

Summer Math Objectives: To review and reinforce the following Grade 5 skills.

Major Fluency for Fifth Grade: 5.NBT.5-Fluently multiply multi-digit whole numbers using the standard algorithm.

Major Work for Fifth Grade: Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving.

NY-5.NF.1 – Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. e.g.,

- $1/3 + 2/9 = 3/9 + 2/9 = 5/9$
- $2/3 + 5/4 = 8/12 + 15/12 = 23/12$

NYS Power Standard: NY-5.NBT.7 – Using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations:

- add and subtract decimals to hundredths;
- multiply and divide decimals to hundredths.

Relate the strategy to a written method and explain the reasoning used.

Note: Students should be taught to use concrete models and drawings; as well as strategies based on place value, properties of operations, *and* the relationship between operations. When solving any problem, students can choose to use a concrete

model *or* a drawing. Their strategy must be based on place value, properties of operations, or the relationship between operations.

Note: Division problems are limited to those that allow for the use of concrete models or drawings, strategies based on properties of operations, and/or the relationship between operations (e.g., $0.25 \div 0.05$). Problems should not be so complex as to require the use of an algorithm (e.g., $0.37 \div 0.05$).

Summer Math Objectives: To review and reinforce the following Grade 6 skills.

Major Fluency for Sixth Grade: NY-6.NS.3 – Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Major Work for Sixth Grade: Ratios and proportional relationships, early work with expressions and equations.

NYS Power Standard: NY-6.RP.3d – Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Note: Conversion of units occur within a given measurement system, not across different measurement systems.

NYS Power Standard: NY-6.RP.3c – Find a percent of a quantity as a rate per 100. Solve problems that involve finding the

whole given a part and the percent, and finding a part of a whole given the percent. e.g., 30% of a quantity means 30/100 times the quantity.

Procedural Fluency: NY-6.NS.3 – Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

NY-6.RP.1 – Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. e.g., “The ratio of wings to beaks in the birdhouse at the zoo was 2:1 because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

NYS Power Standard: NY-6.RP.3b – Solve unit rate problems. e.g., If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? What is the unit rate?

Note: Problems may include unit pricing and constant speed.

Educator Packets (one per unit):

- **Target Number** directions and bull’s eye with numbers to select (*need a timer*)
- **Family Fun** Game Directions and Answer Key
- **CGI** Directions and Word Problems for grade band (*English and Spanish*)
- **Snack Fraction** of the week directions and Answer Key (*need: paper plate, napkin, plastic knife, snack of the week or substitute*)

Student Packets Bilingual English-Spanish (one per unit):

- **Target Number** bull’s eye
- **Family Fun** cards for grade band
- **CGI** Graphic Organizer
- **Snack Fraction** Record Sheet
- **Family Fun** Game Board and “DIY” Game Pieces

Printing Note: Use a different color to print the packets for each grade level. This makes it easier for students in different grade bands to work together. Packets can be print two-sided.

Organization: Each Grade Band has the same four activities, organized in the same order, for each Unit. Students can do the same activity, but use the problems from their own packet.

In-Home Time Management: Students can work together on the Target Number and Family Fun Game. Students use the game cards from their separate Student Packets. The CGI word problems and Snack Fractions, however, often require more focused attention to the individual grade bands.

Summer School Time Management:

1. Warm up each day with Target Number.
2. Create a Daily Routine with the Family Fun game cards. Each row provides practice for different math skills. Select one card from each row. Pose the problems to students. Have the students fold paper into fourths, and then use each fourth to solve the problem and hold up for you to

check. Use three to four each day. (Differentiate for students in different grade bands, so everyone is solving problems, but different problems.)

3. Use the full Cognitive Guided Instruction protocol for the CGI word problems, two times a week.

- a. All students work on the same problem.
- b. Teacher walks between students, quietly asking individuals to explain the strategy/process they are using. This gives students a chance to self-correct.
- c. When most are done, ask two to three volunteers to share their process. First, they draw on the board, and then they explain.

d. As the instructor, you are looking for students who use different strategies (i.e. drawing pictures, using tallies, adding on, etc.)

e. Eventually, use this time for a class discussion about strategies that take more time or less time.

4. Let students play the actual Family Fun game at least once a week.

5. Utilize the extra teaching lessons posted on the website for this grade to fill gaps in learning.

6. Summer School Instructors can bring in extra activities to support the student practice in their math fluency and major works.

