Math-U-See®
Product Training and Implementation Guide

Math·U·See®

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What Is the Math-U-See® Program?

The Math-U-See program is a comprehensive K–12 math curriculum that uses manipulatives and distinctive instructional strategies to provide multiple modes of representation. The program's unique approach helps guide students to mastery of both the "how" and "why" of math concepts and is suitable for a variety of learners. Each level focuses on a specific set of fundamental skills (e.g., multiplication in *Gamma*) that build sequentially, with other math topics introduced where appropriate. Cumulative review assists in skills retention.

Who Is Demme Learning?

Demme Learning is a company commited to building lifelong learners by building understanding in teachers and students. Each sales and customer service representative is a curriculum counselor who supports educators and families as they seek solutions that are tailored to fit the individualized needs of their student(s).

Contact Us

Please send feedback regarding the Math-U-See curriculum and the *Math-U-See Product Training and Implementation Guide* to trainer@demmelearning.com.

For other inquiries, contact us at 866-440-9706 or schools@demmelearning.com.

Curriculum Levels

Rather than grades levels, the Math-U-See program is presented in the following curriculum levels:

P **Primer**

AN INTRODUCTION TO MATHEMATICS

α **Alpha**

ADDITION AND SUBTRACTION FOR SINGLE-DIGIT NUMBERS AND OTHER TOPICS

β **Beta**

ADDITION AND SUBTRACTION FOR MULTIPLE-DIGIT NUMBERS AND OTHER TOPICS

γ **Gamma**

MULTIPLICATION FOR SINGLE AND MULTIPLE-DIGIT NUMBERS AND OTHER TOPICS

δ **Delta**

DIVISION FOR SINGLE AND MULTIPLE-DIGIT NUMBERS AND OTHER TOPICS

ε **Epsilon**

FRACTIONS AND OTHER TOPICS

ζ **Zeta**

DECIMALS, PERCENTS, AND OTHER TOPICS

x **PreAlgebra**

NEGATIVE NUMBERS, ORDER OF OPERATIONS, SOLVING FOR THE UNKNOWN, AND OTHER TOPICS

x^2 **Algebra 1**

GRAPHING, SIMULTANEOUS EQUATIONS, EXPONENTS, POLYNOMIALS, UNIT MULTIPLIERS, AND OTHER TOPICS

Δ **Geometry**

POINTS, LINES, PLANES, ANGLES, CIRCLES, TRIANGLES, QUADRILATERALS, PYTHAGOREAN THEOREM, CONIC SECTIONS, PROOFS, AND OTHER TOPICS

xy **Algebra 2**

FACTORING POLYNOMIALS, QUADRATIC FORMULA, GRAPHING CONIC SECTIONS, AND OTHER TOPICS

$\cos$ **PreCalculus**

TRIGONOMETRY, IDENTITIES, POLAR EQUATIONS, LOGARITHMS, SEQUENCES, LIMITS, AND OTHER TOPICS

$\int$ **Calculus**

DERIVATIVES, INTEGRALS, CALCULUS APPLICATIONS, DIFFERENTIAL EQUATIONS, AND OTHER TOPICS

This module describes the Math-U-See curriculum's placement process. The module also includes the Class Placement Test Data form for recording scores and observations made during testing.

Overview

The placement process provides teachers with the means to assess a student's capabilities in basic computation and to determine the best entry level for the student in the curriculum. Additionally, a baseline is established to support progress monitoring.

How to Administer

The placement process should begin with the Placement Pretest. This starting point may seem unnecessary for every student, especially for those in upper elementary grades; however, careful observation of placement test-taking often reveals the specific foundational difficulties a student is having. A student should already meet the prerequisites for *Alpha* before taking the Placement Pretest.

Prerequisites for Placement Pretest
Students must:

» Demonstrate 1–1 correspondence

» Demonstrate number recognition

» Be able to count verbally zero to nine

» Be able to write numerals zero to nine

» Be ready for formal instruction

Students who do not demonstrate the *Alpha* prerequisites may be placed in the program's first level, entitled *Primer*. The *Primer* level is not recommended for students who do not demonstrate readiness for paper and pencil work. Also, *Primer* was not designed to include written assessment materials.

The Placement Pretest contains a few questions from each level, *Alpha* through *Zeta*. Once the student has missed two or more problems for any one level, the Placement Pretest should be stopped. The level-specific placement test for that level should then be administered.

Placement Results

» A score between 80% and 89% on the level-specific placement test indicates that the student has mastered the material contained in that level and should be placed in the next level.

» A score between 0% and 79% on the level-specific placement test indicates the student has not yet mastered the material contained in that level and should be placed in that level.

» If the student scores between 90% and 100% on the level-specific placement test, the placement test for the subsequent level should be administered.

Delivery and Documentation

Individual testing is ideal, but testing can be done in a group setting if accompanied by careful observation. For planning purposes, be aware that there are word problems on the placement tests; it may be necessary for those problems to be read aloud to the student(s).

During testing, look for the level of understanding of the math problem shown. Unless specified by an IEP, students should not be provided with any assistive devices, such as calculators, manipulatives, or number lines. Do not help students with computation.

It is important during the testing to document thoroughly. Use the comments section of the Class Placement Test Data form to record your observations of each student. Note behaviors like finger counting, touch points, missing steps, and indicators of other issues. As the student progresses through the curriculum, these baseline observations will help to document improvement and mastery. A sample Class Placement Test Data sheet is provided on a subsequent page with representative scores and comments as a guide. A blank form is also provided for teacher use and is available as a fillable PDF in the online Professional Access.

Fact Mastery

If a student scores into a level above *Alpha* conceptually but does not demonstrate fluency with addition, subtraction, multiplication, or division facts and does not have an IEP providing for accommodation, then this needs to be addressed.

The phrase, "Zip, Don't Skip," is a pacing term that describes spending time on areas students have not yet mastered and "zipping" through the concepts which students better grasp. In this manner, students build a strong mathematical foundation.

The Lesson Plan module contains suggestions for students who conceptually place into a higher level but need addition, subtraction, or multiplication strategies and practice to achieve mastery.

Additional Suggestions for Middle and High School Students

Proper placement can make the difference between a student truly gaining understanding or continuing to struggle. Because instruction in the Math-U-See curriculum is organized topically, students can be placed at the appropriate ability level.

It is common for older students to make great leaps in the program once they gain a firm understanding of concepts, such as place value and math facts. If there is any doubt about the student's mastery of these concepts, spend the appropriate amount of time necessary for them to be mastered. (See "Strengthening the Foundation in Strategies and Math Facts" in the Lesson Planning module.)

Having students gain confidence and success is critical. The more successes they have early and often in the program, the more they will want to engage, and the more they will feel confident in their abilities. Therefore, placing an older student according to conceptual understanding should be viewed as meeting the needs of a student and allowing additional opportunities for success. The competencies gained in the areas of numbers, operations, and algebraic reasoning—that are then applied to geometry, measurement, statistics, and data analysis—ensure that students have the strong foundation needed for success in higher education and adult life.

Sample Class Placement Test Data

Teacher _____   School _____   Program _____

Student	Grade	Program	Math-U-See® Level	Placement Test Score		Comments
				Pre	Post	
Wei M.	4	LD	Beta	53%		She subtracted the minuend from the subtrahend, rather than regrouping.
Shivani P.	5	LD	Alpha / Beta	93% / 77%		She labeled her word problems. Errors on both Alpha and Beta tests were just inconsistent calculation mistakes.
Jadiel R.	4	ID	Alpha	83%		While he scored satisfactorily on the Alpha test, he has an intellectual disability that impacts understanding. Based on observation of his math skills, I did not feel the Beta test was appropriate for him and will start him using Alpha materials.
Margaret S.	4	SLI	Alpha	63%		She uses tally marks to figure out answers. She hid this coping skill on the Alpha test by using/reusing already-placed marks.
Alex S.	3	LD	Alpha	47%		He relied extensively on finger counting or guessing.

Sample Class Placement Test Data

Teacher _____   School _____   Program _____

Student	Grade	Program	Math-U-See® Level	Placement Test Score		Comments
				Pre	Post	
Kateri M.	5	LD	Beta	83%		She understands and applies her math knowledge but doesn't know how to round. This concept confuses her.
Shaquem H.	5	ED	Beta Alpha	10% 87%		He is new to my class. He used tally marks on all problems. On the Beta test, he was able to read the gauge problem correctly. For 2+ weeks, he has been in a therapeutic hospital setting, making further evaluation impossible at this time.
Daryl L.	5	LD	Beta	83%		He made simple errors but shows understanding. He did label one word problem and was able to calculate the time on problem 25 as well as read the gauge on problem 26.

Class Placement Test Data

Teacher _____ School _____ Program _____

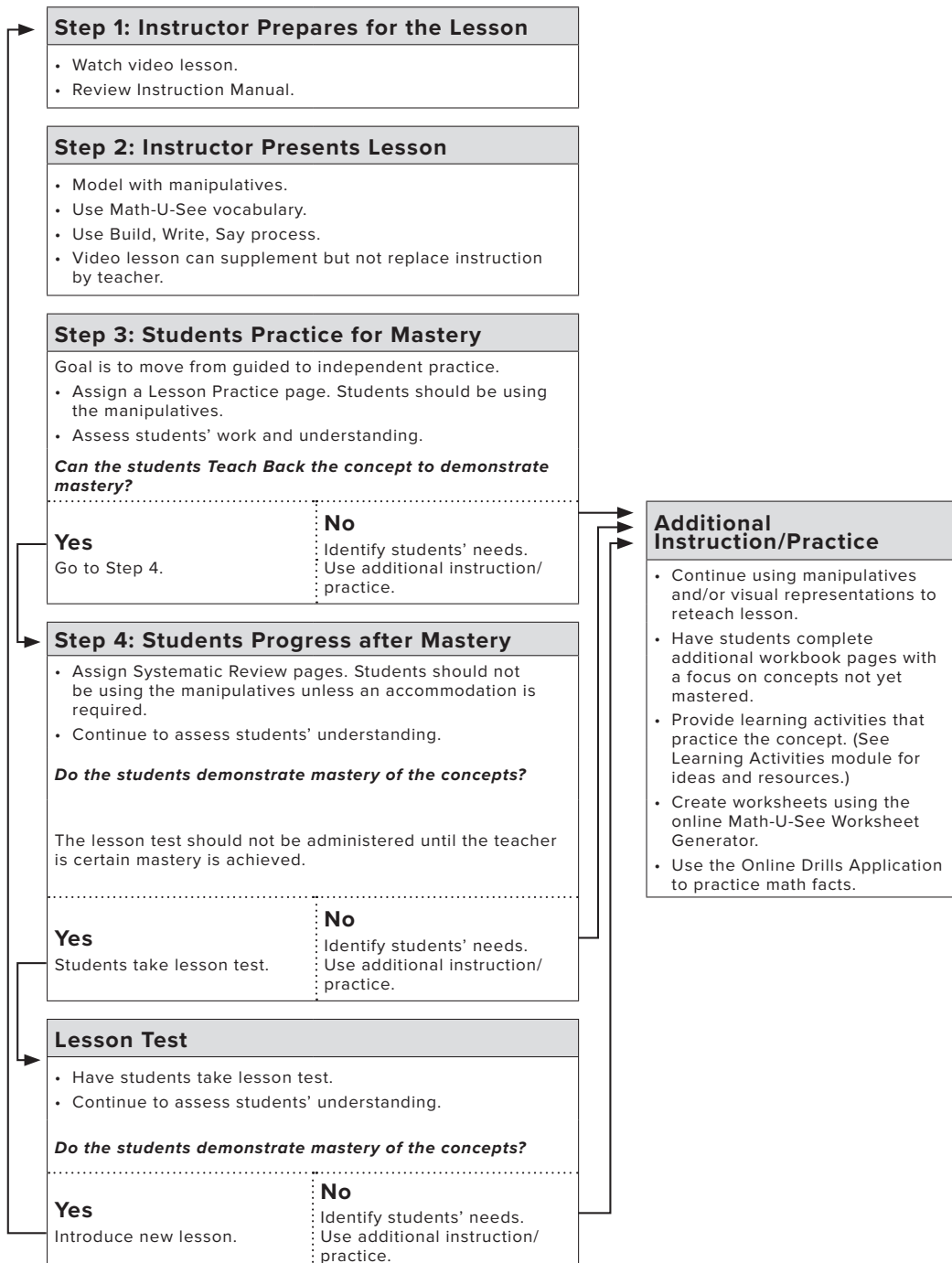| Student	Grade	Program	Math-U-See® Level	Placement Test Score		Comments
				Pre	Post	

This module describes the Math-U-See curriculum's 4-Step Approach and how to plan individual class sessions using it. It includes three templates for planning the multiple days that a lesson requires. The needs of teachers who teach multiple levels or lessons within a level are also addressed. For those teachers who have the assistance of paraprofessionals, suggestions are given for how to help them become familiar with the Math-U-See curriculum and prepare for each lesson.

One lesson in the curriculum will take several days to complete. The length of time needed depends on a variety of factors, but students should demonstrate mastery before moving on.

4-Step Approach Overview

Use placement tests to determine correct level.

Step 1: Instructor Prepares for the Lesson

- Watch video lesson.
- Review Instruction Manual.

Step 2: Instructor Presents Lesson

- Model with manipulatives.
- Use Math-U-See vocabulary.
- Use Build, Write, Say process.
- Video lesson can supplement but not replace instruction by teacher.

Step 3: Students Practice for Mastery

Goal is to move from guided to independent practice.
- Assign a Lesson Practice page. Students should be using the manipulatives.
- Assess students' work and understanding.

Can the students Teach Back the concept to demonstrate mastery?

Yes
Go to Step 4.

No
Identify students' needs. Use additional instruction/ practice.

Step 4: Students Progress after Mastery

- Assign Systematic Review pages. Students should not be using the manipulatives unless an accommodation is required.
- Continue to assess students' understanding.

Do the students demonstrate mastery of the concepts?

The lesson test should not be administered until the teacher is certain mastery is achieved.

Yes
Students take lesson test.

No
Identify students' needs. Use additional instruction/ practice.

Lesson Test

- Have students take lesson test.
- Continue to assess students' understanding.

Do the students demonstrate mastery of the concepts?

Yes
Introduce new lesson.

No
Identify students' needs. Use additional instruction/ practice.

Additional Instruction/Practice

- Continue using manipulatives and/or visual representations to reteach lesson.
- Have students complete additional workbook pages with a focus on concepts not yet mastered.
- Provide learning activities that practice the concept. (See Learning Activities module for ideas and resources.)
- Create worksheets using the online Math-U-See Worksheet Generator.
- Use the Online Drills Application to practice math facts.

Expanded Explanation of the 4-Step Approach

Preliminary to Instruction

Placement
Begin with the Math-U-See curriculum's placement process, which is detailed in the Placement module, in order to determine the best entry level for students in the curriculum.

Unit Pretest
Each Math-U-See level is divided into units, and a unit test is provided in the accompanying Tests booklet. A unit test is given twice per student: once before instruction and once after the last lesson in the unit has been completed. At the start of every unit, administer the unit test as the unit pretest. Use the results of the unit pretest to inform your planning.

Proficiency criteria are assigned based on the pre- and post-unit tests. The criteria, their abbreviations, and the score ranges are as follows:

Advanced (A)	90–100%
Proficient (P)	80–89%
Nearing Proficiency (NP)	70–79%
Beginning Steps (BS)	<70%

This information is entered into the Record Keeping Form discussed in the Record Keeping module.

Step 1: Teacher Prepares for the Lesson
The teacher should watch the video lesson and read the Instruction Manual to ensure appropriate delivery of concepts and vocabulary. The Math-U-See program uses successful but unique strategies for some basic concepts.

Instruction

Step 2: Teacher Presents the Lesson's Concepts
The teacher teaches the concepts to the students, modeling the Build, Write, Say process.

Build: Use the manipulatives to model the problem.

Write: Show the problem step-by-step on paper as it is built.

Say: Explain the steps used to figure out the answer.

Students may watch the video lesson with the teacher, but the video lesson must not replace direct instruction by the teacher. Both the teacher and the students use the Build, Write, Say process. Give ample opportunities for students to practice the new concept prior to working in the Student Workbook. During this practice, use problems from the Instruction Manual and Lesson Practice pages. Personalize word problems from the Student Workbook to the students, school, and community. If students are struggling with a concept, reteaching the concept is essential before a Lesson Practice page is assigned.

Step 3: Students Practice for Mastery
Assign a Lesson Practice page. Assess the students' work and understanding, and determine whether the students are demonstrating mastery of the concepts. If not, continue reteaching and assigning additional workbook pages, focusing students on problems that address the concepts not yet mastered. This is easily done by highlighting only the problems the students should Build, Write, and Say. Not every student needs to complete every worksheet in the Student Workbook. "Zip, Don't Skip," is a pacing tool. The teacher identifies and spends time on mathematical concepts where students are struggling and "zips" through concepts for which students have demonstrated conceptual understanding.

Frequent, short periods of practice are shown to be effective for retention, so refer to the suggestions included in the Learning Activities module. Directions for the online Worksheet Generator and Online Drills Application are included in the Math Facts module.

Step 4: Students Progress after Mastery
Mastery is not just memorization of a math fact or the filling in of worksheets but the ability to explain the mathematical concept using the Build, Write, Say approach. Additional methods of assessment may include:

- fluency in math facts
- correctly solving a word problem that uses the lesson's concepts
- creating a pictorial representation of the concept
- explaining how to correct a wrong answer
- completing an exit slip
- being able to mark "Meets Expectations" for all the rows in the Student Self-Reflection

Once students demonstrate mastery of the lesson's concepts, assign a Systematic Review page. Again, monitor students' accuracy and, if needed, reteach and assign additional pages, focusing the students on problems that address the concepts that need to be reinforced. Be sure to review any Systematic Review pages skipped for important content.

After Instruction

Lesson Test
A lesson test should not be administered until the teacher is certain that the students have mastery of the new concepts as well as review concepts. Administer the lesson test with any required modifications. Solutions are found in the Instruction Manual.

Unit Posttest
At the end of a unit, administer the unit test again as the unit posttest. To facilitate the second administration of the unit test, all of the unit tests can be accessed in the online Professional Access.

Repeat
If scheduling allows, immediately administer the next unit pretest.

Lesson Planning Overview

The examples presented use an hour-long class session and lessons from the *Beta* level as a basis. Each session begins with a brief math activity called Minds Ready for Math to get students thinking mathematically. The last five minutes of class should include clean up and a quick closure activity, such as a whole-group math activity. The remaining class time should be used to work through a lesson using the 4-Step Approach according to your chosen grouping structure. (Guidelines on grouping structures are provided in the Grouping Structures section below.)

Complete the weekly lesson plans according to the appropriate grouping structure. Sample weekly lesson plans are included for one-on-one and small group structures. Blank forms for each of the lesson plan templates are included in this module or can be downloaded as a fillable PDF from the online Professional Access.

Grouping Structures

In order to increase student engagement, teachers may wish to employ a variety of grouping structures within a class session. Below are some recommendations and sample lesson plans for primary instructional groupings beyond whole-group. Regardless of the chosen primary structure, it is recommended that class sessions begin and end with whole-group activities to build community and review concepts beneficial to all students.

One-on-One

One-on-one instruction may be a good option in a pull-out model or if the teacher is working with a group of six or fewer students and has the ability to meet with each student individually each class session. Students are working at an individualized pace, and students within the whole group will likely be at different places in the program.

Maintaining individual student folders containing each student's schedule, applicable worksheets, and a listing of other materials and activities can help provide direction for students while the teacher is meeting individually with others.

Sample One-On-One Student Schedule *(Luis)*

Student Schedule Luis

Monday	Tuesday	Wednesday	Thursday	Friday
• Practice the 7 facts online. [Luis still struggles with these.] • Watch the video for Beta Lesson 7. Think of a question to ask your teacher. • Meet with your teacher. • Complete 7A in your Student Workbook.	• Complete 7B in your workbook. • Practice the 8 facts online. • Meet with your teacher. • Write a word problem that uses two-digit addition. Show the solution.	• Ask Jada to build and solve your word problem. Check her work. [Alternately, Luis can correct his work on 7B.] • Complete 7C in your workbook. [Assign 7C if more practice is needed; assign 7D if mastery is demonstrated.] • Play Race to 100 by yourself. See if you can finish before you meet with your teacher. [Luis needs to practice decomposition of numbers.] • Meet with your teacher.	• Meet with your teacher. • Take the Lesson 7 test. Be sure to do your best! • Complete 7G in your workbook.	• Play Basket of Problems for two-digit addition. See how many you can finish before you meet with your teacher. • Meet with your teacher. • Make a board game with addition problems. Be sure to show all the answers to the problems. [Luis enjoys creative projects. We can also use his board game as a learning center.]
Group Time	Group Time	Group Time	Group Time	Group Time

Sample One-On-One Teacher Schedule

Sample Teacher Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
Derek: Check Lesson 27 test; do mental math page 101.	Mei: Review and prepare for the Lesson 23 test.	Winona: Review multi-digit addition. Demonstrate addition with money.	Luis: Check work and review for Lesson 7 test.	Jada: Do 16A together. Assign 16B and 16C.
Jada: Check work on 15A from last week. Teach back. Assign 15B and 15C or 15D and 15E.	Derek: Model and scaffold five-digit subtraction with regrouping.	Mei: Check lesson test; mental math page 92.	Winona: Check 12A. Start 12B together.	Luis: Explain board game project for practicing two-digit addition.
Luis: Model and scaffold multi-digit addition with regrouping.	Jada: Teach back. Prepare for Lesson 15 test.	Derek: Check work on 28A and 28B. Teach back. Assign either 28C or 28D.	Mei: Model and scaffold four-digit subtraction with regrouping.	Winona: Use 12C to teach back. Assign 12D and 12E.
Winona: Do 11E together. Assign Lesson 11 test.	Luis: Check work on 7A and 7B. Teach back. Assign either 7C (if not mastered) or 7D (if mastered).	Jada: Check Lesson 15 test; mental math page 60.	Derek: Check work on 28C or 28D. Prepare for lesson test.	Mei: Check work on 26A and 26B. Assign either 26C or 26D.
Mei: Tell time on the block clock and then on a regular clock.	Winona: Check Lesson 11 test. Practice skip counting by 10s and 5s orally.	Luis: Check work on 7C or 7D.	Jada: Review place value through hundreds. Scaffold reading and writing numbers in the thousands.	Derek: Check Lesson 28 test and 28F.
Group Game: Fishin' for Tens [Most students could use the practice in composing tens.]	Group Game: Beach Ball Toss [Quick review to keep addition facts fresh.]	Group Game: Both Sides the Same [Luis will need this skill for the unit test; good review for all students.]	Group Game: Race to 100 [Review skills for the state assessments.]	Celebration: Derek improved his accuracy on the 3s facts; Jada mastered perimeter; Luis wrote a great word problem; Winona said the 9s facts without errors; Mei did not reverse any numbers.

Small Group

If the group is too large to meet with each student individually during each class session but includes students of varying needs and abilities, small group instruction may be appropriate. Students may be grouped according to unit pretest results or by lessons dealing with related skills. It is important to keep groups flexible and shift students from group to group as their individual needs dictate.

With small group instruction, the teacher meets with each group once per class session. Students in other groups work to complete worksheets or other learning activities assigned during their daily meeting.

Sample Small Group Student Schedule *(Group A)*

Sample Student Schedule Group A

Monday	Tuesday	Wednesday	Thursday	Friday
Warm-Up: • Meet with your teacher.	Warm-Up: • Meet with your teacher.	Warm-Up: • Meet with your teacher.	Warm-Up: • Meet with your teacher.	Warm-Up: • Meet with your teacher.
Classwork: • Play Zombie and the Brain with your partner. Work through page 7A. • When you finish, go to the computer station.	Classwork: • Complete 7B by yourself. [Use problems 5-9 as a formative assessment to plan tomorrow's activities.] • When you finish, go to a game station.	Classwork: • Complete the page the teacher gives you. [Students who have demonstrated mastery move to 7D; others complete 7C. Use problems 5-9 for reassessment.] • When you finish, go to the word problem station. [Students write a word problem using skill taught and show solution.]	Classwork: • Complete the page the teacher gives you. [Students who have demonstrated mastery work on 7D or E (if more review needed) or can move to 7F. Others complete online worksheet, which will be used for reassessment.] • When you finish, go to the tablet station. [This could also be a project station.]	Classwork: • Take the lesson test. • When you finish, work on page 7F or go to the video station. [Students who have finished 7F can work on an enrichment activity.]
Group Time	Group Time	Group Time	Group Time	Group Time

Sample Small Group Teacher Schedule

Sample Teacher Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
Group A: Watch Lesson 7 video. Model while students shadow.	Group A: Observe and correct as students model problems from 7A.	Group A: Students who scored 4/5 teach back problems from 7B: assign 7D. Other students work on 7C for reassessment.	Group A: Students who scored 4/5 teach back problems from 7C; assign 7D/E/F (mastery) or online worksheet.	Group A: Work only with those students who still have not demonstrated mastery.
Group B: Watch Lesson 13 video. Model while students shadow.	Group B: Observe and correct as students model problems from 13A.	Group B: Students who scored 4/5 teach back problems from 13B; assign 13D. Other students work on 13C for reassessment.	Group B: Students who scored 4/5 teach back problems from 13C; assign 13D/E/F (mastery) or online worksheet.	Group B: Work only with those students who still have not demonstrated mastery.
Group C: Watch Lesson 20 video. Model while students shadow.	Group C: Observe and correct as students model problems from 20A.	Group C: Students who scored 4/5 teach back problems from 20B; assign 20D. Other students work on 20C for reassessment.	Group C: Students who scored 4/5 teach back problems from 20C; assign 20D/E/F (mastery) or online worksheet.	Group C: Work only with those students who still have not demonstrated mastery.
Circulate and help as needed.	Circulate and help as needed.	Circulate and help as needed.	Circulate and help as needed.	Circulate and help as needed.
Group Game: Fishin' for Tens [Most students could use the practice in composing tens.}	Group Game: Beach Ball Toss [Quick review to keep addition facts fresh.]	Group Game: Both Sides the Same [Group A will need this skill for the unit test; good review for all students.]	Group Game: Race to 100 [Review skills for the state assessments.]	Celebration: [Note specific items of praise.]

