Spaced Repetition System (SRS)

Application: General Math Skill Mastery

A Daily Pedagogical Methodology to Increase Skill Mastery and Academically Accelerate Elementary and Middle School Students to Grade Level

PART 2 of 3

Amara4Education Curriculum Writers

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Executive Summary

After high school graduation, far too many American public school children are not adequately prepared for university level mathematics. The reason for this situation is not new or an unsolvable mystery. These young adults do not possess mastery understanding of their high school core math courses. This poor foundational academic base leads to a lack of success in more difficult college level mathematics courses that presume high school mathematics proficiency. The primary reason that these same students are skill deficient in high school mathematics is due to a weak skill foundation in their middle school algebra and geometry courses. Unfortunately, this academic chain reaction continues to spiral downward. These same students struggled in their middle school math classes because they possessed an inadequately developed arithmetic elementary school mathematics foundation. To state the obvious, their elementary school math teachers neither required nor pressed mastery of rudimentary arithmetic math skills. Hence, beginning in elementary school, students' lack of general math skill foundation not only negatively impacts their mathematics understanding in subsequent school years, but students' poor arithmetic numeracy base solidifies a substandard word problem solving ability at a critical age in their mathematics' development.

Regardless of student demographics, all elementary schools are affected to varying degrees when students do not possess grade level math facts and math processing skills; however, Title 1 elementary schools are especially and inequitably impacted. This Title 1 educational inequity leads to the infamous achievement gap on standardized testing from "California to the New York Island." The achievement gap initially surfaces in the intermediate elementary grades when standardized testing indicates a significant differential between Title 1 and non-Title 1 schools. Historically, the gap continues to widen each school year, and attempts to close the achievement gap over the last fifty to sixty years have been largely ineffective because the gap represents the effect of inequity – not its cause. However, if the achievement gap is to close, the math skill gap – both process skills (e.g. place value, rounding, multiples, etc.) and math fact skills (e.g. four basic math operations) must be directly addressed. Until this math skill gap is closed for **all** students, 'this land will **not** be made for you and me.'

The math fact skill student mastery pedagogical process is uniquely sequenced in the white paper, "Accelerated Math Fact Student Mastery," and that document is available for immediate download on the website URL provided in the footer below. However, the spaced repetition methodology described in this paper not only assists in student mastery of math facts, but it provides the skeletal instructional framework for student mastery of the math process skills. In short, a spaced repetition system in conjunction with a daily numeracy program are pedagogical methodologies that rapidly close the skill gap, and ultimately, the achievement gap in both rural and urban Title 1 elementary schools – regardless of student demographics.

There are six main reasons to use this type of instructional system. First, its simple procedural design allows an entry-level teacher with minimal training to be as effective in the classroom as a seasoned teacher. Second, this instructional method is financially attractive since there is not a monetary outlay required to purchase. Third, spaced repetition eliminates or greatly reduces math skill differentiation since struggling students are systematically accelerated to grade level. Fourth, the instructional pedagogy is exceedingly efficient and effective for teachers to meet the minimum number of repetitions for individual math skill mastery thresholds. Fifth, a differentiated daily numeracy program and a daily spaced repetition system symbiotically support one another and are independent of a school or district selected core math adoption. Lastly, this methodology is a praxis proven in Title 1 elementary and middle schools with challenging urban student demographics. Success and replication only requires implementation and training of school personnel. The complete instructional process is sequentially outlined in this paper.

Academic turnaround in mathematics can be accomplished in one school year regardless if the school is classified as a Title 1 school or not. This documented process has produced two (2) urban Title 1 National Blue Ribbon Schools, and both schools are also featured as National Blue Ribbon Profile Schools by the United States Department of Education for academic excellence. Graham Elementary and Blackshear Elementary Fine Arts Academy in the Austin Independent School District have also earned multiple-year Gold Ribbon School (At-Risk Children) awards and a myriad of Texas Education Agency (TEA) high academic performance recognitions.