GETTING STARTED:

Distribute Student Packets so each student receives the grade band for the grade they completed in June. The packets have a symbol instead of the grade number so Educators can differentiate the math level for students as appropriate.

WARM UP: TARGET NUMBER Directions

The Educator gives students one number. Students have one minutes to write down as many different ways to represent the number. Everyone takes turns sharing what they wrote.

Key Points:

- Students are able to write solutions from their own math knowledge.
- Educators can work in examples related to the student's required math fluency and major works in math.
- The goal is for students to find **multiple and different (correct) responses** rather than limiting students to one correct strategy.

Process:

1. Select the Target Number for today. Students can write the number on their Bull's Eye.

- a. All target numbers are fair to use with students in grades 1 through 8. All ages can start with the numbers 12 and 15. After these, you will need to give students in grades 1 to 8 the higher numbers, and use numbers 20 and under for any Kindergarten (rising First Grade) students in the group.
2. The task is to represent the target number in different ways in one minute. Do a couple samples with students before starting the timer.
3. Set the timer for one minute.
4. Educators play along, and write examples to share related to the students' required math fluencies:
5. At the end of the minute, students give ONE example at a time, going around the group a couple of times until all DIFFERENT responses are used. Students need to give **different** ways to represent the number. Writing, "7 + 3" is different from writing, "3 + 7". Drawing 7 circles and 3 circles is different from writing, "7 + 3."

Examples of some different ways to represent the number 10:

$7 + 3$

$10 + 0$

$17 - 7$

2×5

$100 / 10$

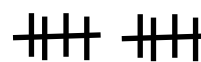
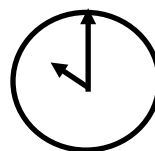
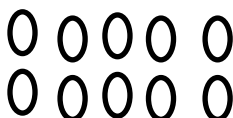
$3 + 7$

$0 + 10$

ten

5×2

$10/1$



One dozen eggs minus 2

$2 + 2 + 2 + 2 + 2$

$100 - 90$

FAMILY FUN GAME

All ages of students play the game together. On their turn, students use the game cards from their own packet to solve math problems at their own level.

Key Points:

- Unit 1 introduces the game and some of the Math Matters skills.
- Units 2 through 5 provide students practice all of the core math skills, except fractions, throughout the summer.

Process:

1. Each Student Packet has its own Family Fun Game Cards, allowing each student to participate together with students who have different skills to practice.
2. Do not cut the cards apart to play the game. Starting with Lesson 2, the three cards in each row will usually practice the same skill.
3. Instead of students drawing a card, students select a problem from their packets. Students can select problems in the order they choose, BUT ask students to solve one problem from each row, before repeating from the row, so they practice each skill.

- a. Many students will read ahead, solving problems, to find the “easiest” ones while waiting for their next turn.
4. Game Directions are on the game board. Game boards are at the end of each Student Packet, so they are easy to pull off and use.
5. The best way to move around the board is to use dice. The Student Packets have a “Do It Yourself (DIY)” version to toss a small wad of paper onto a board of numbers.

CGI CHARTS

CGI is the **C**ognitive **G**uided **I**nstruction for primary students to solve math word problems. While New York State’s Next Generations Learning Standards have similar word problem charts for grades K-4, this does not continue into Grades 5-6.

Using the CGI Charts from Math Matters with students in Grades 5-6 gives the students practice with reasoning to find the solutions, as well as practicing the math skills for multiplication and division with decimals and fractions, as well as working with various rate problems.

Using the CGI process supports students in thinking through the question and strategies for solving the word problems.

Key Points:

- The CGI process allows students to solve the problem in a way they understand, instead of the “right” way.
- Provides the Educator insight about the student’s math knowledge.
- Asks students to explain their solution process before asking for an answer.
- When there is a group of peers, the emphasis is on finding different solution paths, rather than one correct method.
- Eventually this can lead to a real discussion: Does a student’s method work for him or her? Has the student seen another method they are ready to try?

Process:

1. **Select one word problem.** The easiest wording to understand is in the top, left corner of the CGI Chart. The wording is more difficult as you move left and down.
 - a. Start students with the simplest word problems.
 - b. If a student struggles, stick with these for the summer so the student becomes secure. If students are confident, move to questions to the left, or down, to increase their understanding.
2. Have manipulatives and paper/pencil available for students to choose either medium for solving the problem.

