

# Ready, Set, Math!

Math Games spice up reviews, revive interest, and help ensure retention!

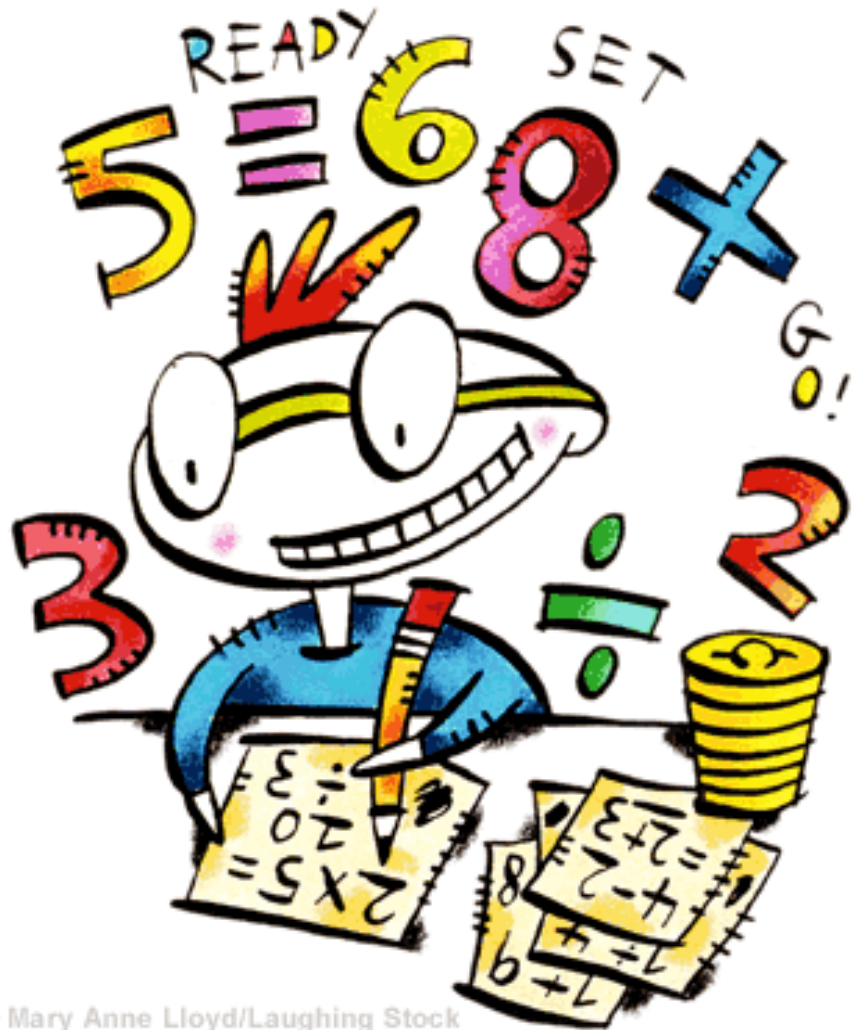
Tips: Offer Immediate Feedback with Multiple Choice Questions

Students do need some exposure to multiple choice questions— in moderation and with modifications. For multiple choice practice use "pinch-it" cards which can easily be adapted to a lot of different games. When having students answer multiple choice questions, it's best to give immediate feedback. Some schools have CPS clicker sets, which can be really fun, but this free method can be pulled out in a second and used over and over again.

Directions: Print out the pinch-it cards on the front and back of sheets of card stock and laminate

(optional). Students simply "pinch" their answer, so that you can immediately assess them. Pinch-it cards also give students the freedom to select an incorrect answer without embarrassment.

Things to think about: How do you evaluate games?



1) Examine mathematical richness. If the game is just window dressing for drill and kill (like math bingo) evaluate it deservingly. Look for problem solving, need for strategy, and math content required.

2) Is speed required? The best games offer equal opportunity (or nearly so) to all your students. Games that require computational speed to be successful may disenfranchise instead of engage your students who need the game the most. Work to make sure all students have an equal opportunity to contribute.

3) Do you find the game interesting or fun? Then your students probably will also.

A



B



C



D



A



B



C



D



A



B



C



D



A



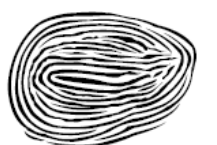
B



C



D



# Math Taboo!

Math Taboo is a fun, fast-paced way for your students to review that pesky content vocab. 😊

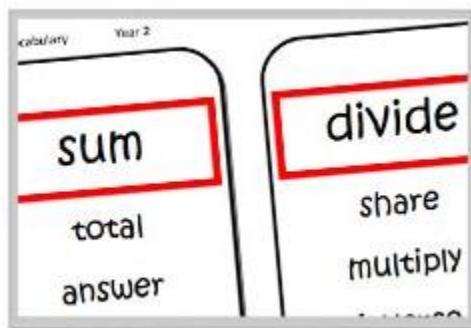
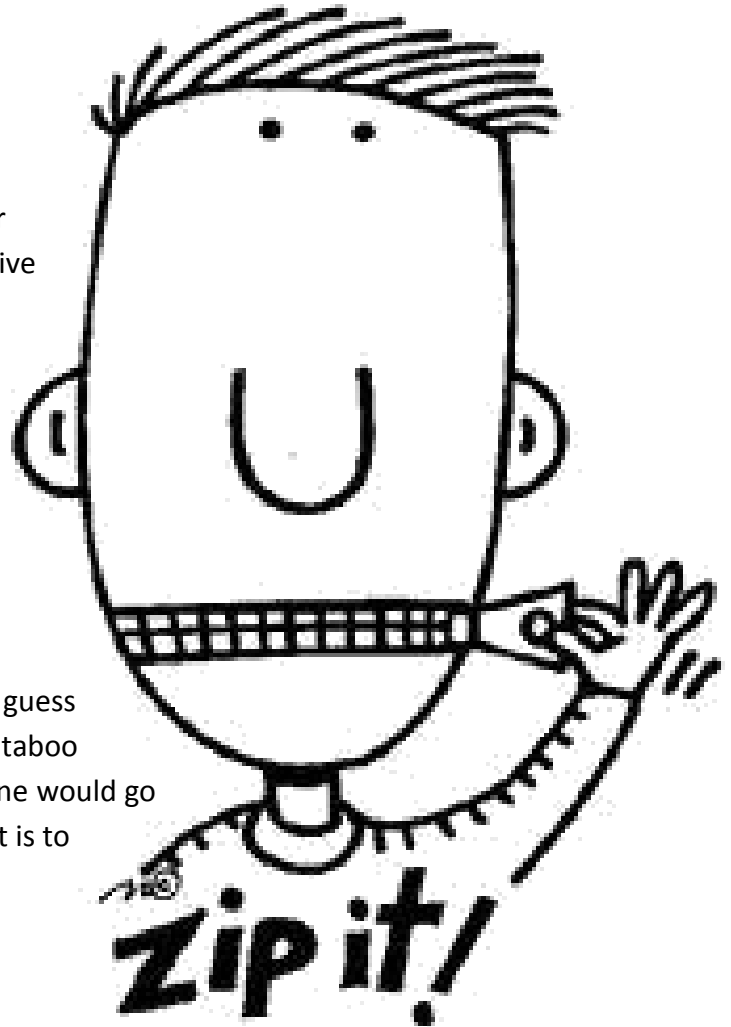
Objective: Have your team guess the word on your card(s) without using the word itself or the other five words on the card. This helps students expand “definitions” to actual understandings of concepts.

Materials:

- Timer
- Cards
- Teams
- Score card

The idea of the real game is to get your partner to guess a word by describing without using any of the five taboo words, which are usually the first words that anyone would go to in a description. So the obvious math equivalent is to pick a term that you are throwing around in your class and get students to describe it without using their go-to math descriptors.

Definitions are important, but assuming that those are indicators of deep understanding is, of course, very problematic, no matter where those definitions come from.



So, this Taboo game serves a two-fold purpose: **learning for the students** (by forcing them to think deeply about a mathematical concept; by having them trade in math jargon for conceptual understanding; and by hearing classmates describe something in more accessible vernacular) and **learning for the instructor** (by seeing how well students actually understand a concept; and by seeing what language students use to talk math in the hopes that the instructor’s mathematical narrative can better reflect theirs in the future).

Prior to Playing Game Practice: With the word to guess already known to everyone, and give students a chance to take a stab at verbalizing a definition without using the taboo words, one at a time until you get an acceptable description.

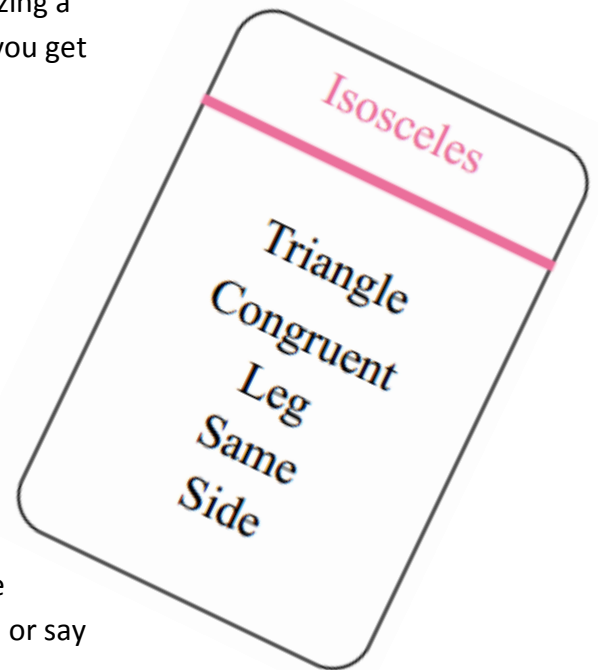
How to Play:

1. Divide students into two equal teams.
2. Team 1 will pick one player to be the "Clue-Giver." Team 2 will pick one player to be the "Monitor."
3. The Clue-Giver from Team 1 will try to get his/her team to guess the word at the top of the card without showing the card to the team.

Note: Clue-Givers may not say part of the word, say any of the words below the line on the card, use gestures, sound effects, or say "sounds like" or "rhymes with."

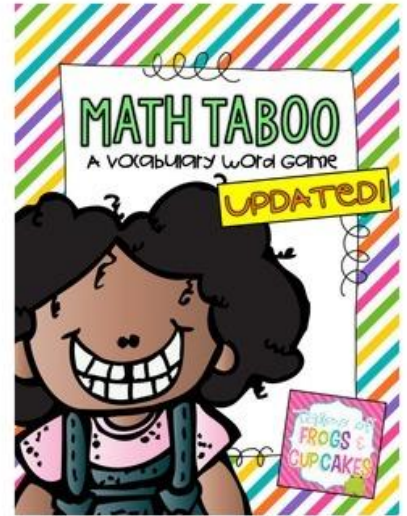
4. The Monitor from Team 2 will make sure Player 1 does not say any of the words on the card (or part of the words), use hand gestures or sound effects, or say "sounds like" or "rhymes with." If the monitor catches the Clue-Giver breaking one of the rules, the Clue-Giver must place the card in the "Penalty" pile.
5. Once Team 1 has correctly guessed the word, the Clue-Giver will place the card in the "Correct" pile and continue on to the next card.
6. The Clue-Giver can pass a card at any time, but must place the card in the Penalty pile.
7. Once time is up the Clue -Giver will add points for every card in the Correct pile and subtract points for every card in the Penalty pile.
8. Team 2 will repeat the same process.
9. The game ends once everyone has had a chance to be a Clue Giver. The team with the most points wins.

Math Taboo Score Card: Make tally marks for each point scored. The team with the most points at the end of the game wins.



## Pre-Made Math Taboo Card Resources:

- Elementary (download pdf of 105+ word cards and instructions for \$3): <http://www.teacherspayteachers.com/Product/Math-Taboo> Older classes can use it as a way of revising previously learned math vocabulary in a fresh and fun way!
- Algebra Taboo Cards (FREE) a total of 126 cards (63 double sides):  
<http://rootsoftheequation.wordpress.com/2012/06/01/algebra-taboo/>
- 



## Tweet Math!

(or any other review terms or subjects will work too)

In how few words can you express this definition?

The idea is to start out with a long definition from a math textbook and *see how few words you can use to express the same idea*. Twitter forces people to think about what is the core of their idea, which leads to this exercise.

This could be done competitively (give groups 5 minutes to brainstorm), or you could do it countdown style, trying to lower the number of words by one each time. This could get students to really consider what is important about a mathematical concept and to get them to realize that the thing itself is more important the words you use to express it.



# Matamoscas!

[aka. Kill the flies, or in French this game is called *Mâcher le moustique*]. In this review game, students race to the board to swat the answers to questions posed by their teacher.

The game can be adapted for all subjects in part because all kinds of answers can be used -

- numbers, shapes, and so on. The game can also be applied at all levels by adjusting the number of questions and answers, their difficulty, the degree of similarity between them.



## Materials:

- Two Fly Swatters
1. Divide the group into two teams.
  2. Prior to the beginning of the game have all of the answers you are going to use written up on the board [scattered randomly across your board]. The number of questions will vary according to your preferences and the grade level. You might begin with ten questions and answers, use them, and then start over with a new set of ten, and so on. Write the answers in random order on the whiteboard.
  3. Choose one student from each team to come up to the front of the room and stand in front of the board with their fly swatters.
  4. When you are ready to play, divide the students into two teams in lines. Read a question from your list. At your signal, the two students who are first in their lines run to the chalkboard and swat what they believe is the answer to the question. Each player must swat only one answer, and the first player to swat the correct answer earns a point for his team and erases the answer off the board. Note: Only one swat is allowed per player, so if one player hits an incorrect answer, the other player can take his/her time selecting an answer.
  5. If neither student chooses the correct answer, read the question again for the next students in line.
  6. The students go back to their group and choose a new player to go up to the front.
  7. The team with the most points at the completion of the game is the winner.

## Variation: Grammar Swat

- For example: There are three types of verbs in English grammar – action verbs, linking verbs, and helping verbs. Write these three types of verbs on the board and have one student from

each team come up to take their turn. Read a sentence out loud, and ask them to SWAT which kind of verb is featured in the sentence. The first to “swat” the correct answer wins! You can play this game for different kinds of adjectives, nouns, articles, and other grammatical elements.

## Bozo Buckets

Bozo Buckets works very well as a review game. If you've never heard of it this is what it is-- First separate the class into two teams. Have a bucket and a large/medium sized soft ball. Set up point strips about a foot apart going away from the bucket (100, 500 pts, 400, ...). Call a member from one team up to the bucket. They choose how many points they are playing for. Ask the student a question, if they get the answer right they shoot for the bucket and earn/don't earn points depending on if they make the bucket. Vary the game to fit your needs. It works great for Academic Vocabulary review or any other subject.

## Auctioneer...Going Once, Going Twice!

Develop a list of math problems based on your students' grades, standards, and skill levels. Questions might involve addition, subtraction, greater than/less than, division, multiplication, word problems, identifying a missing number in a number sequence, and so on. This game can be used to practice any math skill that your students need to hone up on and they'll have fun doing it.

Divide the class into pairs. Each pair will be given a list of auction items, which are lists of math problems that use the needed math skill and an imaginary amount of money, represented on paper or by play money. The auction list should include a 50/50 ratio of correct and incorrect problems.





After the students review the auction list, begin the auction. Pairs will bid on each problem based on whether or not they think it is correct.

A correct problem means you get your money back; an incorrect sentence means you lose your money.

Students must keep track of their remaining funds [subtracting as they go]. Have students check answers and count up the money after all the sentences are auctioned off. The pair with the most money at the finish wins the game.







# Question Kickball!

This easy way to review math in a kickball game format is perfect for those days when students need to get up and MOVE!

## Materials:

Bring the flash cards along with a kickball and four bases to an all-purpose room or outdoors.

Split the group of children in half to create two teams. Each team will have a chance kicking while the other is fielding. Place the bases in a baseball formation. Send one team to the outfield while the other kicks. Roll the ball to the kicker. The child runs the bases when he kicks the ball, and stops at the nearest base when the ball is caught by a fielder. Show a flash card to both the kicker and the child that caught the ball. If the kicker says the correct answer first, the game continues. If the fielder says the correct answer first, the kicker is out. A point is scored when a runner is able to run all the bases.

Once a team has three outs, teams switch so the other team has a chance to kick. Continue playing until all children have had a chance to kick. The team with the most points wins.

Variation: Double Trouble

Needed: 2 kickballs, cards, & bases

How to Play: Pick 2 teams.

Pick 2 pitchers for each team, meaning 4 pitchers total.

The team that is up needs to form 2 lines.

The pitchers are in the field next to each line.

Pitchers roll the balls to the lines.

The balls are kicked.

There can be 2-3 players on a base at the same time; either ball can get them out.

3 outs per inning, hit or tagging is below the waist.

