers two (or three) pages of homework and practice in the Student’s Edition at the end of every lesson. Items focus on skills (often with level practice/scaffolding for the first few exercises) and on problem solving that includes reinforcement of math practices, vocabulary, *Higher Order Thinking*, and *Common Core Assessment*.

**Additional Practice** provides two additional pages of Practice & Problem Solving.

**Learning Aids Online** in *MathXL for School* include personalized practice for every lesson. *MathXL* is autoscored with on-screen help to include *Help Me Solve This* and *View an Example*.

▶ **Intensive Intervention as Needed Anytime**

**Math Diagnosis and Intervention System 2.0 Intervention Lessons** contain 2 pages of guided instruction and practice.

**Visual Learning Animation Plus** is a step-by-step visual learning, interactive animation that is used in each lesson to connect the *Problem-Based Learning Solve & Discuss It, Explain It! or Explore It!* to the lesson concepts in a very visual way. This animation, along with the other interactive examples, can be used anytime to refresh understanding.

**Online Math Games** can be used anytime for more reinforcement.

**Learning Aids Online MathXL for School** (described earlier)

**ExamView CD-ROM** provides unlimited practice exercises for additional practice.

▶ **Math Diagnosis and Intervention System 2.0 (MDIS)** – Helps teachers diagnose students’ needs and provides effective intervention that is on or below grade level.

**Diagnosis** Use the diagnostic tests in the system. Also, use the item analysis charts given with program assessments at the start of a grade or topic, or at the end of a topic, group of topics, or the year.

**Intervention Lessons** These two-page lessons include guided instruction followed by practice. You can assign lessons that are below grade level if needed.

**Teacher Support** Teacher Notes provide the support needed to conduct a short lesson. The lesson focuses on vocabulary, concept development, and practice. The Teacher’s Guide contains individual and class record forms and correlations to Student’s Edition lessons.

▶ **PearsonRealize.com Auto Assigned Differentiation**

**Differentiation Before a Topic** is based on the result of *Topic Readiness Tests*. Students may be assigned intervention lessons, which include lesson Journal PDFs and MathXL Practice.

**Differentiation After a Lesson** is based on results of the *Lesson Quiz*. Students are given the Intervention or Advanced assignment based on student performance. The Intervention assignment includes a Reteach to Build Understanding master while the Advanced assignment includes an Enrichment master.

**Differentiation After a Group of Lessons** is based on the results of the *Mid-Topic Assessment*. Students may be assigned to review specific lesson concepts digitally or to view the Virtual Nerd instructional tutorials.

**Differentiation After a Topic or Group of Topics** is based on results of online *Topic Assessments* and online *Cumulative/Benchmark Assessments*. Students are assigned remediation which includes digital review of specific lesson concepts and Intervention Lessons in the *Math Diagnosis and Intervention System 2.0*. At any time, a teacher may assign students digital math games or Digital Math Tools Activities as needed for differentiation.

**Assignment Reports** show the status of assigned resources.

**Usage Data** lets teachers know how much time students are spending in the online resources.

▶ **Today’s Challenge Online** shows 5 problems using the same data on 5 different days. Problems apply prior knowledge and reinforce the kind of thinking students need for success on high-stakes tests. Problems increase in difficulty within a set. *Today’s Challenge Teacher’s Guide* includes teaching actions organized under Before, During, and After in addition to Vocabulary Review, ELL Support, and Extension.

▶ **English Language Learners** daily ELL instruction support is provided in the Teacher’s Edition for every lesson. This support is used with a specified part of the lesson such as *Solve & Discuss It!, Explain It!, or Explore It!, Visual Learning Bridge, Try It!, or Convince Me!*. Leveled instruction includes suggestions for students at Beginning, Intermediate, and Advanced levels of English Language Proficiency. ELL Toolkit provides additional support for English Language Learners.

▶ **Visual Learning Animation Plus and Other Interactive Examples Online** provide motion and sound to help lower language barriers to learning. Questions that are read aloud also appear on screen to help English Language Learners connect oral and written language.

▶ **Visual Learning Bridge** often has visual models to help give meaning to math language. Instruction is stepped out to visually organize important ideas. Teachers may want to use the Student’s Edition eText to display the *Visual Learning Bridge* after using the *Visual Learning Animation Plus* and other interactive examples.