3. **Read the problem to students once. Note:** Some problems have two to three sets of numbers at the bottom for you to choose from to fill in the blanks. Use the set that works best for the student(s).
4. **Use the Graphic Organizer** to help students organize their notes and strategies.
5. **Read the problem again, and then teach students to take notes.** (As students demonstrate confidence, shift to giving students a chance to take their own notes.)
 - a. Prompt students with questions, and model writing notes. Use the Graphic Organizer.
 - b. Sample questions: What does the problem tell us first? [*Anita saves \$9.50 every week.*] How can we write? [*Each week- \$9.50*]
 - c. What do we learn next? [*Anita saves money for 5 weeks*] How can we write? [*weeks = 5*]
 - d. What question do we have to answer? [*How many money does she have in the jar?*] How can we write this? [*___ in jar at the end*]
6. Give students time to solve. (*If struggling, prompt with, “What number does the problem start with?” Do you want to draw this or use manipulatives to recreate it? Then what happens?*)
7. Ask students to explain their process before asking them for an answer. This allows students time to self-correct and gives the Educator a clue about how the student is thinking.
8. At the end, look at the final answer together, to decide if it solves the problem. How would you say the answer in a sentence? [*Anita saved \$47.50 in the jar.*]

Summer School Note: How to extend this to the full CGI process.

Walk around the group, quietly asking individuals to explain their process to you. When students seem stuck, prompt by re-asking them about their notes.

Take time to ask two to three volunteers to copy their process on a white board or large piece of construction paper. Then ask the students to explain their procedures. When selecting volunteers, it is a good idea to look for different strategies that are successful, not just the “best” method. The variety of examples and explanations will give all students a stronger understanding about math works.

Planning Note: In the original design, the word problems in the CGI Chart used the characters and events from one particular book, listed at the top of the chart. The class spent three days rereading and using the characters and plot from the one book.

While not as rich an experience for students who are not immersed in the particular story, the word problems still serve as good examples for the variety of one-step word problems.

SNACK FRACTIONS

Students separate a snack into a fractional portion. Then eat.

Key Points:

- Equal portions matter when sharing real food
- All students use the same snack food
- Using the record sheet helps students transfer from the real to the symbolic

The Math Matters In-Home curriculum uses the following snacks:

- Unit 1 = String Cheese
- Unit 2 = Cup of Trail Mix
- Unit 3 = 6 pieces Beef Jerky
- Unit 4 = 100 calorie snack bags
- Unit 5 = 4 Graham Crackers and Nutella

Planning Note: Substitute snacks as needed to travel in cars and to fit the budget. If possible, have the substitute snack match the shape or number of the original, so the Fraction Record sheet still makes sense. For example, substituting something rectangular, like a breakfast bar, for the string cheese, or substituting a package with 6 cheese cracker sandwiches for the 6 pieces of beef jerky.

Summer School Note: The original Math Matters Summer School curriculum suggested the following snacks:

- Unit 1 = Apple, ice cream sandwich, string cheese
- Unit 2 = Guacamole and carrots, trail mix, cherry tomatoes and cheese
- Unit 3 = Dill pickle, beef jerky, raisin bread and banana
- Unit 4 = Fruit kabob, 100 calorie snack bag, graham cracker and peanut butter (check for allergies to peanut butter)
- Unit 5 = Laughing Cow cheese wedges, graham crackers and Nutella and strawberries (check for allergies to Nutella), bagels and cream cheese
- Unit 6 = Turkey wrap, personal pan pizza

Process:

- **Use the *Snack Fraction guidance*** in the Teacher Packet and Snack Fraction Record sheet in the Student Packet

Alternative Process:

- **Single student:** splits the food in the fractional amount practicing (half, fourth, third, etc.) and Migrant Educator discusses with student – are they fair shares? Are some

portions larger/smaller? Have the student draw and write the fractional portion of a whole.

- **Partners:** each has whole food. Each splits the food in the fractional amount practicing (half, fourth, third, etc.) but the partner picks the portion (half, $\frac{2}{4}$, $\frac{3}{6}$) first. Have the students draw and write the fractional portion of a whole.