# I Offer!

Looking for something easy yet fun to do in math class? I Offer is an activity that takes little to no preparation. Students love to play and it is a great use of class time!

Get math problems to review, ex. from student's textbooks or flashcards for the game. All the students need is a piece of paper divided into three columns. The first column is labeled "Bets" or "Offerings". The middle column is labeled "Show me the Math". The third column is labeled "Total Earnings".

Students start the activity with \$100. They must make a bet of at least \$1, and cannot place a bet/offer for more money than what they have in their account. Ask students to place their bet/offer before you place the problem up on the board or projector to view.

Students must show their work in the middle column. If they get the answer correct, they double their bet/offer and add it to their total earnings.

If they miss the problem the student must subtract the bet/offer from their previous total. If students run out of money, they come to the front of the class to earn \$10. You might ask them to give you a math formula, or solve a problem to earn the money.

At the end of the game, students with the most money wins.

## Worth Less!?

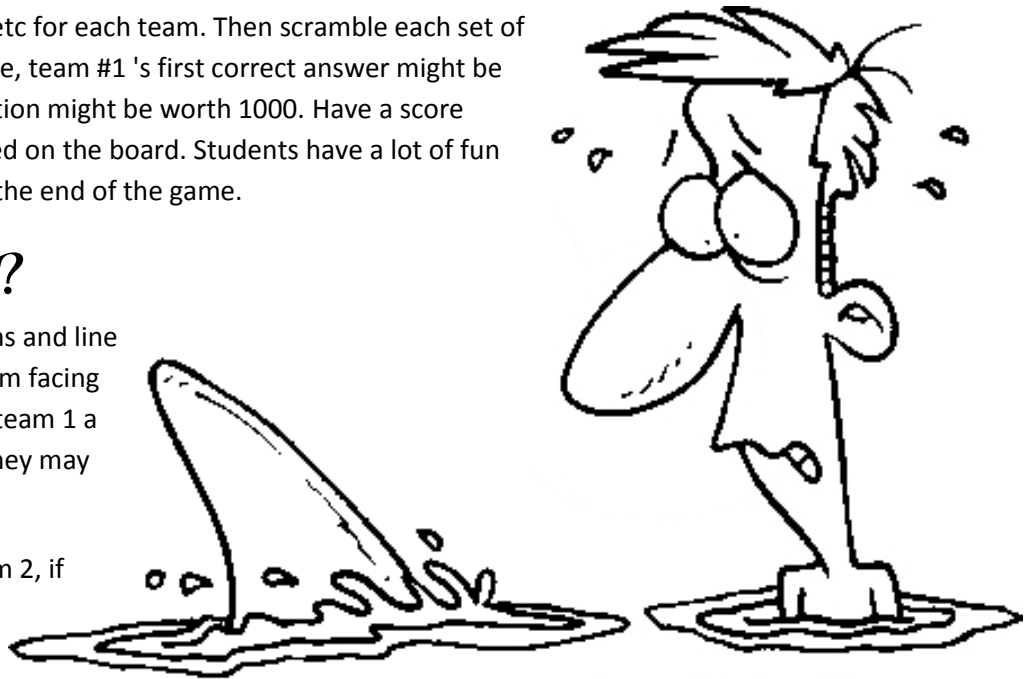
One really fun game that works for reviewing any subject is to divide the class in two teams & assign crazy point values to each question. For example, make 2 matching sets of point cards, such as 5 pts, 79 pts, 1000 pts, 2 pts, 500 pts, etc for each team. Then scramble each set of cards before starting the game, team #1 's first correct answer might be worth 79 pts, team #2's question might be worth 1000. Have a score keeper write the points earned on the board. Students have a lot of fun adding up the total points at the end of the game.

## Sink or Swim?

Have students form two teams and line up in two lines across the room facing each other. Ask someone on team 1 a question, if they get it right they may "sink" someone on team 2.

Then I go to someone on team 2, if they answer their question right they may either sink someone on team 1 or rescue

their "sunken" team member. The kids really love this game. The winning team is the team with the most people still standing.



## Four Corner Review

Multiple choice review questions are center stage in this activity that can be used to review any subject matter, any skill. This lesson is an active one; it involves students in moving around the classroom.

## Materials Needed

- mural paper or poster board
- markers
- index cards (see instructions for labeling in Lesson Plan section below)

## Before the Lesson

- Create four large signs. On one sign, write a large letter *A*. Write a large letter *B* on the second sign; a *C* on the third sign; and a *D* on the fourth. Post one of the signs in each corner of your classroom.
- Obtain one index card for every student in the class. Write the word ***Player*** on about three-fourths of the cards; write the word ***Fibber*** on the remaining cards.
- Prepare in advance at least 25 multiple-choice questions relating to a unit or skill students have been studying. All questions should have four possible answers *A*, *B*, *C*, or *D*.

This game can be used for a variety of curriculum areas and subjects. Following are some examples:

- In math class, provide calculations or word problems for students to solve; if needed they can solve the problems in their math journals/notebooks.

## The Lesson

To begin the lesson, place one of the index cards face down on each student's desk. Instruct students to look at their cards privately to find out if their role in the game is that of a *Player* or a *Fibber*. Tell students to not reveal their roles to their classmates.

Run through a couple of practice questions before beginning the game. Pose the first question and four possible responses. Ask students which response they think is the correct one. Have students who think the correct answer is *A* stand by the *A* sign. Students who think the correct answer is *B*, *C*, or *D* gather near their respective signs.

*Here's the catch!* Students who hold the *Player* cards go to their appropriate corners while students who hold the *Fibber* cards are free to go to *any* corner. The *Fibber's* movements are intended to throw off the other students. Perhaps some of the brightest students are *Fibbers* and some *players* will be tempted to follow those students to the wrong corners. Doing this encourages students to think for themselves, not just follow the flock.

When all students have taken their corners, reveal the correct answer to the question. Ask students who chose the correct answer to explain why they selected that answer. Then you're ready to pose the next question.

# Play Ball!

The rules of baseball are adapted in this lesson that provides review practice for students. In this indoor or outdoor activity, students advance the bases as they give correct answers to review questions. With a little creativity, the lesson can be adapted to almost any subject or skill.

## Materials Needed

- bases (if you don't have space outside, you can play indoors and four student desks might be arranged to create four "bases")
- quiz questions prepared in advance

## Before the Lesson

Prepare a long list of questions that provide math practice, information recall, or skill application.

Following are some examples:

- If you teach math, you might collect simple questions or math problems that reinforce your students' skills or provide math fact practice.
- If you teach language arts, you might prepare sentences that include one grade-appropriate error of punctuation, grammar, or spelling. Or you might provide a word and two definition choices; the students' job will be to identify the correct definition.

## The Lesson

Set up a "baseball field" in your classroom. Identify the locations of home plate, first base, second base, and third base. You can use actual bases or four desks.



Arrange the class into two teams. Flip a coin to determine which team will be "up to bat" first. Pose the first question to the first batter. If the batter gets the question right, s/he goes to first base. If the second batter correctly answers the next question, s/he goes to first base, forcing the student on first base to move to second and so the game goes. Which team scores the most runs?

If a "batter" misses a question, that batter is out and the next batter gets a chance to answer the same question. Three misses and the other team takes the field.

Change pitchers every so often by either switching to a different category or level of difficulty. Name your pitchers; "Juancho Answero" is a classic!

## Extending the Lesson

You might:

- provide questions of varying levels of difficulty. Students could opt to answer a "double" question. Double questions are more difficult, but a correct answer will earn students two bases; that way, they can move along the runners more quickly.
- opt to give each team 4 or 5 outs per inning (if you feel there is too much movement in the game).
- keep track of their own hits, runs scored, runs batted in, and batting averages.

## Pass the Chicken!

In this game, nobody wants to hold the rubber chicken -- the game's only prop! To begin the game, all students sit or stand in a circle. Select one person to be It. That person holds the rubber chicken. The teacher or a "caller" shows a flashcard to the person holding the chicken, "3x5. Pass the chicken!" As soon as the caller says, "Pass the chicken," the person holding the chicken passes it to the right. Students quickly pass the chicken around the circle. If the chicken returns to the original holder before he or she can solve the problem, the holder is still It. Otherwise, the person holding the chicken when It finishes solving the problem is the new It.

## Number Tick Tack Toe

As surely as the sun rises and sets, kids will learn how to play tick tack toe. They do not have to be taught the game. Kids learn it the way they learn jump-rope rhymes and knock-knock jokes. Yet, kids lose interest quickly because tick tack toe is not challenging enough. There are only about a dozen different outcomes. By changing the rules and symbols slightly, you can give the game new life while giving students extended practice in mental math skills and addition and subtraction facts.

1. Students will practice basic addition and subtraction facts to twelve.
2. Students will use high level thinking skills to win at the game of tick tack toe.



RESOURCES/MATERIALS: Students will simply need lots of scratch paper and pencils.

How to Play:

1. The class will need to be divided into pairs.
2. Each pair makes a standard tick-tack-toe grid.
3. Instead of using X's and O's, students use the numbers 0 through 9. Use numbers 0 through 12 for a greater challenge. Each number can be used only once during a game.
4. The object of the game is to complete any row, column, or diagonal so that two of the three numbers add up to the third. The order of the numbers does not matter.
5. The first move may NOT be in the center. (If the first player is allowed to make that move, he or she can always win the game.)
6. The second and subsequent moves, however, can be anywhere on the grid.

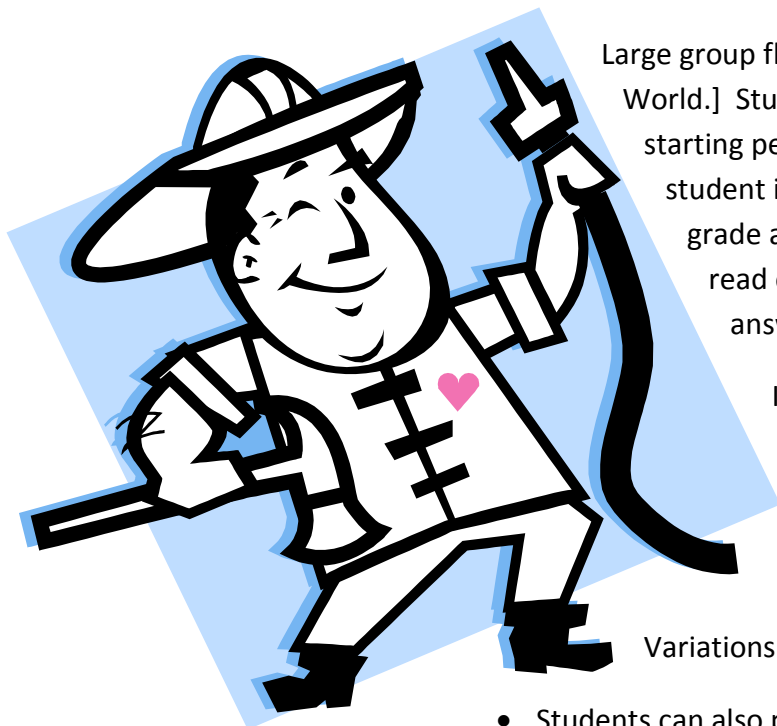
Notes:

There is not any sure fire strategy for winning this type of tick-tack-toe game. Likewise, there seems to be no advantage in going first. The games, however, tend to end with a winner rather than in ties. Most losses result from carelessness. It's easy to make a mistake after four or five numbers have been played. That's when the game requires close attention, higher level thinking skills, and accurate adding and subtracting.

The game is far more complex than tick-tack-toe in that there are thousands of outcomes. The one constant is good number facts practice in an enjoyable context.



# Fireman, Fireman, Put Out the Fire!



Large group flash cards are great for Fireman [Around the World.] Students sit in a circle or in a line. Choose a starting person. This student stands behind the next student in the circle or line. The teacher holds up a grade appropriate flash card and for younger students read out the problem. The first student to say the answer stands behind the next person in the circle.

If the sitting student says the answer first, the standing student sits down in the winner's chair. This process continues until at least one student makes it completely around the circle.

Variations:

- Students can also play using fingers or objects (beans, cereal, etc) on the table, a set for each competitor. They have to move the objects into groups to solve the problems (Ex.  $5-3 = ?$ )
- Have whole group competitions where the students have to draw the correct answer. Ex. Draw eight squares! The first students to finish (correctly) moves forward a spot. Or, Draw 10 circles. Now subtract 6. How many are left?
- Kindergarten students can also look at pictures (fingers, objects, etc) and call out the answer to a question such as "which shows the answer to  $9-4$ ?"

# Trash Can Math!

This game gets students involved as a team while allowing them a chance to throw the ball 'in the hoop'.

Buy or make a small (3-4 inches diameter) ball. An easy one to make is simply a paper wad surrounded by a few layers of masking tape.

Set up the room with two small (clean) garbage cans in the front. These will be the baskets.

Place a piece of masking tape on the floor approximately 3 feet from each basket and another approximately 8 feet from the basket (Adjust the length depending on the size and abilities of your students.)

Divide the students into two teams.

Explain that each student must answer the questions given to them, easy and hard problems will be evenly interspersed.

Keep score for each team. Questions are worth 2 points each.

Regardless of whether they get the question correct each team's player will have a chance to shoot for two 'extra points'. They will shoot first from the tape mark that is closest to the basket and then the one furthest from the basket, for a possible 2 points if both baskets are made.

Note: Make sure that you make it clear that anyone making fun of another student will cause their team to lose points.

Variations:

- Students can also play using fingers or objects (beans, cereal, etc) on the table, a set for each competitor. They have to move the objects into groups to solve the problems (Ex.  $5-3 = ?$ )
- Have whole group competitions where the students have to draw the correct answer. Ex. Draw eight squares! The first students to finish (correctly) moves forward a spot.



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# Asteroids

Draw two circles for “moons” up on the board and fill them in by writing the same numbers for each team in rows. Any set of numbers reachable by adding, subtracting, dividing, or multiplying 1-6 can be used, traditionally the following are used.

1 2 3 4 5  
6 7 8 9 10  
1 2 3 4 5  
6 7 8 9 10

But something like the following can work as well,

30	25	12	2
36	18	4	20
16	5	3	24
45	9	1	10

Have students form two teams, each team having a pair of dice. The teams must race to destroy their moon first by rolling the dice and using the total amount to erase a number. Ex: the team rolls a 6. They can erase a 6, or a 5 and a 1, or a 4 and a 2, or a 1, a 3, and a 2. Anything that adds up (or multiplies or divides if using larger numbers in the moons) to the number rolled.

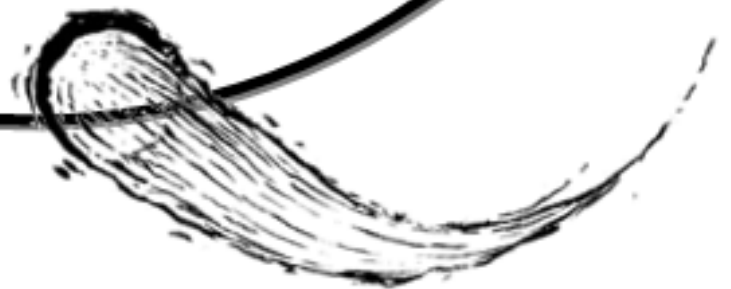
Option: an example playing sheet is included



# Asteroids!



**1 2 3 4 5 6**  
**7 8 9 10 11 12**  
**1 2 3 4 5 6**  
**7 8 9 10 11 12**  
**1 2 3 4 5 6**  
**7 8 9 10 11 12**



# Classroom Jeopardy

Using the format of the famous TV show "Jeopardy" is a good way to practice many math skills. Across the top of the white board write different kinds of math problems or skills you want to practice, ex.

Division,

Multiplication,

Word Problems,

Order of Operations

(PEDMAS), Plotting,

Addition, Greater or

Less Than,

Subtraction, etc.