Qualifying Statement

This document is a stand-alone paper, so the reader/educator understands the outlined process specifically at every juncture in the pedagogical process. However, this document is also a companion white paper to "90 Minute Math Block – Putting All the Pieces Together." It is part 2 of 3 of that series intended to completely expound upon improving elementary school mathematics by clos- -ing the achievement gap via math skill gaps – both process math skills and the 4 operational math facts.

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It is paramount that students master their arithmetic process math skills (e.g. doubles, halves, even/odds, place value, rounding, computational skills, etc.) in elementary school to provide a command in problem solving applications at their current grade level.

And,

as students enter algebraic or geometric classes in middle and high school, their arithmetic math process skills and math fact efficacy are at proficient and mastery levels and will not negatively impact their learning and understanding.

When the "Accelerated Student Math Fact Mastery" Approach and the Formative Loop Numeracy Program is used in conjunction with a Spaced Repetition Mastery System as described in this short white paper, elementary and middle school students will achieve heightened mathematics performance levels - regardless of challenging student demographics.

If an educator has any questions or suggestions to improve this process, please contact us via the web-site address in the footer. It is our overarching hope and objective that children become more adept mathematics students. If your comments or questions can facilitate the learning process, any and all constructive criticism is highly appreciated and welcome.

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Many math process skills (i.e. even/odd, halves, doubles, place value, etc.) and the four math fact operations are embedded in state and national mathematics standards for both intrinsic and extrinsic numeracy reasons. Generally speaking, too many elementary classroom teachers do not practice and review both math fact and math processing skills sufficiently until students demonstrate high levels of proficiency. Hence, many students carry these basic mathematics skills deficiencies into subsequent grade levels. Both seasoned teachers and entry-level classroom teachers working at Title 1 schools quickly discover their students' skill deficiencies within the first two to three weeks of the school year. As early as second grade, a student's mathematics success is highly dependent upon the mastery of prior grade level skills. Those math process and math fact skills provide the foundation for building the intermediate grade level skills.

Students' math skill deficits can be rectified with a deliberate, intentional and daily pedagogical approach for not only prior grade level math skill gap 'catch-up' – but also for mastering current grade level math process skills and math facts as well. Using an individualized and differentiated daily numeracy program in conjunction with a spaced repetition system (SRS) instructional methodology, classroom teachers may implement a brief, dynamic and effective skill review. The daily SRS review consists of one (1) to five (5) prior or recently introduced grade level math process skills and/or math fact skills. For example, at the onset of the core math lesson each day at the beginning of the school year, a third grade teacher may list the following math skills in the upper corner of their classroom chalk/white board: whole number line review, even/odd numbers, divisibility rules using 2, doubles for addition single digits and doubles addition plus 1. Most students have varying degrees of exposure to these skills from primary grade level instruction, but it is highly likely that they do not possess mastery. However, spaced repetition affords classroom teachers the ability to provide ample skill recurrence so every student has sufficient practice and opportunity to master the presented skills.

An efficient and effective spaced repetition system (SRS) daily math skill review dramatically affects student mathematical efficacy in a couple ways. First, it symbiotically complements and often mirrors the structured daily numeracy program. Second, its instructional methodology greatly reduces or completely eliminates regular education students' academic need for individual skill differentiation since students are accelerated to grade level mathematics. Lastly, regardless of challenging Title 1 student demographics, elementary schools have demonstrated sustained, heightened academic performance in similar comparison to their non-Title 1 school's counterparts. These high performing Title 1 elementary and middle schools implemented a differentiated daily numeracy program (i.e. Formative Loop), structured skill-skill based core lessons, grade level problem solving resources, and a spaced repetition system – all with daily consistency and high individual student accountability.

