AVID Summer Bridge

Curriculum Sampler

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AVID Math
Summer Bridge Program

MATH FOR 7TH GRADE

AVID Center

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AVID Math for 7th Grade Summer Bridge Program

The *Math for 7th Grade Summer Bridge Program* is all about students: students learning math; students growing in problem-solving and critical-thinking abilities; students having fun; students growing in confidence about their math abilities; and students participating in a positive learning environment. *Math for 7th Grade* is a program of intensive math content and support activities that teach seventh-grade concepts to prepare students for seventh-grade advanced math courses. It can also be used to strengthen students' knowledge and skills prior to, or after, the seventh-grade math classes designed to prepare students for advanced math courses. The program also incorporates strategies to help English language learner (ELL) students accelerate the development of academic English skills that they need to succeed in math courses.

Math Content and Practices

The curriculum focuses on the most important and fundamental concepts and practices that must be understood in order to provide a solid foundation for seventh-grade math. Some of the math concepts may be quite challenging to students, but they should have been introduced to them in the previous school year. Students will assimilate the concepts at different paces, which requires that the teacher tailor units to the needs of specific classes.

Content

- Ratios and proportional relationships
- Algebraic expressions and equations
- Operations with rational numbers
- Coordinate graphing and transformations
- Multiple representations of math entities

Practices

- Make sense of problems
- Analyze and explain problems and processes
- Discern patterns and structures
- Model with mathematics
- Apply conceptual understanding
- Use precise mathematical language

While keeping in mind the admonition, "telling is not teaching," the content is taught primarily through inquiry processes and lessons and activities that are collaborative, engaging, and effective in order to promote deep conceptual learning for students. However, the teacher remains the most critical element in a classroom. If the curriculum is taught in an energetic and engaging way, with care and concern for the students and a positive attitude, it will build students' math skills, as well as their confidence.

Structure of the Program

WICOR STRATEGIES: The rigorous math content of *Math for 7th Grade* is taught with the foundational AVID strategies of Writing, Inquiry, Collaboration, Organization, and Reading (WICOR). Students frequently teach each other in small-group work and presentations, which engage them actively in the thinking process. Examples of the commonly used WICOR strategies are:

- Cornell-style note-taking, with questions and summaries
- Collaborative group work and team-building activities
- Learning logs, quickwrites, and Philosophical Chairs discussions
- Interactive Notebooks for organizing notes, data, assignments for processing the content, and reflections on the learning

GUILDS: Students in the *Math for 7th Grade Summer Bridge Program* work in "guilds," which compete with each other to earn points. Daily guild challenges review mathematical principles and promote collaborative learning. Students enjoy the competition and love the individual recognition! Although the lessons and activities in the Summer Bridge Program are rigorous, it is important that students have fun while learning in a summer program so that they do not feel that the program is "school as usual." Please make your students feel like superstars during the Summer Bridge Program.

CLASS TIME: Time is a significant factor during the Summer Bridge Program. Please be mindful of the clock as you teach and use your best judgment on extending or shortening lessons or activities. Of course, the pre-teaching activities and notes should not be omitted, so be mindful of all the daily topics. It is best to teach the activities in the order presented and omit the last activity of the unit if necessary. However, the last activity is usually a writing reflection, and it is extremely important for students to write and synthesize their thoughts. Include these activities whenever possible.

It is difficult to gauge the appropriate number of example questions to include in activities and notes throughout the Summer Bridge Program. All teachers will have a varying number of students in their classes with various ability levels. For that reason, teacher discretion and judgment must be used in providing initial discussions or problems before some activities and during some Cornell note-taking lessons. Additionally, you may find that there are too few examples and that your students need more. Please add example problems and scaffolding opportunities into your lessons, based upon the needs of your students.

END-OF-BRIDGE EXAMS: At the conclusion of the program, students take district-prepared End-of-Bridge Exams to form a measure of their performance on the course content. Additional measures that districts may use to consider students' entry into advanced seventh-grade math are their math course grades from the previous school year, state exam scores, and district guidelines.