Co-Teaching

Co-teaching is an excellent option when an additional teacher, paraprofessional, or even a committed parent volunteer is available. Options for utilizing co-teaching will depend on the resources available, but may include:

» Stations - Students rotate among a given combination of stations for a set amount of time. Stations may include one teacher providing direct instruction to a group, independent practice, games, partner work, online learning activities, or assessment. The other co-teacher monitors the remaining stations.

» One teaches, one supports - One teacher takes primary responsibility for instructing the small groups while the other teacher circulates around the classroom assisting individuals as needed.

» Pull-out/Push-in - One teacher manages most of the class while the other teacher works with a designated small group or individual students inside or outside the classroom.

Effectively Utilizing Paraprofessionals

To help ensure consistency for students between teacher instruction and paraprofessional assistance, paraprofessionals should watch the video lesson and take notes on the Lesson Planner for Paraprofessionals. It is helpful for paraprofessionals to keep all the lesson planners in a binder for reference. Following these suggestions will facilitate consistent concept reinforcement and will avoid student confusion.

A blank Lesson Planner for Paraprofessionals is provided in this module or it can be downloaded as a fillable PDF from the online Professional Access.

Multi-Day Lesson Plan

Complete a Multi-Day Lesson Plan for each lesson taught. This form is a one-page reference sheet organized according to the 4-Step Approach. The form organizes the material from the lesson, lists what example problems will be used, highlights important vocabulary, and identifies the requirements for mastery. It may be used for whole-group planning. Alternatively, when using other grouping structures, teachers may find it helpful to complete a Multi-Day Lesson Plan for each lesson, then incorporate content into specific weekly schedules for individual students. A sample completed Multi-Day Lesson Plan is included for *Beta* Lesson 7.

Sample Multi-Day Lesson Plan for __Beta__, Lesson __7__

PRELIMINARY TO INSTRUCTION	
Step 1 – Prepare for the Lesson *Instruction page(s)* __37-40__ Objectives: BE.7.a - Students will be able to add two-digit numbers (with regrouping) using various strategies. Vocabulary: Regroup/carry - convert numbers from one place value to another (compose tens). Place-value notation = expanded form. Strategies: "It's okay to visit, but there's no place like home." Carry the ten home. Materials Needed: IM, DVD, IBK, bag/basket, cut-up problems, playing cards, tablets	**Teacher:** ☑ Watch the video lesson ☑ Review strategies and examples in Instruction Manual ☑ Note vocabulary from video ☑ Check for manipulative use ☑ Determine review or enrichment needs: Review limit of nine in each place value. Use closing activity for Unit Test I review.

INSTRUCTION		
Time		
1–2 minutes	**Minds Ready for Math** M: place value, T: making 10, W: skip counting by 2's, Th: making 10, F: place value	

10–15 minutes	**Step 2 – Present the Lesson's Concepts**
	Build - model using integer blocks, placing composed ten above first addend when regrouping.
	Write problem in standard and place-value notation/ expanded form.
	Say - explain the "why" behind the problem, making sure to reiterate the meaning of regrouping and re-emphasize that with place value "there's no place like home."
		Teacher and Students:
		☑ Watch the video lesson
		☑ Teach concepts
		   ☑ Build
		   ☑ Write
		   ☑ Say

35–40 minutes	**Step 3 – Students: Practice for Mastery** Lesson Practice 7A using "Zombie and the Brain," switching roles. Lesson Practice 7B 1–6 formative assessment (teach back). Reteach and assign Lesson Practice 7C as needed. Learning Centers: Basket of Problems, Build a Wall (making 10), Fishin' for Tens, Online Drill Use Worksheet Generator for Basket of Problems and additional practice (if needed). **Mastery Criteria** Teach back a two-digit addition problem composing ten using place-value notation/expanded form. Correctly solve a related word problem. Fill out Student Self-Reflection with all marked "Meets Expectations" at close of lesson. **Step 4 – Students Progress after Mastery** Systematic Review 7D (7E, 7F as needed) and corrections; learning centers; A&E page; create a word problem and present (group) **Lesson Test/Unit Posttest** Test 7/Unit Test I	**What do the students need?** ☑ Zip, Don't Skip **Teacher:** ☑ Provide guidance, feedback ☑ Reteach as necessary: through observation, target specific problem areas **Students:** ☑ Lesson Practice ☑ Teach Back ☑ Systematic Review ☑ Learning Activities ☑ Lesson Test ☑ Unit Posttest
5 minutes	**Clean Up and Closure:** Unit Test I Review - M: 7A #10, T: rounding to 10, W: 7E #14, Th: 7D #12, F: ordering numbers	☑ Whole-group word problem or game ☑ Unit posttest review ❑ Student learning share

Independent Learning Activities

The chart below provides suggestions for independent learning activities that may be appropriate while students are working towards mastery and after mastery has been achieved. More information on learning centers is provided in the Learning Activities module.

Independent Learning Activities

Before Mastery	After Mastery
• Worksheet from the online Worksheet Generator • Online Drills Application • Corrections of errors on a previous workbook page • App practice • Learning center • Teach Back practice (video recorder) • Watch a student-created instructional video	• Application and Enrichment workbook page • Review of previous concepts for test prep • Be Mr. Demme! (student-created instructional video) • Peer tutoring • Word problem creation (perhaps with an accompanying poster or PowerPoint slide) • Creating a math board game • App practice • Learning center • Online research of an interesting math topic

Strengthening the Foundation in Strategies and Math Facts

As referenced in the Placement module, some students may demonstrate conceptual mastery at a higher level but not demonstrate fluency in basic facts. It is important to allow students to continue to be challenged and advance conceptually while simultaneously working to strengthen the foundation with basic facts. Teachers working with these students should incorporate the suggestions that follow into their weekly lesson plans. The slot reserved for the closing activity is an excellent time to incorporate basic fact practice after the corresponding strategy has been introduced earlier in the class session.

Suggestions for Students Who Place into a Higher Level but Need *Alpha* Strategies

Initially, instruct students at the *Alpha* level to review and practice foundational math concepts as needed for 2–3 weeks. Based upon individual need, a student may need to focus on all or part of a lesson. The following is a list of concepts students should fully grasp.

Place value:

- » **Lesson 1:** Place Value and the Manipulatives
- » **Lesson 2:** Counting to 20—focus on the place value and regrouping principles in the second part of the lesson

Colors of unit blocks:

- » **Lesson 3:** Unit Bars

Addition facts strategies:

- » **Lesson 4:** Addition: + 0
- » **Lesson 5:** Addition: + 1, Commutative Property
- » **Lesson 6:** Counting to 100, Skip Counting by 10
- » **Lesson 7:** Addition: + 2
- » **Lesson 9:** Addition: + 9, Mental Math
- » **Lesson 10:** Addition: + 8
- » **Lesson 12:** Addition: Doubles
- » **Lesson 14:** Addition: Doubles + 1
- » **Lesson 15:** Addition: Making 10
- » **Lesson 16:** Addition: Making 9
- » **Lesson 17:** Addition of the Extras: 3 + 5, 4 + 7, 5 + 7

Solving for the unknown:

- » **Lesson 8:** Solving for the Unknown
- » **Lesson 12:** See Teaching Tip 2 at the end of the lesson
- » **Lesson 17:** Addition of the Extras—last section of the lesson

Word problems:

» **Lesson 4:** See section on Word Problem Tips

Subtraction facts strategies:

» **Lesson 18:** Introduction to Subtraction

» **Lesson 19:** Subtraction: − 1 and − 0

» **Lesson 20:** Subtraction: − 2

» **Lesson 21:** Subtraction: − 9

» **Lesson 22:** Subtraction: − 8

» **Lesson 23:** Subtraction: Doubles

» **Lesson 24:** Subtraction: Making 10

» **Lesson 25:** Subtraction: Making 9

» **Lesson 26:** Subtraction: Extras

» **Lesson 27:** Subtraction by 7, or Adding Up by 3

» **Lesson 28:** Subtraction by 6, or Adding Up by 4

» **Lesson 29:** Subtraction by 5, or Adding Up by 5

» **Lesson 30:** Subtraction by 3 and 4

Continue to review concepts and strategies taught in *Alpha* with each session. Provide review and practice facts.

A suggested model is to conduct a short mini-lesson to review and practice facts (5–7 minutes) and to begin teaching *Alpha* strategies. Then, spend the remainder of the session instructing at the higher level. Conclude the lesson with additional practice with basic facts or fact strategies for 5 minutes.

Fact practice:

» See the Math Facts and Learning Activities modules for suggestions for math fact practice.

Suggestions for Students Who Place into a Higher Level but Need *Gamma* Strategies

Initially, instruct students at the *Gamma* level to review and practice foundational math concepts as needed for 2–3 weeks. Based upon individual need, a student may need to focus on all or part of a lesson. The following is a list of concepts students should fully grasp.

Skip Counting facts:

> » **Lesson 3:** Skip Count by 2, 5, and 10
> » **Lesson 9:** Skip Count by 9—first part of the lesson
> » **Lesson 11:** Skip Count by 3
> » **Lesson 13:** Skip Count by 6—first part of the lesson
> » **Lesson 15:** Skip Count by 4—first part of the lesson
> » **Lesson 17:** Skip Count by 7, Multiples of 10
> » **Lesson 19:** Skip Count by 8—first part of the lesson

Building a rectangle with factors:

> » **Lesson 1:** Rectangles, Area, and Factors
> » **Lesson 7:** Area of a Rectangle and Square

Multiplication fact strategies:

> » **Lesson 2:** Multiply by 1 and 0, Commutative Property
> » **Lesson 4:** Multiply by 2—first part of the lesson
> » **Lesson 5:** Multiply by 10—first part of the lesson
> » **Lesson 6:** Multiply by 5—first part of the lesson
> » **Lesson 10:** Multiply by 9
> » **Lesson 12:** Multiply by 3—first part of the lesson
> » **Lesson 14:** Multiply by 6
> » **Lesson 16:** Multiply by 4—first part of the lesson
> » **Lesson 18:** Multiply by 7 and Multiples of 100
> » **Lesson 20:** Multiply by 8

Solving for the unknown:

> » **Lesson 8:** Solving for the Unknown

Word problems:

> » **Lesson 2:** See section on Word Problem Tips and Strategies for Word Problems

Continue to review concepts and strategies taught in *Gamma* until Lesson 20 with each session. A suggested model is to conduct a short mini-lesson to review and practice facts (5–7 minutes). Then continue with instruction at the higher level (15–20 minutes). Then spend approximately 5 minutes at the end of the lesson with additional practice with basic facts or fact strategies.

Fact practice:

» See the Math Facts and Learning Activities modules for suggestions for math fact practice.

Teacher Schedule

Teacher _____   Class _____

Monday	Tuesday	Wednesday	Thursday	Friday

Student Schedule

Name _____ Group _____

Monday	Tuesday	Wednesday	Thursday	Friday

Multi-Day Lesson Plan for _____ , Lesson _____

PRELIMINARY TO INSTRUCTION

Step 1 – Prepare for the Lesson   *Instruction page(s) _____*

Objectives:

Vocabulary:

Strategies:

Materials Needed:

Teacher:
- ❑ Watch the video lesson
- ❑ Review strategies and examples in Instruction Manual
- ❑ Note vocabulary from video
- ❑ Check for manipulative use
- ❑ Determine review or enrichment needs:

INSTRUCTION

Time	
	Minds Ready for Math

Step 2 – Present the Lesson's Concepts

Teacher and Students:
- ❑ Watch the video lesson
- ❑ Teach concepts
    - ❑ Build
    - ❑ Write
    - ❑ Say

Step 3 – Students: Practice for Mastery

What do the students need?
- ❑ Zip, Don't Skip

Teacher:
- ❑ Provide guidance, feedback
- ❑ Reteach as necessary: through observation, target specific problem areas

Mastery Criteria

Students:
- ❑ Lesson Practice
- ❑ Teach Back
- ❑ Systematic Review
- ❑ Learning Activities
- ❑ Lesson Test
- ❑ Unit Posttest

Step 4 – Students Progress after Mastery

Lesson Test/Unit Posttest

Clean Up and Closure:
- ❑ Whole-group word problem or game
- ❑ Unit posttest review
- ❑ Student learning share

Lesson Planner for Paraprofessionals

Level _____   Lesson _____

1. Objective:

2. Materials:

3. What to look for in the lesson video:

   •Math-U-See Strategy:

   •Vocabulary:

   •Notes about Math-U-See Lesson:

At least once per class, watch each student work through one complete problem (Teach Back):

   1. Build
      "Show me with the manipulatives."

   2. Write
      "Write the problem and the answer."

   3. Say
      "Explain the problem and how you got your answer."

This module suggests ways for students to practice math facts and also includes fifteen full-color posters for addition terminology, strategies, and math facts.

Overview

A quick and efficient recall of math facts enables students to devote more of their cognitive resources to conceptual learning and procedural knowledge. Proficiency with whole numbers is also foundational to acquiring proficiency with fractions, decimals, and algebra.

Math facts have been traditionally presented in charts for memorization. Although automaticity is important, the Math-U-See program emphasizes conceptual understanding as the critical first step. Mastering math facts through the use of strategies helps develop deeper number sense. Only once a math fact and its accompanying strategy have been explicitly taught to a student and then practiced with the blocks is it appropriate to introduce practice to improve fluency.

Math Facts Instruction

Systematically teach the math facts with their specific strategies. Addition and subtraction are found in *Alpha*. As each addition fact is taught, hang the corresponding fact poster on the wall; it can serve as a prompt or reinforcement when students are struggling. The *Gamma* and *Delta* levels contain the multiplication and division facts respectively.

Instruction that facilitates learning and retaining facts includes:

» Explicit teaching and modeling of fact strategies

» Linking strategic understanding with visual representation through the Build, Write, Say process

» Practicing to mastery through use of new and review facts

» Frequent, short periods of practice

» Application of basic facts to different place values

Example: 4 + 5, 40 + 50, 400 + 500

Suggestions for Math Facts Practice

1. Daily Five-Minute Reinforcement Activities and Math Games

Have students practice targeted math facts as a group or with partners.

Frequent, short periods of practice are effective for retention. Rotate students through learning centers and take advantage of the Clean Up and Closure time at the end of a class period. Keep it simple and fast-paced. See the Learning Activities module for applicable learning center ideas.
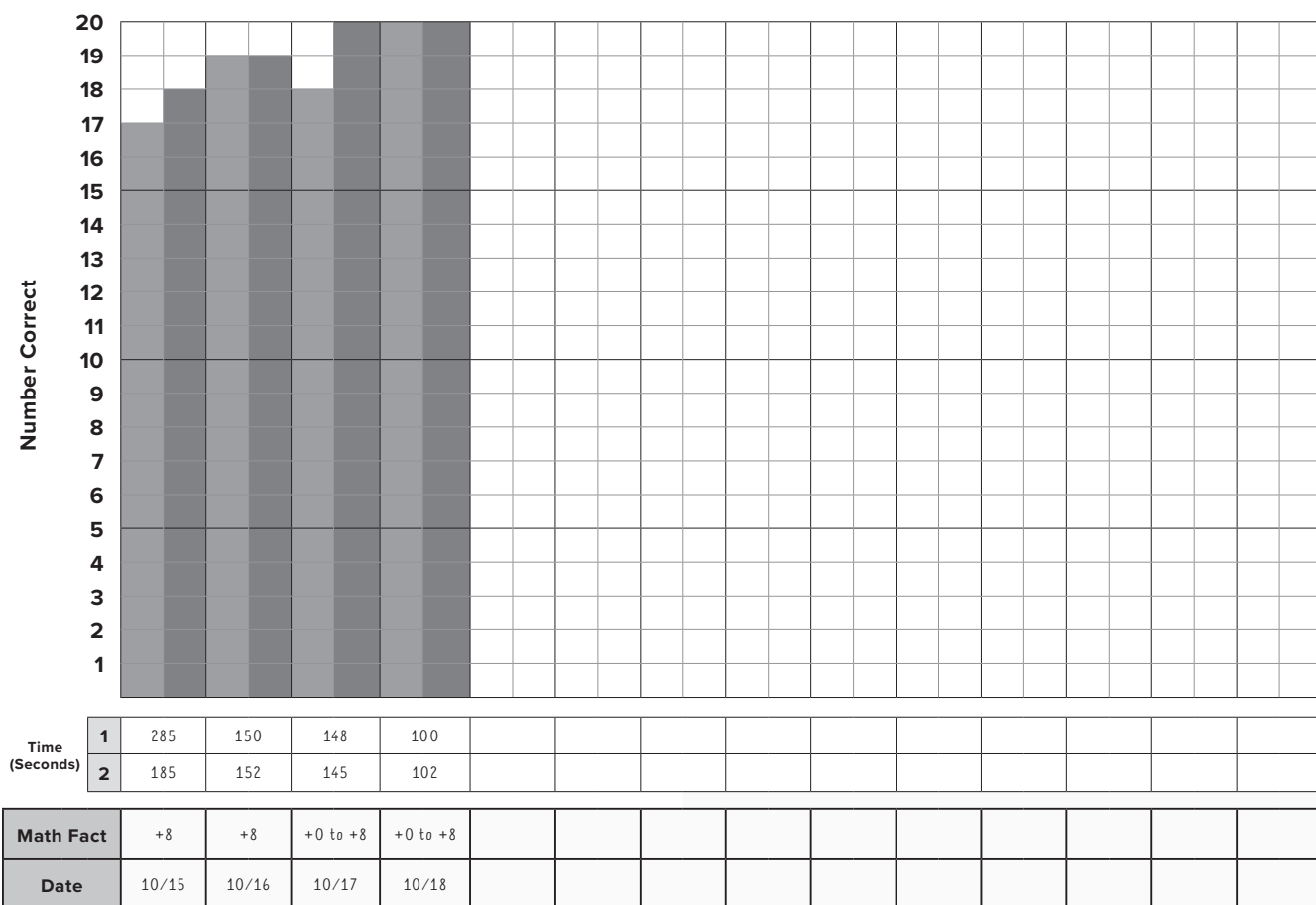
2. Online Drills Application

   The Online Drills Application allows students to focus on specific sets of facts, operations, or a combination. The application presents the student with 20 fact problems. If the student responds incorrectly to a problem, a pop-up window will display the correct fact equation. At the conclusion of 20 problems, a pop-up will display the number of problems answered correctly along with the elapsed time.

   Once a student has been taught a math fact and its accompanying strategy explicitly with the manipulatives and has practiced it with the blocks, they can use the Online Drills Application to practice that fact. The Online Drills Application may be accessed through the online Professional Access. Teachers may then set up a bookmark with the direct link, and teach students to access the drill independently.

   In a given day, it is best for the student to drill the same set of facts twice, recording their time and accuracy scores for both rounds in the same column on the Student Computer Drill Graph. (See sample below.) A blank copy of the graph is found in this module or it can be downloaded from the online Professional Access. Students may find self-graphing motivating. While working toward improving fact fluency, it is important to emphasize accuracy over speed.

Sample **Computer Drill Graph**   *Name* _____Sophia_____

Time (Seconds)	1	285	150	148	100											
	2	185	152	145	102											

Math Fact	+8	+8	+0 to +8	+0 to +8											
Date	10/15	10/16	10/17	10/18											

3. Worksheet Generator

    The Worksheet Generator allows the teacher to create worksheets from one lesson or a range of lessons. (Please note that not all lessons or levels are included.) The number of rows and columns of problems, ranging from two to five, can be specified. Once a student has been taught a math fact and its accompanying strategy explicitly with the manipulatives and has practiced it with the blocks, they can use worksheets created by the teacher using the Worksheet Generator to practice that fact. The Worksheet Generator can be accessed through the online Professional Access.

Students can use the applicable Facts Sheet from their Student Workbook (and also available as a downloadable PDF in the online Professional Acesss) to record their progress in math fact mastery.

Computer Drill Graph

Name _____

Number Correct

20																
19																
18																
17																
16																
15																
14																
13																
12																
11																
10																
9																
8																
7																
6																
5																
4																
3																
2																
1																
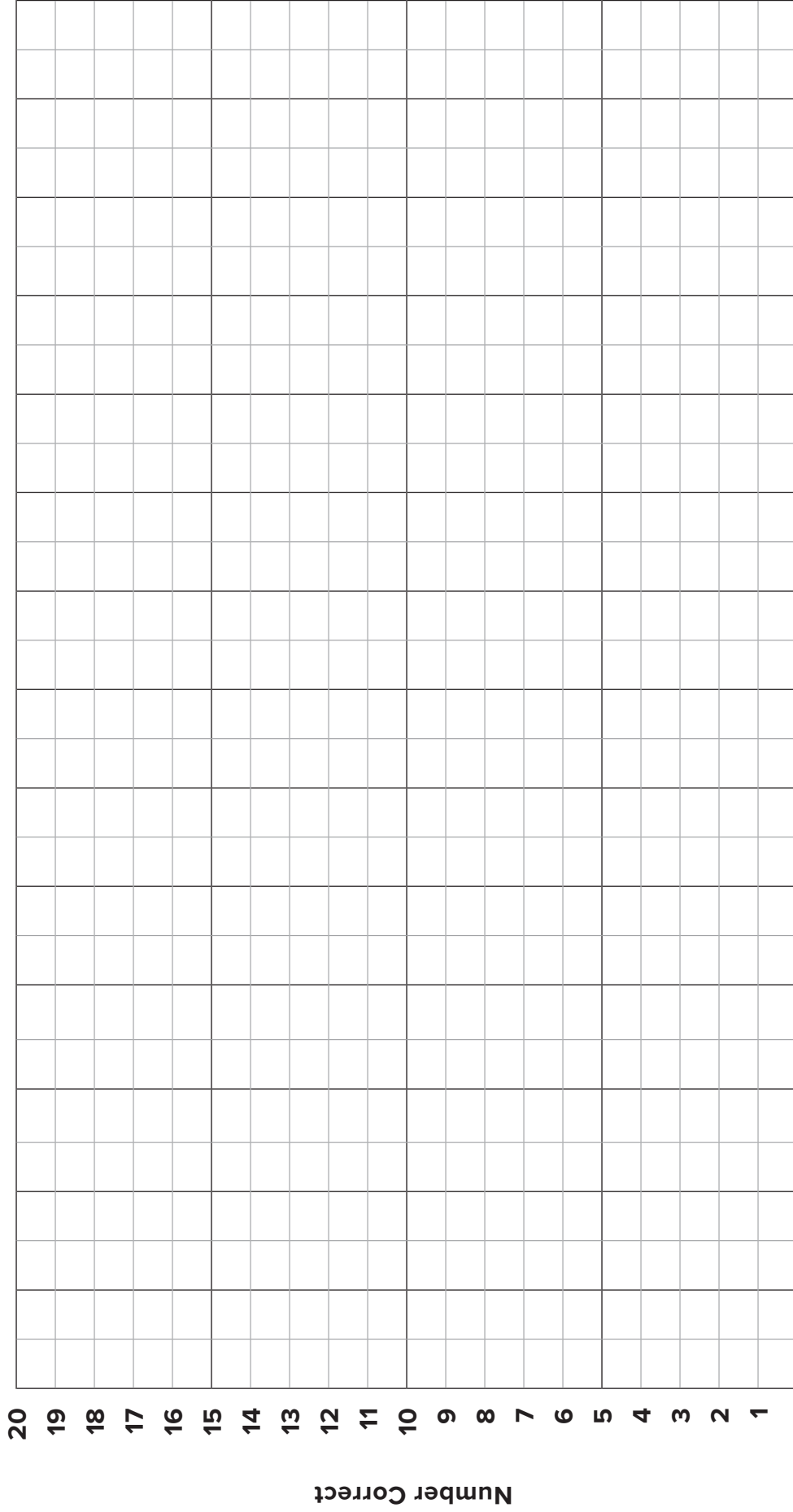
Time (Seconds)	1															
	2															

Math Fact													
Date													

This module suggests ways to integrate practice into the math block through curriculum resources and games. It also provides suggestions for incorporating cooperative learning structures into instructional time.