Under each title,

write point values

from 100 to 500. If

the student chooses

100, he must solve

the problem

correctly. If he

chooses 200, he

must solve the

problem correctly

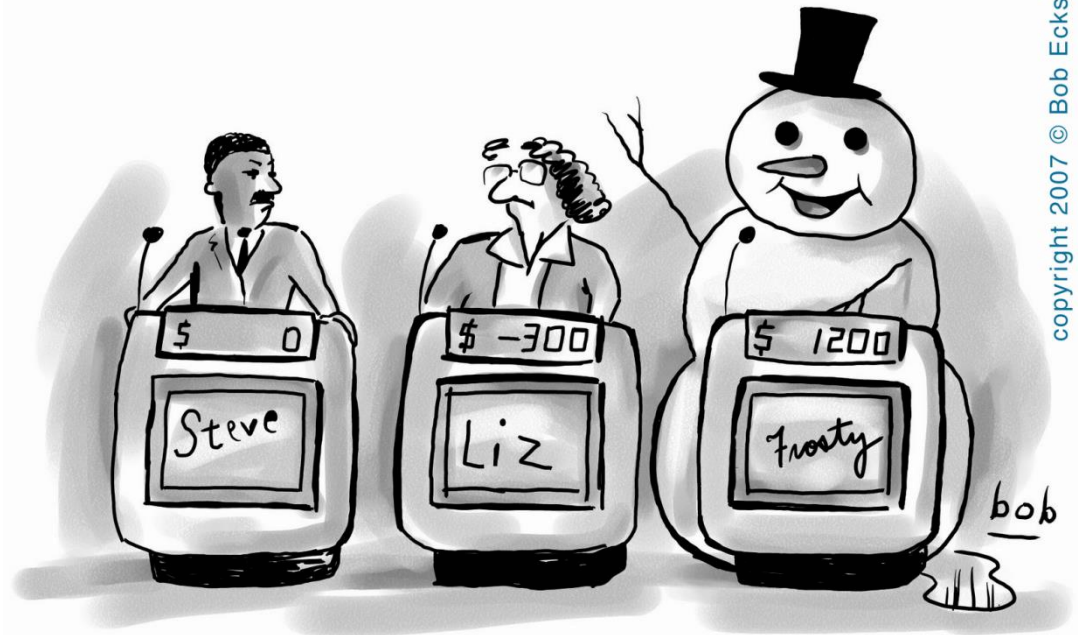
etc. The difficulty of

the problem can

depend on the

student's level. The

winning team chooses the category.



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*“Alex, I’d like ‘Precipitation’ for \$800.”*

FINAL JEOPARDY: Teams select their spokesman to take the seat at the front of the room. Teacher will give the category, then the team will wager the points (have them write it on a piece of paper IN PEN or on a small personal-sized whiteboard). They can wager up to the amount their team has earned in the game. Read the question and then have the class hum the Final Jeopardy song if you want, as the team rep writes their answer, and turns their paper over. Starting with the team with the lowest points, have each team announce their wager and their answer, and tally their final points. If they answer correctly, they get the points; if they don't, they lose the points.

Jeopardy Rules: Discuss these with students before playing

1. The purpose of this activity is to have fun and practice math.
2. Don't waste our time debating with the teacher. The more time we waste, the fewer questions you'll get to see. Argue with the teacher = lose points.

3. No put downs. Even if you don't mean it, phrases like "that's so easy" or "I can't believe they got that one wrong" said under your breath can leave someone feeling defeated. Put downs = lose points.
4. No talking when it's not your team's turn. When your team has the question, you may whisper with each other. If your team is waiting to steal the problem, write notes back and forth but don't talk. When the noise level goes up, people can't hear the questions and answers and therefore can't review. Talk when it's not your team's turn = lose points.

## Friendly Feud

Adapt the "Family Feud" TV game to review any subject or reinforce any skill.

Materials Needed:

- Questions: questions might involve flash cards, students performing calculations, solving word problems, identifying a missing number in a number sequence, solving greater-than or less-than problems, and so on.



"Friendly Feud" is an adaptation of the Family Feud game show students might see on television. The game is easy to adapt to almost any subject or curriculum topic; see the Adapt the Game section at the bottom of this activity for a handful of ideas.

1. Start the game by arranging students into teams of four or five players. Determine the sequence in which teams will play. Determine the sequence in which the players on each team will play. Have each team appoint a captain who will act as the team's final-decision maker and spokesperson.

2. After the teams are organized, prepare to pose the first question of the game (or appoint a student emcee to pose questions). Questions might involve performing calculations, solving word problems, identifying a missing number in a

number sequence, solving greater-than or less-than problems, and so on.

In the first round, the captain of each team will be the only one who can answer the question. Read aloud the first question; call on the team captain who raises his or her hand first to answer the question. To earn a point, that captain must correctly answer the question within 5 seconds. If the captain who was called on does not answer the question within the time limit or if he or she gives an incorrect



answer, the next team can "steal" the question. Members of that team can talk among themselves, then they must agree on the correct answer. The captain serves as spokesperson for the team. If the captain says the correct answer, his or her team earns the point. If the answer is incorrect, the next team has a chance to steal the question and earn the point, and so on.

3. The team that correctly answers the question earns the first chance to answer the next question -- which is posed to the second player on the team. An incorrect answer passes the question to the second player on the next team. A correct answer earns another point for the team and the first chance to answer the next question, which is posed to the third player on the team. The team can keep earning points until team members get a wrong answer or do not respond within the time limit.

4. At the end of the game, the team with the most points is the winner of "Friendly Feud."

## Hopping Hundred

Hopping Hundred is a fun game for two people. It's simple to play and it gives players a chance to practice multiplication and division.

Materials:

Each player will need:

- A copy of Hopping Hundred Game Board, tape the two pages together
- 100 small objects (such as dried beans, pennies, paper clips, or pieces of paper to use as tokens)

Note: This game can be simplified by using only the numbers 1-50 (the top half of the game board). You may want to start with this simpler version of the game, letting players move up to the version of 100 numbers when they are ready. Hopping hundred can also be played independently by groups of two. It is a great activity for those who finish other assignments early.

Before your group plays Hopping Hundred, make sure everyone understands what multiples and factors are. A *multiple* is what results when you multiply a number by other numbers. Some multiples of the number 3, for instance, are 6 (which is  $3 \times 2$ ), 15 (which is  $3 \times 5$ ), and 33 (which is  $3 \times 11$ ).



Factors are numbers you can multiply together to get the number you're after. Some factors of the number 90, for example, are 2, 3, and 5, because  $2 \times 3 \times 3 \times 5 = 90$ . Other factors of 90 are 6, 9, 10, 15, 18, 30, and 45. All of these numbers divide evenly into 90, leaving no remainder.

Summarize the rules of the game aloud or have players follow the instructions written on the board.

## How to Play:

1. Player 1 chooses any even number and puts a token on that number.
2. Player 2 chooses any number (even or odd) that is a *multiple* or a *factor* of player 1's number and puts a token on that number. For example, suppose that Player 1 chooses 10. Player 2 could choose 20, 30, or 40. These numbers are all *multiples* of 10, because you can multiply 10 by some other number to make them. Or Player 2 could choose 1, 2, or 5. These numbers are all *factors* of 10, because they divide evenly into 10. (*Divide evenly* means that the result is a whole number and there is no remainder.)
3. Players take turns choosing numbers to cover from those remaining. On each turn, a player can choose any uncovered number, even or odd, as long as it is either a multiple or a factor of the previous number chosen.
4. The first person who cannot cover a number loses the game.

This game requires players to think ahead. Playing smart means thinking not only about the number you are going to choose but also about the number your opponent might choose—or will be forced to choose—when it's his or her turn. A player wins by picking a number that has no multiples or factors left on the table. Did anyone figure out a consistent technique for winning? There is one!

**Challenge:** Have students work together to make the game last as long as possible before they get stuck on a large prime number!





1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50

51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100



# Blurt!

Decide upon a Reader (a teacher, assistant, or one of the students)

Split the group into two or three teams. They need not be evenly divided. If you wish, have each team make up their team name, but have it start with a B. Blurt Beasts, Blurt Beauties, Blurt Brave, Blurt Bengals, Blurt Butterflies, etc. Place two chairs (or three if you have three teams) at the front of the classroom. Call up individual team members to sit in each chair or “hot seat.”

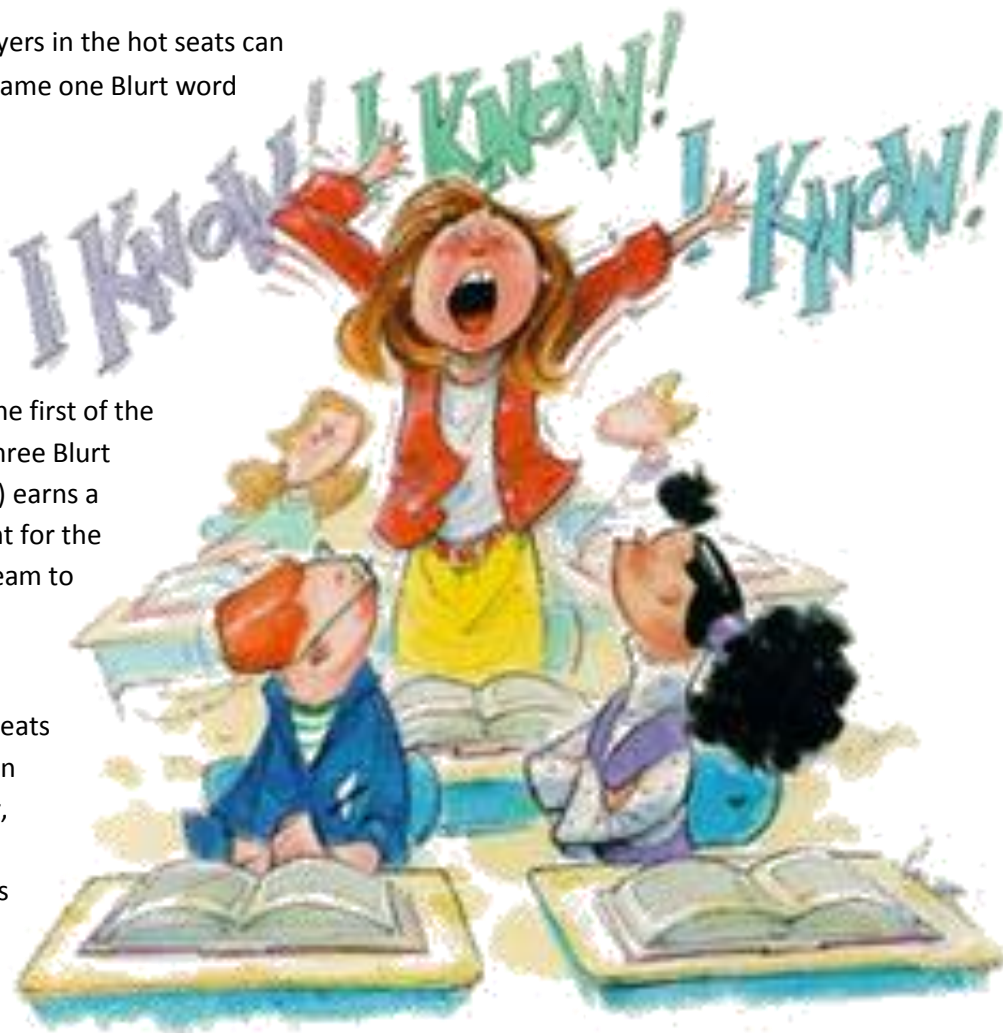
Note: For smaller groups you may wish to simply decide the order of players and rotate through.

**Object:** Be the first team to spell the word B-L-U-R-T-! (with the exclamation point at the end) first. Being the first player in the hot seat to name three Blurt words from the math vocabulary definitions provided gains your team a letter (or the final exclamation point for the win!).

**Option:** For a shorter game, players in the hot seats can score a letter by being the first to name one Blurt word from a single definition provided.

**Play:** The teacher (game host) reads aloud a math vocabulary definition so that each of the team’s current player can hear. The first to blurt out the word defined correctly, games a point. The first of the players in the hot seat to identify three Blurt words correctly (score three points) earns a letter (or the final exclamation point for the win) for his or her team. The first team to spell out B-L-U-R-T-! on the black board wins the game.

If neither of the players in the hot seats can correctly identify the word, then any player in the room may answer, once they are called on by the teacher. Players not in the hot seats raise their hands when they think they know the word. If they are correct, they earn a



letter for their team BUT, if they are incorrect, their team has a letter deducted. Teachers decide whose hand was raised first to determine which classmate may attempt to answer.

**Penalty!** Only players in the hot seats may blurt out the answer. If a player not in the hot seat blurts out a word, a letter is deducted for his or her team.

## GAME #2: Group Play Version Two

You can play in teams just the same way you would as individuals. When it's one team's turn to play, the other team cannot blurt answers, but can help the Reader decide who on the other team(s) blurted first.

## GAME #3: Individual Play!

In small groups, all players blurt word guesses. The first player to blurt the correct words moves ahead in points and/or gains their letter to spell BLURT!

**Additional Challenge:** "Blurt that Word" allows players (or teams) to bid on the number of words out of the definition in which they think they can identify the correct answer. In this way, a fairly easy clue can become extremely difficult. Example:

If you get to blurt, start bidding against other players on how many words of the definition you think you'll need to hear in order to guess the correct word. You only get one guess!

It might go something like this, "I can blurt it in 6 words!"

"Oh yeah, well I can blurt it in 5 words."

"I can blurt it in 4."

"Then blurt that word!"

If you're the low bidder, you get a chance to blurt all by yourself.

Even the Score! If one team is way ahead of their competition let the trailing challenger have a chance through several head-to-head challenges.

## Tic~Tac~Toe, What Do You Know?

Students win Xs and Os as they review knowledge and reinforce skills.

Materials Needed

- teacher-prepared game board/sheet

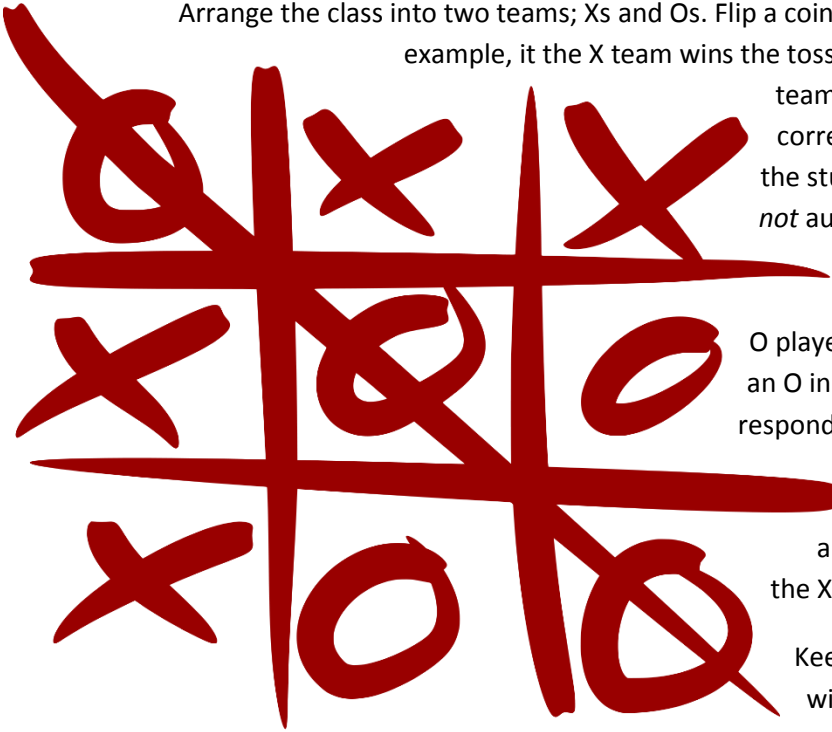
Draw a tic-tac-toe grid on a board or chart paper. Choose a topic/subject for the game (for example, solving money math problems, find the grammar error, or identify the country capital).

Arrange the class into two teams; Xs and Os. Flip a coin to see which team will go first. For example, if the X team wins the toss, pose a question to a student on that

team. If the student on the X team answers correctly, he or she places an X on the grid. If the student answers incorrectly, the O team *does not* automatically get to put an O in that square.

To earn an O, a member of the O team must correctly answer the question. If the O player answers correctly, his or her team puts an O in the square and earns the first chance to respond to the next question. If the O team answers the next question correctly, they get to place another O; if the answer is incorrect, the question is posed to the X team.

Keep track of how many games each team wins.



Tic-tac-toe can be adapted for reinforcing and reviewing a wide variety of skills.

#### Alternative Idea

Write a different topic in each square on the tic-tac-toe game board, so students can choose squares on the topics that most interest them most.

## Will the Winners Lose?

In this review and reinforcement game, negative scoring means that even the winners could lose!

#### Materials Needed

- cards containing game instructions
- prepared cards (or a prepared list) with questions for review and reinforcement

#### Before the Activity

Prepare two sets of cards in advance of the game:

- Prepare a set of 25 "scoring cards." On each of those cards, write a different instruction, for example:

\* Earn 100 points

\* Lose a turn

- \* Take 50 points from the other team
- \* Earn 70 points
- \* Double your total points
- \* Take an extra turn
- \* Earn 500 bonus points
  - On the other set of cards, write 25 questions related to the topic or skill(s) you want to review and reinforce. (Note: Questions might be created in list form rather than on cards.)

Introduce the stack of scoring cards to students. Shuffle the cards. Put the stack face down on a desk.

Alternative idea.