TECHNOLOGY: Since the availability of computers and Internet access cannot be ensured at the sites where the Summer Bridge Program is being conducted, technology is not required for the lessons and activities. If there are computers in the Summer Bridge Program classroom, you may want to use them to provide additional guided practice for students who need more practice with the concepts.

The Curriculum

THE CURRICULUM GUIDE: The curriculum is designed for a 15-day program, as there are 15 consecutive, four-hour units. Units 14 and 15 contain the culminating activities and End-of-Bridge Exam. To allow for flexibility of order, these two units have been combined. If your Summer Bridge Program is shorter or longer than 15 days in length, you will need to adjust the units to fit your specific needs.

The first page of each unit in the curriculum guide is the unit plan, which lists the objectives, activities, handouts, resources and supplies, WICOR strategies, ELL strategies, teacher preparation items, correlation to Common Core State Standards, and vocabulary words for the lessons and activities in that unit. The times listed for each lesson and activity are suggested times. Your students may need more or less time. Common supplies (i.e., markers, pencils, scissors, etc.) are not listed on each lesson or activity, but should be available to students each day. On the unit plan and individual lessons and activities, the handouts are understood to be distributed as one per student, unless otherwise indicated. **The handouts marked with an asterisk (*) are items that are not pre-printed in the student Interactive Notebooks and must be copied and distributed by the teachers as indicated in the lessons and on the handout list in Appendix V. Supplies marked with a star (★) are items that should be readily available and that the teacher can provide without purchasing them.** Each unit begins with a warm-up and ends with a review activity or a written reflection in which students process their learning.

OFFICIAL MATH LANGUAGE: The use of official math language (OML) is emphasized throughout the curriculum and should be a continuous thread during the program. Research shows that a key component in math success is correct vocabulary usage and knowledge. Vocabulary should be emphasized in every unit of the Summer Bridge Program. A purposeful vocabulary activity has been built into most units of the program. Where one has not been built in, one can be added as time allows. The Appendices contain contains vocabulary cards and additional vocabulary activities that can be used at any time.

ENGLISH LANGUAGE LEARNER (ELL) STRATEGIES: In order to help ELL students acquire the content knowledge within the *Math for 7th Grade* program, processing strategies for the lessons provide support through vocabulary activities, student discussions of math concepts, written explanations of concepts, and "gallery walks." Throughout the book, you will see additional **ELL Notes** that offer alternative ways for students to process the information. Keep in mind that ELL students may require additional processing time for the lessons.

OTHER CURRICULUM GUIDE ITEMS: Appendices in the curriculum book contain team-builders/brain breaks, which can be used as often as needed, and a list of supplies and materials. Teachers of *Math for 7th Grade* will have access through the Summer Bridge Resources link on the MyAVID website to digital copies of the student handouts, a certificate template, Word Hunt problems, +/– counters, and the student Interactive Notebook.

Cornell Notes

The Cornell style of taking notes uses two columns in which students write their notes and draw diagrams (right column) and write higher-level questions about the content (left column). An *essential question* (written from the topic or objective) guides the notes and is answered in the *summary* section of the notes.

Since some of the Summer Bridge Program students will not be familiar with Cornell notes, you will need to guide them through the process of note-taking and writing questions. Taking "chunks" of notes and writing questions after each chunk is an effective way to help students process their learning. Writing the summary on each note page is also an important learning tool. Summarizing is an effective instructional strategy that requires students to think critically as they evaluate the key words and facts to use in order to concisely convey the important elements from the notes.

Interactive Notebooks

The curriculum is written with the intention of students keeping an *Interactive Notebook* (INB) as a means of organizing and keeping track of their work. Typically, the notebooks are a record of the information to be learned ("input": notes, worksheets, and data; typically recorded on the right side) and the processing of the information ("output": explanations, reflections, and non-linguistic representations; typically recorded on the left side). During the short Summer Bridge Program, the pages will frequently be completed consecutively, rather than strictly in a right-page–left-page relationship.