Curriculum Resources

» Worksheet Generator
This online tool enables teachers to print extra problems for practicing mastery. The worksheets can also be used to create problem sets for games (e.g., Basket of Problems, described in the "Games" section that follows).

» Online Drills Application
A student completes the same drill twice and records the scores on the Computer Drill Graph. The goal is to increase accuracy and fluency. For more information and detailed instructions, see the Math Facts module.

» Video Lesson
The video lesson may be used for reteaching or review.

Games

Instructional tent signs for use with the following learning activities can be downloaded as PDFs from the online Professional Access and printed on cardstock.

» **Place Value**

Pick a Card/Roll the Dice (1–4 players)
Materials:
- Set of cards with digits 0 to 9 written in green, one on each card (or green 10-sided die)
- Set of cards with the digits 0 to 9 written in blue, one on each card (or blue 10-sided die)
- Set of cards with the digits 0 to 9 written in red, one on each card (or red 10-sided die)
- Integer Block Kit
- Decimal Street® poster

How to Play:

Units (one-digit):	Player draws a green card (or rolls the green die) and places that number of unit blocks in the appropriate house on the Decimal Street poster. For example, if a player picks a card with a green 4, then four unit blocks are counted out and placed in the units house. Replace the card and shuffle. If multiple players are playing, take turns.
Units and Tens (two-digit):	Player draws one green card (or rolls the green die) and one blue card (or rolls the blue die). The player places the correct number of 10-blocks and unit blocks in the appropriate houses on the Decimal Street poster. Replace the cards and shuffle. If multiple players are playing, take turns.
Units, Tens, and Hundreds (three-digit):	Player draws one green card (or rolls the green die), one blue card (or rolls the blue die), and one red card (or rolls the red die). The player places the correct number of 100-blocks, 10-blocks, and unit blocks in the appopriate houses on the Decimal Street poster. Replace the cards and shuffle. If multiple players are playing, take turns.

» **Unit Block Identification (Subitizing)**

Blocks and Symbols Matching (1–3 players)
Materials:
- Set of cards with the numerals 1 to 9 on one side (one on each card) and a traced picture of the matching block on the other side
- Integer Block Kit

How to Play:
Shuffle the cards and place on the table with the numerals showing. The first player draws a card numeral side up and selects the block that matches, using the back of the card to check. If the correct match is made, the player keeps the card. If not, return the card to the bottom of the the pile. If multiple players are playing, take turns.

Simon Says (2 or more players)
Materials:
• Set of cards with various "Simon Says" directions
  (e.g., "Put a three on your shoulder.")
• Integer Block Kit

How to Play:
Teacher acts as "Simon" or a student is selected. Simon reads a card to the
other players. If players follow Simon's directions correctly, they receive a
point. Continue until all the cards have been read. Players may take turns being
Simon after each card.

What's Missing? (2 players)
Materials:
• Integer Block Kit

How to Play:
With the unit to nine blocks lined up in order, one player covers their eyes while
the other player removes one of the blocks. The first player then identifies
which block is missing. Players take turns.

The Grab Bag (2 players)
Materials:
• Set of cards with the numerals 1 to 9 written on them, one per card
• Paper lunch bag
• Integer Block Kit

How to Play:
Place the unit to nine blocks in a paper lunch bag. Players take turns drawing
a card and then feeling around in the bag to try to draw out the block that
matches the card. If the correct match is made, the player keeps the card. If not,
return the card to the bottom of the the pile.

Block Memory (1–4 players)
Materials:
• Set of cards with the numerals 1 to 9 written on them, one per card
• Set of cards with pictures of the unit to nine blocks, one per card

How to Play:
The cards are mixed up and placed on the table face down. The first player
turns over two cards and attempts to match the numeral with the corresponding
block. If the cards match, the player keeps them; if they do not match, the
player turns them back over. If multiple players are playing, take turns.

» **Addition**

Both Sides the Same (1–2 players)
Materials:
- Set of cards with the numerals 1 to 10 written on them, one per card
- Integer Block Kit
- Paper and pencil or small dry erase board and marker

How to Play:
Draw a line down the middle of the paper. The first player draws two cards and finds the blocks that match. The player places a block on one side of the line and the second block on the other side. The player asks, "What plus ___ is the same as ___?" and then picks the block that makes both sides the same. For example, Maria places a 7-block on one side and a 4-block on the other. She asks, "What plus four is the same as seven?" and correctly chooses the 3-block. Replace the cards and shuffle. If multiple players are playing, take turns.

Who Are You? (2 players)
Materials:
- Integer Block Kit
- Paper and pencil (or small dry erase board and marker)

How to Play:
Choose a set of math facts to practice. One player places a block down representing the sum (e.g., the 8-block), and then places a smaller block representing an addend above it (e.g., the 3-block). The player says, "Together we make eight. I am three; who are you?" The other player chooses the block they think will represent the missing addend and writes the corresponding equation
(e.g., 5 + 3 = 8). Players take turns.

Fishin' for Tens (3–4 players)
Materials:
- Deck of playing cards with tens, jokers, and face cards removed
  (Aces are ones.)

How to Play:
Shuffle cards and deal five cards to each player. Set the remaining cards face down on the table as a draw pile. The first player thinks of a number they need to combine with a card in their hand to make ten. (For example, if the player has a three, they need a seven to make ten.) The player asks another player for the needed card. If they have it, the first player takes it and lays down the combination making ten on the table face up in front of them. If the other player does not have the requested card, they say "Go fishin'!" The first player must then take a card from the draw pile. Players take turns until someone is out of cards. The person who runs out of cards gets two points, and everyone gets one point for each ten laid down.

Build a Wall (1 player)
Materials:
- Integer Block Kit
- Paper and pencil (or small dry erase board and marker)

How to Play:
Place a 9- or 10-block on the paper. The player makes a wall of blocks that is the same number of units long, using two blocks in each row. The player writes down the equation for each row in the wall. For example, if the second row is a 6-block and a 4-block, then the equation is 6 + 4 = 10.

Fill in the Space (2 players)
Materials:
- Integer Block Kit
- Paper and pencil (or small dry erase board and marker)

How to Play:
The first player places a 9- or 10-block on the paper and places a smaller block on top of it. The other player selects the correct block to fill the space to make nine or ten and writes the corresponding equation. Players take turns until nine different equations have been created.

Smaller (2 players)
Materials:
- Integer Block Kit

How to Play:
Players lay the unit through nine blocks out in ascending order with the unit block on the right. One player chooses a number between one and nine and asks, "What number is one less than __ (the chosen number)?" The other player answers. Players take turns.

Race to 100 (1–4 players)
Materials:
- Set of cards with the numerals 0 to 9 written in green, one on each card (or green 10-sided die)
- 1 red 100-block for each player
- Integer Block Kit

How to Play:
The first player draws a card (or rolls the die), and places the corresponding block on the first row of the 100-block. Replace the card and shuffle. If multiple players are playing, the next player takes a turn. Each player continues filling their 100-block with blocks, completing one row before moving to the next. If the card drawn is more than needed to complete the row, the block may be exchanged for two smaller blocks (e.g., exchange a 6-block for a 2-block and a 4-block). Continue until a player fills their 100-block.

Race to 500 (1–4 players)
Materials:
- Set of cards with the digits 0 to 9 written in green, one on each card (or green 10-sided die)
- Set of cards with the digits 0 to 9 written in blue, one on each card (or blue 10-sided die)
- Paper and pencil (or small dry erase board and marker)

How to Play:
The first player draws a card from both sets of cards (or rolls both dice). The player places the blue digit in the tens place and the green digit in the units place and writes the corresponding number on the paper. Replace the cards and shuffle. If multiple players are playing, the next player takes a turn. On subsequent turns, add the new number to the previous one. Continue until a player reaches 500 or greater.

Race to 5,000 (1–4 players)
Materials:
- Set of cards with the digits 0 to 9 written in green, one on each card (or green 10-sided die)
- Set of cards with the digits 0 to 9 written in blue, one on each card (or blue 10-sided die)
- Set of cards with the digits 0 to 9 written in red, one on each card (or red 10-sided die)
- Paper and pencil (or small dry erase board and marker)

How to Play:
The first player draws a card from all three sets of cards (or rolls all three dice). The player places the red digit in the hundreds place, the blue digit in the tens place, and the green digit in the units place. Then they write the corresponding number on the paper. Replace the cards and shuffle. If multiple players are playing, the next player takes a turn. On subsequent turns, add the new number to the previous one. Continue until a player reaches 5,000 or greater.

» **Multiple Operations**

T-Chart (2 players)
Materials:
- Set of cards with numerals 0 to 9 written on them, one on each card (or 10-sided die)
- Paper and pencil (or small dry erase board and marker)

How to Play:
Choose a set of math facts to practice, such as adding eight. Players draw a T-chart on a piece of paper with their names as headings. Students take turns drawing a card from the deck or rolling the die. The player who draws the card (or rolls the die) uses the resulting number and the chosen math fact to say and write an equation on the T-chart. For an example, see below.

$8 + \boxed{7} =$

Mark	Sue
8 + 4 = 12	8 + 7 = 15

Math Fact War (2–4 players)
Materials:
- Deck of playing cards with tens, jokers, and face cards removed
  (Aces are ones. Leave tens in deck for multiplication.)

How to Play:
Shuffle the cards and place the pile face down on the table. Choose a set of math facts to practice, such as adding eight. The first player turns over the top card and adds (or multiplies) the math fact and the number on the card. If the player answers correctly, they keep the card. Otherwise, it is returned to the bottom of the pile. Players take turns until all the cards are used.

Ball Toss (2 or more players)
Materials:
- Inflatable beach ball with the numerals 0 to 9 written randomly on different sections with permanent marker (Each numeral should be written at least twice.)

How to Play:
Choose a set of math facts to practice, such as adding eight. The first player catches the ball from another player and finds the number closest to the thumb on their right hand. The player adds (or multiplies) the math fact and that number, and then tosses the ball to the next player. Players earn a point for each correct response.

Basket of Problems (2 or more players)
Materials:
- Small paper bag, box, or basket
- Problems on slips of paper
- Corresponding Math-U-See Manipulatives

How to Play:
Place cut-apart problems in the container. The first player pulls a problem out, builds it with the manipulatives, and gives the answer. The other player checks their work. Players earn a point for each correct answer. Players take turns until all the problems have been drawn or both players have completed five turns.

» **Skip Counting**

Hundreds Chart (1 player)
Materials:
- Laminated hundreds chart with first row showing numerals 0 to 9, second row 10 to 19, etc.
- Dry erase marker
- Marker eraser

How to Play:
Select a skip counting fact. The player circles all the multiples for the selected fact and describes any pattern that they discover.

» **Fractions**

Build a Fraction (1–4 players)
Materials:
- Set of cards with the digits 0 to 5, one on each card, and "numerator" written on the back of each card
- Set of cards with the digits 1 to 6, one on each card, and "denominator" written on the back of each card
- Pencil, chenille stem, or piece of yarn to represent vinculum
- Fraction Overlay Kit (1 per player)

How to Play:
Shuffle each set of cards and place them face down in two piles. The first player takes a card from each pile and places the numerator card above the vinculum and the denominator card below the vinculum. The player then uses the fraction overlays to build the fraction. If the fraction is improper, build it as a mixed number. Replace the cards and shuffle. If multiple players are playing, take turns.

Name That Fraction (2–4 players)
Materials:
- Fraction Overlay Kit
- Paper and pencil or small dry erase board and marker (1 set per player)
- Folder for a "screen"

How to Play:
The first player sets the folder up as a screen and uses the Fraction Overlay Kit to build a fraction behind it. This player says "Go!" and removes the folder. The other players must write the fraction the model represents. Each player earns one point for correctly identifying the fraction. Players take turns building fractions.
VARIATION: The other players must write an equivalent fraction to the one shown.

Equivalent Fraction Race (1–4 players)
Materials:
- Set of cards with the following fractions written: $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}$ (one per card)
- Fraction Overlay Kit (1 per player)
- Paper and pencil or small dry erase board and marker (1 set per player)
- Timer

How to Play:
Shuffle the fraction cards and scatter them face down on the table. Set the timer for two minutes. At the start of the timer, each player takes a fraction card and turns it over. They then write their fraction on their paper and build it with the overlays. Next, each player uses the overlays to write and build as many equivalent fractions as possible before the timer goes off.

» **Decimals**

Race to 10.0 (1–4 players)
Materials:
- Set of cards with the digits 0 to 9 written in green, one on each card (or green 10-sided die)
- Set of cards with the digits 0 to 9 written in blue, one on each card (or blue 10-sided die)
- Set of cards with the digits 0 to 9 written in red, one on each card (or red 10-sided die)
- Token or button to represent decimal point
- Paper and pencil (or small dry erase board and marker)

How to Play:
Shuffle each set of cards and place them face down in three piles. Place a token or button to represent the decimal point on the table. The first player takes a card from each pile (or rolls all three dice). They place the red digit in the hundredths place, the blue digit in the tenths place, and the green digit in the units place. Then they write the corresponding number on the paper. Replace the cards and shuffle. If multiple players are playing, take turns. On subsequent turns, each player adds the new number to their previous one. Continue until a player reaches ten or greater.

Decimal Basketball (2 players)
Materials:
- 1 small ball of paper or ping-pong ball
- Small basket, empty can, or other container for the "basket"
- Paper and pencil or small dry erase board and marker (1 set per player)

How to Play:
Place the basket across the desk or table. The first player tosses the ball ten times, trying to get it into the basket. The player records the number of times they made the shot, and then writes this number as a decimal. The player earns one point if correct. Players take turns.
VARIATIONS: Players must write the score as an equivalent decimal in hundredths or thousandths. Players must write the score as a percentage. Players must record the number of shots made out of twenty or twenty-five attempts instead of ten and convert score to a decimal and/or percentage.

Decimal War (2–4 players)
Materials:
* Deck of playing cards with tens, jokers, and face cards removed
  (Aces are ones.)
* Card, piece of paper, or small dry erase board with a large *greater than* symbol
* Paper and pencil or small dry erase board and marker (1 set per player)

How to Play:
Shuffle the cards and place the pile face down on the table. The first player turns over the top two cards. If they are the same value, set them aside. If the cards are different values, place one on either side of the *greater than* symbol. The player must then use the numbers on the cards to write a correct inequality, incorporating zeros to create decimal values. For example, if the cards drawn appear as 3 > 7, they can add zeros to create 0.3 > 0.007 to get a correct inequality. Players take turns until all the cards are used.

» **Positive and Negative Integers**

Integer War (2–4 players)
Materials:
* Deck of playing cards with jokers and face cards removed
  (Aces are ones.)

How to Play:
Shuffle the cards and place the pile face down on the table. The first player turns over the top two cards. If a card is black, its value is positive; if a card is red, its value is negative. The player adds (or multiplies) the numbers on the cards. If the player answers correctly, they keep the cards. Otherwise, return the cards to the bottom of the pile. Players take turns until all the cards are used.

» **Exponents**

Power War (2 players)
Materials:
- Set of cards with digits 0 to 9 written in blue, one on each card
  (or blue 10-sided die)
- Set of cards with digits 0 to 9 written in red, one on each card
  (or red 10-sided die)
- Paper and pencils (or small dry erase board and markers)
- Scientific calculators (optional)

How to Play:
Players draw a T-chart on a piece of paper with their names as headings.

Mark	Sue

Shuffle the cards and place each pile face down on the table. Each player chooses one card from each pile or rolls both dice. On their side of the chart, they write an expression using the blue digit as the base and the red digit as the exponent (e.g., 5^2). Each player calculates the value and writes it next to the expression. The player who has the greater value earns a point. Return the cards to the piles, shuffle, and play ten rounds.

» **Simplifying Algebraic Expressions**

Make It Simple (1 player)
Materials:
- X-blocks, −X-blocks, green unit blocks
- Box or paper bag
- Paper and pencil (or small dry erase board and marker)

How to Play:
The player places all the blocks into the box or bag. Without looking, they pull out a handful of blocks and place them on the table. The player writes an expression representing the blocks (unit blocks = positive units, upside-down unit blocks = negative units). Next, the player matches and removes all additive inverse pairs (e.g., X-block and −X-block). The player writes another expression for the blocks that remain.

Make It Simple Partner Challenge (2 players)
Materials:
* X-blocks, −X-blocks, green unit blocks
* Paper and pencil (or small dry erase board and marker)

How to Play:
The first player writes an expression on the paper or dry erase board
(e.g., $x + 2x + 5 - x - 3$). The second player builds the expression with the
blocks. A correct expression earns a point. Next, the second player matches
and removes all additive inverse pairs (e.g., X-block and −X-block). The
second player writes another expression for the blocks that remain. A correct
expression earns another point. Players switch roles and continue playing until
one of them reaches ten points.

Cooperative Learning Structures

In addition to incorporating a variety of grouping structures into each class session, teachers
may wish to also incorporate a variety of learning structures. The preceding games include
options for individual, competitive, and cooperative learning.

Cooperative learning can result in higher achievement and increased retention. Students may
also experience reduced anxiety when participating in cooperative learning. Here are some
additional suggestions for incorporating cooperative learning into your implementation of the
Math-U-See program:

Rapid Review

When presenting a new lesson, pause at strategic points and allow small
groups two to three minutes to discuss and ask each other questions for
clarification.

Zombie and the Brain

As a transition from direct instruction to independent practice, allow students to
work through the Build, Write, Say process in pairs. The "brain" can only think
and speak. The "zombie" can only build and write as instructed by the brain.
Students take turns playing the roles of "zombie" and "brain" on alternating
problems.

Think-Pair-Share

Think-Pair-Share is a popular strategy that involves the teacher posing a question, allowing time for individual thinking, students sharing their responses with a partner, and students sharing responses with the whole group. Some suggested uses of Think-Pair-Share in a lesson are:

- To promote making connections between concepts, prior to introducing a new lesson, ask an exploratory question (e.g., prior to instructing on multiple-digit addition with regrouping, "What do you think might happen if you were to add two multiple-digit numbers and ended up with more than nine in a place value?").
- During Clean Up and Closure, present a word problem using concepts in review for a lesson or unit test.
- For review and reteaching, present a problem mirroring a common mistake and have students describe the error, why the error might have been made, and an alternative approach to solving the problem.
- To evaluate conceptual understanding, provide the steps of a worked solution and have students provide the rationale behind each step and why the approach was used. (Note: First, this practice should be modeled for the students by the teacher.)

This module will discuss the record keeping resources provided for teachers and students.

The Goal of Record Keeping with the Math-U-See Program
The goal is for students to demonstrate proficiency in the skills taught within the scope and sequence of the instructional program. Record keeping allows both students and teachers to mark progress towards mastery within the Math-U-See program.

How to Use the Record Keeping Forms

Daily Record Keeping
Within a unit, teachers will assess students and will record data using daily lesson practice pages, student teach-back of concepts, systematic review pages, lesson tests, and unit tests. For an example of how a completed form might look, see the sample on the following page.

Lesson objectives covered in the unit are listed separately at the bottom of each page and are grouped by lesson. Check boxes are provided to assist the teacher in tracking which specific objectives have been mastered and which may need additional instruction and practice. Objective lists for each level are also available to download from the online Professional Access.

Note that on the Record Keeping Forms for *Alpha* through *Zeta* there is a box labeled "Counting?". During the pre- and post-unit tests, teachers should observe and record whether students are using counting strategies or touch points to assist in calculation.

Proficiency criteria are assigned based on the pre- and post-unit tests. (Refer to the Lesson Planning module for information on pre- and post-unit test administration.) The criteria, their abbreviations, and the score required are as follows:

Advanced (A)	90–100%
Proficient (P)	80–89%
Nearing Proficiency (NP)	70–79%
Beginning Steps (BS)	<70%

Teachers may wish to use these same percentages when assisting students with the Lesson Test portion of the Student Self-Reflection discussed in the next section of this module.

Math·U·See

Student _John Johnson_

Sample Record Keeping: *Beta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)	2/19/18	55%	BS	✓

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
		A	B	C		D	E	F			
1	Place Value	93%	100%		✓	93%	100%			94%	2/22/18
2	Sequencing	71%	83%	92%	✓	81%	88%	94%		94%	3/1/18
3	Inequalities	86%	100%		✓	94%				100%	3/5/18
4	Rounding to 10	60%	70%	90%	✓	86%	86%	93%		93%	3/13/18
5	Multiple-Digit Addition	50%	70%	80%	✓	75%	86%	100%		93%	3/23/18
6	Skip Counting by 2	100%			✓	92%				92%	3/27/18
7	Addition with Regrouping	40%	70%	90%	✓	80%	87%	93%		87%	4/11/18

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)	4/13/18	86%	P	✓

LESSON OBJECTIVES

Lesson 1 — Place Value
☑ BE.1.a — Represent a number up to three digits with blocks (units, tens, and hundreds), with words (orally), and with numerals

Lesson 2 — Sequencing
☑ BE.2.a — Order numbers (up to three digits) from least to greatest
☑ BE.2.b — Order numbers (up to three digits) from greatest to least

Lesson 3 — Inequalities
☑ BE.3.a — Use the symbols >, <, and = to indicate whether a number is greater than, less than, or equal to another

Lesson 4 — Rounding to 10
☑ BE.4.a — Round two-digit numbers to the closest ten
☑ BE.4.b — Estimate sums of two-digit numbers by rounding the addends

Lesson 5 — Multiple-Digit Addition
☑ BE.5.a — Convert between standard notation and place-value notation
☑ BE.5.b — Add multiple-digit numbers (no regrouping) using various strategies

Lesson 6 — Skip Counting by 2
☑ BE.6.a — Skip count by two

Lesson 7 — Addition with Regrouping
☑ BE.7.a — Add two-digit numbers (with regrouping) using various strategies

Blank record keeping forms for each level *Primer* through *Calculus* are provided in this module, or they can be downloaded as fillable PDFs from the online Professional Access.

Student Self-Reflection
Self-reflecting is important for students because it helps them pause, consider their level of understanding, and determine where difficulties lie. A self-realization of progress and success also builds self-confidence.

The Student Self-Reflection gives students an opportunity to think about their understanding of both mathematical and word problems for a lesson. The teacher reviews the Self-Reflection with each student and assists the student as needed in its completion.

A blank Student Self-Reflection form is provided in this module. It also available to download from the online Professional Access.

At the End of a Level
The Class Placement Test Data form from the Placement module includes a column labeled Posttest. When a student has finished the fourth unit test, the final test or final exam for that level should be given as another piece of data showing student mastery. Record the results on the Class Placement Test Data form, and celebrate the student's success before moving on to the next level.

Student Self-Reflection

Name _____ I am on Lesson _____ in the _____ book.

	1. Beginning Steps	2. Nearing Expectations	3. Meets Expections
Build.	I needed help with this concept. I need to practice this concept with the teacher. STOP	I needed some help from the teacher to show my understanding by using the manipulatives to show a concrete model.	I am able to show my understanding by using the manipulatives or other material to show a concrete model.
Write.	I needed help with this concept. I need to practice this concept with the teacher. STOP	I needed some help from the teacher to write numbers and symbols that show the concept learned.	I am able to write numbers and symbols that show the concept learned.
Say.	I needed help with this concept. I need to practice this concept with the teacher. STOP	I needed some help to explain why or what is happening in this math concept.	I am able to explain why or what is happening in this math concept.
Word Problem	I needed help with this concept. I need to practice this concept with the teacher. STOP	I needed some help to correctly solve a word problem that shows I understand this concept.	I am able to correctly solve a word problem that shows I understand this concept.
Lesson Test	My teacher says my lesson test shows that I need more instruction on the concept of this lesson or a previous lesson. STOP	My teacher says my lesson test shows that I need to review the concept of this lesson or a previous lesson.	My teacher says my lesson test shows that I have mastered the concept of this lesson.
Self-Reflection	I feel I do not understand this concept.	I understand this concept a little. I need to practice this concept some more.	I feel confident that I have learned and understand this concept.