The success and overall effectiveness of whole group spaced repetition "mini-skill sessions" are highly dependent upon the classroom teacher ensuring all students are attentively prepared for the start of the lesson. For example, the teacher should have a clearly recognizable signal and daily routine to ensure all students are 'ready' to be actively engaged. A non-inclusive sampling of 'attention-getting' anticipatory methods are summarized below:

> *"All eyes on me."* **or** *"Pencils in the air."* **or** *"I can see 'Susan' is ready to begin. 'Jesus' is ready to learn. Great job, Jesus."* **or** *"'Yellow' Table is ready, 'Green' Table is ready…"* ***or*** *"All students at Table 2 are in the learning position."* ***or*** *a repeated teacher-student choral chant.*

Of course, whatever attention-getting phrase or method the classroom teacher chooses is a preference to his or her own teaching style; however, there is a universal pedagogical requirement: The daily anticipatory routine must be time effective and efficient each school day. A classroom teacher should **not** begin their group-direct teach until all students are attentively focused. If teachers lack a viable attention-securing signal to students, student learning is significantly impaired, regardless of the potential effectiveness of a spaced repetition system. It is important to generally note that the overall efficacy of a teacher's classroom management system and daily routines are two major factors that influence student academics in all classroom settings. The continued loss of instructional minutes over the course of time is costly to a child's education and cannot be overemphasized.

The following five (5) sections assist educators in the procedural understanding and pedagogical replication of the spaced repetition system (SRS) instructional method. Spaced repetition flexibility readily affords variations not only for the changing curricular needs and demands throughout the school year, but it also easily partners with an additional preparatory math warm-up system. Section 3 expounds on differing curricular needs; whereas, Section 4 illustrates an inclusionary paper measurement warm-up system example. Section 5 provides an incomplete listing that serves as a recommended starting point for SRS numeracy skills for grades 2 through 5, respectively.

SECTION 1

Spaced Repetition System (SRS) Background, Basics and Understanding

The concept of spaced repetition has been around for well over a hundred years. The idea was first proposed by Hermann Ebbinghaus in 1885. Since that time, a slew of academic research has been conducted further emphasizing its effectiveness in learning and retention. Basically, a spaced repetition system is an instructional learning method that proposes the following: by increasing the number of intervals of review and practice, then the person's ability to remember the material is significantly heightened. Hence, regardless of what an individual is attempting to learn, if the interval of review or study is discretely spaced over time and consistently and *actively* delivered to their students in short intervals over a number of days, their students' retention of the material is dramatically increased.

Three (3) key points extracted from a white paper by Sean H. K. Kang, Department of Education, Dartmouth College state the main precepts of spaced repetition:

- Practice and repetition is more effective when spaced over days compared to learning material the same amount of practice in one sitting.
- The instructional timing and arrangement of the review is important, and it positively affects student learning and outcomes.
- Interval practice positively affects memory, problem solving and transfer of learning to new contexts.

What are the pragmatic implications in pedagogy and instructional design/presentation?

If it is indeed the case that humans retain learned content that is presented repeatedly in discrete chunks over time, then what can or should be done to improve student learning outcomes in instructional design and the pedagogy of daily lessons in public schools?

1. A short daily review process should be consistently implemented especially in math, grammar, geography, vocabulary and science to ensure that students have sufficient practice over time so subject content and skills are mastered.
2. Teachers and administrators should seek and implement instructional resources that have an embedded spiraling curriculum.

3. Teachers should have a readily prepared review on prior content in the event that a daily lesson ends early so students may be refreshed on previously presented material.
4. Teachers should be specific and selective on the curriculum and skill content to prioritize the more important material, so students are exposed to that higher valued material more often during the spaced repetition process.
5. Teachers should incorporate dynamic reviews of the material using different formats, so students do not become bored with the repetition.
6. Teachers should assess students in periodic intervals in both formative and summative assessments to evaluate student mastery and vary the content review, as needed, based on those evaluations.

SECTION 2

Spaced Repetition System – General Method via Numeracy Development

Using a spaced repetition system in any core subject requires a minimum amount of planning time, but the classroom teacher must be adequately prepared due to highly focused pedagogy and the speed of the instruction. The small amount of planning and instructional time yields high-end results that increase students' math skill efficacy in only 5 to 10 minutes each instructional day.