A table of contents in the teacher curriculum guide and the student Interactive Notebook lists the placement of the pre-printed pages and the blank pages on which students will either glue or tape handouts or create the information. (These page entries are shaded in the teacher's guide.) If additional space is needed for a page, a "flip page" can be glued or taped onto the page. The table of contents has columns for writing in the date of each activity.

Printing the INB: Printed and bound Interactive Notebooks are available for purchase from AVID Center. Schools and teachers may choose to (1) print the INB in its entirety from MyAVID (Summer Bridge Resources), (2) provide spiral notebooks in which students glue the handouts, or (3) distribute activity sheets individually and keep them in folders for students.

- **Printed INB:** Most of the handouts are pre-printed in the INB, except for those that are to be distributed when they are used (e.g., *Guild Challenges*). These are marked with an asterisk (*) in the list of handouts on each unit plan. Pages are left blank for these additional pages. These INB pages are laid out to be printed two-sided. Pre-printing the INB will greatly minimize the use of valuable instruction time to cut handouts and glue them into the notebooks.
- **Spiral notebooks:** Individual handout pages are cut and glued in the notebooks. In regular classrooms, this is the method teachers typically use for Interactive Notebooks. In the short summer programs, where time is limited during the class period, you will have to allow extra time for students to cut and glue pages into the notebooks.
- **Distribute activity sheets individually:** If Interactive Notebooks or spiral notebooks are not used to organize student materials, you can distribute each activity sheet as it is needed and keep the completed sheets in folders for each student.

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UNIT 7:
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Objectives: The Students Will...

- Reinforce the concept and application of rational number operations.
- Review the order of operations and apply it to problems with rational numbers.
- Explain and justify steps in solutions to problems.
- Analyze and correct errors.

Activities

- *Warm-Up* (20 min)
- *Back Me Up: Vocabulary* (20 min)
- *Order of Operations Review: Cornell Notes* (15 min)
- *Does Your Guild Operate with Order?* (15 min)
- *Word Hunt* (40 min)
- *Guild Challenge: Think, Think, Think!* (30 min)
- *SLAP* (30 min)
- *Brain Break: Human Knot* (15 min)
- *Guild Challenge: Order of Operations Trashketball* (20 min)
- *Guild Challenge: Mistaken Mike* (20 min)

Handouts

- *Warm-Up, Unit 7*
- *Order of Operations Review: Cornell Notes*
- *Does Your Guild Operate with Order?*
- *Word Hunt Posters* (1 set of 6 per class; located on MyAVID)*
- *Think, Think, Think!*
- *SLAP Cards* (2 copies of 4 sets per class; located on MyAVID)*
- *Mistaken Mike* (1 per group)*
- *Exit Tickets* (use handout from Unit 1; 1 ticket per student)*

Resources and Supplies

- Markers, highlighters, pencils, scissors, sticky notes, glue sticks, adhesive tape, colored pencils
- 3" x 5" index cards (1 per student)
- Cardstock (for printing *Word Hunt Posters* and *SLAP Cards*)
- Construction paper (optional)
- Student whiteboards or improvised whiteboards with sheet protectors (1 per student)
- Dry erase markers (1 per student)
- Trash can★
- Crumpled paper (to be used as "trashketball")★
- Masking tape

Teacher Preparation

- Prepare vocabulary cards for *Back Me Up: Vocabulary*.
- Prepare *Word Hunt* posters and display them around the room.
- Print *SLAP Cards* and cut into sets (2 copies of 4 sets for 1 class; template provided on MyAVID).
- Mark off 10, 20, and 30 point lines on the classroom floor for *Guild Challenge: Order of Operations Trashketball*.
- If needed, prepare improvised student whiteboards with white paper in sheet protectors for *Guild Challenge: Order of Operations Trashketball.*
- Print *Mistaken Mike* handouts for each group for *Guild Challenge: Mistaken Mike*.
- Print *Exit Tickets* (1 per student; from Unit 1 handout) for students to complete at the closure of the unit.