I have learned: _____

_____

_____

_____

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Mastery Check	Check Date
		A	B	C		D	E	F			
1	Number Recognition										
2	Writing Numerals										
3	Number Recognition and Writing Numerals 1										
4	Geometric Shapes: Rectangles										
5	Number Recognition and Writing Numerals 2										
6	Geometric Shapes: Circles										
7	Number Recognition and Writing Numerals 3										
8	Geometric Shapes: Triangles										
9	Place Value: Units and Tens										
10	Place Value: Hundreds										

LESSON OBJECTIVES

Lesson 1 **Number Recognition**
☐ PR.1.a   Count up to nine unit blocks or other objects
☐ PR.1.b   Identify the correct numeral for a given number of objects

Lesson 2 **Writing Numerals**
☐ PR.2.a   Trace numerals in preparation for writing

Lesson 3 **Number Recognition and Writing Numerals 1**
☐ PR.3.a   Use a ten-frame and manipulative blocks to represent a given number

Lesson 4 **Geometric Shapes: Rectangles**
☐ PR.4.a   Identify a rectangle
☐ PR.4.b   Choose a subset of shapes based on a given attribute

Lesson 5 **Number Recognition and Writing Numerals 2**
☐ PR.5.a   Write the correct numeral to match a number of counted objects

Lesson 6 **Geometric Shapes: Circles**
☐ PR.6.a   Identify a circle

Lesson 7 **Number Recognition and Writing Numerals 3**
☐ PR.7.a   Write the numeral that corresponds to a given representation

Lesson 8 **Geometric Shapes: Triangles**
☐ PR.8.a   Identify a triangle

Lesson 9 **Place Value: Units and Tens**
☐ PR.9.a   Identify tens and units using a model
☐ PR.9.b   Build a number between ten and ninety-nine using manipulative blocks
☐ PR.9.c   Identify numbers to ninety-nine represented by manipulative blocks
☐ PR.9.d   Use the words "less than" and "greater than" to compare numbers

Lesson 10 **Place Value: Hundreds**
☐ PR.10.a   Identify hundreds using a model
☐ PR.10.b   Build a number between ten and nine hundred ninety-nine using manipulative blocks
☐ PR.10.c   Identify numbers to nine hundred ninety-nine represented by manipulative blocks

Math·U·See

Record Keeping: *Primer*

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Mastery Check	Check Date
	A	**B**	**C**		**D**	**E**	**F**			
11 Unit Bars										
12 Addition: Introduction and Symbol										
13 Addition: +1										
14 Counting to 20										
15 Addition: 2 + 2 and 3 + 3; Vertical Addition										
16 Shapes: Squares; Addition: 4 + 4 and 5 + 5										
17 Skip Counting by 2										
18 Addition of Tens										
19 Skip Counting by 10										
20 Addition of Hundreds										

LESSON OBJECTIVES

Lesson 11   **Unit Bars**

☐ PR.11.a   Associate numbers with manipulative blocks of different colors and lengths

Lesson 12   **Addition: Introduction and Symbol**

☐ PR.12.a   Model addition with manipulative blocks

☐ PR.12.b   Identify the addition symbol

Lesson 13   **Addition: +1**

☐ PR.13.a   Use the counting-on strategy to add one to any number under ten, using manipulative blocks

Lesson 14   **Counting to 20**

☐ PR.14.a   Count to twenty

☐ PR.14.b   Write numerals from 0 to 20

☐ PR.14.c   Use manipulative blocks to represent numbers zero through twenty

☐ PR.14.d   Count to one hundred

Lesson 15   **Addition: 2 + 2 and 3 + 3; Vertical Addition**

☐ PR.15.a   Model the 2 + 2 and 3 + 3 doubles facts using manipulative blocks

☐ PR.15.b   Solve addition problems written vertically

Lesson 16   **Shapes: Squares; Addition: 4 + 4 and 5 + 5**

☐ PR.16.a   Identify a square

Lesson 17   **Skip Counting by 2**

☐ PR.17.a   Count up to twenty objects arranged in groups of two

☐ PR.17.b   Skip count by two

Lesson 18   **Addition of Tens**

☐ PR.18.a   Add ten and multiples of ten using manipulative blocks

Lesson 19   **Skip Counting by 10**

☐ PR.19.a   Count up to one hundred objects arranged in groups of ten

☐ PR.19.b   Skip count by ten

Lesson 20   **Addition of Hundreds**

☐ PR.20.a   Add hundreds using manipulative blocks

☐ PR.20.b   Add hundreds without using manipulative blocks

Math·U·See

Record Keeping: *Primer*

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Mastery Check	Check Date
		A	B	C		D	E	F			
21	Solving for an Unknown Addend										
22	Skip Counting by 5										
23	Tally Marks										
24	Addition: Making 10										
25	Skip Count to Find Area										
26	Telling Time with Minutes										
27	Telling Time with Hours										
28	Telling Time with Minutes and Hours										
29	Subtraction: Introduction and Symbol										
30	Subtraction: −1										

LESSON OBJECTIVES

Lesson 21   **Solving for an Unknown Addend**
☐ PR.21.a   Solve for the unknown addend using manipulative blocks and drawings (sums of ten and under)

Lesson 22   **Skip Counting by 5**
☐ PR.22.a   Count up to fifty objects arranged in groups of five
☐ PR.22.b   Skip count by five

Lesson 23   **Tally Marks**
☐ PR.23.a   Use tally marks to record information

Lesson 24   **Addition: Making 10**
☐ PR.24.a   Decompose ten into pairs of numbers

Lesson 25   **Skip Count to Find Area**
☐ PR.25.a   Skip count to find the area of a rectangle

Lesson 26   **Telling Time with Minutes**
☐ PR.26.a   State that there are sixty minutes in an hour
☐ PR.26.b   Use skip counting by five to identify the number of minutes indicated by the minute hand on a block clock or analog clock

Lesson 27   **Telling Time with Hours**
☐ PR.27.a   State that twelve hours are shown on a clock face
☐ PR.27.b   Identify the hour indicated by the hour hand on a block clock or analog clock

Lesson 28   **Telling Time with Minutes and Hours**
☐ PR.28.a   Identify minutes and hours to tell the time on a block clock or analog clock

Lesson 29   **Subtraction: Introduction and Symbol**
☐ PR.29.a   Model subtraction with manipulative blocks
☐ PR.29.b   Identify the subtraction symbol

Lesson 30   **Subtraction: −1**
☐ PR.30.a   Use manipulative blocks to subtract single-digit numbers

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
1 Place Value										
2 Counting to 20										
3 Unit Bars										
4 Addition: +0										
5 Addition: +1										
6 Count 100, Skip 10										
7 Addition: +2										
8 Solve for Unknown										
9 Addition: +9										
10 Addition: +8										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1 **Place Value**

☐ AL.1.a Model a number up to three digits with manipulatives (units, tens, and hundreds)

☐ AL.1.b Use words to write a number up to three digits (units, tens, and hundreds)

☐ AL.1.c Write a number up to three digits (units, tens, and hundreds)

Lesson 2 **Counting to 20**

☐ AL.2.a Count from zero through twenty

☐ AL.2.b Write the numerals 0–20

Lesson 3 **Unit Bars**

☐ AL.3.a Identify the value of each manipulative block by color

☐ AL.3.b Represent numbers zero through nine with manipulative blocks

Lesson 4 **Addition: +0**

☐ AL.4.a Identify the addition symbol and equals sign

☐ AL.4.b Solve addition by zero problems written horizontally and vertically

☐ AL.4.c Solve addition word problems

Lesson 5 **Addition: +1**

☐ AL.5.a Represent addition with the manipulative blocks

☐ AL.5.b Add one to any number less than ten by using blocks, by counting on, and by memory

☐ AL.5.c Demonstrate the Commutative Property of Addition by using the manipulatives

Lesson 6 **Count 100, Skip 10**

☐ AL.6.a Count to one hundred (and one hundred twenty)

☐ AL.6.b Skip count by ten

Lesson 7 **Addition: +2**

☐ AL.7.a Add two to make any sum up to ten

☐ AL.7.b Add multiples of ten

☐ AL.7.c Add multiples of one hundred

Lesson 8 **Solve for Unknown**

☐ AL.8.a Find the missing number in an addition equation, using the manipulatives as needed

Lesson 9 **Addition: +9**

☐ AL.9.a Add nine to any single-digit number

Lesson 10 **Addition: +8**

☐ AL.10.a Add eight to any single-digit number

Math·U·See.

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
11 Circles, Triangles; Skip Counting by 2										
12 Addition: Doubles										
13 Rectangles, Squares; Skip Counting by 5										
14 Addition: Doubles +1										
15 Add to Make 10										
16 Add to Make 9										
17 Addition: Extras										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)				

LESSON OBJECTIVES

Lesson 11 Circles, Triangles; Skip Counting by 2
☐ AL.11.a Identify a triangle
☐ AL.11.b Identify a circle
☐ AL.11.c Skip count by two

Lesson 12 Addition: Doubles
☐ AL.12.a Fluently add the doubles facts

Lesson 13 Rectangles, Squares; Skip Counting by 5
☐ AL.13.a Identify a square
☐ AL.13.b Identify a rectangle
☐ AL.13.c Skip count by five

Lesson 14 Addition: Doubles +1
☐ AL.14.a Fluently add the plus one facts

Lesson 15 Add to Make 10
☐ AL.15.a Fluently add two numbers that make ten
☐ AL.15.b Decompose ten into pairs of facts

Lesson 16 Add to Make 9
☐ AL.16.a Fluently add two numbers that make nine
☐ AL.16.b Decompose nine into pairs of facts

Lesson 17 Addition: Extras
☐ AL.17.a Fluently add the "extra" addition facts (3 + 5, 4 + 7, 5 + 7)

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
18 Subtraction										
19 Subtraction: −1, −0										
20 Subtraction: −2										
21 Subtraction: −9										
22 Subtraction: −8										
23 Subtraction: Doubles										
24 Subtraction from 10										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 18 Subtraction

☐ AL.18.a Understand subtraction as the opposite of addition (unknown addend problem)

☐ AL.18.b Solve a subtraction problem using the manipulatives

Lesson 19 Subtraction: −1, −0

☐ AL.19.a Fluently subtract one and zero

☐ AL.19.b Fluently subtract two numbers with a difference of one or zero

☐ AL.19.c Check a subtraction problem by "adding up"

Lesson 20 Subtraction: −2

☐ AL.20.a Fluently subtract two

☐ AL.20.b Fluently subtract two single-digit numbers with a difference of two

☐ AL.20.c Subtract multiples of ten

☐ AL.20.d Subtract multiples of one hundred

Lesson 21 Subtraction: −9

☐ AL.21.a Fluently subtract nine using the "adding up" strategy

Lesson 22 Subtraction: −8

☐ AL.22.a Fluently subtract eight using the "adding up" strategy

Lesson 23 Subtraction: Doubles

☐ AL.23.a Fluently subtract the doubles subtraction facts

Lesson 24 Subtraction from 10

☐ AL.24.a Fluently subtract any number from ten, using familiarity with "making ten"

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
25 Subtraction from 9										
26 Subtraction: Extras										
27 Subtraction: −7										
28 Subtraction: −6										
29 Subtraction: −5										
30 Subtraction: −3, −4										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 25 Subtraction from 9

☐ AL.25.a Fluently subtract any number from nine using familiarity with "making nine"

Lesson 26 Subtraction: Extras

☐ AL.26.a Fluently subtract the "extra" facts (7 − 4, 7 − 3, 8 − 5, 8 − 3)

Lesson 27 Subtraction: −7

☐ AL.27.a Fluently subtract seven using the "adding up" strategy

Lesson 28 Subtraction: −6

☐ AL.28.a Fluently subtract six using the "adding up" strategy

Lesson 29 Subtraction: −5

☐ AL.29.a Fluently subtract five using the "adding up" strategy

Lesson 30 Subtraction: −3, −4

☐ AL.30.a Fluently subtract three and four using the "adding up" strategy

	Appendix A1	Appendix A2
A Telling Time: Minutes		

LESSON OBJECTIVES

Appendix A Telling Time: Minutes

☐ AL.A.a   Write the minutes indicated by a
block clock or analog clock

	Appendix B1	Appendix B2	Appendix B3	Appendix B4
B Telling Time: Hours				

LESSON OBJECTIVES

Appendix B Telling Time: Hours

☐ AL.B.a   Write the time (hours and minutes) indicated
by a block clock or analog clock

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
1 Place Value										
2 Sequencing										
3 Inequalities										
4 Rounding to 10										
5 Multiple-Digit Addition										
6 Skip Counting by 2										
7 Addition with Regrouping										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1   **Place Value**
☐ BE.1.a   Represent a number up to three digits with blocks (units, tens, and hundreds), with words (orally), and with numerals

Lesson 2   **Sequencing**
☐ BE.2.a   Order numbers (up to three digits) from least to greatest
☐ BE.2.b   Order numbers (up to three digits) from greatest to least

Lesson 3   **Inequalities**
☐ BE.3.a   Use the symbols >, <, and = to indicate whether a number is greater than, less than, or equal to another

Lesson 4   **Rounding to 10**
☐ BE.4.a   Round two-digit numbers to the closest ten
☐ BE.4.b   Estimate sums of two-digit numbers by rounding the addends

Lesson 5   **Multiple-Digit Addition**
☐ BE.5.a   Convert between standard notation and place-value notation
☐ BE.5.b   Add multiple-digit numbers (no regrouping) using various strategies

Lesson 6   **Skip Counting by 2**
☐ BE.6.a   Skip count by two

Lesson 7   **Addition with Regrouping**
☐ BE.7.a   Add two-digit numbers (with regrouping) using various strategies

Student _____

Record Keeping: *Beta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A & E	Lesson Test	Test Date
	A	B	C		D	E	F			
8 Skip Counting by 10; Pennies and Dimes										
9 Skip Counting by 5; Nickels										
10 Money										
11 Round to 100s										
12 Adding Money										
13 Column Addition										
14 Measure, Foot										
15 Perimeter										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)				

LESSON OBJECTIVES

Lesson 8   **Skip Counting by 10; Pennies and Dimes**
☐ BE.8.a   Skip count by ten
☐ BE.8.b   Identify a penny and its value (one cent)
☐ BE.8.c   Identify a dime and its value (ten cents)

Lesson 9   **Skip Counting by 5; NIckels**
☐ BE.9.a   Skip count by five
☐ BE.9.b   Identify a nickel and its value (five cents)

Lesson 10   **Money**
☐ BE.10.a   Model a money amount using manipulatives and knowledge of place value
☐ BE.10.b   Write a money amount using a dollar sign and decimal point

Lesson 11   **Round to 100s**
☐ BE.11.a   Round three-digit numbers to the closest hundred
☐ BE.11.b   Estimate sums of three-digit numbers by rounding the addends and adding them
☐ BE.11.c   Add three-digit numbers (with regrouping) using various strategies

Lesson 12   **Adding Money**
☐ BE.12.a   Add money amounts that include dollar signs with decimals (with regrouping)

Lesson 13   **Column Addition**
☐ BE.13.a   Add columns of one- and two-digit numbers, making tens when possible (with regrouping)

Lesson 14   **Measure, Foot**
☐ BE.14.a   Measure objects using feet or inches
☐ BE.14.b   State that there are 12 inches in one foot

Lesson 15   **Perimeter**
☐ BE.15.a   Add measurements to find the perimeter of a square, rectangle, or triangle

Math·U·See

Student _____

Record Keeping: *Beta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
16 1,000s										
17 Round to 1,000s										
18 Multiple-Digit Columns 1										
19 Multiple-Digit Columns 2										
20 Multiple-Digit Subtraction										
21 Time: Minutes										
22 Subtraction with Regrouping										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 16   1,000s

☐ BE.16.a   Read and write numbers to the hundred thousands place

Lesson 17   Round to 1,000s

☐ BE.17.a   Round four-digit numbers to the closest thousand

☐ BE.17.b   Estimate sums of four-digit numbers by rounding the addends

☐ BE.17.c   Add three-digit numbers using place-value notation and regrouping as needed

Lesson 18   Multiple-Digit Columns 1

☐ BE.18.a   Add up to five three-digit numbers using column addition

Lesson 19   Multiple-Digit Columns 2

☐ BE.19.a   Add up to three four-digit numbers using column addition

Lesson 20   Multiple-Digit Subtraction

☐ BE.20.a   Subtract two- and three-digit numbers (no regrouping)

Lesson 21   Time: Minutes

☐ BE.21.a   Write the minutes indicated by a block clock or analog clock

Lesson 22   Subtraction with Regrouping

☐ BE.22.a   Subtract two-digit numbers (with regrouping)

Math·U·See

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
23 Time: Hours										
24 3-Digit Subtraction										
25 Ordinal Numbers										
26 4-Digit Subtraction										
27 Subtract Money										
28 Multiple-Digit Subtraction										
29 Gauges										
30 Graphs										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 23 **Time: Hours**
☐ BE.23.a   Write the time indicated by a block clock or analog clock

Lesson 24 **3-Digit Subtraction**
☐ BE.24.a   Subtract three-digit numbers (with regrouping)

Lesson 25 **Ordinal Numbers**
☐ BE.25.a   Use ordinal numbers to name days and months (e.g., January is the first month of the year)
☐ BE.25.b   Use tally marks to record a number of objects
☐ BE.25.c   Read the number indicated by a set of tally marks

Lesson 26 **4-Digit Subtraction**
☐ BE.26.a   Subtract four-digit numbers (with regrouping)

Lesson 27 **Subtract Money**
☐ BE.27.a   Subtract money amounts that include dollar signs and decimals (with regrouping)

Lesson 28 **Multiple-Digit Subtraction**
☐ BE.28.a   Subtract five-digit numbers (with regrouping)

Lesson 29 **Gauges**
☐ BE.29.a   Read a circular gauge or speedometer
☐ BE.29.b   Read a thermometer

Lesson 30 **Graphs**
☐ BE.30.a   Obtain information from simple bar and line graphs
☐ BE.30.b   Record information on a bar or line graph

Appendix A1

A Identifying Shapes: Fractional Parts

LESSON OBJECTIVES

Appendix A   Identifying Shapes: Fractional Parts

☐ BE.A.a   Identify two-dimensional shapes
by the number of sides

☐ BE.A.b   Identify a cube

☐ BE.A.c   State that a fraction represents
an "equal share"

Appendix B1

B Number Line

LESSON OBJECTIVES

Appendix B   Number Line

☐ BE.B.a   Identify whole numbers as lengths
from zero on a number line

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
1 Rectangles										
2 Multiplying by 1 and 0										
3 Skip Counting by 2, 5, and 10										
4 Multiplying by 2										
5 Multiplying by 10										
6 Multiplying by 5										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1 **Rectangles**
☐ GA.1.a   Identify a rectangle and a square
☐ GA.1.b   Use a unit square to measure area

Lesson 2 **Multiplying by 1 and 0**
☐ GA.2.a   Multiply a number zero through ten by one
☐ GA.2.b   Explain why zero times any number is zero
☐ GA.2.c   Apply knowledge of the Commutative Property of Multiplication to identify the factors and product of a multiplication model

Lesson 3 **Skip Counting by 2, 5, and 10**
☐ GA.3.a   Skip count by two
☐ GA.3.b   Skip count by five
☐ GA.3.c   Skip count by ten

Lesson 4 **Multiplying by 2**
☐ GA.4.a   Multiply a number zero through ten by two
☐ GA.4.b   Use multiplication by two to convert quarts to pints

Lesson 5 **Multiplying by 10**
☐ GA.5.a   Multiply a number zero through ten by ten
☐ GA.5.b   Use multiplication by ten to convert dimes to cents

Lesson 6 **Multiplying by 5**
☐ GA.5.a   Multiply a number zero through ten by five
☐ GA.6.b   Use multiplication by five to convert nickels to cents

		Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)					

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
		A	B	C		D	E	F			
7	Area of a Rectangle										
8	Solve for an Unknown Factor										
9	Skip Counting by 9										
10	Multiplying by 9										
11	Skip Counting by 3										
12	Multiplying by 3										
13	Skip Counting by 6										
14	Multiplying by 6										

		Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)					

LESSON OBJECTIVES

Lesson 7   **Area of a Rectangle**

☐ GA.7.a   Use multiplication to find the area of a rectangle with known dimensions

☐ GA.7.b   Use multiplication to solve word problems involving area

Lesson 8   **Solve for an Unknown Factor**

☐ GA.8.a   Find an unknown factor

Lesson 9   **Skip Counting by 9**

☐ GA.9.a   Skip count by nine

☐ GA.9.b   Use skip counting to make equivalent fractions

Lesson 10   **Multiplying by 9**

☐ GA.10.a   Multiply a number zero through ten by nine

Lesson 11   **Skip Counting by 3**

☐ GA.11.a   Skip count by three

Lesson 12   **Multiplying by 3**

☐ GA.12.a   Multiply a number zero through ten by three

☐ GA.12.b   Use multiplication by three to convert yards to feet and tablespoons to teaspoons

Lesson 13   **Skip Counting by 6**

☐ GA.13.a   Skip count by six

☐ GA.13.b   Count shaded parts of a rectangle to name a fraction

Lesson 14   **Multiplying by 6**

☐ GA.14.a   Multiply a number zero through ten by six

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
15 Skip Counting by 4										
16 Multiplying by 4										
17 Skip Counting by 7										
18 Multiplying by 7										
19 Skip Counting by 8										
20 Multiplying by 8										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 15   Skip Counting by 4
☐ GA.15.a   Skip count by four
☐ GA.15.b   Use multiplication by four to convert gallons to quarts

Lesson 16   Multiplying by 4
☐ GA.16.a   Multiply a number zero through ten by four
☐ GA.16.b   Use multiplication by four to convert dollars to quarters

Lesson 17   Skip Counting by 7
☐ GA.17.a   Skip count by seven
☐ GA.17.b   Multiply multiples of ten by single-digit numbers

Lesson 18   Multiplying by 7
☐ GA.18.a   Multiply a number zero through ten by seven
☐ GA.18.b   Multiply one hundred by a single-digit number

Lesson 19   Skip Counting by 8
☐ GA.19.a   Skip count by eight
☐ GA.19.b   Use multiplication by eight to convert gallons to pints

Lesson 20   Multiplying by 8
☐ GA.20.a   Multiply a number zero through ten by eight

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Record Keeping: *Gamma*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
21 Multiple-Digit Multiplication										
22 Rounding, Estimating										
23 2-Digit × 2-Digit										
24 2-Digit Regrouping										
25 Multiple-Digit Regrouping										
26 Factors										
27 Millions										
28 Multiple-Digit Multiplication										
29 Prime Numbers										
30 Miles and Tons										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 21 Multiple-Digit Multiplication

☐ GA.21.a Use place-value strategies and the Distributive Property of Multiplication over Addition to multiply numbers with one multiple-digit factor and one single-digit factor

Lesson 22 Rounding, Estimating

☐ GA.22.a Round to the closest ten, hundred, and thousand

☐ GA.22.b Use rounding to estimate the answer to a multiplication problem

Lesson 23 2-Digit × 2-Digit

☐ GA.23.a Multiply a two-digit number by a two-digit number (no regrouping)

Lesson 24 2-Digit Regrouping

☐ GA.24.a Multiply a two-digit number by a two-digit number, using regrouping as needed

Lesson 25 Multiple-Digit Regrouping

☐ GA.25.a Multiply a three-digit number by a two-digit number, using regrouping as needed

Lesson 26 Factors

☐ GA.26.a Find all possible factor pairs for a given number

☐ GA.26.b Multiply to find the number of cents in a given number of quarters

Lesson 27 Millions

☐ GA.27.a Represent and interpret numbers up to the one hundred millions with words, place-value notation, and standard notation

☐ GA.27.b Use multiplication by sixteen to convert pounds to ounces

Lesson 28 Multiple-Digit Multiplication

☐ GA.28.a Multiply a three-digit number by a three-digit number

☐ GA.28.b Multiply a four-digit number by a three-digit number

Lesson 29 Prime Numbers

☐ GA.29.a Find all possible pairs of factors for a number

☐ GA.29.b Determine whether a number is prime or composite

☐ GA.29.c Multiply twelve by a single-digit number

Lesson 30 Miles and Tons

☐ GA.30.a Use multiplication (by a whole number conversion factor) to convert miles to feet and tons to pounds

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Appendix A1

A More on Fractions

LESSON OBJECTIVES

Appendix A More on Fractions

☐ GA.A1.a   Use models to represent fractions of whole numbers

☐ GA.A1.b   Describe a simple proper fraction using the terms numerator and denominator

☐ GA.A1.c   Describe the relationship of two fractions using > or <

Appendix B1

B Metric Measures

LESSON OBJECTIVES

Appendix B Metric Measures

☐ GA.B1.a   Identify the appropriate metric units of measurement for length, volume, and mass

☐ GA.B1.b   Solve application problems involving metric units of length, volume, and mass

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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Student _____

Record Keeping: *Delta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
1 Rectangles										
2 Divide by 1, by 2; Symbols										
3 Divide by 10										
4 Divide by 5, by 3										
5 Parallel, Perpendicular										
6 Divide by 9										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1   Rectangles

☐ DE.1.a   Find the dimensions of a rectangle by counting blocks for the length and width

☐ DE.1.b   Solve for the area of a given rectangle

☐ DE.1.c   Solve for an unknown in a simple multiplication equation

Lesson 2   Divide by 1, by 2; Symbols

☐ DE.2.a   Identify the different symbols used for division

☐ DE.2.b   Demonstrate proficiency of division facts for one and two

☐ DE.2.c   Explain that, when the divisor is one, the quotient is the same as the dividend

☐ DE.2.d   Solve division problems when the divisor is one or two

☐ DE.2.e   Solve word problems by applying knowledge of division facts for one and two

Lesson 3   Divide by 10

☐ DE.3.a   Model the relationship between multiplication and division with blocks