You might post the 25 scoring cards in random order on a bulletin board or chalkboard. Post the cards *with the blank side facing students and the scoring instructions hidden from view.*

Arrange students into two or more teams. Decide which team goes first, and then pose the first question to a member of that team. If the student answers correctly, he or she draws a scoring card from the stack (or removes one from the bulletin board or chalkboard). The score on the card determines the score the student earns for his or her team.

- If the team has 0 (zero) points and the card selected reads "Earn 50 points," the team has a total of 50 points.
- If the card reads, "Double your present score," the team doubles its score of 0, for a total of 0 points.
- If the card reads, "Deduct 50 points from your score," the team subtracts 50 from 0, for a score of -50.

If the student answer incorrectly, the first student on another team to raise his or her hand earns the right to "steal" the question. A correct answer earns that student the opportunity to choose a scoring card...

Of course, the scoring card could carry a negative message, so answering a question correctly is no guarantee that a team will earn points; as a matter of fact, the team could lose points! A team could conceivably answer all the questions correctly and lose the game. That's why the game is called "Will the Winners Lose?"

A Couple More Twists

- You might have each student track the score for each team. Students track the team scores on their own. At the end of the game, each student who correctly calculated each team's final score might earn 50 bonus points for his or her team.

- You might introduce another rule. Since no team member knows whether the scoring card he or she selects will earn or lose points, you might allow students the option of *not* selecting a card when they answer correctly. If the student thinks the next card in the stack might carry a negative scoring instruction, he or she is free to pass and earn (or lose) no points for the team. Students only learn whether that was a good move or not if the next student to choose a card reveals the scoring instruction on the card.

## "Concentration" Review Game

Adapt the game of Concentration to hundreds of skills. Ideas, puzzle sources included.

### Materials Needed

- white craft paper
- 3- by 5-inch index cards
- 3- by 5-inch sticky notes
- prizes (optional)

### Lesson Plan

This lesson adapts the TV game "Concentration" to most any subject.

### Before the Lesson

Gather thirty 3- by 5-inch index cards. Create 15 questions/problems that relate to your latest unit of study. Write each problem or question on a card in large print. Write the answer to each question on another card. With a little creative thought, this activity can be adapted to almost any subject area or teaching theme. (See Concentration Across the Curriculum below.)

Arrange the cards in random order in 6 rows of 5 cards on a bulletin board. Then place a large (3- by 5-inch) sticky note on top of each card. Number the sticky notes in order from 1 to 30 to look like the board from the Concentration TV game show.

Start the game by calling the name of a student. You might use the Popsicle stick method of calling on students. (See Popsicle Stick Method below.) That will help keep all students focused on the game. The game continues in this way:

1. The student calls out a number.
2. Lift the sticky note with that number on it to reveal a question or an answer.
3. If a question is under that sticky note, students call out another number under which they hope to find the matching answer; if the number they called out reveals an answer underneath, students call out another number under which they hope to find the matching question.

4. If the cards under the two numbers reveal a matching question and answer, then the student earns 1 point. If the cards do not match, the sticky note with the number on it is returned to its spot and all students do their best to recall what question or answer was revealed under each number so when they're called on, they will be able to make a match.
5. Keep playing until all matches have been revealed.

## Concentration across the Curriculum

Use the Concentration game to review skills across the curriculum: For example, adapt for any kind of math skill you are teaching -- from addition facts to algebraic equations. Write the problem on one card, the answer on another.

## Get 20!

Materials:

Enough Decks of Cards for your students

Invite your participants to get into groups of 4 or 5. Have one person in each group deal each participant four cards. Ask them to use any math function (addition, subtraction, multiplication and division) to get their cards into a sequence that would equal the number 20. For example, if one student had a cluster of cards that are these values: a King(10), Ace (1 or 11), 5, 6 and 8, the student would put them into a line and explain to the group how they equal 20: a King plus an Ace would be 11, 11 plus 8 equals 19, 19 plus 6 equals 25. 25 minus 5 equals 20.

The student that **correctly** calculates their cards to 20 first keeps those cards. The deck is reshuffled and play starts again.

## Alternate Versions: 15!

### To play the game

The cards are placed on the table (or floor) between the two or more players.

Players take turns to choose a card (any card they like) from the pile.

The winner is the first to have a set of three cards that add to 15.

For example, if you drew 1,5,6 and 8, then you would win, because  $1+6+8$  is 15. Unless of course, I had my set of three first!

### For younger students

For younger students, place the cards face down. Then they can concentrate on the arithmetic, since they can't see the numbers before they choose them. For older kids, it makes a more exciting game if the cards are face up.

### Extra exciting!

To make it extra exciting for an older group, you could have a "15 game" class tournament! You could even make it span a whole semester, with league charts and so on pinned to the wall of the class.

## Slapdash



A deck of cards will do the trick for this game (you don't need flash cards and parents appreciate the idea for home use).

Divide the deck in half and assign values to the Jack (11), Queen (12), King (0), Ace (1) and all other cards have face value.

Two students oppose each other and alternate turning two cards over at a time which they then each have to add, subtract, multiply or divide within a certain time limit (say 5 seconds). The student who correctly answers gets to keep the cards.

They each create two piles of cards, one pile for those they got right and one pile for those they got wrong. The first student to get rid of his "wrong" pile wins the game.

This game is a lot of fun for practicing basic mental math facts. Several students can play together or you can have a few games going on at the same time (using a few decks of cards). Use your imagination and vary the game as you see fit to best serve your student's needs.

## Target 300

Target 300 is a dice game that helps kids learn how to multiply by tens. An empty shoebox can be used as a game board in which kids roll their dice. The object of the game is for kids to reach the number 300 by multiplying the number they roll on the dice by ten, twenty and other multiples of ten up to fifty.

Each kid gets 6 turns to roll, increase his number and then add all of the turns together to reach 300. At the beginning, kids might multiply their numbers by higher multiples of ten in order to increase their numbers. But with the last couple of rolls, kids might realize that they are already past the number 300, or haven't come close to it yet. The child who gets the closest to 300 wins the game.

## Math Function Card Draw

The Math Function Card Draw is a race between two players to solve the equation the fastest after they draw a card from the math shoebox. Each player draws a face-down card and gets one moment to look at the card, without showing his opponent. Then, on the count of three, the kids must slap their cards face-up and be the first to shout out the equation. The function the kids are learning, such as addition, subtraction, multiplication or division, will dictate what math function they use for the game. If kids are learning addition, and the cards that are drawn are a 2 and a 7, then the first player who shouts "2 plus 7 equals 9" wins the round. The cards are shuffled back in the box for the next round.

## Backwards Math: Covering the Basics

Just like in a camera math can be flipped upside down and backwards from the way we normally see it and do it. The following

activities provide excellent practice through individual and collaborative activities that stress problem solving and critical thinking, ex. as applied to order of operations



and math problems. Classes and groups of students will be challenged to work together to explore and complete the tasks.

These activities will also give you an opportunity to introduce and practice the order of operations:

- a. Do work inside **parentheses**.
- b. Solve **exponents**.
- c. **Multiply** and **divide** from left to right in the problem.
- d. **Add** and **subtract** from left to right.

An easy acronym to help remember the order of operations is P.E.M.D.A.S.: “**P**lease **E**xuse **M**y **D**ear **A**unt **S**ally.”

### Materials:

- paper
- calculators
- printouts
- pencils
- butcher paper

Tell the students that today’s math will be backwards. You will give them all the answers. (This will usually make them pretty happy.) However, tell them that they must come up with the correct problem to the answer.

### Variations:

1. Younger students may be given a limited range of numbers, ex. 1-10, as solutions. Students must come up with as many problems as they can that correctly have those numbers as their solutions within a limited amount of time, ex. 60 seconds. Students must use each of the required grade level appropriate skills within their problems at some point, ex. multiplication, division, subtraction, addition.
2. Have students do as many problems as they can with a specific number, ex. 10, as the second number in the problem, using their grade level appropriate skills, ex. multiplication, division, subtraction, addition, within a specific time period, ex. 3 minutes. Note which areas your students struggle with and continue practicing basic skills and build upon those and go deeper as their skills go.
3. Give students part of the answer, ex. the answer must be a two digit answer, ending in 5. Students must come up with as many problems as they can that correctly have that numbers as the second number in their solutions, ex. 35, 25, 75, 150, within a limited amount of time, ex. 60 seconds. Students must use each of the required grade level appropriate skills the teacher declares, ex. multiplication, division, subtraction, addition.
4. Draw a grid like the following on the board and give the students two or three minutes to write as many addition and subtraction, multiplication, or division equations as they can based around the included digits [the following numbers may be changed, the grid is a sample].

15	9	6	7
3	12	8	5
7	4	13	2
5	1	11	10

The numbers in the equation must be connected vertically, horizontally, or diagonally. For example, with this grid these are acceptable:  $15 - 12 = 3$ ,  $5 + 7 = 12$  (but not  $7 + 5 = 12$ ),  $15 - 3 - 7 = 5$ . Equations must involve two or more numbers, and one or more operations, but no number can be used twice.



**Scoring:** After time is called, have players take turns (in a clockwise circle) reading the problems they wrote down for each solution. If another player or players have the same math problems everyone must cross it out, only unique math problems get points. If a player reads off a problem that another player thinks is incorrect, you can either use a calculator as the deciding factor, or all players can vote on it. If it's decided it's not a valid problem, then the player who read it must subtract a point. There is no penalty for writing down an invalid problem (no other players have to subtract points if they have it written down), there's only a penalty if they decide to read it out loud during the scoring period.

Students gain points for each equation only they have recorded. One point is given for each number used in the equation, for example,  $15 - 3 - 7 = 4 + 1$  earns five points! The player with the most points wins.

Once all players read their problems, they announce their scores to the group. Backwards Math can either be played round by round (ie. there's an individual winner for each round separate from other rounds), or a cumulative score can be kept to have one overall winner at the end of the game.

Option: For easy assessment, have students work in teams. One partner verifies the solution of another student. If they believe it's correct, they record it on the chart. If another team proves them wrong, that team gets two points and the incorrect solution is erased.

## Backwards Math: Four 4s Challenge

Simply Great Math Activities: Number Sense ©Teacher to Teacher Press Fulton and Lombard

The graphic on the right shows 10 different ways to use four 4's to create expressions equaling one. In them we see parentheses, place value, decimals, square roots, exponents, and more. Factorials and the greatest integer function could also be used to give students a richer experience.

As students find ways to combine fours, their number sense deepens and their creativity increases.

- $1 = 4/4 + (4-4)$
- $2 = 4/4 + 4/4$
- $3 = (4 + 4 + 4)/4$
- $4 = 4 + (4-4) \times 4$
- $5 = (4 \times 4 + 4)/4$

The next step extending this activity might be looking for 10 ways to use four 4's to create expressions equaling two.

As students gain confidence in their math skills they are willing to explore new and novel combinations of numbers and their numerical flexibility improves. This is great news for teachers as our students are increasingly required to be able to see and explore algebraic expressions. Give this a try and marvel at the amazing expressions your students will create.

Tip: Have classes compete against one another. Assign fours to one class, fives to another, sixes to the next and so on.

**Materials:**

- paper
- calculators
- printouts
- pencils
- butcher paper

Again, tell the students that today's math will be backwards. You will give them all the answers. However, tell them that they must come up with the correct problem to the answer, but in this variation, the challenge is, the only numbers they can use are four 4's.

For example, they can make a problem that produces the answer one in either of these ways:

$$\frac{4}{4} \times \frac{4}{4} = 1$$

$$\frac{44}{44} = 1$$

Challenge students to find other ways to make a problem equal to one.

$1 = 4/4 \bullet 4/4$   
 $1 = 4/4 \div 4/4$   
 $1 = 4/4 + (4 - 4)$   
 $1 = 4/4 + (.4 - .4)$   
 $1 = 44/44$   
 $1 = 44^{(4 - 4)}$   
 $1 = 4/4 \bullet .4/.4$   
 $1 = (\sqrt{4} + 4) \div (\sqrt{4} + 4)$   
 $1 = 4.4/4.4$   
 $1 = (4.4 - .4)/4$

Next have them try to get the numbers two through ten. This will give you an opportunity to introduce the order of operations:

- Do work inside **parentheses**.
- Solve **exponents**.
- Multiply** and **divide** from left to right in the problem.
- Add** and **subtract** from left to right.

For example, in this problem, solving correctly will result in an answer of 32:

$$\frac{4^4}{(4+4)} = \frac{4^4}{8} = \frac{256}{8} = 32$$

An acronym for the order of operations is P.E.M.D.A.S.: “**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally.”

For more advanced classes, you can introduce exponents, roots, factorials, and the greatest integer function. Some examples of these are given below.

**Exponents**

$$4^4 = 4 \times 4 \times 4 \times 4 = 256$$

**Square roots**

$$\sqrt{4} = 2$$

**Factorial**

$$4! = 4 \times 3 \times 2 \times 1 = 24$$

**Greatest integer function**

$$[4 \times 4.44] = [17.76] = 17$$

(The greatest integer function,  $[x]$ , is the largest integer  $\leq$  to  $x$ .)

Have the students number a piece of paper one through one hundred (or whatever range you desire, ex. to 40). Note: people have managed to do this for 1000s of numbers!) Allow students to make up problems and write them on the paper by the correct answers. Share these with the whole class to get them started. Keep a classroom sample chart up on the wall with correct problems for each solution 1-100 as they are found and verified. Students can volunteer solutions to various answers. Write them on the board and have the class verify them. Those that work can stay on the list or chart. You may wish to include multiple solutions to some answers.

You may wish to have students work in teams of three or four. This project will take more than one day. Even advanced students will have difficulty finding all 100 answers in a week. Option: You might prefer to ask them to do ten problems per session.

**Discuss with students, if you erased the four 4's in a problem and substituted four 5's, would any of them have the same answer? Why or why not?**

**Would four 9's be easier or more difficult to use? Why?**

**How many problems can you write that will have a solution of 1?**

**Extension:** This assignment can be repeated and/or modified using four fives, four sixes, and so on. Some numbers will provide greater difficulty. For example, while 44 is usable in some problems, 88 rarely is since it is too large a number. However,

$$[8 \cdot 8] \approx [5.2780316] = 5.$$

Note: For those teachers, ONLY, not students, that need a bit of help, some hints may be found here... <http://www.wheels.org/math/44s.html> and here <http://www.mathsisfun.com/puzzles/four-fours-solution.html>

Have students brainstorm a creative way of presenting their upside and backwards math/four fours in “photo”/poster format. Have students use materials such as colored poster paper, construction paper, markers, scissors, and other supplies provided to create a neat finished product. You may wish to have the poster size fixed, to limit size. Don’t give out the art supplies until they are 3/4 finished with their numbers and have an initial outline of their poster. Students can present their four fours in a variety of ways and allow groups to present their posters to the class.

# Backwards Math

Name \_\_\_\_\_

Here are the answers to one hundred math problems. Use four 4's to create problems that will give these answers. Remember to use the correct order of operations to solve your problems: Parentheses, Exponents, Multiply or Divide, Add or Subtract.

- 1 = \_\_\_\_\_
- 2 = \_\_\_\_\_
- 3 = \_\_\_\_\_
- 4 = \_\_\_\_\_
- 5 = \_\_\_\_\_
- 6 = \_\_\_\_\_
- 7 = \_\_\_\_\_
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- 50 = \_\_\_\_\_

# Backwards Math

Name \_\_\_\_\_

51 = \_\_\_\_\_

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99 = \_\_\_\_\_

100 = \_\_\_\_\_

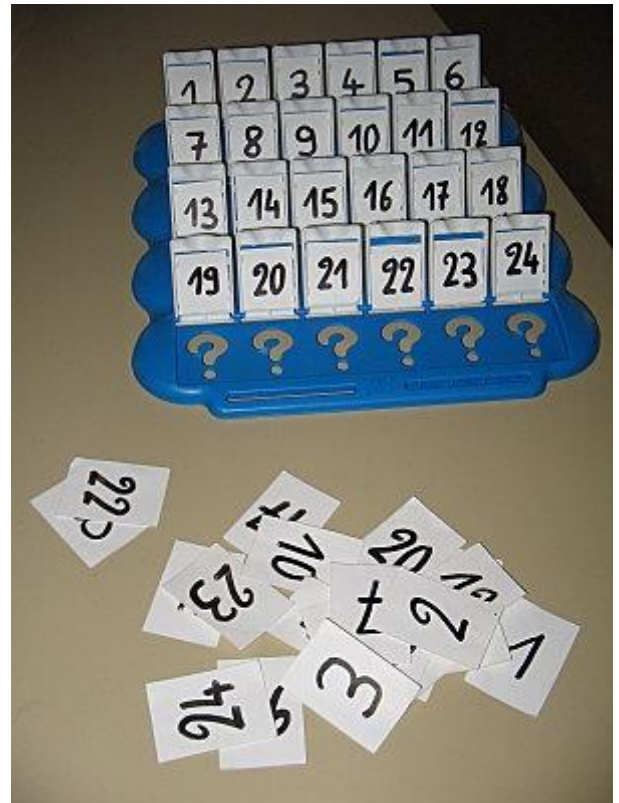


# What's the Number?

Create this game by using the famous "Guess Who?" Game (or the included printable board).