Prior to the beginning of the daily core classroom lesson, the teacher presents a quick review of three (3) to five (5) previously presented math skills from earlier core lessons or math skills from prior grades that possess fundamental mastery importance. For example, at the beginning of the school year, a fifth (5^{th}) grade teacher writes the following fundamental math skills (i.e. SRS list – Figure 1 below) in the corner of the white/black board or their lesson plan book for quick and easy reference:

1.) even and odd numbers, small to large numbers
2.) missing addends/subtrahends, small to 2 digit numbers
3.) multiples (i.e. whole number skip counting) – begin 2's, 10's, 5's, 3's, 4's, 6's, etc.
4.) place value – expanded to standard form – to ten thousands place value
5.) computational practice of addition 2 and 3 digit with and without carrying

Figure 1: Beginning Skill Review 'SRS' List

Again, all of these math concepts/skills were taught in previous grade levels. Even and odd numbers, multiples and finding missing addends and subtrahends are prior grade level math objectives; however, elementary students – especially students attending Title 1 schools – often possess skill deficiencies from prior grade levels. However, the spaced repetition system (SRS) method affords the classroom teacher the ability to efficiently remedy prior math skill deficiencies while also teaching current core grade level standards to mastery simultaneously. The recommended number of repetitions to achieve mastery for a regular education student is between 8 to 18 iterations, depending on the particular skill. This instructional process is both efficient and effective for reaching that threshold range. However, the skill should remain on the review list for a quick summative assessment several days after to ensure students have retained the skill. If the skill was not mastered based on the summative diagnostic, it is easy to revisit the skill for a quick review, as needed.

Each class day prior to the core lesson, the teacher provides this review until students demonstrate skill mastery. The SRS math skill daily list is constantly updated as new skills from recent core lessons are added and math skills that have been sufficiently reviewed and mastered are removed from the list. For example, the SRS list may have changed after only five (5) to eight (8) class days to the list in figure 2 below. It is imperative that the teacher create not only a grade level skill list, but a list of fundamentally relevant prior grade level skills to review. The methodology cannot be nearly as effective if the list is a randomly sequenced process math skills and math fact skills list. There is a scope and sequence of skills in the Formative Loop Resource Library for each grade level from 1st grade through 6th grade. This SRS skill list and the sequenced skills named in the Accelerated Math Fact Student Mastery white paper may serve as a pragmatic starting point to readily create a math skill spaced repetition skill list for each elementary grade level.

1.) multiples (i.e. whole number skip counting) – 3's, 4's, 6's, 7's, 8's, etc.,
2.) place value – expanded to standard form
3.) Making 10 and Making 100 – Whole Numbers Only – Multiples of 10 on Making 100
4.) computational practice of subtraction 2 and 3 digit with and without regrouping,
5.) place value – Value and Place Value – from ones to the ten thousands,

Figure 2: Evolving Skill Review 'SRS' List

With this pedagogy, the educator is dynamically assuring mastery of these important math skills with short and effective daily structured practice. Additionally, there is tremendous flexibility with spaced repetition as well as instructional modifications as described in Sections 3 and 4 below. The general method described in this section can be used in conjunction with those variations. However, if a daily differentiated structured numeracy program such as the Formative Loop Numeracy Program is used in parallel with a SRS, then student math skill performance on those daily assessments may also be used to diagnostically identify student skill needs for inclusion in the daily spaced repetition system.

The Ten (10) Basic Instructional Methodology and Spaced Repetition Tips

1.) Students ready each day with a set, structured routine – spiral notebooks and pencils ready
2.) In lieu of spiral notebooks, small12 inch x 12 inch white boards with dry erase colored markers may be used. Advantages: **a.)** saves paper **b.)** students' answers and responses are immediately visible for quick teacher inspection for student mastery. **c.)** white board and dry erase marker are always at student desk – no time loss for an unsharpened pencil.
3.) Student attention is securely focused on classroom teacher prior to starting SRS math review
4.) Teacher must be actively engaging – encouraging and challenging students. Teacher should appropriately vary procedure to ensure students do not become bored with the routine.
5.) There is no opting out! All students participate. Pair-up any 504 or student receiving special education services with a socially and academic compatible student for assistance, as needed.
6.) Teacher should closely monitor students to reduce the potential of a student copying a peer's work.
7.) Teacher should use proximity to position children's desks, as needed, or classroom management or academic assistance reasons.
8.) Teacher should observe the work/answers/responses from struggling academic students to ensure all students are mastering each skill. Additional work may be needed with a few select students. Intervene with assistance at a convenient time in the teacher's daily schedule. Provide select homework (handwritten or computer generated) as needed in each case for additional home practice. The Formative Loop Resource Library affords educators immediate download of nearly every math skill from 1st through 8th grade.
9.) Teacher must include short, periodic formative assessments in the SRS process – visual or paper/pencil to determine if the math skill has been mastered by **all** students, and if specific skill

can be removed from SRS list. Note: This outcome is attainable with the high SRS implementation fidelity in conjunction with a differentiated daily numeracy program.