☐ DE.3.b   Explain why division is not commutative

☐ DE.3.c   Demonstrate proficiency of basic division facts for ten

☐ DE.3.d   Identify the $\frac{1}{2}$ rectangle box as a symbol for division

☐ DE.3.e   Solve division problems when ten is the divisor

☐ DE.3.f   Solve word problems by applying knowledge of basic division facts for ten

Lesson 4   Divide by 5, by 3

☐ DE.4.a   Identify the divisor, dividend, and quotient in a divison problem

☐ DE.4.b   Fluently divide by five and three

☐ DE.4.c   Solve division problems when five or three is the divisor

☐ DE.4.d   Solve word problems by applying knowledge of division facts for five and three

Lesson 5   Parallel, Perpendicular

☐ DE.5.a   Define parallel lines, perpendicular lines, angles, and planes

☐ DE.5.b   Identify lines which appear to be parallel to one another

☐ DE.5.c   Identify lines which appear to be perpendicular to one another

☐ DE.5.d   Write the symbols for parallel and perpendicular lines

☐ DE.5.e   Apply knowledge of parallel and perpendicular lines to solve problems

Lesson 6   Divide by 9

☐ DE.6.a   Fluently divide by nine

☐ DE.6.b   Solve division problems when nine is the divisor

☐ DE.6.c   Solve word problems by applying knowledge of division facts for nine

Student _____

Record Keeping: *Delta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
7 Area of a Parallelogram										
8 Divide by 6										
9 Area of a Triangle										
10 Divide by 4										
11 Averages										
12 Divide by 7, by 8										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)				

LESSON OBJECTIVES

Lesson 7   **Area of a Parallelogram**

☐ DE.7.a   Find the area of a parallelogram with known height and known base length

☐ DE.7.b   Apply the formula for calculating area of a parallelogram to solve problems

Lesson 8   **Divide by 6**

☐ DE.8.a   Fluently divide by six

☐ DE.8.b   Solve division problems when six is the divisor

☐ DE.8.c   Solve word problems by applying knowledge of basic division facts for six

Lesson 9   **Area of a Triangle**

☐ DE.9.a   Find the area of a triangle with known height and known base length, using the formula $\frac{1}{2} \times b \times h$

☐ DE.9.b   Solve word problems by using the formula for area of a triangle

Lesson 10   **Divide by 4**

☐ DE.10.a   Fluently divide by four

☐ DE.10.b   Solve division problems when four is the divisor

☐ DE.10.c   Solve word problems by applying knowledge of division facts for four

Lesson 11   **Averages**

☐ DE.11.a   Find the mean (average) of a set of positive integers

☐ DE.11.b   Solve word problems by calculating an average

Lesson 12   **Divide by 7, by 8**

☐ DE.12.a   Fluently divide by seven and eight

☐ DE.12.b   Solve division problems when seven or eight is the divisor

☐ DE.12.c   Solve word problems by applying knowledge of division facts for seven and eight

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
13 Area of a Trapezoid										
14 Thousands, Millions										
15 Billions, Trillions										
16 Divison with Remainder										
17 Upside Down Multiplication										
18 Divide 2 Digits by 1 Digit										
19 Divide 3 Digits by 1 Digit										
20 Divide 3 Digits by 1 Digit (Cont.)										
21 Round, Estimate										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 13   Area of a Trapezoid

☐ DE.13.a   Calculate the area of a trapezoid given the base length and height

☐ DE.13.b   Substitute values into the formula $\frac{b_1 + b_2}{2} \times h$ to find the area of a trapezoid

Lesson 14   Thousands, Millions

☐ DE.14.a   Read numbers to the thousands and millions place in words

☐ DE.14.b   Write numbers to the thousands and millions place using standard notation

☐ DE.14.c   Write numbers to the thousands and millions place using place-value notation

Lesson 15   Billions, Trillions

☐ DE.15.a   Use a place-value chart to model numbers to the billions and trillions

☐ DE.15.b   Read numbers in standard notation to the billions and trillions

☐ DE.15.c   Write numbers to the billions and trillions

☐ DE.15.d   Write numbers in expanded notation to the billions and trillions

Lesson 16   Division with Remainder

☐ DE.16.a   Solve division-with-remainder problems with a divisor of one through nine

☐ DE.16.b   Solve word problems using long division

Lesson 17   Upside Down Multiplication

☐ DE.17.a   Model traditional multiplication with blocks

☐ DE.17.b   Use blocks to model upside down multiplication

☐ DE.17.c   Solve multiplication problems using place-value notation

☐ DE.17.d   Solve multiplication problems using upside down multiplication

☐ DE.17.e   Use patterns to break division problems into smaller ones

Lesson 18   Divide 2 Digits by 1 Digit

☐ DE.18.a   Solve division problems with two-digit dividends and a divisor of one through nine (with remainders)

☐ DE.18.b   Verify answers by using upside down multiplication

☐ DE.18.c   Solve word problems using division strategies

Lesson 19   Divide 3 Digits by 1 Digit

☐ DE.19.a   Solve division problems with three-digit dividends and a divisor of one through nine (with remainders)

☐ DE.19.b   Multiply to check a division problem

Lesson 20 **Divide 3 Digits by 1 Digit (Cont.)**

☐ DE.20.a   Solve division problems with three-digit dividends and a divisor of one through nine, using fractions to express remainders

☐ DE.20.b   Use division to convert inches to feet and ounces to pounds

Lesson 21 **Round, Estimate**

☐ DE.21.a   Identify the symbol for "approximately equal to"

☐ DE.21.b   Estimate quotients by rounding the dividend to the greatest place value and then dividing

☐ DE.21.c   Compare the approximate quotient with the exact quotient to verify that an answer is reasonable

☐ DE.21.d   Apply knowledge of division and estimating quotients to solve word problems

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Student _____

Record Keeping: *Delta*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
22 Divide 3 Digits by 2 Digits										
23 Divide 4 Digits by 1 Digit										
24 Divide 4 Digits by 2 Digits										
25 Multiple-Digit Division										
26 Volume										
27 Fraction of a Number										
28 Roman Numerals										
29 Fraction of One										
30 Roman Numerals (Cont.)										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 22 Divide 3 Digits by 2 Digits

☐ DE.22.a Solve division-with-remainder problems with three-digit dividends and two-digit divisors

Lesson 23 Divide 4 Digits by 1 Digit

☐ DE.23.a Solve division-with-remainder problems with four-digit dividends and one-digit divisors

Lesson 24 Divide 4 Digits by 2 Digits

☐ DE.24.a Solve division-with-remainder problems with four-digit dividends and two-digit divisors

Lesson 25 Multiple-Digit Division

☐ DE.25.a Solve division-with-remainder problems where the divisor has up to three digits

Lesson 26 Volume

☐ DE.26.a Use models to demonstrate that volume is measured in three dimensions

☐ DE.26.b Explain why cubic units are used to measure volume

☐ DE.26.c Find the volume of a rectangular prism by multiplying given dimensions using the formula $V = b \times h$

☐ DE.26.d Label answers to volume problems with cubic units

☐ DE.26.e Use multiplication to convert cubic feet to gallons

Lesson 27 Fraction of a Number

☐ DE.27.a Use blocks or drawings to find a fraction of a positive integer when the integer is a multiple of the denominator

☐ DE.27b Express a fraction of a fraction

☐ DE.27.c Multiply to calculate a fraction of a fraction

Lesson 28 Roman Numerals

☐ DE.28.a Interpret the values for Roman numerals composed of I, V, X, L, and C

☐ DE.28.b Rewrite Roman numerals as Arabic numerals

☐ DE.28.c Rewrite Arabic numerals as Roman numerals

☐ DE.28.d Use knowledge of Roman numerals and Arabic numerals to solve problems

Lesson 29 Fraction of One

☐ DE.29.a Use models to determine a fraction of one

☐ DE.29.b Express the shaded regions of a rectangle in fraction notation

☐ DE.29.c Use models to represent a given proper fraction

☐ DE.29.d Apply knowledge of determining a fraction of one to solve word problems

Lesson 30 Roman Numerals (Cont.)

☐ DE.30.a Interpret and apply the Roman numeral symbols D, M, and the overbar

☐ DE.30.b Rewrite greater numbers as Roman numerals and Arabic numerals

Record Keeping: *Epsilon*

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
1 Fraction of a Number										
2 Fraction of One										
3 Add, Subtract Same Denominator										
4 Equivalent Fractions										
5 Add, Subtract Unequal Denominators										
6 Rule of Four										
7 Compare Fractions										
8 Add Multiple Fractions										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1 **Fraction of a Number**

☐ EP.1.a Use models to represent fractions of whole numbers

☐ EP.1.b Describe a simple proper fraction using the terms numerator and denominator

☐ EP.1.c Identify a proper fraction, improper fraction, and mixed number

☐ EP.1.d Calculate a fraction of a whole number

Lesson 2 **Fraction of One**

☐ EP.2.a Model a proper fraction using manipulatives

☐ EP.2.b Identify the fraction represented in a model using words

☐ EP.2.c Name the fraction represented in a model using symbols

Lesson 3 **Add, Subtract Same Denominator**

☐ EP.3.a Use models to represent two fractions with common denominators

☐ EP.3.b Represent the sum or difference of two fractions using fraction notation

☐ EP.3.c Express the sum or difference of two fractions using words

☐ EP.3.d Add or subtract two fractions with common denominators

☐ EP.3.e Apply knowledge of adding and subtracting fractions with common denominators to solve word problems

Lesson 4 **Equivalent Fractions**

☐ EP.4.a Use models to represent equivalent fractions

☐ EP.4.b Express fractions in words

☐ EP.4.c Add or subtract fractions with common denominators

☐ EP.4.d Use knowledge of equivalent fractions to solve word problems

Lesson 5 **Add, Subtract Unequal Denominators**

☐ EP.5.a Build models of equivalent fractions to find common denominators

☐ EP.5.b Use models to add and subtract fractions with unequal denominators

☐ EP.5.c Apply knowledge of adding and subtracting fractions to solve word problems

Lesson 6 **Rule of Four**

☐ EP.6.a Use the "rule of four" to add and subtract pairs of proper fractions with unequal denominators

Lesson 7 **Compare Fractions**

☐ EP.7.a Build models of fractions with unequal denominators to find a common denominator

☐ EP.7.b Describe the relationship of two fractions using >, <, or =

Lesson 8 **Add Multiple Fractions**

☐ EP.8.a Use the "rule of four" to add multiple proper fractions with unequal denominators

☐ EP.8.b Add multiple fractions with unequal denominators

☐ EP.8.c Apply knowledge of equivalent fractions to solve word problems

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	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
9 Multiply Fractions										
10 Divide Fractions										
11 Common Factors										
12 Reduce Fractions 1										
13 Reduce Fractions 2										
14 Fractional Lengths										
15 Mixed Numbers 1										
16 Mixed Numbers 2										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)				

LESSON OBJECTIVES

Lesson 9 — Multiply Fractions

☐ EP.9.a — Explain that calculating a fraction of a fraction is equivalent to multiplication of a fraction by a fraction

☐ EP.9.b — Use models to show multiplication of fractions

☐ EP.9.c — Multiply a fraction by a whole number

Lesson 10 — Divide Fractions

☐ EP.10.a — Use the "rule of four" to divide pairs of proper fractions with unequal denominators

☐ EP.10.b — Divide a fraction by a fraction

☐ EP.10.c — Apply knowledge of dividing fractions to solve word problems

Lesson 11 — Common Factors

☐ EP.11.a — Apply rules of divisibility to find common factors for a pair or group of numbers

☐ EP.11.b — Determine the Greatest Common Factor (GCF) for a number or pair of numbers

Lesson 12 — Reduce Fractions 1

☐ EP.12.a — Use models to illustrate simplifying fractions by a common factor

☐ EP.12.b — Determine the GCF to simplify fractions to lowest terms

☐ EP.12.c — Simplify fractions to lowest terms

Lesson 13 — Reduce Fractions 2

☐ EP.13.a — Use models to build rectangles to represent prime numbers from one to twenty-four

☐ EP.13.b — Find the prime factors for given values by using a factor tree

☐ EP.13.c — Use prime factorization to simplify fractions

☐ EP.13.d — Explain why prime factorization is an effective method when the GCF is not obvious

Lesson 14 — Fractional Lengths

☐ EP.14.a — Use models to illustrate common fractional increments on a customary ruler

☐ EP.14.b — Demonstrate using a ruler as a practical application for simplifying fractions

☐ EP.14.c — Draw a line of a given fractional length

☐ EP.14.d — Simplify fractional measurements to lowest terms when measuring with a ruler

Lesson 15 — Mixed Numbers 1

☐ EP.15.a — Define the terms mixed number, proper fraction, and improper fraction

☐ EP.15.b — Write fractions as mixed numbers, proper fractions, and improper fractions

☐ EP.15.c — Use models to illustrate how to convert a mixed number to an improper fraction and vice versa

☐ EP.15.d — Convert mixed numbers to improper fractions and vice versa

Lesson 16 — Mixed Numbers 2

☐ EP.16.a — Apply knowledge of fractions, mixed numbers, and simplifying fractions to read measurements on a customary ruler

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
17 Add, Subtract Mixed Numbers										
18 Add Mixed Numbers (Regrouping)										
19 Subtract Mixed Numbers (Regrouping)										
20 Same Difference Theorem										
21 Add Mixed Numbers Unequal Denominators										
22 Subtract Mixed Numbers Unequal Denominators										
23 Divide with Reciprocal										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 17 Add, Subtract Mixed Numbers

☐ EP.17.a Use estimation when adding mixed numbers with common denominators, without regrouping, to determine if the answer is reasonable

☐ EP.17.b Add and subtract mixed numbers with common denominators

Lesson 18 Add Mixed Numbers (Regrouping)

☐ EP.18.a Build models of mixed numbers with common denominators to illustrate how to add the fractional pieces by converting them to whole-number parts

☐ EP.18.b Add mixed numbers with common denominators, using regrouping

☐ EP.18.c Simplify answers to lowest terms when possible

Lesson 19 Subtract Mixed Numbers (Regrouping)

☐ EP.19.a Use models to demonstrate how to regroup when subtracting mixed numbers

☐ EP.19.b Subtract mixed numbers with common denominators, using regrouping as necessary

Lesson 20 Same Difference Theorem

☐ EP.20.a Apply the "same difference theorem" to subtract mixed numbers with common denominators

Lesson 21 Add Mixed Numbers Unequal Denominators

☐ EP.21.a Add mixed numbers with unequal denominators by using the "rule of four" to find a common denominator

☐ EP.21.b Add fractions with unequal denominators with regrouping

Lesson 22 Subtract Mixed Numbers Unequal Denominators

☐ EP.22.a Subtract mixed numbers with unequal denominators by finding a common denominator with the "rule of four"

☐ EP.22.b Subtract fractions with unequal denominators using the "same difference theorem"

☐ EP.22.c Subtract fractions with unequal denominators with regrouping

Lesson 23 Divide with Reciprocal

☐ EP.23.a Define reciprocal

☐ EP.23.b Explain why multiplying by the reciprocal of a number is the same as dividing by that number

☐ EP.23.c Convert mixed numbers to improper fractions before dividing

☐ EP.23.d Divide fractions by multiplying by the reciprocal

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
24 Solve for Unknown 1										
25 Multiply 3 Fractions										
26 Solve for Unknown 2										
27 Area, Circumference of a Circle										
28 Solve for Unknown 3										
29 Fraction to Decimal to Percentage										
30 Solve for Unknown 4										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 24   Solve for Unknown 1

☐ EP.24.a   Define multiplicative inverse

☐ EP.24.b   Solve for an unknown in an equation by using the multiplicative inverse

☐ EP.24.c   Check work for accuracy by substituting the unknown with the solution

☐ EP.24.d   Apply knowledge of solving equations to solve word problems

Lesson 25   Multiply 3 Fractions

☐ EP.25.a   Multiply mixed numbers

☐ EP.25.b   Multiply fractions, simplifying first by finding common factors

☐ EP.25.c   Multiply fractions and simplify the final product by finding common factors

Lesson 26   Solve for Unknown 2

☐ EP.26.a   Solve equations by using the additive inverse to isolate the unknown

☐ EP.26.b   Multiply by the multiplicative inverse to eliminate a coefficient

Lesson 27   Area, Circumference of a Circle

☐ EP.27.a   Define circumference of a circle

☐ EP.27.b   Define area of a circle

☐ EP.27.c   Substitute the approximation of π $\left(\frac{22}{7}\right)$ into formulas to calculate the area of a circle

☐ EP.27.d   Substitute the approximation of π $\left(\frac{22}{7}\right)$ into formulas to calculate the circumference a circle

Lesson 28   Solve for Unknown 3

☐ EP.28.a   Use the multiplicative inverse to isolate the unknown when the coefficient is a fraction

☐ EP.28.b   Solve simple equations with fractional coefficients

Lesson 29   Fraction to Decimal to Percentage

☐ EP.29.a   Define the terms place value, decimal, expanded notation, and percent

☐ EP.29.b   Use models to illustrate converting a denominator to a power of ten

☐ EP.29.c   Convert fractions to percentages

☐ EP.29.d   Convert decimals to percentages

Lesson 30   Solve for Unknown 4

☐ EP.30.a   Solve equations with rational numbers

☐ EP.30.b   Use the multiplicative inverse to find the unknown

	Appendix A1	Appendix A2
A Area of a Trapezoid		

LESSON OBJECTIVES

Appendix A Area of a Trapezoid

☐ EP.A.a   Find the area of a trapezoid

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test I)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
1 Exponents										
2 Place Value										
3 Decimal, Expanded, Exponential Notation										
4 Add Decimals										
5 Subtract Decimals										
6 Metric: Greek Prefix										
7 Metric: Latin Prefix										
8 Metric: Conversion 1										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test I)				

LESSON OBJECTIVES

Lesson 1   Exponents

☐ ZE.1.a   Model exponents with the same base raised to a power of two using manipulative blocks

☐ ZE.1.b   Evaluate exponents with the same base using blocks

☐ ZE.1.c   Name numbers in exponential form in at least three different ways

☐ ZE.1.d   Apply appropriate strategies to solve word problems

Lesson 2   Place Value

☐ ZE.2.a   Use models to show place value in expanded notation

☐ ZE.2.b   Write numbers in expanded notation

☐ ZE.2.c   Express numbers in exponential notation

☐ ZE.2.d   Evaluate exponents with a base of ten

Lesson 3   Decimal, Expanded, Exponential Notation

☐ ZE.3.a   Write decimals in expanded notation

☐ ZE.3.b   Rewrite decimal numbers in decimal notation

☐ ZE.3.c   Determine whether to multiply or divide by ten when "moving" a decimal point to increase or decrease its value

☐ ZE.3.d   Explain why money is a practical application for the use of decimal values

Lesson 4   Add Decimals

☐ ZE.4.a   Use models to add decimal values

☐ ZE.4.b   Apply regrouping principles to compute decimal addition problems accurately

☐ ZE.4.c   Apply knowledge of adding decimals to solve word problems

Lesson 5   Subtract Decimals

☐ ZE.5.a   Use models to subtract decimal values

☐ ZE.5.b   Apply regrouping principles to compute decimal subtraction problems accurately

☐ ZE.5.c   Apply knowledge of subtracting decimals to solve word problems

Lesson 6   Metric: Greek Prefix

☐ ZE.6.a   Name metric prefixes that describe large quantities

☐ ZE.6.b   Identify corresponding value for metric prefixes

☐ ZE.6.c   Express metric measurement relationships for large quantities as ratios

☐ ZE.6.d   Determine the best metric measure for a given object or situation

☐ ZE.6.e   Convert given values between metric units that describe large quantities

Lesson 7   Metric: Latin Prefix

☐ ZE.7.a   Name metric prefixes that describe small quantities

☐ ZE.7.b   Identify corresponding values for metric prefixes

☐ ZE.7.c   Express metric measurement relationships for small quantities as ratios

☐ ZE.7.d   Determine the best metric measure for a given object or situation

☐ ZE.7.e   Estimate using metric units of measure

☐ ZE.7.f   Solve multi-step word problems using metric measurement

Lesson 8   **Metric: Conversion 1**

☐ ZE.8.a   Convert large metric units
to smaller metric units

☐ ZE.8.b   Convert large metric units to smaller metric
units using the "shortcut" (adding zeros)

☐ ZE.8.c   Determine which metric unit corresponds
most closely with U.S. customary units

☐ ZE.8.d   Apply knowledge of the metric system
to solve multi-step problems

Student _____

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test II)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
9 Multiply $\frac{1}{10}$ or 0.1										
10 Multiply $\frac{1}{100}$ or 0.01										
11 Percentage of a Number										
12 Percentages ≥ 100%										
13 Pie Graphs										
14 Multiply Decimals										
15 Metric: Conversion 2										
16 Area, Circumference of a Circle										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test II)				

LESSON OBJECTIVES

Lesson 9 **Multiply $\frac{1}{10}$ or 0.1**

☐ ZE.9.a   Model multiplication of tenths using blocks

☐ ZE.9.b   Multiply tenths using place-value notation

☐ ZE.9.c   Multiply tenths using decimal notation

☐ ZE.9.d   Apply knowledge of multiplying tenths to solve word problems

Lesson 10 **Multiply $\frac{1}{100}$ or 0.01**

☐ ZE.10.a   Multiply hundredths using decimal notation

☐ ZE.10.b   Multiply hundredths using the standard algorithm

☐ ZE.10.c   Apply knowledge of multiplying hundredths to solve word problems

Lesson 11 **Percentage of a Number**

☐ ZE.11.a   Model the relationship between fractions, decimals, and percentages

☐ ZE.11.b   Explain that percent means out of one hundred

☐ ZE.11.c   Write a percentage as a decimal

☐ ZE.11.d   Write a percentage as a fraction

☐ ZE.11.e   Identify common decimals and fractions as percentages (e.g., $\frac{1}{4}$ = 0.25 = 25%)

☐ ZE.11.f   Change a percentage to a decimal

☐ ZE.11.g   Change a percentage to a fraction

☐ ZE.11.h   Use knowledge of percentages to solve word problems

Lesson 12 **Percentages ≥ 100%**

☐ ZE.12.a   Change a whole number to a percentage

☐ ZE.12.b   Change a fraction to a percentage

☐ ZE.12.c   Convert a mixed number to a percentage

☐ ZE.12.d   Convert a decimal to a percentage

☐ ZE.12.e   Solve problems by converting among quantities written as a fraction, decimal, and percentage

Lesson 13 **Pie Graphs**

☐ ZE.13.a   Explain that a pie graph represents a visual presentation of the whole and its parts

☐ ZE.13.b   Interpret data on a pie graph

☐ ZE.13.c   Find the percent of a number given data on a pie graph

☐ ZE.13.d   Apply knowledge of percent to display data on a pie graph

Lesson 14 **Multiply Decimals**

☐ ZE.14.a   Estimate factors to verify the reasonableness of an answer

☐ ZE.14.b   Multiply decimal values using decimal notation

☐ ZE.14.c   Calculate the placement of a decimal point in a decimal multiplication problem by counting the spaces to the right of the decimal point

☐ ZE.14.d   Solve problems that involve multiplication of decimal values

Lesson 15 **Metric: Conversion 2**

☐ ZE.15.a   Convert small metric units to larger metric units by using ratios

☐ ZE.15.b   Use the shortcut method of "moving" one decimal place for each step when converting metric units

Lesson 16 **Area, Circumference of a Circle**

☐ ZE.16.a   Substitute the approximation of π (3.14) into formulas to calculate values for a circle

☐ ZE.16.b   Apply the formulas π*d* and 2π*r* to calculate the circumference of a circle

☐ ZE.16.c   Compute the area of a circle using the formula π*r*^{2}

Math·U·See

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test III)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
17 Divide a Decimal by a Whole Number										
18 Divide a Whole Number by Decimal										
19 Solve for Unknown 1										
20 Divide a Decimal by a Decimal										
21 Decimal Remainders										
22 Solve for Unknown 2										
23 Transform Any Fraction										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test III)				

LESSON OBJECTIVES

Lesson 17 Divide a Decimal by a Whole Number

☐ ZE.17.a Divide a decimal by a whole number

☐ ZE.17.b Identify where to place the decimal point in the quotient

☐ ZE.17.c Explain the procedure for dividing a decimal by a whole number

☐ ZE.17.d Use multiplication to check the accuracy of the answer for a division problem

Lesson 18 Divide a Whole Number by a Decimal

☐ ZE.18.a Divide whole numbers by a decimal value

☐ ZE.18.b Adjust decimal points by multiplying the divisor and dividend by the same power of 10

☐ ZE.18.c Use estimation to determine the reasonableness of a quotient

☐ ZE.18.d Apply knowledge of dividing decimal numbers to solve word problems

Lesson 19 Solve for Unknown 1

☐ ZE.19.a Divide to solve equations with decimal values

☐ ZE.19.b Use equations with decimal values to solve word problems

Lesson 20 Divide a Decimal by a Decimal

☐ ZE.20.a Divide a decimal by a decimal value

Lesson 21 Decimal Remainders

☐ ZE.21.a Divide a decimal by a whole number by adding zeros to yield a quotient without a remainder