Students must find the hidden number. Kids ask questions like Is the number greater than/less than...? Is the number between \_\_\_ and \_\_\_? Is the number in the tens place \_\_\_? etc. No two questions in a row can make the same comparison. Or students may ask in number sentences- - Is the number  $5+1$ ?

Game 2: This time, the target student numbers, e.g. 6. It is a question by stating a number sentence. So here: Is the hidden number is  $5 + 1$ ,  $7-1$  or  $3 + 3$ ...? Etc. Or, to work multiplications:  $2 \times 3$  (you cannot put that in this case the numbers corresponding to the multiplication result you want to work).



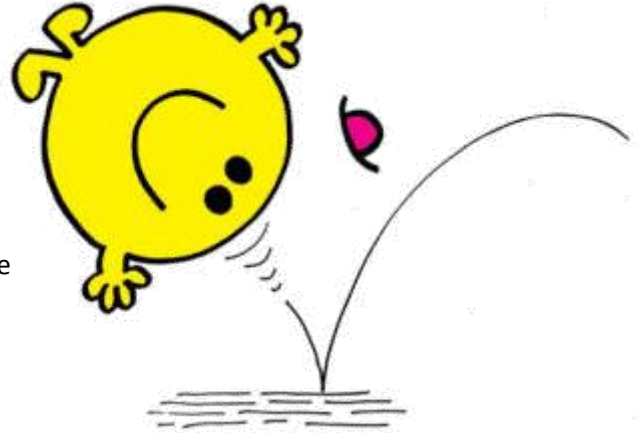
# What Number?


# Bounce Back

Here is how it works: Divide the class into two groups. Have the students organize their groups so that each student has a number. Then ask a question of the first student in group A.

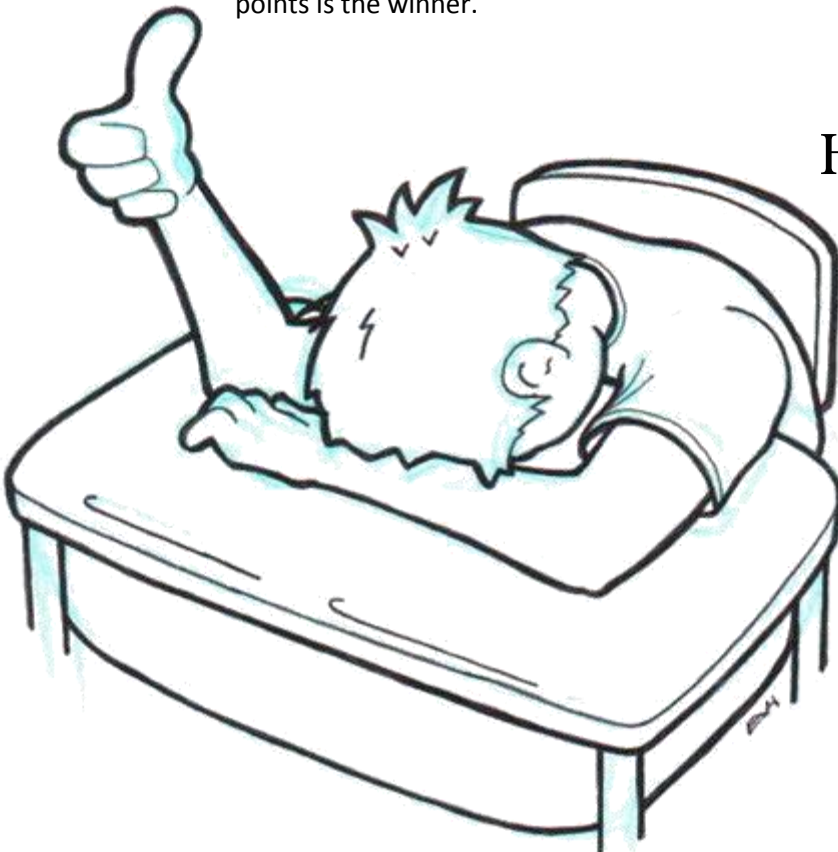
That student can answer for 5 points or he/she can bounce the question back to student 1 in group B. The student in Group B (student 1) will either answer for 5 points or bounce it back to student 1 in group A.

If student 1 gets it right they get 10 points. Then the challenge went to the 2nd student in each group – but group B got to start the next time. The kids love the game because they get to take chances, trying to earn more points by “bouncing” the questions back, even if they know the answer, hoping their opponent won’t and it will come back to them.



# Checker Challenge

Take black and red checkers, place in small, solid color bag. Have students form 2 teams. Ask question. If student answers correctly, they get to pick a chip from the bag. BEFORE they pick the chip, they have to decide whether to apply points to their own team or to the opposing team (black chip is +2, red chip is -2). First team to reach 20 points is the winner.



# Heads Up, 7 Up, Review!

Materials:

- Review Questions

In the traditional game of "Heads Up, Seven Up," seven students stand at the front of the room while all others close their eyes and place their heads down. The standing players roam the room, and each chooses one seated student by gently tapping his or her head. When all selections have been made, the seated students who have been

tapped stand up. Each student has the opportunity to guess which of the seven at the front touched his head. If the guesser is correct, he trades places with the student who tapped him. If the guesser is wrong, he sits down.

Now take the "guesswork" out of this game and add the aspect of review. Randomly show individual students math facts flash cards until seven of them have offered a correct answer, and send these players to the front of the room. Announce that students at their seats should put their heads down and close their eyes. Have the seven players make their choices among those seated; each student should tap a seated student on the head. When the seven "tappers" have returned to their positions at the front of the class, ask the seven students who have been tapped to stand.

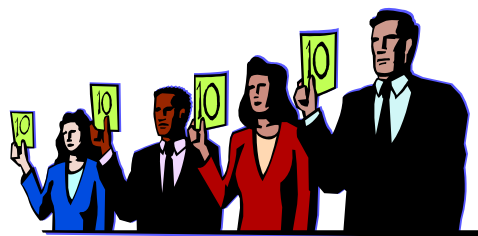
Instead of asking the students to make guesses about who may have tapped them, show each one a flash card or ask them a question. If a student answers the problem correctly, the child who tapped her sits down, and she goes to the front. If the answer is incorrect, the student remains at his seat and his chooser stays at the front. The round is completed when all of the tapped students have answered a flash card and heads are put down. Then another round begins.



Math facts aren't the only questions that can be used with this game. Try review questions in any subject, spelling words, vocabulary, and more!

## 1 vs. The Class

This game is played much like the television show "1 vs 100". The aim of the game is for one contestant to answer questions against (class size) others and eventually try to eliminate them all.



Materials:

- Color coded answer cards (with A, B, C, & D) or thumb cards for each of the "mob" members. Copy templates onto colored paper (cardstock is preferred)
- Review question ranging in difficulty with multiple choice answers.

Procedure:

1. Randomly select one person to be the "one". The rest of the class becomes the "mob".
2. Play begins by the "one" being asked a question. The player and the mob answer using their color coded cards displayed at the same time. Give a time limit to answer— like 15 seconds.
3. If the "one" answers the question correctly, any "mob" players that also answered correctly remain in the game. The wrong answered players are eliminated.
4. The next question and each succeeding question increases in difficulty. After correctly answering the first three questions, the "one" may choose to leave the game with their acquired points only before answering the next question. If they choose to go on and cannot answer the question then the "mob" wins.
5. If "one" answers incorrectly, his turn is finished and the "mob" (whoever is left) wins.
6. Points are awarded from low (for the easier questions) to high (for the harder ones.) The "one" accumulates points as he/she answers correctly. Whatever points have been accumulated when the "one" answers the question incorrectly are split between the remaining "mob" members or awarded to each mob member equally. The "one" receives no points.
7. Play ends when the "one" has eliminated the "mob" and receives all the points.

Note: Color coded cards or Thumb Cards for each player are a must. Students need to hold up card high to help avoid last minute changes in the answers.

# Ready, Set, Math!

The following is a comprehensive list of the math skills students learn in each grade. The skills are organized into categories: As you read the activities in the plan, keep in mind the specific skills your students need to practice and master in the different grade levels you work with. Use their needs to guide your approach in how you'll modify and present the activities and what specific tasks you will have the students do.

## Kindergarten Math Skills

Numbers and counting up to 3

- A.1 Count to 3
- A.2 Represent numbers - up to 3
- A.3 Count by typing - up to 3

Numbers and counting up to 5

- B.1 Count to 5
- B.2 Represent numbers - up to 5
- B.3 Count by typing - up to 5
- B.4 Count up - up to 5
- B.5 Count down - up to 5

Numbers and counting up to 10

- C.1 Count to 10
- C.2 Count dots - 0 to 10
- C.3 Represent numbers - up to 10
- C.4 Count by typing - up to 10
- C.5 Count up - with pictures
- C.6 Count up - with numbers
- C.7 Count up and down - with pictures
- C.8 Count up and down - with numbers
- C.9 Tally marks - up to 10
- C.10 Number lines - up to 10
- C.11 Before, after, and between - up to 10
- C.12 Count forward - up to 10
- C.13 Count forward and backward - up to 10
- C.14 Names of numbers - up to 10
- C.15 Complete a sequence - up to 10

Numbers and counting up to 20

- D.1 Count to 20
- D.2 Count dots - 0 to 20
- D.3 Represent numbers - up to 20
- D.4 Count by typing - up to 20

- D.5 Count up - up to 20
- D.6 Count up and down - up to 20
- D.7 Tally marks - up to 20
- D.8 Number lines - up to 20
- D.9 Before, after, and between - up to 20
- D.10 Count forward - up to 20
- D.11 Count forward and backward - up to 20
- D.12 Names of numbers - up to 20
- D.13 Complete a sequence - up to 20
- D.14 Count tens and ones - up to 20
- D.15 Write tens and ones - up to 20

Numbers and counting beyond 20

- E.1 Count to 30
- E.2 Count to 100
- E.3 Count groups of ten
- E.4 Number lines - up to 30
- E.5 Count tens and ones - up to 30
- E.6 Write tens and ones - up to 30

Skip-counting

- F.1 Skip-count by twos
- F.2 Skip-count by fives
- F.3 Skip-count by tens
- F.4 Skip-count by twos, fives, and tens

Comparing

- G.1 Fewer, equal, and more
- G.2 Fewer and more - comparing groups
- G.3 Fewer and more - with charts
- G.4 Fewer and more - mixed
- G.5 Compare numbers up to 10

Patterns

- H.1 Similar patterns

- H.2 Complete missing parts of patterns
- H.3 Growing patterns

#### Adding

- I.1 Addition with pictures - sums up to 5
- I.2 Add two numbers - sums up to 5
- I.3 Addition sentences - sums up to 5
- I.4 Ways to make a number - sums up to 5
- I.5 Addition word problems - sums up to 5
- I.6 Addition with pictures - sums up to 10
- I.7 Add two numbers - sums up to 10
- I.8 Addition sentences - sums up to 10
- I.9 Ways to make a number - sums up to 10
- I.10 Addition word problems - sums up to 10

#### Subtracting

- J.1 Subtract with pictures - numbers up to 5
- J.2 Subtraction - numbers up to 5
- J.3 Subtraction sentences - numbers up to 5
- J.4 Subtraction word problems - numbers up to 5
- J.5 Subtract with pictures - numbers up to 10
- J.6 Subtraction - numbers up to 9
- J.7 Subtraction sentences - numbers up to 10
- J.8 Subtraction word problems - numbers up to 9

#### Positions

- K.1 Inside and outside
- K.2 Left, middle, and right
- K.3 Top, middle, and bottom
- K.4 Above and below
- K.5 Location in a three-by-three grid

#### Fractions

- L.1 Identify halves, thirds, fourths
- L.2 Equal parts

#### Time

- M.1 Match clocks and times

- M.2 Read clocks and write times
- M.3 Times of everyday events
- M.4 Match analog and digital clocks
- M.5 Seasons
- M.6 A.M. and P.M.

#### Sorting, ordering, and classifying

- N.1 Same
- N.2 Different
- N.3 Same and different
- N.4 Classify by color
- N.5 Venn diagrams
- N.6 Put numbers up to 10 in order
- N.7 Put numbers up to 30 in order

#### Data and graphs

- O.1 Making graphs
- O.2 Interpreting graphs

#### Probability

- P.1 More or less likely

#### Measurement

- Q.1 Long and short
- Q.2 Tall and short
- Q.3 Light and heavy
- Q.4 Holds more or less
- Q.5 Compare size, weight, and capacity

#### Money

- R.1 Coin names - penny through quarter
- R.2 Coin values - penny through quarter
- R.3 Count money - pennies only
- R.4 Count money - pennies and nickels
- R.5 Count money - pennies, nickels, and dimes
- R.6 Equivalent coins
- R.9 Compare two groups of coins

#### Geometry

- S.1 Identify shapes
- S.3 Same shape
- S.4 Identify solid figures
- S.5 Relate planar and solid figures
- S.6 Count sides and corners
- S.7 Compare sides and corners
- S.8 Geometry of everyday objects
- S.9 Symmetry

#### Vocabulary



- T.1 Sum and difference

# 1<sup>st</sup> Grade Math Skills

## Counting and number patterns

- A.1 Counting review - 0 to 10
- A.2 Counting review - up to 20
- A.3 Counting tens and ones - up to 20
- A.4 Counting - up to 30
- A.5 Counting - up to 100
- A.6 Counting by tens - up to 100
- A.7 Counting tens and ones - up to 99
- A.8 Skip-counting - with pictures
- A.9 Counting by twos, fives, and tens - up to 100
- A.10 Counting forward and backward
- A.11 Number lines
- A.12 Hundred chart
- A.13 Identifying even and odd numbers
- A.14 Which even or odd number comes before or after?
- A.15 Skip-counting patterns - with tables
- A.16 Sequences - count up and down by 1, 2, 3, 5, and 10
- A.17 Ordinal numbers
- A.18 Writing numbers in words
- A.19 Roman numerals I, V, X

## Addition

- B.1 Addition with pictures - sums to 10
- B.2 Addition sentences - sums to 10
- B.3 Addition word problems - sums to 10
- B.4 Word problems - write the addition sentence
- B.5 Ways to make a number using addition
- B.6 Ways to make a number - addition sentences
- B.7 Adding zero
- B.8 Adding doubles
- B.9 Addition facts - sums to 10

- B.10 Addition facts - sums to 18
- B.11 Addition word problems - sums to 18
- B.12 Complete the addition sentence
- B.13 Adding three numbers
- B.14 Word problems - adding three numbers
- B.16 Addition facts - sums to 20
- B.17 Add tens
- B.19 Add a one-digit number to a two-digit number - without regrouping
- B.20 Regrouping tens and ones
- B.22 Add a one-digit number to a two-digit number - with regrouping

## Subtraction

- D.1 Subtraction with pictures - numbers up to 10
- D.2 Subtraction sentences - numbers up to 10
- D.3 Subtraction word problems - one-digit numbers
- D.4 Word problems - write the subtraction sentence
- D.5 Ways to make a number using subtraction
- D.6 Ways to make a number - subtraction sentences
- D.7 Ways to subtract from a number - subtraction sentences
- D.8 Subtracting zero and all
- D.9 Subtracting doubles
- D.10 Subtraction facts - numbers up to 10
- D.11 Subtraction facts - numbers up to 18
- D.12 Subtraction word problems - numbers up to 18

- D.13 Complete the subtraction sentence
- D.16 Subtract tens
- D.17 Subtract one-digit numbers from two-digit numbers

#### Mixed operations

- F.1 Addition and subtraction - ways to make a number
- F.2 Which sign makes the number sentence true?
- F.3 Fact families
- F.4 Addition and subtraction facts - numbers up to 10
- F.5 Addition and subtraction facts - numbers up to 18
- F.6 Addition and subtraction word problems
- F.7 Ten more or less
- F.8 Add and subtract tens
- F.9 Addition and subtraction terms

#### Comparing

- G.2 Comparing numbers up to 10
- G.3 Comparing numbers up to 100
- G.4 Comparison word problems

#### Estimating

- H.1 Estimate to the nearest ten

#### Fractions

- I.1 Halves, thirds, and fourths
- I.2 Equal parts
- I.3 Simple fractions: what fraction does the shape show?
- I.4 Simple fractions: parts of a group
- I.5 Fractions - word problems
- I.6 Compare fractions
- I.7 Simple fractions: which shape matches the fraction?