10.) If the daily spaced repetition requires more time than expected on a newly added or difficult math skill, the teacher should stop on time for core lesson. Flexibility on controlling time is fully at the teacher's discretion for both core lesson and SRS math skill list. As expected, students' speed on difficult math skills increases with practice. Finally, SRS methodology is highly beneficial to schools with medium to high student mobility – providing an efficient and effective process for academic catch-up for newly enrolled students.

SECTION 3

Spaced Repetition System – Application Flexibility

As noted, the general methodology for SRS may include other aspects of a daily mathematics program. The SRS skill list may continue as described in Section 2; however, the SRS math skill list is fluid and easy to include specific math skills from specific core lesson areas, as applicable and needed.

Difficult Math Concepts or Computations

Current core lessons often involve developmentally appropriate difficult math concepts, computations, conceptual models or computation algorithms. These skills and concepts are readily inserted in the daily SRS sequencing to provide additional practice. For example, computational problems involving subtraction across a zero in the minuend (i.e. the top number in a subtraction problem) is often an arduous process math skill for many elementary students to master. The SRS is the ideal pedagogical vehicle for students to master this difficult skill. The teacher may include 2 to 3 'across the zero' subtraction problems in the daily SRS list until the skill is mastered by all students. For second and third graders, this skill may need to be practiced for two weeks in consecutive days.

Another example of a difficult math processing skill for many intermediate elementary students to master is a thorough understanding of multiplication and division models for multi-digit computations. For instance, the teacher may readily provide a correctly worked 2 digit by 2 digit multiplication problem – 16 x 23 = 368. With sufficient daily repeated practice in an SRS environment, students quickly illustrate the physical pictorial meaning of 16 x 23 – as shown in Figure 3 below. Again, with sufficient daily practice in a SRS math skill system, students quickly ingrain the physical pictorial meaning of multi-digit multiplication and division.

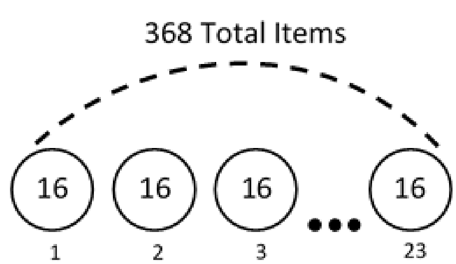

Figure 3: Student Drawn Pictorial Model: 16 x 23 = 368

One of the most difficult mathematical connections 4th grade through 8th grade students demonstrate conceptual difficulty is the fraction-decimal connection. The equivalency of proper fractions and decimals is initially confusing, but the vast majority of students experience greater understanding linking the equivalency or magnitude of mixed numbers, improper fractions and decimals. To many students, a mixed number, decimal or an improper fraction 'float' without mental fixity with regard to a fractional number line. However, using a spaced repetition system, this process is instructionally simplified. A separate white paper using spaced repetition is posted on The New 3Rs website sequentially outlining the pedagogical process.

Proactive Skill Development

The SRS daily math system can also be adapted for proactive skill development in multi-step math processes. For example, a fifth grade math standard requires addition and subtraction of proper or improper fractions with unlike denominators. Students struggle with this concept for one primary reason – there are too many separate computational and process steps when computing fractional sums and differences of unlike denominators. In this case, the teacher can include many weeks in advance the following skills that will be needed by students in that math process: listing multiples of numbers 1 through 12, finding the LCM/LCD and computing equivalent fractions – including reducing fractions to lowest terms.