☐ ZE.21.b Express a quotient by rounding to a given place value when numbers do not divide evenly

☐ ZE.21.c Write a remainder as a decimal

☐ ZE.21.d Divide until a pattern is determined and write the answer with a vinculum over the repeating digits

☐ ZE.21.e Express a remainder as a fraction

Lesson 22 Solve for Unknown 2

☐ ZE.22.a Solve for an unknown in an equation

☐ ZE.22.b Substitute the solution for the variable in the original equation to verify the answer

Lesson 23 Transform Any Fraction

☐ ZE.23.a Convert fractions to decimals

☐ ZE.23.b Convert fractions to decimals and percentages to solve problems

	Date	Test Score	Proficiency	Counting?
Pretest (Unit Test IV)				

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	B	C		D	E	F			
24 Decimals as Rational Numbers										
25 Mean, Median, Mode										
26 Probability										
27 Points, Lines, Rays, Line Segments										
28 Planes and Symbols										
29 Angles										
30 Types of Angles										

	Date	Test Score	Proficiency	Counting?
Posttest (Unit Test IV)				

LESSON OBJECTIVES

Lesson 24 Decimals as Rational Numbers

☐ ZE.24.a Write a terminating decimal as a fraction in simplest form

☐ ZE.24.b Use knowledge of decimals and fractions to solve problems

Lesson 25 Mean, Median, Mode

☐ ZE.25.a Calculate the mean for a set of data

☐ ZE.25.b Find the median for a set of data

☐ ZE.25.c Determine the mode for a set of data

☐ ZE.25.d Analyze a given set of data using mean, median, and mode

Lesson 26 Probability

☐ ZE.26.a Determine the probability of how likely something is to happen or to be true in a given scenario

☐ ZE.26.b Record the probability in ratio form in lowest terms for a given scenario

Lesson 27 Points, Lines, Rays, Line Segments

☐ ZE.27.a Define the geometric terms point, line, ray, and line segment

☐ ZE.27.b Draw representations for the geometric terms point, line, ray, and line segment

☐ ZE.27.c Represent a point, line, ray, and line segment using geometric symbols

☐ ZE.27.d Identify the symbol for infinity

☐ ZE.27.e Define infinity

☐ ZE.27.f Explain the relationship of infinity to a point, line, ray, and line segment

Lesson 28 Planes and Symbols

☐ ZE.28.a Define zero-, one-, two-, and three-dimensional geometric shapes

☐ ZE.28.b Identify zero-, one-, two-, and three-dimensional geometric shapes

☐ ZE.28.c Define similar, equal, and congruent

☐ ZE.28.d Identify the symbols for similar, equal, and congruent

Lesson 29 Angles

☐ ZE.29.a Name the parts of an angle

☐ ZE.29.b Define angle and right angle

☐ ZE.29.c Use letters and symbols to name angles

☐ ZE.29.d Explain that angles are measured in degrees

☐ ZE.29.e Identify a box symbol as a representation of a 90-degree angle

☐ ZE.29.f State that a circle contains 360 degrees

Lesson 30 Types of Angles

☐ ZE.30.a Define acute, obtuse, and straight angles

☐ ZE.30.b Classify an angle as acute, obtuse, right, or straight

☐ ZE.30.c Determine if an angle is acute, obtuse, right, or straight, given a degree measurement

		Date		Test Score				Proficiency		
Pretest (Unit Test I)										

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
		A	**B**	**C**		**D**	**E**	**F**			
1	Negative Numbers, Addition										
2	Negative Numbers, Subtraction										
3	Negative Numbers, Multiplication										
4	Negative Numbers, Division										
5	Exponents										
6	Place Value										
7	Negative Numbers with Exponents										

		Date		Test Score				Proficiency		
Posttest (Unit Test I)										

LESSON OBJECTIVES

Lesson 1 **Negative Numbers, Addition**
- ☐ PA.1.a — Add integers
- ☐ PA.1.b — Explain how negative addends affect the sign of the sum

Lesson 2 **Negative Numbers, Subtraction**
- ☐ PA.2.a — Subtract integers
- ☐ PA.2.b — Rewrite subtraction of a negative as addition of a positive and vice versa

Lesson 3 **Negative Numbers, Multiplication**
- ☐ PA.3.a — Multiply integers
- ☐ PA.3.b — Explain how negative factors affect the sign of the product

Lesson 4 **Negative Numbers, Division**
- ☐ PA.4.a — Divide integers
- ☐ PA.4.b — Explain how the signs of the original numbers affect the sign of the quotient

Lesson 5 **Exponents**
- ☐ PA.5.a — Convert from an exponential expression to a series of factors and vice versa
- ☐ PA.5.b — Express exponential expressions in words

Lesson 6 **Place Value**
- ☐ PA.6.a — Express quantities in standard notation, place-value notation, expanded notation, and exponential notation; convert among these notations
- ☐ PA.6.b — Explain how dollars, dimes, and pennies are parallel to units, tenths, and hundredths, respectively

Lesson 7 **Negative Numbers with Exponents**
- ☐ PA.7.a — Raise an integer to a power
- ☐ PA.7.b — Explain how the use of parentheses affects the value of an integer raised to a power

Student _____

Record Keeping: *PreAlgebra*

	Date	Test Score	Proficiency
Pretest (Unit Test II)			

	LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
	A	**B**	**C**		**D**	**E**	**F**			
8 Roots and Radicals										
9 Solve for an Unknown										
10 Pythagorean Theorem										
11 Associative and Commutative Properties										
12 Distributive Property										
13 Solve for an Unknown with Multiplicative Inverse										
14 Solve for an Unknown with Order of Operations										

	Date	Test Score	Proficiency
Posttest (Unit Test II)			

LESSON OBJECTIVES

Lesson 8 **Roots and Radicals**
- ☐ PA.8.a Identify the square root symbol
- ☐ PA.8.b Find square roots of perfect squares

Lesson 9 **Solve for an Unknown**
- ☐ PA.9.a Explain how adding the same amount to both sides of an equation does not affect its validity
- ☐ PA.9.b Solve equations for an unknown by using the additive inverse

Lesson 10 **Pythagorean Theorem**
- ☐ PA.10.a State the Pythagorean theorem
- ☐ PA.10.b Apply the Pythagorean theorem to solve for the length of the missing side of a right triangle
- ☐ PA.10.c Use the Pythagorean theorem to determine if a triangle is a right triangle when all the sides are known

Lesson 11 **Associative and Commutative Properties**
- ☐ PA.11.a Identify the operations to which the Associative and Commutative Properties apply
- ☐ PA.11.b Rewrite addition or multiplication problems using the Associative and/or Commutative Properties
- ☐ PA.11.c Rewrite subtraction problems as addition problems so that the Associative and Commutative Properties can be applied
- ☐ PA.11.d Apply the Associative and Commutative Properties to solve equations

Lesson 12 **Distributive Property**
- ☐ PA.12.a Explain how the Distributive Property can be used to solve a problem
- ☐ PA.12.b Rewrite expressions by applying the Distributive Property of Multiplication over Addition
- ☐ PA.12.c Rewrite expressions by finding the common factor
- ☐ PA.12.d Explain that variables with no specified coefficient are understood to have a coefficient of one

Lesson 13   Solve for an Unknown with Multiplicative Inverse

☐ PA.13.a   Define multiplicative inverse

☐ PA.13.b   Find the multiplicative inverse of a number

☐ PA.13.c   Use the multiplicative inverse to solve equations

Lesson 14   Solve for an Unknown with Order of Operations

☐ PA.14.a   Explain the order of operations and how it is applied to an expression

☐ PA.14.b   Use the order of operations to evaluate expressions

☐ PA.14.c   Use the order of operations to solve for an unknown in an equation

	Date	Test Score	Proficiency
Pretest (Unit Test III)			

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
		A	B	C		D	E	F			
15	Surface Area of Solids										
16	Convert Celsius to Fahrenheit										
17	Convert Fahrenheit to Celsius										
18	Absolute Value										
19	Ratio and Proportion										
20	Similar Polygons										
21	Least Common Multiple										
22	Greatest Common Factor										

	Date	Test Score	Proficiency
Posttest (Unit Test III)			

LESSON OBJECTIVES

Lesson 15 Surface Area of Solids

☐ PA.15.a Explain that the surface area of a solid is the sum of the areas of all external surfaces of the solid

☐ PA.15.b Calculate the surface area of rectangular solids, including cubes, triangluar pyramids, and rectangular pyramids

☐ PA.15.c Determine the surface area of rectangular solids to solve problems

Lesson 16 Convert Celsius to Fahrenheit

☐ PA.16.a State the formula for converting Celsius to Fahrenheit

☐ PA.16.b Convert temperature from degrees Celsius to degrees Fahrenheit

Lesson 17 Convert Fahrenheit to Celsius

☐ PA.17.a State the formula for converting Fahrenheit to Celsius

☐ PA.17.b Convert temperature from degrees Fahrenheit to degrees Celsius

Lesson 18 Absolute Value

☐ PA.18.a Identify the absolute value symbol

☐ PA.18.b Determine the absolute value of a number

☐ PA.18.c Simplify absolute value expressions

Lesson 19 Ratio and Proportion

☐ PA.19.a Explain the meaning of ratio and proportion

☐ PA.19.b Solve problems involving proportions with unknowns

☐ PA.19.c Write and solve proportions based on word problems

Lesson 20 Similar Polygons

☐ PA.20.a Write a proportion to solve for the missing side length in a pair of similar polygons

Lesson 21 Least Common Multiple

☐ PA.21.a Define Least Common Multiple (LCM)

☐ PA.21.b Find the LCM of two numbers by listing their respective multiples

☐ PA.21.c Find the LCM of two numbers using prime factorization

Lesson 22 Greatest Common Factor

☐ PA.22.a Define Greatest Common Factor (GCF)

☐ PA.22.b Find the GCF of two numbers by listing factors and selecting the greatest factor common to both lists

☐ PA.22.c Find the GCF of two numbers using prime factorization

		Date			Test Score			Proficiency		
Pretest (Unit Test IV)										

		LESSON PRACTICE			TEACH BACK	SYSTEMATIC REVIEW			A&E	Lesson Test	Test Date
		A	B	C		D	E	F			
23	Polynomials, Addition										
24	Volume of a Cylinder										
25	Polynomials, Multiplication										
26	Adding and Subtracting Time										
27	Volume of a Pyramid and a Cone										
28	Military Time, Addition and Subtraction										
29	Measurement, Addition and Subtraction										
30	Irrational Numbers										

		Date			Test Score			Proficiency		
Posttest (Unit Test IV)										

LESSON OBJECTIVES

Lesson 23   Polynomials, Addition

☐ PA.23.a   Define the terms polynomial, trinomial, binomial, and monomial

☐ PA.23.b   Show the relationships among physical, pictorial, and symbolic representations of polynomials

☐ PA.23.c   Calculate the sum of two polynomials

Lesson 24   Volume of a Cylinder

☐ PA.24.a   Find the volume of a cylinder given the height and the radius or diameter

☐ PA.24.b   Apply the formula $V = Bh$ to determine the volume of a cylinder

Lesson 25   Polynomials, Multiplication

☐ PA.25.a   Build a rectangle with blocks to find the product of polynomials

☐ PA.25.b   Multiply binomials

☐ PA.25.c   Explain the similarity between multiplication of base-10 numbers and base-x numbers

Lesson 26   Adding and Subtracting Time

☐ PA.26.a   Calculate elapsed time in hour and minute units

☐ PA.26.b   Solve problems involving elapsed time in hours and minutes

Lesson 27   Volume of a Pyramid and a Cone

☐ PA.27.a   Find the volume of a cone given its altitude and its radius or diameter

☐ PA.27.b   Apply the formula $V = \frac{1}{3}Bh$ to determine the volume of a pyramid and cone

Lesson 28   Military Time, Addition and Subtraction

☐ PA.28.a   Convert between military time and time on a 12-hour clock

☐ PA.28.b   Perform operations of addition and subtraction with military time

Lesson 29   Measurement, Addition and Subtraction

☐ PA.29.a   Perform addition and subtraction with multiple customary units of measure

Lesson 30   Irrational Numbers

☐ PA.30.a   Explain the difference between a rational and irrational number

☐ PA.30.b   Identify numbers as rational or irrational

☐ PA.30.c   Find the square root of a number to the nearest hundredth, without a calculator

	Date	Test Score	Proficiency
Pretest (Unit Test I)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	**B**		**C**	**D**	**E**			
1 Commutative and Associative Properties									
2 Order of Operations and Absolute Value									
3 Solve for Unknown with One Variable									
4 Distributive Property									
5 Number Lines and Cartesian Coordinates									
6 Graphing a Line									
7 Slope-Intercept Formula									
8 Graphing a Line from Slope-Intercept Formula									
9 Graphing Parallel Lines									
10 Graphing Perpendicular Lines									
11 Finding the Slope-Intercept Formula									

	Date	Test Score	Proficiency
Posttest (Unit Test I)			

LESSON OBJECTIVES

Lesson 1 Commutative and Associative Properties

☐ A1.1.a Identify the operations to which the Associative and Commutative Properties apply

☐ A1.1.b Rewrite addition or multiplication expressions using the Associative and/or Commutative Properties

☐ A1.1.c Rewrite subtraction expressions as addition before using Associative or Commutative Properties

☐ A1.1.d Use the Associative and Commutative Properties to solve equations

☐ A1.1.e Perform operations with integers

Lesson 2 Order of Operations and Absolute Value

☐ A1.2.a State the priority for multiple operations in the same equation or expression

☐ A1.2.b Simplify expressions using the order of operations

Lesson 3 Solve for Unknown with One Variable

☐ A1.3.a Define a variable

☐ A1.3.b Solve single-variable linear equations, applying the principles of additive and multiplicative inverses

Lesson 4 Distributive Property

☐ A1.4.a Use factoring and the Distributive Property of Multiplication over Addition to simplify expressions

☐ A1.4.b Simplify expressions to solve equations

Lesson 5 Number Lines and Cartesian Coordinates

☐ A1.5.a Plot numbers on a number line

☐ A1.5.b Plot single-variable inequalities on a number line

☐ A1.5.c Identify the coordinates of a given point on the Cartesian plane

☐ A1.5.d Identify in which quadrant of the Cartesian plane a point lies

☐ A1.5.e Plot a point on the Cartesian plane, given a pair of coordinates

Lesson 6 **Graphing a Line**

☐ A1.6.a Write a linear equation for a real-world scenario

☐ A1.6.b Substitute for the variables in an equation to determine solutions

☐ A1.6.c Create a table for a real-world scenario

☐ A1.6.d Graph the data provided on a table in a coordinate grid

☐ A1.6.e Determine whether a set of data demonstrates a linear relationship

Lesson 7 **Slope-Intercept Formula**

☐ A1.7.a Find the slope and *y*-intercept of a line graphed on the Cartesian plane

☐ A1.7.b Find the slope and *y*-intercept of a line represented by a given equation

☐ A1.7.c Give the equation of a line graphed on the Cartesian plane

☐ A1.7.d Describe the equation of a line as a relationship between a dependent and an independent variable

Lesson 8 **Graphing a Line from Slope-Intercept Formula**

☐ A1.8.a Graph a linear equation

☐ A1.8.b Give the equation for any horizontal or vertical line

☐ A1.8.c Describe the visual difference between positive and negative slope

☐ A1.8.d Explain that a numerically greater slope is steeper than a slope that is numerically less

Lesson 9 **Graphing Parallel Lines**

☐ A1.9.a Rewrite linear equations in standard form

☐ A1.9.b Rewrite linear equations in slope-intercept form

☐ A1.9.c Given a pair of equations, determine whether the lines they represent are parallel, without graphing

Lesson 10 **Graphing Perpendicular Lines**

☐ A1.10.a Determine whether a given equation represents a line perpendicular to a given line on a graph

☐ A1.10.b Define perpendicular lines

☐ A1.10.c Explain the relationship between the slopes of two perpendicular lines

☐ A1.10.d Write the equation of a line perpendicular to a given line that runs through a specific point

Lesson 11 **Finding the Slope-Intercept Formula**

☐ A1.11.a Find the equation in slope-intercept form when given the slope and one point on a line

☐ A1.11.b Find the slope when given two points on a line

☐ A1.11.c Find the equation in slope-intercept form when given two points on a line

	Date	Test Score	Proficiency
Pretest (Unit Test II)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
12 Graphing Inequalities									
13 Solving Simultaneous Equations by Graphing									
14 Solving Simultaneous Equations by Substitution									
15 Solving Simultaneous Equations by Elimination									
16 Coin Problems									
17 Consecutive Integers									
18 Multiplication and Division with Exponents									
19 Exponents, Negative and Raising to a Power									
20 Addition and Multiplication of Polynomials									
21 Factor Polynomials									
22 Factoring Trinomials with Coefficients									
23 Factoring Trinomials with Negative Numbers									

	Date	Test Score	Proficiency
Posttest (Unit Test II)			

LESSON OBJECTIVES

Lesson 12 Graphing Inequalities

☐ A1.12.a   Graph a linear inequality

☐ A1.12.b   Name a pair of points which are on opposite sides of the boundary line of a linear inequality

☐ A1.12.c   Determine whether a given point is a solution to a linear inequality

Lesson 13 Solving Simultaneous Equations by Graphing

☐ A1.13.a   Explain that the graph of a line represents all the ordered pairs that make the line's equation true

☐ A1.13.b   Explain that the intersection of two lines represents the one point that makes the equations of both lines true

☐ A1.13.c   Explain that two parallel lines have no intersection and that their equations have no common solution

Lesson 14 **Solving Simultaneous Equations by Substitution**

☐ A1.14.a   Rewrite a given equation in a form that expresses one variable in terms of the other

☐ A1.14.b   Replace a variable in one equation with an expression representing that variable in terms of the other variable

☐ A1.14.c   Substitute the value of a known variable into a linear equation and solve for the unknown variable

Lesson 15 **Solving Simultaneous Equations by Elimination**

☐ A1.15.a   Rewrite one equation from a system of equations to prepare for elimination of one variable by addition

☐ A1.15.b   Eliminate one variable in a system of equations by adding two equations

Lesson 16 **Coin Problems**

☐ A1.16.a   Solve a system of equations for coin problems

Lesson 17 **Consecutive Integers**

☐ A1.17.a   Solve an equation or set of equations for consecutive integer problems

Lesson 18 **Multiplication and Division with Exponents**

☐ A1.18.a   Use addition of exponents to multiply factors with the same base

☐ A1.18.b   Use subtraction of exponents to divide factors with the same base

Lesson 19 **Exponents, Negative and Raising to a Power**

☐ A1.19.a   Rewrite an expression with a negative exponent as the multiplicative inverse of the same expression with a positive exponent

☐ A1.19.b   Rewrite negative exponents as fractions

☐ A1.19.c   Rewrite fractions as expressions with negative exponents

☐ A1.19.d   Identify numbers with an exponent of zero as being equal to one

☐ A1.19.e   Raise an exponential expression to a power by multiplying exponents

☐ A1.19.f   Rewrite rational expressions using negative exponents so that all the exponents are positive

Lesson 20 **Addition and Multiplication of Polynomials**

☐ A1.20.a   Model second-order polynomials using manipulatives

☐ A1.20.b   Model addition of second-order polynomials using manipulatives

☐ A1.20.c   Add second-order polynomials

☐ A1.20.d   Model multiplication of binomials using manipulatives

☐ A1.20.e   Multiply binomials

Lesson 21 **Factor Polynomials**

☐ A1.21.a   Model factorization of second-order polynomials using manipulatives

☐ A1.21.b   Factor second-order polynomials into two binomial factors

Lesson 22 **Factoring Trinomials with Coefficients**

☐ A1.22.a   Model factorization of second-order polynomials where the coefficient of the squared term is not one

☐ A1.22.b   Use vertical multiplication to factor second-order polynomials where the coefficient of the squared term is not one

☐ A1.22.c   Use FOIL to factor second-order polynomials where the coefficient of the squared term is not one

Lesson 23 **Factoring Trinomials with Negative Numbers**

☐ A1.23.a   Model factorization of second-order polynomials, where some terms are negative

☐ A1.23.b   Factor second-order polynomials using vertical multiplication, where some terms are negative

☐ A1.23.c   Factor second-order polynomials using FOIL, where some terms are negative

		Date		Test Score				Proficiency	
Pretest (Unit Test III)									

		LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
		A	B		C	D	E			
24	Square Roots and Dividing Polynomials									
25	Difference of Two Squares									
26	Repeated Factoring of Polynomials									
27	Solving Equations with Factoring									
28	Unit Multipliers									
29	Square Unit Multipliers									
30	Metric Conversions									
31	Fractional Exponents									
32	Significant Digits and Scientific Notation									
33	Bases Other Than Ten									
34	Graphing a Circle and an Ellipse									
35	Graphing a Parabola and a Hyperbola									

		Date		Test Score			Proficiency	
Posttest (Unit Test III)								

LESSON OBJECTIVES

Lesson 24 Square Roots and Dividing Polynomials
- ☐ A1.24.a Find the square root of a perfect square trinomial using various strategies
- ☐ A1.24.b Model division of a trinomial by a binomial
- ☐ A1.24.c Perform long division of a trinomial by a binomial

Lesson 25 Difference of Two Squares
- ☐ A1.25.a Model the factorization of the difference of two squares
- ☐ A1.25.b Factor the difference of two squares

Lesson 26 Repeated Factoring of Polynomials
- ☐ A1.26.a Identify the appropriate strategies to use in factoring a polynomial
- ☐ A1.26.b Factor a polynomial completely

Lesson 27 Solving Equations with Factoring
- ☐ A1.27.a Factor to solve quadratic equations
- ☐ A1.27.b Check solutions to quadratic equations

Lesson 28 Unit Multipliers
- ☐ A1.28.a Create unit multipliers
- ☐ A1.28.b Identify the correct unit multiplier to use in a given problem
- ☐ A1.28.c Use a unit multiplier to convert from one unit to another

Lesson 29 Square Unit Multipliers
- ☐ A1.29.a Identify the number of times a unit multiplier needs to be used, based on whether a conversion is in one, two, or three dimensions
- ☐ A1.29.b Identify when different unit multipliers need to be used

Lesson 30 Metric Conversions
- ☐ A1.30.a Convert between metric and customary units of length, using unit multipliers
- ☐ A1.30.b Convert between metric and customary units of weight/mass, using unit multipliers
- ☐ A1.30.c Convert between metric and customary units of volume, using unit multipliers

Lesson 31 Fractional Exponents

☐ A1.31.a   Rewrite a radical expression as a base
with a fractional exponent

☐ A1.31.b   Rewrite a base with a fractional exponent
as a radical expression

Lesson 32 Significant Digits and Scientific Notation

☐ A1.32.a   Identify the number of significant digits
in a given number

☐ A1.32.b   Express answers to addition and multiplication
problems using the correct number of
significant digits

☐ A1.32.c   Convert numbers to and from
scientific notation

☐ A1.32.d   Use scientific notation to multiply and divide
both very large and very small numbers

Lesson 33 Bases Other Than Ten

☐ A1.33.a   Convert numbers from base ten to other bases

☐ A1.33.b   Convert numbers from other bases to base ten

Lesson 34 Graphing a Circle and an Ellipse

☐ A1.34.a   State the center and radius of a circle, given
its equation

☐ A1.34.b   State the center and extremities of an ellipse
based on its equation

☐ A1.34.d   Graph a circle

☐ A1.34.e   Graph an ellipse

Lesson 35 Graphing a Parabola and a Hyperbola

☐ A1.35.a   Plot points and sketch a parabola, given
its equation

☐ A1.35.b   Plot points and sketch a hyperbola, given
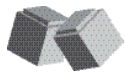its equation

Math·U·See

Record Keeping: *Geometry*

	Date	Test Score	Proficiency
Pretest (Unit Test I)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
1 Points, Lines, Rays, and Line Segments									
2 Planes and Sets									
3 Angles									
4 Types of Angles									
5 Parallel and Perpendicular Lines									
6 Supplementary and Complementary Angles									
7 Transversals									
8 Perimeter; Interior Angles									
9 Area									
10 Constructing and Identifying Triangles									

	Date	Test Score	Proficiency
Posttest (Unit Test I)			

LESSON OBJECTIVES

Lesson 1 Points, Lines, Rays, and Line Segments

☐ GE.1.a Describe a point, line, ray, line segment, and plane

☐ GE.1.b Identify points, lines, rays, segments, and planes

☐ GE.1.c Identify symbols associated with points, lines, rays, segments, and planes

☐ GE.1.d Define the terms equal, similar, congruent, collinear, endpoint, and geometry

☐ GE.1.e Draw and label a line segment, ray, line, and plane

Lesson 2 Planes and Sets

☐ GE.2.a Define the terms coplanar, plane geometry, and solid geometry

☐ GE.2.b Define a set, intersection, union, empty or null set, proper subset, improper subset, element, complement, n(A), and universal set

☐ GE.2.c Identify the symbols for set, intersection, union, empty or null set, proper subset, improper subset, element, not an element, complement, n(A), and universal set