#### Geometry

- J.1 Identify 2-dimensional shapes
- J.2 Identify 3-dimensional figures
- J.3 Geometry of everyday objects
- J.4 Relate planar and solid figures
- J.5 Count sides and vertices
- J.6 Count edges, vertices, and faces

- J.7 Compare sides and vertices
- J.8 Compare edges, vertices, and faces
- J.9 Open and closed shapes
- J.10 Flip, turn, and slide
- J.11 Symmetry
- J.12 Same shape

#### Spatial sense

- K.1 Left, middle, and right
- K.2 Above, below, top, middle, and bottom
- K.3 Location in a three-by-three grid

#### Data and graphs

- L.1 Record data with tally charts, picture graphs, tables
- L.2 Interpret data in tally charts, picture graphs, tables
- L.3 Interpret bar graphs
- L.4 Which bar graph is correct?

#### Measurement

- M.1 Read a thermometer
- M.2 Compare objects: length and height
- M.3 Which customary unit of length is appropriate?
- M.4 Customary units of length: word problems
- M.5 Which customary unit of weight is appropriate?
- M.6 Compare and convert cups, pints, and quarts
- M.7 Which metric unit of length is appropriate?
- M.8 Metric units of length: word problems
- M.9 Which metric unit of weight is appropriate?

#### Money

- N.1 Money names and values
- N.2 Count pennies, nickels, and dimes
- N.3 Count pennies, nickels, dimes, and quarters
- N.4 Equivalent coins
- N.6 Money - word problems

- N.7 Compare money amounts
- N.8 Least number of coins
- N.9 Purchases: do you have enough money?

#### Patterns

- O.1 Recognize patterns
- O.2 Describe patterns

#### Probability and statistics

- P.1 More, less, and equally likely
- P.2 Certain, probable, unlikely, and impossible
- P.3 Mode and range

#### Sorting, ordering, and classifying

- Q.1 Venn diagrams

- Q.2 Put numbers in order
- #### Time

- R.1 Days of the week
- R.2 Reading clocks
- R.3 Match clocks and times
- R.4 Times of everyday events
- R.5 Match analog and digital clocks
- R.6 A.M. or P.M.
- R.7 Compare clocks
- R.8 Time and clocks: word problems
- R.9 Choose the appropriate time units
- R.10 Seasons of the year
- R.11 Read a calendar
- R.12 Months of the year

## 2<sup>nd</sup> Grade Math Skills

#### Counting and number patterns

- A.1 Skip-counting
- A.2 Skip-counting sequences
- A.3 Counting patterns - up to 100
- A.4 Number lines - up to 100
- A.5 Hundreds chart
- A.6 Even or odd
- A.8 Which even or odd number comes before or after?
- A.9 Skip-counting stories
- A.10 Skip-counting puzzles
- A.11 Number lines - up to 1,000
- A.12 Counting patterns - up to 1,000

#### Comparing and ordering

- B.1 Comparing numbers up to 100
- B.2 Inequalities with addition and subtraction - up to 100
- B.3 Comparing numbers up to 1,000
- B.4 Put numbers up to 100 in order
- B.5 Put numbers up to 1,000 in order
- B.6 Greatest and least - word problems - up to 100
- B.7 Greatest and least - word problems - up to 1,000

#### Names of numbers

- C.1 Ordinal numbers up to 10th

- C.2 Ordinal numbers up to 100th
- C.3 Writing numbers up to 100 in words
- C.4 Writing numbers up to 1,000 in words
- C.5 Distinguishing ordinal and cardinal numbers
- C.6 Roman numerals I, V, X, L

#### Patterns

- D.1 Repeating patterns
- D.2 Growing patterns
- D.3 Describe patterns

#### Addition - one digit

- E.1 Review - add one-digit numbers - sums to 10
- E.2 Review - ways to make a number - sums to 10
- E.3 Review - writing addition sentences - sums to 10
- E.4 Add one-digit numbers
- E.5 Addition with pictures - sums to 20
- E.6 Write addition sentences to describe pictures - sums to 20
- E.7 Addition input/output tables - sums to 20
- E.8 Add zero
- E.9 Addition word problems - one digit

- E.10 Complete the addition sentence - one digit
- E.11 Write the addition sentence - one digit
- E.12 Balance addition equations - one digit
- E.13 Add three or more one-digit numbers
- E.14 Add three or more one-digit numbers - word problems

#### Subtraction - one digit

- F.1 Review - subtract one-digit numbers - up to 10
- F.2 Review - ways to subtract - up to 10
- F.3 Review - writing subtraction sentences - up to 10
- F.4 Subtract a one-digit number from a two-digit number up to 18
- F.5 Subtraction with pictures
- F.6 Write subtraction sentences to describe pictures - up to 18
- F.7 Subtraction input/output tables - up to 18
- F.8 Subtract zero/all
- F.9 Subtraction word problems - up to 18
- F.10 Complete the subtraction sentence - up to 18
- F.11 Write the subtraction sentence - up to 18
- F.12 Balance subtraction equations - up to 18

#### Addition - two digits

- G.1 Add multiples of 10
- G.2 Add a two-digit and a one-digit number - without regrouping
- G.3 Add a two-digit and a one-digit number - with regrouping
- G.4 Add two two-digit numbers - without regrouping
- G.5 Add two two-digit numbers - with regrouping
- G.6 Write addition sentences to describe pictures

- G.7 Addition input/output tables - up to two digits
- G.8 Ways to make a number using addition
- G.9 Addition word problems - up to two digits
- G.10 Complete the addition sentence - up to two digits
- G.11 Write the addition sentence - up to two digits
- G.12 Balance addition equations - up to two digits
- G.13 Add three or more numbers up to two digits each
- G.14 Add three or more numbers up to two digits - word problems

#### Subtraction - two digits

- H.1 Subtract multiples of 10
- H.2 Subtract a one-digit number from a two-digit number - without regrouping
- H.3 Subtract a one-digit number from a two-digit number - with regrouping
- H.4 Subtract two two-digit numbers - without regrouping
- H.5 Subtract two two-digit numbers - with regrouping
- H.6 Write subtraction sentences to describe pictures - up to two digits
- H.7 Subtraction input/output tables - up to two digits
- H.8 Ways to make a number using subtraction
- H.9 Subtraction word problems - up to two digits
- H.10 Complete the subtraction sentence - up to two digits
- H.11 Write the subtraction sentence - up to two digits
- H.12 Balance subtraction equations - up to two digits

#### Addition - three digits

- I.1 Add multiples of 100
- I.2 Add two three-digit numbers

- I.3 Addition input/output tables - up to three digits
- I.4 Addition word problems - up to three digits
- I.5 Complete the addition sentence - up to three digits
- I.6 Write the addition sentence - up to three digits
- I.7 Balance addition equations - up to three digits

#### Subtraction - three digits

- J.1 Subtract multiples of 100
- J.2 Subtract three-digit numbers
- J.3 Subtraction input/output tables - up to three digits
- J.4 Subtraction word problems - up to three digits
- J.5 Complete the subtraction sentence - up to three digits
- J.6 Write the subtraction sentence - up to three digits
- J.7 Balance subtraction equations - up to three digits

#### Properties

- K.1 Related addition facts
- K.2 Related subtraction facts
- K.3 Fact families
- K.4 Addition, subtraction, multiplication, and division terms
- K.5 Solve inequalities using addition and subtraction shortcuts

#### Mixed operations

- L.1 Add and subtract numbers up to 20
- L.2 Addition and subtraction - ways to make a number - up to 20
- L.3 Addition and subtraction word problems - up to 20
- L.4 Addition and subtraction - balance equations - up to 20
- L.5 Input/output tables - write the rule - up to 20
- L.6 Add and subtract numbers up to 100

- L.7 Addition and subtraction - ways to make a number - up to 100
- L.8 Addition and subtraction word problems - up to 100
- L.9 Addition and subtraction - balance equations - up to 100
- L.10 Input/output tables - write the rule - up to 100
- L.11 Which sign (+ or -) makes the number sentence true?
- L.12 Write addition and subtraction sentences

#### Place values

- M.1 Place value models - tens and ones
- M.2 Place value models - up to hundreds
- M.3 Place value models - up to thousands
- M.4 Value of underlined digit - tens and ones
- M.5 Value of underlined digit - up to hundreds
- M.6 Value of underlined digit - up to thousands
- M.7 Regrouping tens and ones
- M.9 Convert to/from a number - tens and ones
- M.10 Convert to/from a number - up to hundreds
- M.11 Convert to/from a number - up to thousands
- M.12 Convert between place values - up to thousands
- M.13 Convert from expanded form - up to hundreds
- M.14 Convert from expanded form - up to thousands
- M.15 Identify the digit in the ones, tens, hundreds, or thousands place

#### Estimation and rounding

- N.1 Estimate to the nearest ten
- N.2 Round to the nearest ten
- N.3 Round to the nearest ten or hundred

- N.4 Round to the nearest ten, hundred, or thousand
- N.5 Estimate sums

#### Logical reasoning

- O.1 Guess the number

#### Money

- P.1 Identify names and values of common coins
- P.2 Identify names and values of all coins
- P.3 Count money - up to \$1
- P.4 Count money - up to \$5
- P.5 Equivalent amounts of money - up to \$1
- P.6 Equivalent coins
- P.8 Add and subtract money - up to \$1
- P.9 Add and subtract money - word problems - up to \$1
- P.10 Which picture shows more - up to \$5
- P.11 Least number of coins
- P.12 Purchases - do you have enough money - up to \$1
- P.13 Purchases - do you have enough money - up to \$5
- P.14 How much more to make a dollar?
- P.15 Making change

#### Time

- Q.1 Days of the week
- Q.2 Reading clocks
- Q.3 Time words: o'clock, half, quarter
- Q.4 Match clocks and times
- Q.5 Match analog and digital clocks
- Q.6 Seasons
- Q.7 A.M. and P.M.
- Q.8 Compare clocks
- Q.9 Elapsed time
- Q.11 Choose the appropriate time units
- Q.12 Read a calendar
- Q.13 Months of the year
- Q.14 Number of days in each month
- Q.15 Relate time units

- Q.16 Time patterns

#### Data and graphs

- R.1 Coordinate graphs
- R.2 Interpret bar graphs
- R.3 Which bar graph is correct?
- R.4 Interpret line plots
- R.5 Create line plots
- R.6 Interpret pictographs
- R.7 Create pictographs
- R.8 Interpret line graphs
- R.9 Which line graph is correct?
- R.10 Interpret Venn diagrams

#### Measurement

- S.1 Read a thermometer
- S.2 Which customary unit of length is appropriate?
- S.3 Customary units of length: word problems
- S.4 Which customary unit of weight is appropriate?
- S.5 Which customary unit of volume is appropriate?
- S.6 Compare and convert customary units of volume
- S.7 Which metric unit of length is appropriate?
- S.8 Metric units of length: word problems
- S.9 Which metric unit of weight is appropriate?
- S.10 Which metric unit of volume is appropriate?
- S.11 Compare and convert metric units of volume
- S.12 Compare and convert metric units of weight
- S.13 Choose the appropriate measuring tool

#### Geometry

- T.1 Identify planar and solid shapes
- T.2 Compare sides, vertices, edges, and faces

- T.3 Count sides, vertices, edges, and faces
- T.4 Symmetry
- T.5 Congruent
- T.6 Flip, turn, and slide
- T.7 Perimeter
- T.8 Perimeter - word problems
- T.9 Area

#### Fractions

- U.1 Equal parts
- U.2 Halves, thirds, and fourths
- U.3 Identify the fraction
- U.4 Which shape illustrates the fraction?
- U.5 Parts of a group
- U.6 Fraction word problems

- U.7 Compare fractions
- U.8 Order fractions

#### Probability and statistics

- V.1 More, less, and equally likely
- V.2 Certain, probable, unlikely, and impossible
- V.3 Median, mode, and range
- V.4 Interpret graphs to find median, mode, and range

#### Multiplication

- W.1 Multiplication sentences
- W.2 Multiplication tables up to 5
- W.3 Multiplication tables up to 10

#### Division

- X.1 Divisors and quotients up to 5
- X.2 Divisors and quotients up to 10

## 3<sup>rd</sup> Grade Math Skills

#### Numbers and comparing

- A.1 Write numbers in words
- A.2 Ordinal numbers to 100th
- A.3 Roman numerals I, V, X, L, C, D, M
- A.4 Even and odd I
- A.6 Skip-counting puzzles
- A.7 Number sequences
- A.8 Put numbers in order
- A.9 Which number is greatest/least?
- A.10 Comparing numbers
- A.11 Comparing - with addition and subtraction
- A.12 Multi-step inequalities

#### Place values

- B.1 Place value models
- B.2 Place value names
- B.3 Value of a digit
- B.4 Identify the digit with a particular place value
- B.5 Convert to/from a number
- B.6 Convert between place values
- B.7 Convert from expanded form
- B.8 Convert between standard and expanded form
- B.9 Place value word problems

#### Addition

- C.1 Add two numbers up to three digits
- C.2 Addition input/output tables - up to three digits
- C.3 Add two numbers up to three digits - word problems
- C.4 Complete the addition sentence - up to three digits
- C.5 Balance addition equations - up to three digits
- C.6 Add three or more numbers up to three digits each
- C.7 Add three or more numbers up to three digits - word problems
- C.8 Addition patterns over increasing place values
- C.9 Add two numbers with four or more digits
- C.10 Addition input/output tables - four or more digits
- C.11 Add two numbers with four or more digits - word problems
- C.12 Complete the addition sentence - four or more digits



- C.13 Balance equations - four or more digits
- C.14 Add three or more numbers with four or more digits
- C.15 Add three or more numbers with four or more digits - word problems
- C.16 Addition: fill in the missing digits

#### Subtraction

- D.1 Subtract numbers up to three digits
- D.2 Subtraction input/output tables - up to three digits
- D.3 Subtract numbers up to three digits - word problems
- D.4 Complete the subtraction sentence - up to three digits
- D.5 Balance subtraction equations - up to three digits
- D.6 Subtraction patterns over increasing place values
- D.7 Subtract numbers with four or more digits
- D.8 Subtraction input/output tables - four or more digits
- D.9 Subtraction: fill in the missing digits

#### Multiplication

- E.1 Multiplication sentences
- E.2 Multiplication - facts to 12
- E.3 Multiplication word problems - facts to 12
- E.4 Missing factors - facts to 12
- E.5 Missing factors - facts to 12 - word problems
- E.6 Squares up to 20
- E.7 Multiplication patterns over increasing place values
- E.8 Multiply by a multiple of ten
- E.9 Multiply numbers ending in zeroes
- E.10 Multiply a one-digit number by a larger number
- E.11 Multiply a one-digit number by a larger number - word problems
- E.12 Multiply three or more numbers
- E.13 Multiply three or more numbers - word problems

- E.14 Multiplication input/output tables
- E.15 Multiplication input/output tables: find the rule

#### Division

- G.1 Division facts to 5
- G.2 Division facts to 10
- G.3 Division word problems - facts to 10
- G.4 Complete the division sentence - facts to 10
- G.5 Division facts to 12
- G.6 Division patterns over increasing place values
- G.7 Divide numbers ending in zeroes
- G.8 Divide three-digit numbers
- G.9 Divide three-digit numbers - word problems
- G.10 Divide larger numbers
- G.11 Divide larger numbers - word problems
- G.12 Divisibility rules for 2, 5, and 10
- G.13 Complete the division table
- G.14 Division input/output tables
- G.15 Division input/output tables: find the rule

#### Mixed operations

- I.1 Addition, subtraction, multiplication, and division facts
- I.2 Complete the addition, subtraction, multiplication, or division sentence
- I.3 Add, subtract, multiply, and divide
- I.4 Addition, subtraction, multiplication, and division word problems
- I.5 Interpret data in tables
- I.6 Multi-step word problems
- I.7 Missing operators

#### Properties

- J.1 Addition, subtraction, multiplication, and division terms
- J.2 Understanding parentheses
- J.3 Properties of addition
- J.4 Solve using properties of addition
- J.5 Properties of multiplication

- J.6 Solve using properties of multiplication
- J.7 Relate addition and multiplication
- J.8 Relate multiplication and division

#### Equations and variables

- K.1 Identify equations
- K.2 Solve for the variable - addition and subtraction only
- K.3 Solve for the variable - with multiplication and division
- K.4 Write variable equations to represent word problems

#### Estimation and rounding

- L.1 Rounding
- L.2 Round money amounts
- L.3 Rounding puzzles
- L.4 Solve inequalities using estimation
- L.5 Estimate sums
- L.6 Estimate products
- L.7 Estimate quotients

#### Logical reasoning

- M.1 Guess the number
- M.2 Largest/smallest number possible
- M.3 Find the order
- M.4 Age puzzles
- M.5 Guess two numbers based on sum and difference
- M.6 Guess two numbers based on sum, difference, product, and quotient