In this example, a teacher proactively prepares students for future success by providing repetitive mastery of the necessary math process skills that are needed to competently add and subtract proper or improper fractions with unlike denominators. Hence, when students begin their work with fractions consisting of unlike denominators, the teacher simply instructs students to piece together prior mastered math skills to compute fractional sums and differences. Students not only demonstrate mastery of this difficult math lesson in a much shorter period of time, but students retain the math process more readily due to skill component mastery.

Proactive skill development may also be used in a daily SRS when teaching students to correctly read a customary or metric ruler. In this case, brief lessons with sample paper rulers may be used to ensure students are familiar with these linear tools. Teachers can require students to label customary rulers in only halves and quarters for four (4) to five (5) class days. After mastery, the eighths and sixteenths can be added to the daily process until mastered. Paper customary and metric rulers as well as blank fractional number lines are available for download in the Formative Loop Resource Library.

Benchmark Assessments – Diagnostic Analysis

At specific points in the school year, teachers assess student with summative math units and school/district benchmark assessments. If students demonstrate a lack of understanding or proficiency with specific problem types or specific math skills, teachers can easily include those skills or missed problem types in the daily SRS math review. Hence, students rapidly adapt and overcome test formatting issues. For example, let's assume on a district benchmark assessment, students demonstrated a poor conceptual, computational and/or equational understanding of the following problem:

Betty's son, LuisPedro is twelve years old. Priscilla, his sister, is 20 years younger than her mother. If Betty is four times older than LuisPedro, what are the ages of Priscilla and Betty?

At first, these problems are difficult for fourth, fifth and sixth grade students. However, with concerted and focused practice, they become very adept at solving them. The teacher can include the equational type of problem easily on a daily basis in the SRS math skill list, and in very little time, students are competent at setting up the relationships as well as back checking their work to ensure their solution is reasonable and correct. There is one guaranteed outcome with common problem like the one presented above. If students are not given sufficient exposure and repetition to understanding the mathematical relationships in equation form, they will not be prepared to solve them when expected on a future assessment.

Lastly, on unit assessments, teachers frequently discover after diagnostically reviewing their students' math work that their students' understanding on a previously taught concept was not retained. In this case, embedded skill deficiencies or the concept requires additional focus and practice. Those skills or concepts are easily interjected into the SRS math list, and students are provided sufficient attention until students clearly demonstrate mastery level understanding.

SECTION 4

Spaced Repetition System – Coordinated with a Daily Paper Warm-up

A short daily paper warm-up consisting of five to ten questions with the 8.5 x 11 inch paper divided in to halves or thirds is an extremely beneficial skill review tool. For example, in Figure 4 below, a typical measurement warm-up daily review is shown. After the students complete this exercise, the teacher can quickly check their work globally – monitoring and assisting the few students who struggle on specific measurement concepts.

After checking the paper warm-up and answering student questions, students flip their warm-up measurement paper over so the blank side is facing up. Then, the teacher begins the daily spaced repetition system – even/odd, multiples, place value, halve/doubles, rounding, etc. A short daily paper warm-up is effective in every classroom setting, but it is especially effective in a core subject rotational system – when a teacher on the grade level teaches all students in only one core subject. Class to class transitional time is greatly reduced since students acquire the paper daily exercise as they enter the next classroom, find their desk, and immediately engage in learning. Hence, the least amount of instructional time is lost during classroom transitions using this structured routine. Please note that fifth and six grade measurement daily warm-ups for both customary and metric practice are available for immediate download in the Formative Loop Resource Library – 'General Section' and 'Fifth (5^{th})/Sixth (6^{th}) Grade Sections.' An actual measurement 'daily' metric example is shown in Figure 4 below.