Lesson 3 Angles

☐ GE.3.a Define angle, protractor, degree, and vertex

☐ GE.3.b Measure given angles with a protractor

☐ GE.3.c Draw angles of a given measure

☐ GE.3.d Identify angles using Greek letters, 3-letter names, and 1-letter names

☐ GE.3.e Differentiate between ∠ and m∠

Lesson 4 Types of Angles

☐ GE.4.a Classify angles as acute, obtuse, straight, or reflex

☐ GE.4.b Identify and explain the meaning of the right angle indicator

Lesson 5 Parallel and Perpendicular Lines

☐ GE.5.a Define the terms parallel, perpendicular, bisector, midpoint, and bisect

☐ GE.5.b Identify the symbols for parallel and perpendicular

☐ GE.5.c Construct the perpendicular bisector of a line segment

☐ GE.5.d Construct the bisector of an angle

Lesson 6   Supplementary and Complementary Angles

☐ GE.6.a   Identify and write Greek letters alpha, beta, gamma, and delta

☐ GE.6.b   Describe and identify adjacent angles, vertical angles, supplementary angles, and complementary angles

Lesson 7   Transversals

☐ GE.7.a   Describe transversal, interior angles, exterior angles, corresponding angles, alternate angles, alternate exterior angles, and alternate interior angles

☐ GE.7.b   Identify congruent pairs of angles formed by a set of parallel lines and a transversal

☐ GE.7.c   Describe a postulate and converse

Lesson 8   Perimeter; Interior Angles

☐ GE.8.a   Describe perimeter, quadrilateral, rectangle, parallelogram, rhombus, trapezoid, square, and interior angle

☐ GE.8.b   State the number of degrees in the interior angles of a triangle and a quadrilateral

Lesson 9   Area

☐ GE.9.a   Define the terms area, height, and base

☐ GE.9.b   Find the area of a rectangle, parallelogram, triangle, square, and trapezoid

Lesson 10   Constructing and Identifying Triangles

☐ GE.10.a   Define the terms equilateral, equiangular, isosceles, and scalene

☐ GE.10.b   Define the terms obtuse, right, and acute as they relate to triangles

☐ GE.10.c   Explain why the sum of the lengths of the shorter two sides of a triangle must be greater than the length of the longest side of the triangle

☐ GE.10.d   Demonstrate the use of hash marks to show congruent line segments or congruent angles

	Date	Test Score	Proficiency
Pretest (Unit Test II)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
11 Regular Polygons									
12 Geometry of a Circle, Sphere, and Ellipse									
13 Area of a Circle and an Ellipse									
14 Volume: Rectangular Solid and Cylinder									
15 Volume: Pyramid, Cone, Prism, and Sphere									
16 Surface Area of Solids									
17 Radicals									
18 Pythagorean Theorem									
19 More on Radicals									

	Date	Test Score	Proficiency
Posttest (Unit Test II)			

LESSON OBJECTIVES

Lesson 11   Regular Polygons

☐ GE.11.a   Define the terms polygon, concave polygon, convex polygon, regular polygon, pentagon, hexagon, octagon, decagon, dodecagon, interior angle, and exterior angle

☐ GE.11.b   Calculate the sum of the measures of the interior angles of a polygon

☐ GE.11.c   State the measure of one interior angle of a regular polygon

☐ GE.11.d   State that the sum of the measures of the exterior angles of a polygon is 360 degrees

Lesson 12   Geometry of a Circle, Sphere, and Ellipse

☐ GE.12.a   Define the terms circle, center, chord, radius, diameter, tangent, secant, sector, arc, sphere, ellipse, central angle, minor arc, major arc, intercepted arc, and inscribed angle

☐ GE.12.b   State the relationship between the measures of a central and an inscribed angle in a circle

Lesson 13   Area of a Circle and an Ellipse

☐ GE.13.a   State the formula for the area of a circle

☐ GE.13.b   Find the area of a circle

Lesson 14   Volume: Rectangular Solid and Cylinder

☐ GE.14.a   Define the terms face, edge, and vertex as they relate to solid shapes

☐ GE.14.b   Define the terms cube and cylinder

☐ GE.14.c   Find the volume of a rectangular solid

☐ GE.14.d   Find the volume of a cylinder

Lesson 15   Volume: Pyramid, Cone, Prism, and Sphere

☐ GE.15.a   Define the terms altitude and slant height

☐ GE.15.b   Define the terms pyramid, cone, triangular prism, and sphere

☐ GE.15.c   Find the volume of a pyramid

☐ GE.15.d   Find the volume of a cone

☐ GE.15.e   Find the volume of a triangular prism

☐ GE.15.f   Find the volume of a sphere

Lesson 16   Surface Area of Solids

☐ GE.16.a   Find the surface area of any rectangular solid

☐ GE.16.b   Find the surface area of a pyramid

☐ GE.16.c   Find the surface area of a cylinder

Lesson 17   Radicals

☐ GE.17.a   Define the term radical

☐ GE.17.b   Perform addition and subtraction operations with terms containing radicals

☐ GE.17.c   Perform multiplication and division operations with terms containing radicals

☐ GE.17.d   Simplify radical expressions by removing all square factors from under the radical sign

☐ GE.17.e   Find decimal approximations of irrational roots using a calculator

Lesson 18   Pythagorean Theorem

☐ GE.18.a   Define the terms leg and hypotenuse in reference to a right triangle

☐ GE.18.b   State the Pythagorean theorem

☐ GE.18.c   Use the Pythagorean theorem to find the missing side of a right triangle when two sides are given

☐ GE.18.d   State the converse of the Pythagorean theorem

☐ GE.18.e   Determine if a triangle is right when given the lengths of the three sides

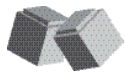**Lesson 19   More on Radicals**

☐ GE.19.a   Rationalize the denominator of a fraction (one-term denominator)

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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		Date		Test Score				Proficiency	
Pretest (Unit Test III)									

		LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
		A	B		C	D	E			
20	Special Triangles: 45°-45°-90°									
21	Special Triangles: 30°-60°-90°									
22	Axioms, Postulates, and Theorems									
23	Corresponding Parts of Triangles									
24	Proving Triangles Congruent: SSS and SAS									
25	Proving Triangles Congruent: ASA and AAS									
26	Proving Right Triangles Congruent									
27	Proving Triangles Similar with AA									
28	Transformational Geometry									
29	Trigonometric Functions									
30	Reciprocal Trigonometric Functions									

		Date		Test Score				Proficiency	
Posttest (Unit Test III)									

LESSON OBJECTIVES

Lesson 20   Special Triangles: 45°-45°-90°

☐ GE.20.a State the proportional relationship between one leg and the hypotenuse on a 45°-45°-90° triangle

☐ GE.20.b State the proportional relationship between one leg of a 45°-45°-90° triangle and the other leg

☐ GE.20.c State the lengths of the remaining sides of a 45°-45°-90° triangle when given the length of one side

☐ GE.20.d Determine whether a triangle has angle measures of 45°-45°-90° based on the side lengths

Lesson 21   Special Triangles: 30°-60°-90°

☐ GE.21.a State the proportional relationships among the three sides of a 30°-60°-90° triangle

☐ GE.21.b Find the length of any side of a 30°-60°-90° triangle given any other side

☐ GE.21.c Determine whether a triangle has angle measures of 30°-60°-90° based on the side lengths

Lesson 22   Axioms, Postulates, and Theorems

☐ GE.22.a State the Property of Symmetry: if A = B, then B = A

☐ GE.22.b State the Reflexive Property: A = A

☐ GE.22.c State the Transitive Property: if A = B and B = C, then A = C

☐ GE.22.d Define the terms axiom, postulate, and theorem

Lesson 23 Corresponding Parts of Triangles

☐ GE.23.a   Identify corresponding parts of a pair of congruent or similar triangles

☐ GE.23.b   Define the term remote interior angle

Lesson 24 Proving Triangles Congruent: SSS and SAS

☐ GE.24.a   Prove a pair of triangles congruent using SSS

☐ GE.24.b   Prove a pair of triangles congruent using SAS

Lesson 25 Proving Triangles Congruent: ASA and AAS

☐ GE.25.a   Prove a pair of triangles congruent using ASA

☐ GE.25.b   Prove a pair of triangles congruent using AAS

☐ GE.25.c   Describe CPCTRC

☐ GE.25.d   Identify corresponding parts of congruent triangles

☐ GE.25.e   State the amplified parallelogram theorem

☐ GE.25.f   Apply the amplified parallelogram theorem

Lesson 26 Proving Right Triangles Congruent

☐ GE.26.a   Prove two right triangles congruent by HL

☐ GE.26.b   Prove two right triangles congruent by HA

☐ GE.26.c   Prove two right triangles congruent by LA

☐ GE.26.d   Prove two right triangles congruent by LL

Lesson 27 Proving Triangles Similar with AA

☐ GE.27.a   Define the term similar

☐ GE.27.b   Define the AA postulate

☐ GE.27.c   Prove two triangles similar using the AA postulate

☐ GE.27.d   State the ratio of corresponding sides in pairs of similar polygons

☐ GE.27.e   Find the lengths of missing sides in pairs of simliar polygons when the ratio of corresponding sides is known

Lesson 28 Transformational Geometry

☐ GE.28.a   Translate a graph horizontally and/or vertically using integer movements

☐ GE.28.b   Reflect a graph across the *x*- or *y*-axis

☐ GE.28.c   Reflect a graph across horizontal and vertical lines that are not axes

☐ GE.28.d   Rotate a graph about the origin

☐ GE.28.e   Rotate a graph about a point other than the origin

☐ GE.28.f   Dilate a graph about its center

☐ GE.28.g   Combine two or more transformations of one graph

☐ GE.28.h   Describe a transformation, given a before and an after graph

Lesson 29 Trigonometric Functions

☐ GE.29.a   Define the terms adjacent and opposite

☐ GE.29.b   Define the trigonometric ratios sine, cosine, and tangent

☐ GE.29.c   Give sine, cosine, and tangents of angles in triangles with given side lengths
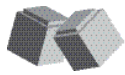
Lesson 30 Reciprocal Trigonometric Functions

☐ GE.30.a   Define the trigonometric ratios secant, cosecant, and cotangent

☐ GE.30.b   State the secant, cosecant, and tangent in triangles with given side lengths

☐ GE.30.c   State the Pythagorean identity

	Date	Test Score	Proficiency
Pretest (Unit Test I)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
1 Exponents									
2 Rational Expressions									
3 Scientific Notation; Combining Like Terms									
4 Radicals, Basic Operations, and Simplifying									
5 Factoring Polynomials; Rational Expressions									
6 Fractional Exponents									
7 Imaginary and Complex Numbers									
8 Conjugate Numbers									
9 Squares, Cubes, and Pascal's Triangle									
10 Binomial Theorem									

	Date	Test Score	Proficiency
Posttest (Unit Test I)			

LESSON OBJECTIVES

Lesson 1   Exponents

☐ A2.1.a   Simplify an expression containing negative exponents so that all the exponents are positive

Lesson 2   Rational Expressions

☐ A2.2.a   Identify restricted values for variables in the denominator of a rational expression

☐ A2.2.b   Perform addition and subtraction of rational expressions

☐ A2.2.c   Rewrite a rational expression in simplest form

Lesson 3   Scientific Notation; Combining Like Terms

☐ A2.3.a   State the number of significant digits in a given number

☐ A2.3.b   Express answers to addition and multiplication problems using the correct number of significant digits

☐ A2.3.c   Convert numbers to and from scientific notation

☐ A2.3.d   Multiply and divide using scientific notation

☐ A2.3.e   Identify the terms in an algebraic expression

Lesson 4   Radicals, Basic Operations, and Simplifying

☐ A2.4.a   Perform addition and subtraction operations with terms containing radicals

☐ A2.4.b   Perform multiplication and division operations with terms containing radicals

☐ A2.4.c   Simplify radical expressions by removing all square factors from under the radical sign

☐ A2.4.d   Find decimal approximations of irrational roots using a calculator

	Lesson 5	**Factoring Polynomials; Rational Expressions**
☐	A2.5.a	Factor second-order polynomials into two binomial factors
☐	A2.5.b	Use vertical multiplication to factor second-order polynomials, where the coefficient of the squared term is not one, into two binomial factors
☐	A2.5.c	Use FOIL to factor second-order polynomials, where the coefficient of the squared term is not one, into two binomial factors
☐	A2.5.d	Factor second-order polynomials into two binomial factors using vertical multiplication, where some terms are negative
☐	A2.5.e	Factor second-order polynomials into two binomial factors using FOIL, where some terms are negative
☐	A2.5.f	Identify common factors as the first step to factoring a polynomial
☐	A2.5.g	Use repeated factoring to factor a polynomial completely
☐	A2.5.h	Factor to solve quadratic equations
☐	A2.5.i	Simplify compound rational expressions

	Lesson 6	**Fractional Exponents**
☐	A2.6.a	Rewrite a radical expression as a base with a fractional exponent
☐	A2.6.b	Rewrite a base with a fractional exponent as a radical expression

	Lesson 7	**Imaginary and Complex Numbers**
☐	A2.7.a	Define the imaginary number i
☐	A2.7.b	Simplify radicals with negative numbers by factoring out i^2 (-1)
☐	A2.7.c	Define a complex number as a number of the form $a + b$i
☐	A2.7.d	Perform arithmetic operations on complex numbers

	Lesson 8	**Conjugate Numbers**
☐	A2.8.a	Write the conjugate of a real or complex binomial
☐	A2.8.b	Use the conjugate to rationalize the denominator of a real or complex fraction

	Lesson 9	**Squares, Cubes, and Pascal's Triangle**
☐	A2.9.a	Write the square of a given binomial
☐	A2.9.b	Write the square root of a given perfect-square second-degree polynomial
☐	A2.9.c	Write the cube of a given binomial
☐	A2.9.d	Write an arbitrary number of rows of Pascal's triangle
☐	A2.9.e	Use Pascal's triangle to determine the coefficients for the terms of the expansion of a binomial raised to a power

	Lesson 10	**Binomial Theorem**
☐	A2.10.a	Describe the pattern of exponents of terms generated when raising a binomial to any power
☐	A2.10.b	Combine knowledge of coefficients and exponents to raise a binomial to any power
☐	A2.10.c	Generalize knowledge of coefficients and exponents in expanded binomials, using the binomial theorem
☐	A2.10.d	Apply the binomial theorem to raise a binomial to any power

	Date	Test Score	Proficiency
Pretest (Unit Test II)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
11 Completing the Square									
12 Quadratic Formula									
13 Discriminants									
14 Applications Using Percent									
15 Isolating One Variable									
16 Ratios									
17 Unit Multipliers									
18 Distance = Rate × Time									
19 More Motion Problems									

	Date	Test Score	Proficiency
Posttest (Unit Test II)			

LESSON OBJECTIVES

Lesson 11 Completing the Square

☐ A2.11.a Complete the square in a polynomial by adding a quantity to the second or third term

☐ A2.11.b Use completing the square as a means of solving a second-degree equation

☐ A2.11.c Check irrational roots of a second-degree equation by using the roots to solve the equation

Lesson 12 Quadratic Formula

☐ A2.12.a State the quadratic formula

☐ A2.12.b Use the quadratic formula to solve quadratic equations

Lesson 13 Discriminants

☐ A2.13.a Use the discriminant to predict the nature of the solution to a quadratic equation

Lesson 14 Applications Using Percent

☐ A2.14.a Calculate the result of a percentage markup on a base price

☐ A2.14.b Calculate original price from percentage and markup price

☐ A2.14.c Calculate the percentage of an element in a compound based on molecular weights

Lesson 15 Isolating One Variable

☐ A2.15.a Manipulate a formula to isolate any variable

Lesson 16 Ratios

☐ A2.16.a Set up a proportion based on information about relationships between two quantities

☐ A2.16.b Solve for the unknown in a proportion

Lesson 17 Unit Multipliers

☐ A2.17.a Create unit multipliers

☐ A2.17.b Identify the correct unit multiplier to use in a given problem

☐ A2.17.c Multiply by a unit multiplier to convert it from one unit to another

☐ A2.17.d Identify the number of times a unit multiplier needs to be used based on whether a conversion is in one, two, or three dimensions

Lesson 18 Distance = Rate × Time

☐ A2.18.a Solve problems involving movement of one object or person

☐ A2.18.b Solve problems involving movement of two objects or persons moving the same distance

Lesson 19 More Motion Problems

☐ A2.19.a Solve problems involving movement of two objects or persons moving different distances or directions

Student _____

Record Keeping: *Algebra 2*

	Date	Test Score	Proficiency
Pretest (Unit Test III)			

	LESSON PRACTICE		TEACH BACK	SYSTEMATIC REVIEW			H	Lesson Test	Test Date
	A	B		C	D	E			
20 Graphing Lines: Slope-Intercept Formula									
21 Parallel and Perpendicular Lines; Inequalities									
22 Distance Formula and Midpoint Formula									
23 Conic Sections: Circle and Ellipse									
24 Parabola									
25 Parabola: Maxima and Minima									
26 Hyperbola									
27 Solving Systems of Equations									
28 Coins, Consecutive Integers, and Mixtures									
29 Age and Boat-and-Current Problems									
30 Solving Equations with Three Variables									
31 Vectors									

	Date	Test Score	Proficiency
Posttest (Unit Test III)			

LESSON OBJECTIVES

Lesson 20   Graphing Lines: Slope-Intercept Formula

☐ A2.20.a   Find the slope and *y*-intercept of a line graphed on the Cartesian plane

☐ A2.20.b   Find the slope and *y*-intercept of a line represented by a given equation

☐ A2.20.c   Give the equation of a line graphed on the Cartesian plane

☐ A2.20.d   Describe the equation of a line as a relationship between a dependent and an independent variable

☐ A2.20.e   Find the equation in slope-intercept form when given the slope and one point on a line

☐ A2.20.f   Find the slope when given two points on a line

☐ A2.20.g   Find the equation in slope-intercept form when given two points on a line

Lesson 21   Parallel and Perpendicular Lines; Inequalities

☐ A2.21.a   Write the equation for a line parallel to a given line, passing through a given point

☐ A2.21.b   Write the equation for a line perpendicular to a given line, passing through a given point

☐ A2.21.c   Graph any linear inequality

Lesson 22   Distance Formula and Midpoint Formula

☐ A2.22.a   Compute the distance between two points on a graph, using the distance formula

☐ A2.22.b   Compute the midpoint between two points on a graph, using the midpoint formula

Lesson 23   Conic Sections: Circle and Ellipse

☐ A2.23.a   State the center and radius of a circle, given its equation

Lesson 24 Parabola

☐ A2.24.a Plot points and sketch a parabola, given its equation

☐ A2.24.b Plot points and sketch a hyperbola, given its equation

☐ A2.24.c Estimate the coefficient of the squared term of the equation for a parabola, given its graph

☐ A2.24.d State the equation for a parabola, given the graph and three stated points on the parabola

Lesson 25 Parabola: Maxima and Minima

☐ A2.25.a Compute the axis of symmetry for any parabola, given its equation

☐ A2.25.b Compute the vertex of any parabola, given its equation

☐ A2.25.c Describe how the components of the standard form of the equation of a parabola affect the graph, in terms of geometric transformation

☐ A2.25.d Apply parabolas to area optimization problems

Lesson 26 Hyperbola

☐ A2.26.a Give an example of an inverse relationship

☐ A2.26.b Identify an equation of the form $xy = a$ constant as a hyperbola

☐ A2.26.c Identify an equation of the form $ay^2 - bx^2 = n^2$ as a hyperbola

Lesson 27 Solving Systems of Equations

☐ A2.27.a Graph a pair of equations when one or both are conic

☐ A2.27.b Find the solution of a system of linear or conic equations

Lesson 28 Coins, Consecutive Integers, and Mixtures

☐ A2.28.a Write a system of equations to solve coin problems

☐ A2.28.b Solve a system of equations representing a coin problem

☐ A2.28.c Write a system of equations to solve consecutive integer problems

☐ A2.28.d Solve a system of equations representing a consecutive integer problem

☐ A2.28.e Write a system of equations to solve a mixture problem

☐ A2.28.f Solve a system of equations representing a mixture problem

Lesson 29 Age and Boat-and-Current Problems

☐ A2.29.a Write an equation or system of equations to solve a problem involving age

☐ A2.29.b Solve equation(s) representing a problem involving age

☐ A2.29.c Write a system of equations to solve a boat-and-current problem

☐ A2.29.d Solve a system of equations representing a boat-and-current problem

Lesson 30 Solving Equations with Three Variables

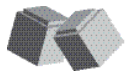☐ A2.30.a Solve a system of three equations

Lesson 31 Vectors

☐ A2.31.a Add two or more right-angle vectors

	Date		Test Score		Proficiency
Pretest (Unit Test I)					

	A	B	TEACH BACK	C	D	H	Lesson Test	Test Date
1 Introduction to Trigonometry								
2 Reciprocal Trigonometric Ratios								
3 Interpreting the Trigonometry Tables								
4 Use the Trigonometric Table to Solve for the Unknown								
5 Using a Calculator and Arc Functions								
6 Angles of Elevation and Depression								
7 Angles < 0°, > 360°, and Reference Angles								
8 Cofunctions; Negative Angle Relationships								

	Date		Test Score		Proficiency
Posttest (Unit Test I)					

LESSON OBJECTIVES

Lesson 1   **Introduction to Trigonometry**

☐ PC.1.a   Define the trigonometric ratios sine, cosine, and tangent

Lesson 2   **Reciprocal Trigonometric Ratios**

☐ PC.2.a   Show the inverse relationship between sine and cosecant

☐ PC.2.b   Show the inverse relationship between cosine and secant

☐ PC.2.c   Show the inverse relationship between tangent and cotangent

☐ PC.2.d   Convert any ratio from fraction form to rounded decimal form

☐ PC.2.e   Use the Pythagorean theorem to find the length of the missing side of a right triangle

Lesson 3   **Interpreting the Trigonometry Tables**

☐ PC.3.a   Find trigonometric ratios for angles that are listed in a table

☐ PC.3.b   Find the angle for trigonometric ratios that are listed in a table

☐ PC.3.c   Express tangent in terms of sine and cosine

☐ PC.3.d   Express cotangent in terms of sine and cosine

Lesson 4   **Use the Trig Table to Solve for the Unknown**

☐ PC.4.a   Find the measure of the missing side of a right triangle using trigonometric ratios

Lesson 5   **Using a Calculator and Arc Functions**

☐ PC.5.a   Use a calculator to find the trigonometric ratios for any angle

☐ PC.5.b   Use a calculator to find the angle associated with a trigonometric ratio

☐ PC.5.c   Convert Degrees, Minutes, and Seconds (DMS) to Decimal Degrees (DD) using unit multipliers or conversion factors

☐ PC.5.d   Convert DD to DMS using unit multipliers or conversion factors

☐ PC.5.e   State the inverse relationship between trigonometric functions in general and their arc functions

Lesson 6   **Angles of Elevation and Depression**

☐ PC.6.a   Define the angle of elevation and angle of depression

☐ PC.6.b   Model a word problem involving trigonometry with a drawing

☐ PC.6.c   Apply knowledge of trigonometry to solve word problems

Lesson 7   **Angles < 0°, > 360°, and Reference Angles**

☐ PC.7.a   Define initial side, terminal side,
and coterminal

☐ PC.7.b   Explain positive and negative rotation
with respect to angles

☐ PC.7.c   Identify the quadrant in which the
terminal side of an angle lies

Lesson 8   **Cofunctions; Negative Angle Relationships**

☐ PC.8.a   Describe the relationship between cofunctions
and complementary angles

☐ PC.8.b   Find the value of a trigonometric function of
negative theta when given the trigonometric
function of theta

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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	Date		Test Score				Proficiency	
Pretest (Unit Test II)								

		A	B	TEACH BACK	C	D	H	Lesson Test	Test Date
9	Proving Trigonometric Identities								
10	Verifying Trig Expressions and Identities								
11	Sum and Difference Identities								
12	The Double-Angle and Half-Angle Identities								
13	Law of Sines								
14	Law of Cosines								

	Date		Test Score				Proficiency	
Posttest (Unit Test II)								

LESSON OBJECTIVES

Lesson 9 Proving Trigonometric Identities

☐ PC.9.a   Prove trigonometric identities

Lesson 10 Verifying Trig Expressions and Identities

☐ PC.10.a   Evaluate trigonometric expressions containing angle measures with reference angles of 0°, 30°, 45°, 60°, and 90°

☐ PC.10.b   Express evaluated trigonometric expressions in simplest exact form

Lesson 11 Sum and Difference Identities

☐ PC.11.a   Apply the sum and difference identities to calculate sine, cosine, and tangent ratios for angles

Lesson 12 The Double-Angle and Half-Angle Identities

☐ PC.12.a   Apply the double and half-angle identities to calculate sine, cosine, and tangent ratios for angles