- ▶ **Online Glossary** is always available to students and teachers while using digital resources. The glossary is in English and Spanish to help students connect Spanish math terms they may know to English equivalents.
- ▶ **Pictures with a purpose** that appear in lesson practice provide comprehensible input and help communicate information related to math concepts or to real-world problems.

A unit or longer lesson should:

- Recommend and facilitate a mix of instructional approaches for a variety of learners such as using multiple representations (e.g., including models, using a range of questions, checking for understanding, flexible grouping, pair-share).
  - ▶ Students frequently use models to represent their thinking and solutions in the **Develop: Problem-Based Learning** Part 1 of each lesson, **Solve & Discuss It!, Explain It!, or Explore It!**. Teachers are provided with guiding questions to facilitate this discussion and **Before, During, and After** teaching actions model classroom discourse.
    - Before** uses Teaching Actions #1 (Implement Tasks that Promote Reasoning and Problem Solving) and #2 (Build Understanding) to start understanding. This is whole-class discussion.
    - During** (#3 Support Productive Struggle in Learning Mathematics) is used when students are stumped and are working together in pairs or small groups as the teacher facilitates.
    - After** represents another whole-class discussion. Use teaching action #4 (Facilitate Meaningful Mathematical Discourse) and #5 (Transition to Visual Learning) to discuss students' thinking and work, and to make math ideas explicit. Use #6 (Extension for Early Finishers) as needed.
  - ▶ Blue guiding questions are provided throughout each lesson to support classroom discourse.
  - ▶ *Try It!* and *Convince Me!* checks for understanding right after the first example and connects to the essential understanding of the lesson and to math practices.
  - ▶ A variety of activities are provided for differentiation where students may be working with the teacher in small groups or in pairs on a digital device or in print. Different learning modalities offer greater access for all students.
- Gradually remove supports, requiring students to demonstrate their mathematical understanding independently.
  - ▶ The **enVisionmath2.0** (Grades 6–8) instructional lesson design (print and online) represents a gradual release model.
    - Step 1: Develop: Problem-Based Learning, Solve & Discuss It!, Explain It! or Explore It!*, introduces the lesson by engaging students with a problem in which new math ideas are embedded. Students work in small groups to solve the problem with teacher-facilitated discussion.
    - *Step 2: Develop: Visual Learning* is provided whole class through direct instruction from the *Visual Learning Bridge* and/or *Visual Learning Animation Plus* and other interactive examples online where learning is stepped out. *Do You Understand? Do You Know How?* includes teacher-supported concepts and skills practice. *Practice & Problem Solving* builds proficiency as students work on their own.
    - Step 3: Assess & Differentiate* provides additional independent work through *Additional Practice* – two additional pages of homework and practice.
  - ▶ *Practice & Problem Solving* items focus on skills (often with leveled practice/scaffolding for the first few exercises) and on problem solving that includes reinforcement of math practices, vocabulary, *Higher Order Thinking*, and *Common Core Assessment*.
  - ▶ *Additional Practice* items focus on skills (often with scaffolding) and on problem solving that includes reinforcement of math practices, vocabulary, *Higher Order Thinking*, and *Common Core Assessment*.
  - ▶ *Reteach to Build Understanding* provides scaffolded, guided reteaching that prepares students for the homework.
- Demonstrate an effective sequence and a progression of learning where the concepts or skills advance and deepen over time.
  - ▶ One or more topics in **enVisionmath2.0** (Grades K–8) focus on each Common Core cluster. Grade 8 Topic 6 focuses on Major Cluster 8.G.A: Understand congruence and similarity using physical models, transparencies, or geometry software. Grade 8 Topic 6, Congruence and Similarity, focuses on analyzing transformations (translations, reflections, dilations), understanding congruent and similar figures, understanding angle

relationships among angles formed by parallel lines and a transversal, the interior/exterior angles of a triangle, and Angle-Angle (AA) triangle similarity.