Day 31: Measurement – Metric - Length

Name:________________

Daily Math 5 minute Review on Measurement

1.) centimeters in a meter ______	**7.)** 2 cm = _____ mm
2.) millimeters in a meter ______	**8.)** 4 cm = _____ mm
3.) millimeters in a centimeter _______	**9.)** 2 m = ______ cm
4.) About how big is a centimeter? _________________	**10.)** 20 mm = ______ cm
5.) About how long is your **thumb** in centimeters? _________	**11.)** 15 mm = ______ cm
6.) Measure in **centimeters**: ________________________________	_____ centimeters

Name:________________

Daily Math 5 minute Review on Measurement

Figure 4: Metric Measurement Daily Practice Sheet

SECTION 5

Starting (Sample) Numeracy Skill 'SRS' List: Grades 2 - 5

Entry-level teachers often experience difficulty identifying the numeracy skills to include in the sequence using a spaced repetition system (SRS) for mathematics. The table below is intended as an initial starting point for 2nd – 5th grade classroom teachers for an SRS daily program.

SRS – Math: Sample Starting Numeracy Skill List – Grades 2 - 5

Second Grade	Third Grade	Fourth Grade	Fifth Grade
Making 10	W Number Line Review	Even/Odd Numbers	Even/Odd Numbers
Multiples 2's, 10's, 5's	Even/Odd Numbers	Divisibility 2, 5, 10	Divisibility 2, 5, 10
Doubles Addition - SD	Divisibility Rule for 2	Making 10	Missing Addends
Doubles Addition +1	Doubles Addition - SD	Making 100 – 1 (10's)	Missing Subtrahends
Doubles Addition - 1	Doubles Addition +1	Multiples (1-12)	Missing Minuends
Making 100 – (10's)	Doubles Addition - 1	Missing Addends	Making 10
Pick a 2 Digit # + 2	Making 10	Missing Subtrahends	Multiples (1-12)
Pick a 2 Digit # - 2	Making 100 – 1 (10's)	Add to Make 1	Making 100 - 1 (10's)
PV – Qual: 1's & 10's	Pick a 2 Digit # +/- 10	PV Expanded	Making 1,000-1 (100's)
PV – Qual: 1's to 100's	Pick a 3 Digit # +/- 100	PV Standard	Making 100 - 2 (5's)
PV – Exp: 1's & 10's	Multiples – 2, 10 & 5's	PV Standard - Mixed	Making 1,000-2 (50's)
PV – Exp: 1's to 100's	PV Qual. 1's & 10's	Making 1,000-1 (100s)	Place Value (PV) Exp
PV – Std: 1's & 10's	PV Qual. 1's to 100's	PV Qualitative	Factors: Comp. Meth.
PV – Std: 1's to 100's	PV Qual. to 10,000's	Making 100-2 (5's)	PV – Qualitative
Even/Odd Numbers	Multiples – 3's & 4's	Addition – W Carrying	PV – Standard/Base 10
Pick a 2 Digit # + 10	PV Exp. 1's & 10's	Subtraction – Regroup.	PV – Decimal Form
Pick a 2 Digit # - 10	PV Exp. 1's to 100's	Rounding to 100's	Decimal Magnitudes
Pick a 3 Digit # + 100	PV Exp. to 10,000's	Subtraction Across 0's	Addition: WN & Dec.
Pick a 3 Digit # - 100	PV Std. 1's & 10's	PV Base 10	Subtraction WN & Dec
Even/Odd Number	PV Std. 1's to 100's	Rounding to 10,000's	PV – Fraction Form
Add: 10's No Carrying	PV Std. to 10,000's	Fact Families - +/-	Customary: Linear WU
Add: 100's No Carrying	PV Base 10: 1's & 10's	Fact Families – x/÷	Subtraction: Across 0's

Table 1: Sample SRS Numeracy List – Grades 2 - 5

As detailed in section 3 and 4 above, the flexibility of the spaced repetition system allows for the addition or deletion of numeracy skills based on need as determined by each teacher. In Table 1, both math fact mastery and math processing skills are included in the SRS skill listing. To develop this SRS skill list, a school/district curricular list and/or the Formative Loop Resource Library scope and sequence can be used. Regardless of the resource(s) used to develop a SRS daily sequenced list, it is imperative that a *complete* math skill list for each grade level be developed. Finally, the rate of review on any given school day will depend on the teacher's ability to balance skill content and accurately assess students' academic mastery of specific skills. However, within a short time using an SRS math skill review, a teacher's pedagogical prowess will increase with both the speed efficiency of the daily review and their overall control of the methodology.