Recipe Note:

Trail Mix: (mix equal parts of each of the following)

- Peanuts, M&M's, Fish crackers (check for allergies to peanuts); or
- Chex Corn Cereal, Cheerios, dried fruit

(Optional) SUMMER ASSESSMENTS

Formal Summer Assessments

The formal Summer Assessments are based on the grade that a student completed. A student who completed Fourth Grade in June, but might be considered a (rising) Fifth Grader in the summer, should take the Summer Assessments for Grade 4. The questions are based on end-of-year mastery to maintain core math skills over the summer.

Note: Grades 5 and 6 receive the instruction together, but the students are assessed with different a pre-/post-tests. Each has different supplies to support the student.

- **Grade 5** uses a single OWL icon to code the papers students can see.
- **Grade 6** uses two OWL ICONS to code the papers students can see.
- **No extra supplies are suggested for Grades 5 or 6 to have during the assessments.**

Next Generation Modifications: These assessments started as the Math Matters pre-tests and post-tests in English and Spanish. The assessments are now modified to align with the *New York State Next Generation Mathematics Learning Standards*.

- The Math Matters assessments correlate well to NYS's Next Generation Standards. There are only cosmetic changes for consistency and readability.
 - **NY-6.RP.3c** – simplified to a one-step problem to better differentiate between Grade 6 and Grade 7 use of percent for solving word problems.
- The Educator Scoring Instructions were modified to provide more examples and explanations for the strategies.

Informal Assessments

Educators can observe when a student is able to complete the problems or not. When gaps in knowledge are observed, Educators can re-teach to those skills, to close the gaps in learning. When a student can complete a skill on his or her own, it is important for the student to continue practicing the skill to avoid summer loss.

CLOSING THE GAPS

Use this section for ideas when a student struggles with a particular skill.

Get curious and ask yourself:

- *Does the student just need a reminder and more practice?*
- *Does the student need a full lesson to re-introduce the skill?*
- *Is the wording of the problem causing misunderstanding, rather than the math?*
- *Does the student need to have both the English and Spanish packets to work with?*

You can follow up the next lesson:

- Plan to utilize your own examples during next week's "Target Number" to support this skill. At the beginning of Family Fun, use one of the game's examples to review the skill before playing the game.
- Review the Skill Lessons posted on the website for Grades 5-6, to teach/ reteach the Summer Math skill for individual students.

Math Matters Note: These lessons were written for a classroom, and are called "TV Lessons" because they were also scripts and videotaped during Math Matters. For example, most lessons refer to a "Pirate's Corner" that was an on-line activity when the Math Matters Consortium was funded. You will need to preview so you can adapt the script to your students and situation.

NY-5NF.1. - Find Equivalent Fractions to solve Addition and Subtraction of Fractions with Unlike Denominators

- This has two lessons. It starts with the Transition to Math (TM), followed by the related "TV" lesson
- Lesson references the Aesop Fable: "The Crow and the Pitcher"
- "BLM" in Math Matters refers to "Black Line Master" (i.e. worksheet)
- Supplies for Students
 - two pieces of construction paper cut 1" by 9," one red and one yellow

NY-6.RP.3c- Introduction to Percents and relationship to Hundredths as fractions and decimals

- Lesson references working with hundredths in an earlier lesson
- Supplies for Students
 - Yellow or orange crayon

NY-6.RP.1 – Introduction to Ratios and Proportional Relationships

- The lesson refers to an earlier lesson about mixing primary colors of paint
- Student Supplies
 - Color counters to represent the portions
 - 6 each: Red, Blue, Yellow

NY-6.RP.1 – Solve Ratio Problems with Cross Multiplication

- The lesson refers to the detective in the book, The Lemon Tree Caper: A Mickey Rangel Mystery/La intriga del limonero: Colección Mickey Rangel, detective privado.
- No Students Supplies suggested

NY-6.RP.1 – Using Percents (portion of the whole) to Solve Problems

- The lesson references a City Mouse/Country Mouse story.
- Supplies for Students
 - Basic Calculator

NY-6.RP.3d - Using Ratios to Convert Measurements

- The lesson refers to a poem about the sea and uses the Bermuda Rig sailboat
- Image of the Bermuda Rig style of sailboat add to the packet to use with students
- No additional Supplies needed for Students