Lesson 13 Law of Sines

☐ PC.13.a   Apply the law of sines to find missing parts of a triangle

☐ PC.13.b   Explain why the law of sines can sometimes give misleading answers

☐ PC.13.c   Evaluate the level of reliability of the law of sines in given situations

☐ PC.13.d   Explain a strategy for guarding against errors caused by the ambiguity in the law of sines

Lesson 14 Law of Cosines

☐ PC.14.a   Apply the law of cosines to find missing parts of a triangle

		Date		Test Score			Proficiency	
Pretest (Unit Test III)								

		A	B	TEACH BACK	C	D	H	Lesson Test	Test Date
15	Radian Measure								
16	Polar Coordinates; Rectangular Coordinates								
17	Polar Equations and Polar Graphs								
18	Vectors								
19	Functions, Relations, Domain, and Range								
20	Composite Functions								
21	Logarithms								
22	Natural Exponential and Logarithm Functions								

		Date		Test Score			Proficiency	
Posttest (Unit Test III)								

LESSON OBJECTIVES

Lesson 15 Radian Measure

☐ PC.15.a Convert angle measures from degrees to radians

☐ PC.15.b Convert angle measures from radians to degrees

Lesson 16 Polar Coordinates; Rectangular Coordinates

☐ PC.16.a Plot a point using polar coordinates on a rectangular coordinate system

☐ PC.16.b Convert polar coordinates to rectangular coordinates

☐ PC.16.c Plot a point using polar coordinates on a rectangular coordinate system when the distance is negative

☐ PC.16.d Convert rectangular coordinates to polar coordinates

☐ PC.16.e Present a model that makes intuitive sense of negative angle measures and negative distances in polar coordinates

☐ PC.16.f Plot points on a polar coordinate system

Lesson 17 Polar Equations and Polar Graphs

☐ PC.17.a Rewrite a rectangular equation as a polar equation

☐ PC.17.b Rewrite a polar equation as a rectangular equation

Lesson 18 Vectors

☐ PC.18.a Convert polar and rectangular coordinates to vector form

☐ PC.18.b Convert vectors to rectangular or polar form

☐ PC.18.c Add two vectors to find a resultant vector

☐ PC.18.d Subtract one initial vector from a resultant vector to find the other initial vector

☐ PC.18.e Model vector addition and subtraction visually

Lesson 19 Functions, Relations, Domain, and Range

☐ PC.19.a Define the term function

☐ PC.19.b Model the concept of a function

☐ PC.19.c State whether a given relation is a function, based on formula or graph

☐ PC.19.d Calculate the value of a function with various inputs

☐ PC.19.e State the domain and range of a function

Lesson 20 Composite Functions

☐ PC.20.a Evaluate the sum or difference of two functions

☐ PC.20.b Evaluate the product or quotient of two functions

☐ PC.20.c Evaluate a composite function

Lesson 21   Logarithms

☐ PC.21.a   Rewrite an exponential expression as a logarithmic expression

☐ PC.21.b   Rewrite a logarithmic expression as an exponential expression

☐ PC.21.c   Give the base 10 log powers of 10

☐ PC.21.d   Read logs from a log table

☐ PC.21.e   Find the log of numbers not in the log table, using interpolation

☐ PC.21.f   Define the terms characteristic and mantissa

☐ PC.21.g   Explain the meaning of an antilog

☐ PC.21.h   Find the antilog of a number

☐ PC.21.i   Solve logarithmic equations

Lesson 22   Natural Exponential and Logarithm Functions

☐ PC.22.a   Define natural log as log base e

☐ PC.22.b   State the natural logs of zero and one

☐ PC.22.c   Explain the inverse relationship between e^x and $\ln(x)$

☐ PC.22.d   State the rules for $\ln(xy)$, $\ln(\frac{x}{y})$, and $\ln(x^a)$

☐ PC.22.e   Simplify expressions using the natural log or exponential function

☐ PC.22.f   Solve equations using natural log or exponential functions

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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	Date	Test Score	Proficiency
Pretest (Unit Test IV)			

		A	B	TEACH BACK	C	D	H	Lesson Test	Test Date
23	Graphing Sine and Cosine Equations								
24	Graphing the Cosecant and Secant								
25	Graphing the Tangent and Cotangent								
26	Arithmetic Sequences and Series								
27	Geometric Sequences and Series								
28	Equations with Radicals and Absolute Value								
29	Inequalities with Absolute Value and Radicals								
30	Limits								

	Date	Test Score	Proficiency
Posttest (Unit Test IV)			

LESSON OBJECTIVES

Lesson 23 Graphing Sine and Cosine Equations

☐ PC.23.a Graph the function $y = \sin(x)$

☐ PC.23.b Graph the function $y = \cos(x)$

☐ PC.23.c Define the terms period, shift, translation, and amplitude

☐ PC.23.d Graph variations of the basic sine and cosine graphs

☐ PC.23.e Determine the equation of a sine or cosine graph

Lesson 24 Graphing the Cosecant and Secant

☐ PC.24.a Graph the function $y = \csc(x)$

☐ PC.24.b Graph the function $y = \sec(x)$

☐ PC.24.c Graph variations of the basic cosecant and secant graphs

☐ PC.24.d Define the term asymptote

Lesson 25 Graphing the Tangent and Cotangent

☐ PC.25.a Graph the function $y = \tan(x)$

☐ PC.25.b Graph the function $y = \cot(x)$

☐ PC.25.c Graph variations of the basic tangent and cotangent graphs

Lesson 26 Arithmetic Sequences and Series

☐ PC.26.a Define the terms sequence, arithmetic sequence, finite sequence, infinite sequence, and series

☐ PC.26.b Determine the common difference in a given arithmetic sequence

☐ PC.26.c Use the formula to find the nth term of a sequence

☐ PC.26.d Identify the parts of sigma notation

☐ PC.26.e State two formulas for finding the sum of an arithmetic series: one with d, and the other without

☐ PC.26.f Compute the sum of an arithmetic series

Lesson 27 Geometric Sequences and Series

☐ PC.27.a Define a geometric sequence

☐ PC.27.b Define a common ratio

☐ PC.27.c Give the formula for finding the nth term in a geometric sequence

☐ PC.27.d Find the nth term in a geometric sequence

☐ PC.27.e Give the formula for finding the sum of a geometric series

☐ PC.27.f Compute the sum of a geometric series

Lesson 28 Equations with Radicals and Absolute Value

☐ PC.28.a   Solve equations containing
absolute value expressions

☐ PC.28.b   Solve equations containing radical expressions

☐ PC.28.c   Identify equations with no solution

☐ PC.28.d   Identify situations that would result in
extraneous solutions for equations containing
radical or absolute value expressions

Lesson 29 Inequalities with Absolute Value and Radicals

☐ PC.29.a   Solve inequalities containing
absolute value expressions

☐ PC.29.b   Graph one-dimensional inequalities
containing absolute value expressions

☐ PC.29.c   Solve inequalities containing
radical expressions

☐ PC.29.d   Graph one-dimensional inequalities
containing radical expressions

Lesson 30 Limits

☐ PC.30.a   Give an operational definition of a limit

☐ PC.30.b   Identify the parts of an expression
containing limit notation

☐ PC.30.c   Evaluate limits of functions shown on graphs

☐ PC.30.d   Evaluate limits algebraically

☐ PC.30.e   Give operational definitions of
right- and left-handed limits

Proficiency Guide: A (Advanced) 90–100%   **P** (Proficient) 80–89%   **NP** (Nearing Proficiency) 70–79%   **BS** (Beginning Steps) Below 70%

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	Date	Test Score	Proficiency
Pretest (Unit Test I)			

		LESSON PRACTICE		TEACH BACK	LESSON PRACTICE		H	Lesson Test	Test Date
		A	**B**		**C**	**D**			
1	Terminology and Graphing								
2	Parabola, Circle, Ellipse								
3	Hyperbolas and Systems of Equations								
4	Functions								
5	Trigonometry								
6	Exponential and Logarithmic Functions								
7	Limits								

	Date	Test Score	Proficiency
Posttest (Unit Test I)			

LESSON OBJECTIVES

Lesson 1 **Terminology and Graphing**

☐ CA.1.a — Define the terms variable, constant, coefficient, function, interval, tangent line, and secant line

☐ CA.1.b — Graph one-dimensional equations containing absolute value expressions

☐ CA.1.c — Graph two-dimensional equations containing absolute value expressions

☐ CA.1.d — Classify graphs based on their equation

☐ CA.1.e — Graph piecewise functions

☐ CA.1.f — Write piecewise functions of given graphs

☐ CA.1.g — Explain continuity by analogy

Lesson 2 **Parabola, Circle, Ellipse**

☐ CA.2.a — Graph a line given an equation in x and y

☐ CA.2.b — State the center and radius of a circle given its equation

☐ CA.2.c — State the center and extremities of an ellipse based on its equation

☐ CA.2.d — Graph a circle

☐ CA.2.e — Graph an ellipse

☐ CA.2.f — Plot points and sketch a parabola given its equation

☐ CA.2.g — Plot a point and sketch a hyperbola given its equation

Lesson 3 **Hyperbolas and Systems of Equations**

☐ CA.3.a — State the general standard form for the equation of a north-south or east-west hyperbola

☐ CA.3.b — Graph a pair of equations when one or both are conic

☐ CA.3.c — Find the solution of a system of linear or conic equations

☐ CA.3.d — Graph conic inequalities

Lesson 4 **Functions**

☐ CA.4.a — Define the term function

☐ CA.4.b — Model the concept of a function

☐ CA.4.c — State whether a given relation is a function, based on formula or graph

☐ CA.4.d — Calculate the value of a function with various inputs

☐ CA.4.e — State the domain and range of a function

☐ CA.4.f — Explain the distinction between dependent and independent variables

☐ CA.4.g — Rewrite a function in equation form using function notation

☐ CA.4.h — Evaluate the sum or difference of two functions

☐ CA.4.i — Evaluate the product or quotient of two functions

☐ CA.4.j — Evaluate composite functions

☐ CA.4.k — Write the inverse for a given function

☐ CA.4.l — Use the horizontal line test to see if the inverse of a given function is also a function

Lesson 5   **Trigonometry**

☐ CA.5.a   Give the sine, cosine, and tangent for 0°, 30°, 45°, 60°, and 90° angles, without a calculator

☐ CA.5.b   Find trigonometric ratios for any angle with a reference angle of 0°, 30°, 45°, 60°, or 90°, without a calculator

☐ CA.5.c   Graph the function $y = \sin(x)$

☐ CA.5.d   Graph the function $y = \cos(x)$

☐ CA.5.e   Define period, shift, translation, and amplitude

☐ CA.5.f   Graph variations of the basic sine and cosine graphs

☐ CA.5.g   Determine the equation of a sine or cosine graph

Lesson 6   **Exponential and Logarithmic Functions**

☐ CA.6.a   Define natural log as log base e

☐ CA.6.b   State the natural logs of zero and one

☐ CA.6.c   Explain the inverse relationship between e^x and $\ln(x)$

☐ CA.6.d   State the rules for $\ln(xy)$, $\ln(x/y)$, and $\ln(x^o)$

☐ CA.6.e   Simplify expressions using the natural log or exponential function

☐ CA.6.f   Solve equations using natural log or exponential functions

☐ CA.6.g   Sketch the graph of basic natural exponential functions without using a calculator

☐ CA.6.h   Sketch the graph of basic natural log functions without using a calculator

Lesson 7   **Limits**

☐ CA.7.a   Identify the parts of limit notation

☐ CA.7.b   State the limit of a sum of two functions

☐ CA.7.c   State the limit of a quotient of two functions

☐ CA.7.d   State the limit of two functions

☐ CA.7.e   State the limit of a constant times a function

☐ CA.7.f   State the limit of the product of two functions

☐ CA.7.g   Give the mathematical definition of a limit

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Record Keeping: *Calculus*

	Date	Test Score	Proficiency
Pretest (Unit Test II)			

		LESSON PRACTICE		TEACH BACK	LESSON PRACTICE		H	Lesson Test	Test Date
		A	B		C	D			
8	Limits and Continuity								
9	Definition of a Derivative								
10	Derivative Rules								
11	Chain Rule								
12	Derivatives of Trig Functions								
13	Derivatives of e^x and $\ln(x)$								
14	Implicit Differentiation								

	Date	Test Score	Proficiency
Posttest (Unit Test II)			

LESSON OBJECTIVES

Lesson 8   Limits and Continuity

☐ CA.8.a   Write the notation for infinity

☐ CA.8.b   Give operational definitions of right- and left-handed limits

☐ CA.8.c   Find the limit of a rational expression using any appropriate method

☐ CA.8.d   Evaluate the limit of a function using graphing, substitution, or factoring

☐ CA.8.e   Evaluate the limit of a function using conjugates or trigonometric identities

☐ CA.8.f   Give the location of any vertical asymptotes in the graph of a function

☐ CA.8.g   Give the location of any horizontal asymptotes in the graph of a function

☐ CA.8.h   State three possible reasons for the non-existence of a limit

Lesson 9   Definition of a Derivative

☐ CA.9.a   Define a derivative

☐ CA.9.b   Identify a derivative as the slope of a tangent line

☐ CA.9.c   Calculate the derivative of a function using the definition

☐ CA.9.d   Explain the operation of the greatest integer function

☐ CA.9.e   Describe a step function

Lesson 10   Derivative Rules

☐ CA.10.a   State rules for the derivatives of a constant, a variable with respect to itself, the sum of two functions, the product of two functions, a constant times a function, a function raised to a power, and the quotient of two functions

☐ CA.10.b   Apply derivative rules to find the derivatives of a constant, a variable with respect to itself, the sum of two functions, the product of two functions, a constant times a function, a function raised to a power, and the quotient of two functions

Lesson 11   Chain Rule

☐ CA.11.a   State the chain rule

☐ CA.11.b   Use the chain rule to differentiate composite functions

☐ CA.11.c   Find the second and higher-order derivatives of functions

☐ CA.11.d   List four situations where functions are not differentiable

☐ CA.11.e   Identify non-differentiable sections of functions

Lesson 12   Derivatives of Trig Functions

☐ CA.12.a   State the derivative of the sine and cosine functions

☐ CA.12.b   Differentiate functions containing sine, cosine, tangent, secant, cosecant, or cotangent

☐ CA.12.c   Differentiate functions by choosing and combining best strategies

Lesson 13   **Derivatives of e^x and ln(x)**

☐ CA.13.a   State the derivative of e^x

☐ CA.13.b   Differentiate functions of the form e^u dx, where u is a function of x

☐ CA.13.c   State the derivative of ln(x)

☐ CA.13.d   Differentiate functions of the form ln(u), where u is a function of x

☐ CA.13.e   Differentiate functions containing e^u and ln(u) expressions

Lesson 14   **Implicit Differentiation**

☐ CA.14.a   State the derivative of y with respect to x

☐ CA.14.b   Differentiate a function implicitly

☐ CA.14.c   Find the normal line to a function at a given point

Record Keeping: *Calculus*

	Date	Test Score	Proficiency
Pretest (Unit Test III)			

		LESSON PRACTICE		TEACH BACK	LESSON PRACTICE		H	Lesson Test	Test Date
		A	**B**		**C**	**D**			
15	Graphing with the 1st Derivative								
16	Graphing with the 2nd Derivative								
17	Mean Value Theorem; L'Hôpital's Rule								
18	Physics Applications								
19	Economics Applications								
20	Optimization								
21	Related Rates								

	Date	Test Score	Proficiency
Posttest (Unit Test III)			

LESSON OBJECTIVES

Lesson 15 Graphing with the 1st Derivative

☐ CA.15.a Define local and global minimum and maximum

☐ CA.15.b Define the terms maximum, minimum, and extremum

☐ CA.15.c Use the first derivative to find an extremum

☐ CA.15.d Determine whether an extremum is a maximum or minimum using the first derivative test

☐ CA.15.e State three places where extrema can exist in a function

☐ CA.15.f List types of critical points

☐ CA.15.g Find critical points in a function

☐ CA.15.h Sketch the graph of a function based on its critical points and its first derivative

☐ CA.15.i Identify positive-slope and negative-slope intervals on the graph of a function

Lesson 16 Graphing with the 2nd Derivative

☐ CA.16.a Give operational definitions for the terms concave up and concave down

☐ CA.16.b Define inflection point

☐ CA.16.c Define the term concavity

☐ CA.16.d Identify the concavity of an interval of a function using the second derivative test

☐ CA.16.e Distinguish between maxima and minima using the second derivative when the second derivative is not equal to zero

☐ CA.16.f Identify whether critical points are maxima, minima, inflection points, or none of these

☐ CA.16.g Describe situations where functions will have oblique asymptotes

☐ CA.16.h Find the equation for oblique asymptotes in a graph

Lesson 17 Mean Value Theorem; L'Hôpital's Rule

☐ CA.17.a Give an operational definition for the mean value theorem (MVT)

☐ CA.17.b State the necessary conditions for application of the MVT

☐ CA.17.c Find a value on an interval which satisfies the MVT

☐ CA.17.d Give an operational definition for Rolle's theorem

☐ CA.17.e Determine the existence of a root of a polynomial on an interval using Rolle's theorem

☐ CA.17.f Give an operational definition for L'Hôpital's rule

☐ CA.17.g State the necessary conditions for application of L'Hôpital's rule

☐ CA.17.h Calculate limits using L'Hôpital's rule

☐ CA.17.i Define even and odd functions

☐ CA.17.j State the connection between symmetry and function parity

☐ CA.17.k State whether a given function is odd, even, or neither

Lesson 18   **Physics Applications**

☐ CA.18.a   State the first and second derivative of position

☐ CA.18.b   Find the velocity and acceleration functions for a given position function

☐ CA.18.c   Find the velocity and acceleration at a particular moment in time, given the position function

☐ CA.18.d   Solve word problems involving position, velocity, and acceleration by use of derivatives and algebra

Lesson 19   **Economics Applications**

☐ CA.19.a   Explain the cost function, average cost function, price function, revenue function, and profit function

☐ CA.19.b   Explain the marginal cost function

☐ CA.19.c   Find the marginal cost function when given the cost function

☐ CA.19.d   Maximize a revenue function

☐ CA.19.e   Find the break-even point given cost and revenue functions

Lesson 20   **Optimization**

☐ CA.20.a   Outline the general procedure for solving optimization problems

☐ CA.20.b   Give an operational definition for a constraint equation

☐ CA.20.c   Give an operational definition for an optimization equation

☐ CA.20.d   Write a constraint equation

☐ CA.20.e   Write an optimization equation

☐ CA.20.f   Solve optimization problems

Lesson 21   **Related Rates**

☐ CA.21.a   Give the general procedure for solving related-rates problems

☐ CA.21.b   Differentiate between particular information and general information

☐ CA.21.c   Write a set of equations for a related-rates problem

☐ CA.21.d   Differentiate a related-rates equation with respect to time

☐ CA.21.e   State the answer(s) to a related-rates word problem

	Date	Test Score	Proficiency
Pretest (Unit Test IV)			

		LESSON PRACTICE		TEACH BACK	LESSON PRACTICE		H	Lesson Test	Test Date
		A	B		C	D			
22	Antiderivatives								
23	Integration Formulas								
24	Area Under a Curve								
25	Definite Integrals								
26	Area Between Two Curves								
27	Inverse Trigonometric Functions								
28	Integration Using an Integral Table								
29	Differential Equations								
30	Integral Application: Differential Equations								

	Date	Test Score	Proficiency
Posttest (Unit Test IV)			

LESSON OBJECTIVES

Lesson 22 Antiderivatives

☐ CA.22.a Give an operational definition for an antiderivative

☐ CA.22.b Identify the integral operator

☐ CA.22.c Give the integral of zero and one

☐ CA.22.d State the sum rule for integrals

☐ CA.22.e State the power rule for integrals

☐ CA.22.f State the integral rule for a constant times a function

☐ CA.22.g Apply integration rules to find antiderivatives of simple functions

☐ CA.22.h Find a function through a given point which is the antiderivative of a given function

Lesson 23 Integration Formula

☐ CA.23.a Select an appropriate integration formula to be used for finding the antiderivative of a given function

☐ CA.23.b Integrate functions using substitution

☐ CA.23.c Introduce quantities as needed to make integration possible

☐ CA.23.d Change the form of an expression to simplify integration

Lesson 24 Area Under a Curve

☐ CA.24.a Give an operational definition for Riemann sums

☐ CA.24.b Give an operational definition for a definite integral

☐ CA.24.c Explain definite integral notation

☐ CA.24.d Write the formula that relates Riemann sums to a definite integral

☐ CA.24.e State the area under a curve when the upper and lower limit of an integral are equal

☐ CA.24.f Simplify an integral by moving a constant factor before the integral sign

☐ CA.24.g Integrate the sum of two functions

☐ CA.24.h Explain the result of reversing the upper and lower limits on a definite integral

☐ CA.24.i Explain the meaning and function of the vertical bar (evaluation bar)

☐ CA.24.j State the fundamental theorem of calculus

☐ CA.24.k Integrate simple functions

☐ CA.24.l Find the area between a curve and the *x*-axis over a defined interval

☐ CA.24.m State the meaning of area below the *x*-axis and above a curve

Lesson 25 Definite Integrals

☐ CA.25.a   Integrate more moderately complex functions using the rules, formulas, substitution, or simplification

Lesson 26 Area Between Two Curves

☐ CA.26.a   Find pertinent integral limits in preparation for expressing the area between curves as the sum of definite integrals

☐ CA.26.b   Find the area bounded by two defined curves

☐ CA.26.c   Explain why it is sometimes useful to integrate with respect to *y* instead of *x* when finding area

Lesson 27 Inverse Trigonometric Functions

☐ CA.27.a   Graph inverse trigonometric functions

☐ CA.27.b   Find the derivative of functions containing inverse trigonometric functions, using applicable rules and strategies

☐ CA.27.c   Find the antiderivative of functions containing inverse trigonometric functions, using applicable rules and strategies

Lesson 28 Integration Using an Integral Table

☐ CA.28.a   Integrate more complex functions using rules from a table of integrals

☐ CA.28.b   Integrate functions requiring repeated use of reduction formulas

Lesson 29 Differential Equations

☐ CA.29.a   Find general solutions for first-order separable differential equations

☐ CA.29.b   Find particular solutions for first-order separable differential equations

Lesson 30 Integral Application: Differential Equations

☐ CA.30.a   Solve unbounded growth problems using differential equations

☐ CA.30.b   Solve decay problems using differential equations

☐ CA.30.c   Solve cooling problems using differential equations and Newton's Law of Cooling

☐ CA.30.d   Solve continuously-compounding interest problems using differential equations

☐ CA.30.e   Solve motion problems using differential equations

This module identifies the resources available online with Math-U-See Professional Access.

Overview

To assist with teachers' implementation of the Math-U-See program, numerous resources are available in the online Professional Access. Information regarding individual teacher login will be provide to school adminstration. Please do not share this information.

Available Resources

The resources listed below are available as part of the online Professional Access. Please note that these resources may be reproduced for individual student use or by an individual teacher for classroom use, as applicable only.

Save any fillable PDF files to your computer prior to attempting to enter any data.

Placement:
- Placement Pretest (PDF)
- Level-specific Placement Tests for *Alpha–Calculus* (PDF)
- Answer Keys for Level-specific Placement Tests *Alpha–Calculus* (PDF)
- Class Placement Test Data Form (Fillable PDF)

Lesson Planning:
- Blank Teacher Schedule (Fillable PDF)
- Blank Student Schedule (Fillable PDF)
- Multi-Day Lesson Plan (Fillable PDF)
- Lesson Planner for Paraprofessionals (Fillable PDF)

Math Facts:
- Computer Drill Graph (PDF)
- Strategy Posters: Vertical Addition (PDF)
- Addition Facts Sheet (PDF)
- Subtraction Facts Sheet (PDF)
- Multiplication Facts Sheet (PDF)
- Division Facts Sheet (PDF)
- Online Drills Application
- Worksheet Generator

Learning Activities:
- Learning Center Signs *Primer–Algebra 1* (PDF)
- "Simon Says" Commands (PDF)

Record Keeping:
- Level-specific Record Keeping Forms *Primer–Calculus* (Fillable PDF)
- Student Self-Reflection (PDF)

Additional Resources:
- Sample Rubrics (PDF)
  - » Integer Blocks
  - » Fraction Overlays
  - » Decimal Inserts
  - » Algebra Inserts
- Blank Rubric (Fillable PDF)
- Graph Paper: Full Sheet (PDF)
- Graph Paper: Six per Page (PDF)
- Graph Paper: Half-Inch Grid (PDF)
- Graph Paper: Sine/Cosine (PDF)
- Math-U-See Correlation with Common Core State Standards K–6 (PDF)
- Level-specific Resources
  - » Unit Tests *Alpha–Calculus* (PDF)
  - » Objective Lists *Primer–Calculus* (PDF)
  - » *Algebra 1* Extra Practice Pages (PDF)
  - » *Algebra 1* Solutions for Extra Practice Pages (PDF)
  - » *Algebra 2* Extra Practice Pages (PDF)
  - » *Algebra 2* Solutions for Extra Practice Pages (PDF)