#### Money

- N.1 Count coins and bills - up to \$5 bill
- N.2 Which picture shows more?
- N.3 Purchases - do you have enough money - up to \$10
- N.4 Making change
- N.5 Inequalities with money
- N.6 Put money amounts in order
- N.7 Add and subtract money amounts
- N.8 Add money amounts - word problems
- N.9 Price lists
- N.10 Multiply money amounts
- N.11 Divide money amounts

#### Time

- O.1 Read clocks and write times

- O.2 Elapsed time
- O.4 Read a calendar
- O.5 Relate time units
- O.6 Time patterns
- O.7 Convert between hours and fractions of hours
- O.8 Reading schedules
- O.9 Time lines

#### Graphs

- P.1 Coordinate graphs
- P.3 Graph points on a coordinate plane
- P.4 Interpret bar graphs
- P.5 Create bar graphs
- P.6 Interpret line plots
- P.7 Create line plots
- P.8 Interpret pictographs
- P.9 Create pictographs
- P.10 Interpret line graphs
- P.11 Create line graphs
- P.12 Venn diagrams

#### Measurement

- Q.1 Read a thermometer
- Q.2 Reasonable temperature
- Q.3 Which customary unit is appropriate?
- Q.4 Compare and convert customary units of length
- Q.5 Compare and convert customary units of weight
- Q.6 Compare and convert customary units of volume
- Q.7 Conversion tables - customary units
- Q.8 Compare customary units by multiplying
- Q.9 Which metric unit is appropriate?
- Q.10 Compare and convert metric units of length
- Q.11 Compare and convert metric units of weight
- Q.12 Compare and convert metric units of volume
- Q.13 Conversion tables - metric units

#### Geometry

- R.1 Identify planar and solid shapes

- R.2 Which 2-dimensional shape is being described?
- R.3 Count and compare sides, edges, faces, and vertices
- R.4 Symmetry
- R.5 Similar and congruent
- R.6 Reflection, rotation, and translation
- R.7 Perimeter
- R.8 Perimeter: find the missing side length
- R.9 Area of figures made of unit squares
- R.10 Area of rectangles
- R.11 Area of squares and rectangles: word problems
- R.12 Area of complex figures (with all right angles)
- R.13 Compare area and perimeter of two figures
- R.14 Use area and perimeter to determine cost
- R.15 Relationship between area and perimeter
- R.16 Volume
- R.17 Angles: greater than, less than, or equal to a right angle
- R.18 Lines, line segments, and rays
- R.19 Is it a polygon?
- R.20 Triangles: equilateral, isosceles, and scalene
- R.21 Triangles: acute, right, and obtuse
- R.22 Classify quadrilaterals

#### Fractions

- S.1 Unit fraction review
- S.2 Fraction review
- S.3 Fraction review - word problems
- S.4 Fractions on number lines
- S.5 Compare fractions

## 4<sup>th</sup> Grade Math Skills

#### Number sense

- A.1 Place values
- A.2 Convert between place values
- A.3 Word names for numbers

- S.6 Equivalent fractions: type the missing numerator or denominator
- S.7 Equivalent fractions: choose the equivalent fraction
- S.8 Reducing fractions to simplest form
- S.9 Put fractions in order
- S.10 Fractions of a number
- S.11 Fractions of a number - word problems
- S.12 Mixed numbers: what mixed number is shown?
- S.13 Mixed numbers: write the mixed number in words
- S.14 Add and subtract fractions with like denominators

#### Decimals

- T.1 What decimal number is illustrated?
- T.2 Convert between decimals and fractions
- T.3 Understanding decimals expressed in words
- T.4 Number sequences involving decimals
- T.5 Inequalities with decimals
- T.6 Put decimal numbers in order
- T.7 Add and subtract decimals
- T.8 Add and subtract decimals - word problems
- T.9 Add three or more decimal numbers

#### Probability and statistics

- U.1 Certain, probable, unlikely, and impossible
- U.2 Mean, median, mode, and range
- U.3 Interpret charts to find mean, median, mode, and range
- U.4 Combinations (as in how many combinations of things can be made)

- A.4 Roman numerals
- A.5 Prime and composite numbers
- A.6 Rounding
- A.7 Even and odd

- A.8 Inequalities with number lines
- A.9 Compare numbers up to billions

#### Addition

- B.1 Add numbers up to millions
- B.2 Add numbers up to millions: word problems
- B.3 Addition: fill in the missing digits
- B.4 Properties of addition
- B.5 Add 3 or more numbers up to millions
- B.6 Addition patterns over increasing place values
- B.7 Choose numbers with a particular sum
- B.8 Estimate sums
- B.9 Estimate sums: word problems

#### Subtraction

- C.1 Subtract numbers up to millions
- C.2 Subtract numbers up to millions: word problems
- C.3 Subtraction: fill in the missing digits
- C.4 Subtraction patterns over increasing place values
- C.5 Choose numbers with a particular difference
- C.6 Estimate differences
- C.7 Estimate differences: word problems

#### Multiplication

- D.1 Multiplication facts to 12
- D.2 Missing factors - facts to 12
- D.3 Choose the multiples of a given number up to 12
- D.4 Identify factors
- D.5 Multiply 1-digit numbers by larger numbers
- D.6 Multiplication patterns over increasing place values
- D.7 Properties of multiplication
- D.8 Estimate products
- D.9 Estimate products: word problems
- D.10 Multiply a 2-digit number by a 2-digit number: complete the missing steps

- D.11 Multiply a 2-digit number by a 2-digit number
- D.12 Multiply a 2-digit number by a 2-digit number: word problems
- D.13 Choose numbers with a particular product
- D.14 Multiply a 2-digit number by a larger number: complete the missing steps
- D.15 Multiply a 2-digit number by a larger number
- D.16 Multiply a 2-digit number by a larger number: word problems
- D.17 Multiply numbers ending in zeroes
- D.18 Multiply numbers ending in zeroes: word problems
- D.19 Multiply 3 numbers up to 2 digits each
- D.20 Inequalities with multiplication

#### Division

- E.1 Division facts to 12
- E.2 Division facts to 12: word problems
- E.3 Properties of division
- E.4 Divide larger numbers, one-digit divisors
- E.5 Divide larger numbers, one-digit divisors: word problems
- E.6 Divide by 1-digit numbers: complete the table
- E.7 Divide by 1-digit numbers: interpret remainders
- E.8 Choose numbers with a particular quotient
- E.9 Divide numbers ending in zeroes, one-digit divisors
- E.10 Estimate quotients, one-digit divisors
- E.11 Divisibility rules
- E.12 Division patterns over increasing place values
- E.13 Divide numbers ending in zeroes, multi-digit divisors
- E.14 Divide numbers ending in zeroes, multi-digit divisors: word problems

- E.15 Divide 2-digit numbers by multiples of 10
- E.16 Divide by 2-digit numbers
- E.17 Divide by 2-digit numbers: word problems
- E.18 Divide larger numbers by 2-digit numbers
- E.19 Divide larger numbers by 2-digit numbers: word problems
- E.20 Inequalities with division
- E.21 Estimate quotients

#### Mixed operations

- F.1 Add, subtract, multiply, and divide
- F.2 Addition, subtraction, multiplication, and division word problems
- F.3 Estimate sums, differences, products, and quotients: word problems
- F.4 Multi-step word problems
- F.5 Word problems with extra or missing information
- F.6 Solve word problems using guess-and-check
- F.7 Choose numbers with a particular sum, difference, product, or quotient
- F.8 Mentally add and subtract numbers ending in zeroes
- F.9 Inequalities involving addition, subtraction, multiplication, and division

#### Algebra

- G.1 Write variable expressions
- G.2 Write variable expressions: word problems
- G.3 Evaluate variable expressions
- G.4 Simplify expressions using order of operations and parentheses
- G.5 Write variable equations to represent word problems
- G.6 Solve variable equations

#### Functions

- H.1 Input/output tables with addition, subtraction, multiplication, and division
- H.2 Function tables

- H.3 Write linear functions
- H.4 Graph linear functions

#### Coordinate graphs

- I.1 Coordinate graphs review
- I.2 Graph points on a coordinate plane
- I.3 Relative coordinates
- I.4 Coordinate graphs as maps

#### Data, charts, and graphs

- J.1 Read a table
- J.2 Interpret line graphs
- J.3 Create line graphs
- J.4 Interpret bar graphs
- J.5 Create bar graphs
- J.6 Interpret line plots
- J.7 Create line plots
- J.8 Frequency charts
- J.9 Stem-and-leaf plots
- J.10 Circle graphs
- J.11 Choose the best type of graph

#### Logical reasoning

- K.1 Guess two numbers based on sum and difference
- K.2 Guess two numbers based on sum, difference, product, and quotient
- K.3 Find the order

#### Patterns

- L.1 Geometric growth patterns
- L.2 Increasing growth patterns
- L.3 Numeric patterns: word problems
- L.4 Patterns involving addition and multiplication
- L.5 Mixed patterns review

#### Money

- M.1 Compare money amounts
- M.2 Round money amounts
- M.3 Add and subtract money amounts
- M.4 Add, subtract, multiply, and divide money amounts
- M.5 Making change
- M.6 Price lists with addition and subtraction
- M.7 Price lists with multiplication
- M.8 Unit prices

#### Measurement

- N.1 Compare and convert customary units
- N.2 Compare and convert metric units
- N.3 Compare customary units by multiplying
- N.4 Convert mixed customary units
- N.5 Add and subtract mixed customary units
- N.6 Convert between metric and customary units

#### Time

- O.1 Convert time units
- O.2 Add and subtract mixed time units
- O.3 Fractions of time units
- O.4 Time zones
- O.5 Elapsed time
- O.6 Find start and end times: multi-step word problems
- O.7 Transportation schedules
- O.8 Time patterns

#### Geometry

- P.1 Identify planar and solid figures
- P.2 Types of triangles
- P.3 Open and closed shapes and qualities of polygons
- P.4 Which 2-dimensional shape is being described?
- P.5 Which 3-dimensional figure is being described?
- P.6 Classify quadrilaterals
- P.7 Number of sides in polygons
- P.8 Count and compare sides, edges, faces, and vertices
- P.9 Similar and congruent
- P.10 Nets of 3-dimensional figures
- P.11 Acute, right, obtuse, and straight angles
- P.12 Angles of 90, 180, 270, and 360 degrees
- P.13 Measure angles with a protractor
- P.14 Estimate angle measurements
- P.15 Adjacent angles
- P.16 Parts of a circle
- P.17 Perimeter
- P.18 Area of squares and rectangles

- P.19 Area of complex figures (with all right angles)
- P.20 Compare area and perimeter of two figures
- P.21 Relationship between area and perimeter
- P.22 Volume
- P.23 Use area and perimeter to determine cost
- P.24 Rotational symmetry
- P.25 Lines of symmetry
- P.26 Lines, line segments, and rays
- P.27 Parallel, perpendicular, intersecting
- P.28 Calculate radius, diameter and circumference

#### Fractions and mixed numbers

- Q.1 Equivalent fractions
- Q.2 Patterns of equivalent fractions
- Q.3 Reduce fractions to simplest form
- Q.4 Fractions review
- Q.5 Compare fractions
- Q.6 Put fractions in order
- Q.7 Fractions of a number
- Q.8 Fractions of a number: word problems
- Q.9 Mixed number review
- Q.10 Convert between improper fractions and mixed numbers

#### Add and subtract fractions

- R.1 Add and subtract fractions with like denominators
- R.2 Add and subtract fractions with like denominators: word problems
- R.3 Add 3 or more fractions with like denominators
- R.4 Add fractions with unlike denominators
- R.5 Subtract fractions with unlike denominators
- R.6 Add and subtract fractions with unlike denominators: word problems
- R.7 Add 3 or more fractions with unlike denominators

- R.8 Add 3 or more fractions with like and unlike denominators: word problems
- R.9 Find the missing numerator or denominator in addition and subtraction sentences
- R.10 Add and subtract mixed numbers with like denominators
- R.11 Add and subtract mixed numbers with unlike denominators
- R.12 Add and subtract mixed numbers with like and unlike denominators: word problems
- R.13 Inequalities with addition and subtraction of fractions
- R.14 Recipes

#### Multiply fractions

- S.1 Multiply fractions by whole numbers
- S.3 Multiply fractions by whole numbers: word problems

#### Decimals

- T.1 What decimal number is illustrated?
- T.2 Understanding decimals expressed in words
- T.3 Place values in decimal numbers
- T.4 Equivalent decimals
- T.5 Decimal number lines
- T.6 Convert fractions and mixed numbers to decimals
- T.7 Convert decimals to fractions and mixed numbers

- T.8 Compare decimals and fractions
- T.9 Round decimals
- T.10 Compare decimal numbers
- T.11 Put decimal numbers in order
- T.12 Number sequences involving decimals
- T.13 Solve decimal problems using diagrams

#### Add and subtract decimals

- U.1 Add decimal numbers
- U.2 Subtract decimal numbers
- U.3 Add and subtract decimals: word problems
- U.4 Choose decimals with a particular sum or difference
- U.5 Add 3 or more decimals
- U.6 Add 3 or more decimals: word problems
- U.7 Complete the addition or subtraction sentence
- U.8 Inequalities with addition and subtraction
- U.9 Estimate sums and differences of decimals

#### Probability and statistics

- V.1 Calculate probability
- V.2 Make predictions
- V.3 Mean, median, mode, and range
- V.4 Interpret charts to find mean, median, mode, and range
- V.5 Combinations (as in how many combinations can be made?)

## 5<sup>th</sup> Grade Math Skills

#### Place values and number sense

- A.1 Place values
- A.2 Convert between place values
- A.3 Compare numbers up to billions
- A.4 Word names for numbers
- A.5 Roman numerals
- A.6 Rounding
- A.7 Even and odd arithmetic patterns
- A.8 Understanding integers

- A.9 Compare integers
- A.10 Put integers in order
- A.11 Scientific notation

#### Geometry

- B.1 Identify planar and solid figures
- B.2 Types of triangles
- B.3 Open and closed shapes and qualities of polygons
- B.4 Regular and irregular polygons



- B.5 Number of sides in polygons
- B.6 Which figure is being described?
- B.7 Classify quadrilaterals
- B.8 Reflection, rotation, and translation
- B.9 Count and compare sides, edges, faces, and vertices
- B.10 Similar and congruent
- B.11 Nets of 3-dimensional figures
- B.12 Types of angles
- B.13 Measure angles with a protractor
- B.14 Parts of a circle
- B.15 Perimeter
- B.16 Area of squares and rectangles
- B.17 Area of triangles
- B.18 Area of parallelograms and trapezoids
- B.19 Area of compound figures
- B.20 Area and perimeter of irregular figures
- B.21 Area and perimeter: word problems
- B.22 Volume of rectangular prisms made of unit cubes
- B.23 Volume of irregular figures made of unit cubes
- B.24 Volume of cubes and rectangular prisms
- B.25 Surface area
- B.26 Three-dimensional figures viewed from different perspectives
- B.27 Lines of symmetry
- B.28 Rotational symmetry
- B.29 Lines, line segments, and rays
- B.30 Parallel, perpendicular, intersecting
- B.31 Radius, diameter, circumference, and area of a circle
- B.32 Find the unknown angle in triangles and quadrilaterals

#### Decimals

- C.1 What decimal number is illustrated?
- C.2 Understanding decimals expressed in words
- C.3 Place values in decimal numbers

- C.4 Equivalent decimals
- C.5 Round decimals
- C.6 Decimal number lines
- C.7 Compare decimal numbers
- C.8 Put decimal numbers in order
- C.9 Convert fractions to decimals
- C.10 Convert decimals to fractions
- C.11 Compare decimals and fractions
- C.12 Repeating decimals
- C.13 Put assorted decimals, fractions, and mixed numbers in order

#### Addition and subtraction

- D.1 Add and subtract whole numbers up to billions
- D.2 Add and subtract whole numbers: word problems
- D.3 Add and subtract money amounts
- D.4 Add and subtract money: word problems
- D.5 Complete addition and subtraction sentences
- D.6 Fill in the missing digits
- D.7 Choose numbers with a particular sum or difference
- D.8 Properties of addition
- D.9 Inequalities with addition and subtraction
- D.10 Estimate sums and differences of whole numbers
- D.11 Estimate sums and differences: word problems

#### Add and subtract decimals

- E.1 Add and subtract decimal numbers
- E.2 Add and subtract decimals: word problems
- E.3 Choose decimals with a particular sum or difference
- E.4 Complete the addition or subtraction sentence
- E.5 Inequalities with decimal addition and subtraction
- E.6 Estimate sums and differences of decimals