WICOR Strategies

W - Take notes and provide evidence for mathematical rules
I - Analyze and correct errors
C - Work in collaborative groups
O - Plan and organize using note-taking and Interactive Notebooks
R - Read and interpret math word problems

ELL Strategies

- Vocabulary building
- Guided note-taking
- Partner share
- Kinesthetic activities
- Group discussion and response
- Peer collaboration

Alignment to Math Common Core State Standards: The Students Will…

- Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (7.NS.1c)
- Apply properties of operations as strategies to add and subtract rational numbers. (7.NS.1d)
- Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. (7.NS.2a)
- Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $(-p/q) = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. (7.NS.2b)
- Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.2c)
- Write and evaluate numerical expressions involving whole-number exponents. (6.EE.1)

New Vocabulary

- order of operations
- exponent

Mistaken Mike

Mistaken Mike has answered each of the following problems incorrectly. Circle the step he got wrong. Redo the problem correctly, and explain what Mistaken Mike did wrong.

Mistaken Mike's Work	Redo the problem correctly.
$3(8 - 10)^2$	
$3(-2)^2$	
$(-6)^2$	
36	
Explain the mistake in a complete sentence.	

Mistaken Mike's Work	Redo the problem correctly.
$-7 + 10(3 + 2)$	
$3(3 + 2)$	
$3(5)$	
15	
Explain the mistake in a complete sentence.	

Mistaken Mike's Work	Redo the problem correctly.
$(8 - 5)^2 - (1 - 9)$	
$(3)^2 - (1 - 9)$	
$9 - 8$	
1	
Explain the mistake in a complete sentence.	

Mistaken Mike's Work	Redo the problem correctly.
$15 - 6 \cdot 3^2$	
$15 - 6 \cdot 9$	
$15 - 54$	
39	
Explain the mistake in a complete sentence.	

What are at least two common mistakes that you want to be mindful to avoid?

Human Inequalities Graphing

INTRODUCTION

The *Human Inequalities Graphing* activity will allow students to work in a physically collaborative manner while representing inequality solutions.

time

20 minutes

supplies

- Copy paper (1 sheet per student; numbers and symbols are pre-written on each sheet by the teacher)

Teacher Directions

- Write the numbers –10 through +10 (including zero) on sheets of paper (one number per page). Also draw, on separate sheets of paper, an open circle, a closed circle, and a large arrow.
- Hand out one number or symbol to each student and have the students with numbers order themselves from least to greatest. The students with a circle or arrow will remain to the side.
    - If you have more than 23 students in your class, divide the students into two groups, and use a smaller set of numbers for each group. For example, hand out –5 through +5 to each group. In this case you will need to alter the problems to fit the smaller number range.
- Once students are in an ordered line, read or display the problems below and have the students demonstrate the graphs.
    - For example, those students whose numbers would be included in the solution will step forward. They will then decide if the situation requires an open or closed circle and the placement of the arrow.
- At the end of the activity, ask for students' comments on how the "human" activity helped them grasp the concept of graphing inequalities.

Problems

1. $x \geq -2$
2. $x < 3$
3. ***x* is at most 6**
4. ***y* is no less than -4**
5. **You must be at least 4 feet tall to ride the roller coaster.**
6. **Bob needs no more than 8 tickets.**

Solutions

1. $x \geq -2$ *All students to the right of -2, including -2, should step forward, along with a closed circle and an arrow to the right of the largest number.*
2. $x < 3$ *All students to the left of +3, excluding +3, should step forward, along with an open circle and an arrow to the left of the smallest number.*
3. ***x* is at most 6** *All students to the left of +6, including +6, should step forward, along with a closed circle and an arrow to the left of the smallest number.*
4. ***y* is no less than -4** *All students to the right of -4, including -4, should step forward, along with a closed circle and an arrow to the right of the largest number.*
5. **You must be at least 4 feet tall to ride the roller coaster.** *All students to the right of +4, including +4, should step forward, along with a closed circle and an arrow to the right of the largest number.*
6. **Bob needs no more than 8 tickets.** *All students between 0 and +8, including those numbers, should step forward. You will not use the arrow or the circles because this is a "between" situation.*