- ▶ At the start of a topic, one or more *Essential Questions* help students focus on key ideas in the topic. Grade 8 Topic 6 *Essential Question* is, “How can you show that two figures are either congruent or similar to one another?”
- ▶ An *Essential Understanding* is stated in the Teacher’s Edition for each lesson. The Essential Understandings build from each other and show the progression of concepts within a topic.
- ▶ Some of the elements of a lesson that help teachers focus students’ attention on important lesson ideas include the *Lesson Essential Question*, the *Visual Learning Bridge* and its digital counterpart, the *Visual Learning Animation Plus* and other interactive examples, the *Key Concept*, as well as the *Try It!* or *Convince Me!*.

○ Expect, support and provide guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately.

- ▶ **enVisionmath2.0 (Grades K–8) provides steps to fluency success.** Students achieve fluency when they demonstrate skill in carrying out procedures flexibly, accurately, efficiently, and appropriately. Follow the *Steps to Fluency Success* to help all students achieve fluency standard expectations for each grade.

**Step 1: Fluency Development with Understanding** For each fluency standard, there is a topic that develops fluency with understanding. That topic is the culmination of foundations for fluency taught previously.

**Step 2: Ongoing Assessment of Fluency Subskills** After Step 1, assess fluency subskills using one of the following:

**Fluency Practice/Assessment Worksheets** (Grades K–5) in Teacher’s Resource Masters

**Fluency Practice/Assessment Worksheets** (Grades K–5) generated by ExamView® CD-ROM

**Practice Buddy Online** (Grades 3–5) or **MathXL for School** (Grades 6–8) at *PearsonRealize.com*. After Step 2, for students who are fluent, go to Step 5.

**Step 3: Fluency Intervention** For students who struggle with a fluency standard, use one of the following:

**MDIS (Math Diagnosis and Intervention System) Lessons** for remediation of subskills. You can also give an *MDIS Diagnostic Test* to assess a need for *MDIS lessons* on prerequisite skills.

**Practice Buddy Online** (Grades 3–5) or **MathXL for School** (Grades 6–8) with intervention also available via the learning aids “*Help Me Solve This*” and “*View an Example.*”

**Step 4: Practice on Fluency Subskills** After Step 3, give students practice using one of the following. Then reassess (Step 2).

**Fluency Practice/Assessment Worksheets** (Grades K–5) in Teacher’s Resource Masters

**Fluency Practice/Assessment Worksheets** (Grades K–5) generated by ExamView® CD-ROM

**Practice Buddy Online** (Grades 3–5) or **MathXL for School** (Grades 6–8)

**Step 5: Fluency Maintenance** For fluency maintenance, use some of the following:

**Fluency Practice Activities** in the Student’s Edition. Students can collaborate, allowing them to help each other as needed.

**Fluency Practice/Assessment Worksheets** (Grades K–5) in Teacher’s Resource Masters

**Fluency Practice/Assessment Worksheets** (Grades K–5) generated by ExamView® CD-ROM

**Practice Buddy Online** (Grades 3–5) or **MathXL for School** (Grades 6–8)

**Game Center Online** at *PearsonRealize.com*

**Step 6: Summative Fluency Assessment** For a summative fluency assessment of all students, use one of the following:

**Fluency Practice/Assessment Worksheets** (Grades K–5) in Teacher’s Resource Masters

**Fluency Practice/Assessment Worksheets** (Grades K–5) generated by ExamView® CD-ROM

**Practice Buddy Online** (Grades 3–5) or **MathXL for School** (Grades 6–8)

## IV. Assessment

*The lesson/unit regularly assesses whether students are mastering standards-based content and skills:*

- Is designed to elicit direct, observable evidence of the degree to which a student can independently demonstrate the targeted CCSS.

- Assesses student proficiency using methods that are accessible and unbiased, including the use of grade-level language in student prompts.
  - Includes aligned rubrics, answer keys and scoring guidelines that provide sufficient guidance for interpreting student performance.
- ▶ **enVisionmath2.0** (Grades K–8) provides opportunities for students to independently demonstrate their understanding.  
**Online assessments can be customized** as needed.  
**Math Practices Proficiency Rubric** is provided and can be used at any time.  
**Scoring rubrics and sample student work** are included for some assessments in the *Assessment Sourcebook*.
  - ▶ The formats of the assessment items, which prepare students for high-stakes Common Core tests, include the following:
    - Selected response**, e.g., single response, multiple response
    - Constructed response**, e.g., short or extended responses, sometimes using an on-screen symbols palette
    - Technology-enhanced items**, e.g., drag and drop, drop-down menus, graphing, on-screen tools
    - Performance tasks**, hand scored or machine scored
  - ▶ A variety of auto-generated assessment reports are available for online assessments.  
**Individual and class views** of progress are provided in an easy-to-view format.  
**Common Core Standards mastery reports** show individual students’ mastery or class-wide mastery for each standard.
  - ▶ **Assessment data** can be used to organize students into groups for purposes of making instructional decisions and assigning differentiation resources.
  - ▶ Every lesson includes **Common Core practice items** in formats that help prepare students for Common Core high-stakes tests. These types of items are also included in Readiness Assessments, Mid-topic Checkpoints and Performance Tasks, Lesson Quizzes, End of Topic Assessments and Performance Tasks.

A unit or longer lesson should:

- Use varied modes of curriculum-embedded assessments that may include pre-, formative, summative and self-assessment measures.
- ▶ **enVisionmath2.0** (Grades K–8) provides students with multiple ways to show what they have learned.
  - ▶ **DIAGNOSTIC ASSESSMENT**
    - At the start of the YEAR**
      - Beginning-of-Year Assessment* Online in TestNav™
      - Beginning-of-Year Assessment Masters* in *Assessment Sourcebook*
      - Diagnostic Test Masters* in *Math Diagnosis and Intervention System 2.0*
    - At the start of a TOPIC**
      - Topic Readiness Assessment* Online in TestNav™
      - Topic Readiness Assessment Masters* in *Assessment Sourcebook*
      - Diagnostic Test Masters* in *Math Diagnosis and Intervention System 2.0*
      - Review What You Know* in Student’s Edition or eText
  - ▶ **FORMATIVE ASSESSMENT**
    - During a LESSON**
      - Questions in the *Visual Learning Animation Plus* and *Other Interactive Examples*
      - Questions to use with the *Visual Learning Bridge* in Teacher’s Edition
      - Try It!* and *Convince Me!* in Student’s Edition or eText
      - Do You Understand? Do you Know How?* in Student’s Edition or eText
    - At the end of a LESSON**
      - Lesson Quiz* Online in TestNav™
      - Lesson Quiz Masters* in *Assessment Sourcebook*
  - ▶ **SUMMATIVE ASSESSMENT**
    - In the middle of a TOPIC**
      - Mid-Topic Checkpoint* in Student’s Edition or eText
      - Mid-Topic Assessment* Online in TestNav™

*Mid-Topic Assessment Masters in Assessment Sourcebook*

*Self-Assessment Tool in Mid-Topic Assessment*

*Mid-Topic Performance Task in Student's Edition or eText*

**At the end of a TOPIC**

*Topic Assessment Masters in Assessment Sourcebook*

*Topic Assessment Online in TestNav™*

*Topic Assessment by ExamView® CD-ROM*

*Topic Performance Assessment Masters in Assessment Sourcebook*

*Fluency Assessment by Practice Buddy Online (Grades K–5)*

*Fluency Practice/Assessment Masters in Teacher's Resource Masters (Grades K–5)*

*Basic-Facts Timed Test Masters (Grades 1–5) in Assessment Sourcebook*

**After a group of TOPICS**

*Cumulative/Benchmark Assessment Online in TestNav™*

*Cumulative/Benchmark Assessment Masters in Assessment Sourcebook*

*Practice Performance Tasks Assessment Online in TestNav™*

*Practice Performance Tasks Assessment Masters in Assessment Sourcebook*

**At the end of the YEAR**

*End-of-Year Assessment Online in TestNav™*

*End-of-Year Assessment Masters in Assessment Sourcebook*

*Next Generation Assessment Practice Test Online in TestNav™*

*Next Generation Assessment Practice Test Assessment Masters in Assessment Sourcebook*

**▶ SELF ASSESSMENT**

*Self-Assessment Tool in Teaching Tools section of the Teacher's Resource Masters (Grades K–8)*

*Self-Assessment Tool in Mid-Topic Checkpoint in Student's Edition*

The EQuIP rubric is derived from the Tri-State Rubric and the collaborative development process led by Massachusetts, New York, and Rhode Island and facilitated by Achieve.

This version of the EQuIP rubric is current as of 06-15-13.

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