#### Multiplication

- F.1 Multiply by 1-digit numbers

- F.2 Multiply by 1-digit numbers: word problems
- F.3 Multiplication patterns over increasing place values
- F.4 Multiply numbers ending in zeroes
- F.5 Multiply numbers ending in zeroes: word problems
- F.6 Properties of multiplication
- F.7 Choose numbers with a particular product
- F.8 Estimate products
- F.9 Estimate products: word problems
- F.10 Multiply by 2-digit numbers: complete the missing steps
- F.11 Multiply a 2-digit number by a 2-digit number
- F.12 Multiply a 2-digit number by a larger number
- F.13 Multiply by 2-digit numbers: word problems
- F.14 Multiply three or more numbers up to 2 digits each
- F.15 Multiply by 3-digit numbers
- F.16 Multiply three numbers up to 3 digits each
- F.17 Multiply three or more numbers: word problems
- F.18 Inequalities with multiplication

#### Multiply decimals

- G.1 Estimate products of decimals
- G.2 Multiply a decimal by a power of ten
- G.3 Multiply a decimal by a one-digit whole number
- G.4 Multiply a decimal by a multi-digit whole number
- G.5 Multiply decimals and whole numbers: word problems
- G.6 Multiply money amounts: word problems
- G.7 Multiply three or more numbers, one of which is a decimal
- G.8 Multiply two decimals using grids
- G.9 Multiply two decimals

- G.10 Inequalities with decimal multiplication

#### Division

- H.1 Division facts to 12
- H.2 Division facts to 12: word problems
- H.3 Divide multi-digit numbers by 1-digit numbers
- H.4 Divide multi-digit numbers by 1-digit numbers: word problems
- H.5 Divide by 1-digit numbers: interpret remainders
- H.6 Estimate quotients: word problems
- H.7 Division patterns over increasing place values
- H.8 Divide numbers ending in zeroes
- H.9 Divide numbers ending in zeroes: word problems
- H.10 Divide by 2-digit numbers
- H.11 Divide by 2-digit numbers: word problems
- H.12 Divide money amounts: word problems
- H.13 Estimate quotients
- H.14 Choose numbers with a particular quotient

#### Division with decimals

- I.1 Divide by powers of ten
- I.2 Decimal division patterns over increasing place values
- I.3 Division with decimal quotients
- I.4 Division with decimal quotients and rounding
- I.5 Division with decimal quotients: word problems

#### Problem solving

- J.1 Multi-step word problems
- J.2 Word problems with extra or missing information
- J.3 Guess-and-check problems
- J.4 Find the order
- J.5 Use Venn diagrams to solve problems

#### Number theory

- K.1 Prime and composite numbers
- K.2 Prime factorization

- K.3 Prime factorization with exponents
- K.4 Divisibility rules
- K.5 Divisibility rules: word problems
- K.6 Greatest common factor
- K.7 Least common multiple

#### Fractions and mixed numbers

- L.1 Fractions review
- L.2 Equivalent fractions
- L.3 Reduce fractions to simplest form
- L.4 Convert between improper fractions and mixed numbers
- L.5 Least common denominator
- L.6 Compare fractions and mixed numbers
- L.7 Put fractions in order
- L.8 Arithmetic sequences with fractions
- L.9 Geometric sequences with fractions
- L.10 Round mixed numbers
- L.11 Reciprocals

#### Add and subtract fractions

- M.1 Add and subtract fractions with like denominators
- M.2 Add and subtract fractions with like denominators: word problems
- M.3 Add and subtract mixed numbers with like denominators
- M.4 Add fractions with unlike denominators
- M.5 Subtract fractions with unlike denominators
- M.6 Add and subtract fractions with unlike denominators: word problems
- M.7 Add 3 or more fractions with unlike denominators
- M.8 Add 3 or more fractions: word problems
- M.9 Complete addition and subtraction sentences with fractions
- M.10 Inequalities with addition and subtraction of fractions
- M.11 Estimate sums and differences of mixed numbers
- M.12 Add mixed numbers with unlike denominators

- M.13 Subtract mixed numbers with unlike denominators
- M.14 Add and subtract mixed numbers: word problems
- M.15 Complete addition and subtraction sentences with mixed numbers
- M.16 Inequalities with addition and subtraction of mixed numbers

#### Multiply fractions

- N.1 Multiply fractions by whole numbers
- N.3 Multiply fractions by whole numbers: word problems
- N.4 Multiply fractions by whole numbers: input/output tables
- N.5 Multiply fractions - with models
- N.6 Multiply two fractions
- N.7 Multiply two fractions: word problems
- N.8 Multiply three or more fractions and whole numbers
- N.9 Complete the fraction multiplication sentence
- N.10 Estimate products of mixed numbers
- N.11 Multiply a mixed number by a whole number
- N.12 Multiply a mixed number by a fraction
- N.13 Multiply two mixed numbers
- N.14 Multiply three or more mixed numbers, fractions, and/or whole numbers
- N.15 Multiplication with mixed numbers: word problems
- N.16 Complete the mixed-number multiplication sentence

#### Divide fractions

- O.1 Divide fractions by whole numbers
- O.2 Divide fractions by whole numbers: word problems
- O.3 Divide whole numbers by fractions
- O.4 Divide two fractions

- O.5 Divide fractions and mixed numbers
- O.6 Complete the division sentence
- O.7 Divide fractions and mixed numbers: word problems
- O.8 Recipes with fractions

#### Mixed operations

- P.1 Add, subtract, multiply, and divide whole numbers
- P.2 Add, subtract, multiply, and divide whole numbers: word problems
- P.3 Add, subtract, multiply, and divide decimals
- P.4 Add, subtract, multiply, and divide decimals: word problems
- P.5 Add, subtract, multiply, and divide fractions and mixed numbers
- P.6 Add, subtract, multiply, and divide fractions and mixed numbers: word problems

#### Algebra

- Q.1 Simplify expressions using order of operations and parentheses
- Q.2 Write variable expressions
- Q.3 Evaluate variable expressions
- Q.4 Write equations to represent word problems
- Q.5 Solve equations
- Q.7 Function tables
- Q.8 Convert graphs to input/output tables
- Q.9 Write linear functions
- Q.10 Graph linear functions
- Q.11 Evaluate functions
- Q.12 Write multiplication expressions using exponents
- Q.13 Evaluate exponent expressions
- Q.14 Complete the exponent expression

#### Coordinate graphs

- R.1 Coordinate graphs review - whole numbers only
- R.2 Coordinate graphs with decimals and negative numbers
- R.3 Graph points on a coordinate plane

- R.4 Coordinate graphs as maps
- R.5 Relative coordinates: follow directions
- R.6 Quadrants

#### Data, charts, and graphs

- S.1 Read a table
- S.2 Interpret line graphs
- S.3 Create line graphs
- S.4 Interpret bar graphs
- S.5 Create bar graphs
- S.6 Interpret pictographs
- S.7 Create pictographs
- S.8 Interpret histograms
- S.9 Create histograms
- S.10 Interpret line plots
- S.11 Create line plots
- S.12 Frequency charts
- S.13 Stem-and-leaf plots
- S.14 Circle graphs
- S.15 Choose the best type of graph

#### Patterns

- T.1 Geometric growth patterns
- T.2 Increasing growth patterns
- T.3 Patterns involving addition and multiplication
- T.4 Numeric patterns: word problems
- T.5 Mixed patterns review

#### Consumer math

- U.1 Price lists
- U.2 Unit prices
- U.3 Sale prices

#### Ratios, proportions, and percents

- V.1 Determine the ratio
- V.2 Ratio tables
- V.3 Ratios: word problems
- V.4 Equivalent ratios
- V.5 Proportions
- V.6 Unit rates and equivalent rates
- V.7 Scale drawings
- V.8 What percentage is illustrated?
- V.9 Convert between percents, fractions, and decimals
- V.10 Percent of a number
- V.11 Percent of a number: word problems

- V.12 Compare percentages

#### Measurement

- W.1 Choose the appropriate customary unit of measure
- W.2 Choose the appropriate metric unit of measure
- W.3 Compare and convert customary units
- W.4 Compare and convert metric units
- W.5 Compare customary units by multiplying
- W.6 Convert customary units involving fractions
- W.7 Convert mixed customary units
- W.8 Add and subtract mixed customary units
- W.9 Convert between metric and customary units
- W.10 Reasonable temperature - Celsius and Fahrenheit

#### Time

- X.1 Convert time units
- X.2 Add and subtract mixed time units
- X.3 Time zones
- X.4 Elapsed time
- X.5 Find start and end times: word problems
- X.6 Schedules and time lines
- X.7 Time patterns

#### Probability and statistics

- Y.1 Calculate mean, median, mode, and range
- Y.2 Mean, median, mode, and range: find the missing number
- Y.3 Interpret charts to find mean, median, mode, and range
- Y.4 Calculate probability
- Y.5 Make predictions
- Y.6 Combinations
- Y.7 Probabilities of compound events

## 6<sup>th</sup> Grade Math Skills

#### Whole numbers

- A.1 Place values in whole numbers
- A.2 Word names for numbers
- A.3 Roman numerals

#### Decimal numbers

- B.1 What decimal number is illustrated?
- B.2 Decimal place values
- B.3 Word names for decimal numbers
- B.4 Convert decimals to mixed numbers
- B.5 Put decimal numbers in order
- B.6 Inequalities with decimals
- B.7 Round decimals
- B.8 Round whole numbers and decimals: find the missing digit
- B.9 Decimal number lines

#### Integers

- C.1 Understanding integers
- C.2 Absolute value and opposite integers
- C.3 Number lines with integers
- C.4 Compare and order integers

#### Rational numbers

- D.1 Compare rational numbers
- D.2 Put rational numbers in order
- D.3 Absolute value of rational numbers
- D.4 Add and subtract rational numbers
- D.5 Multiply and divide rational numbers

#### Exponents and square roots

- E.1 Write multiplication expressions using exponents
- E.2 Evaluate exponents
- E.3 Exponents: solve for the variable
- E.4 Exponents with decimal bases
- E.5 Exponents with fractional bases
- E.6 Understanding negative exponents
- E.7 Evaluate negative exponents
- E.8 Advanced exponents
- E.9 Square roots of perfect squares
- E.10 Estimate square roots

#### Money

- F.1 Find the number of each type of coin
- F.2 Add and subtract money amounts

- F.3 Add and subtract money amounts: word problems
- F.4 Multiply money by whole numbers and decimals
- F.5 Multiply money: word problems
- F.6 Divide money amounts
- F.7 Divide money amounts: word problems

#### Consumer math

- G.1 Which is the better coupon?
- G.2 Unit prices: which is the better buy?
- G.3 Unit prices with fractions and decimals
- G.4 Unit prices with customary unit conversions
- G.5 Sale prices
- G.6 Sale prices: find the original price
- G.7 Percents - calculate tax, tip, mark-up, and more
- G.8 Simple interest

#### Time

- H.1 Elapsed time
- H.2 Time units
- H.3 Find start and end times

#### Add and subtract integers

- I.1 Review - add and subtract whole numbers
- I.2 Review - add and subtract whole numbers: word problems
- I.3 Properties of addition
- I.4 Integer addition and subtraction rules
- I.5 Add integers - using counters
- I.6 Add integers
- I.7 Subtract integers - using counters
- I.8 Subtract integers
- I.9 Add and subtract integers - input/output tables
- I.10 Add three or more integers

#### Add and subtract decimals

- J.1 Add and subtract decimal numbers
- J.2 Add and subtract decimals: word problems

- J.3 Estimate sums and differences of decimals

- J.4 Maps with decimal distances

#### Multiplication

- K.1 Multiply whole numbers
- K.2 Multiply whole numbers: word problems
- K.3 Multiply whole numbers with four or more digits
- K.4 Multiply numbers ending in zeroes
- K.5 Multiply numbers ending in zeroes: word problems
- K.6 Multiply three or more numbers
- K.7 Multiply three or more numbers: word problems
- K.8 Estimate products
- K.9 Properties of multiplication
- K.10 Solve for a variable using properties of multiplication
- K.11 Integer multiplication rules
- K.12 Multiply integers

#### Division

- L.1 Divisibility rules
- L.2 Division patterns with zeroes
- L.3 Divide numbers ending in zeroes: word problems
- L.4 Estimate quotients
- L.5 Divide whole numbers - 2-digit divisors
- L.6 Divide whole numbers - 3-digit divisors
- L.7 Integer division rules
- L.8 Divide integers

#### Problem solving and estimation

- M.1 Estimate to solve word problems
- M.2 Word problems with multiple steps or extra or missing information
- M.3 Guess-and-check word problems
- M.4 Distance/direction to starting point
- M.5 Use logical reasoning to find the order

#### Number theory

- N.1 Convert between standard and scientific notation

- N.2 Compare numbers written in scientific notation
- N.3 Prime or composite
- N.4 Identify factors
- N.5 Prime factorization
- N.6 Prime factorization with exponents
- N.7 Greatest common factor
- N.8 Least common multiple
- N.9 GCF and LCM: word problems

#### Multiply and divide decimals

- O.1 Multiply decimals
- O.2 Estimate products of decimal numbers
- O.3 Inequalities with decimal multiplication
- O.4 Divide decimals by whole numbers
- O.5 Divide decimals by whole numbers: word problems
- O.6 Multiply and divide decimals by powers of ten
- O.7 Division with decimal quotients
- O.8 Inequalities with decimal division
- O.9 Evaluate expressions involving decimals

#### Algebra

- P.1 Write variable expressions to represent word problems
- P.2 Evaluate variable expressions with whole numbers
- P.3 Solve word problems involving two-variable equations
- P.4 Evaluate variable expressions involving decimals, fractions, and mixed numbers
- P.5 Solve one-step equations with whole numbers
- P.6 Solve one-step equations involving decimals, fractions, and mixed numbers
- P.7 Evaluate multi-variable expressions
- P.8 Solve two-step equations
- P.9 Complete a function table
- P.10 Write linear functions
- P.11 Linear function word problems

- P.12 Evaluate expressions involving integers
- P.13 Solve equations involving integers
- P.14 Does (x, y) satisfy an equation?
- P.15 Identify terms, coefficients, and monomials
- P.16 Add and subtract like terms
- P.17 Simplify variable expressions using properties
- P.18 Distributive property
- P.19 Solve equations involving like terms
- P.20 Half-life and population doubling
- P.21 Inequalities on number lines
- P.22 Solutions to variable inequalities
- P.23 Solve one-step linear inequalities

#### Coordinate graphing

- Q.1 Coordinate graphs review
- Q.2 Graph points on a coordinate plane
- Q.3 Coordinate graphs as maps
- Q.4 Distance between two points
- Q.5 Find points on a function graph
- Q.6 Write the linear function shown in a graph
- Q.7 Graph linear functions
- Q.8 Relative coordinates
- Q.9 Identify linear and nonlinear functions

#### Charts and graphs

- R.1 Interpret pictographs
- R.2 Create pictographs
- R.3 Stem-and-leaf plots
- R.4 Interpret line plots
- R.5 Create line plots
- R.6 Create frequency tables
- R.7 Interpret bar graphs
- R.8 Create bar graphs
- R.9 Interpret double bar graphs
- R.10 Create double bar graphs
- R.11 Create histograms
- R.12 Circle graphs with fractions
- R.13 Interpret line graphs
- R.14 Create line graphs
- R.15 Interpret double line graphs
- R.16 Create double line graphs

- R.17 Interpret box-and-whisker plots
- R.18 Choose the best type of graph

#### Statistics

- S.1 Calculate mean, median, mode, and range
- S.2 Interpret charts to find mean, median, mode, and range
- S.3 Mean, median, mode, and range: find the missing number
- S.4 Identify representative, random, and biased samples

#### Fractions and mixed numbers

- T.1 Fractions and mixed numbers review
- T.2 Equivalent fractions review
- T.3 Simplify fractions
- T.4 Understanding fractions: word problems
- T.5 Least common denominator
- T.6 Compare fractions with like and unlike denominators
- T.7 Compare fractions: word problems
- T.8 Convert between improper fractions and mixed numbers
- T.9 Convert between decimals and fractions or mixed numbers
- T.10 Put a mix of decimals, fractions, and mixed numbers in order

#### Add and subtract fractions

- U.1 Add and subtract fractions with like denominators
- U.2 Add and subtract fractions with like denominators: word problems
- U.3 Add and subtract fractions with unlike denominators
- U.4 Add and subtract fractions with unlike denominators: word problems
- U.5 Inequalities with addition and subtraction of like and unlike fractions
- U.6 Add and subtract mixed numbers
- U.7 Add and subtract mixed numbers: word problems
- U.8 Estimate sums and differences of mixed numbers
- U.9 Maps with fractional distances

#### Multiply fractions

- V.1 Fractions of whole numbers
- V.3 Fractions of a number: word problems
- V.4 Estimate products of fractions and whole numbers
- V.5 Multiply fractions - with models
- V.6 Multiply two fractions
- V.7 Multiply fractions: word problems
- V.8 Multiply three or more fractions and whole numbers
- V.9 Estimate products of fractions, whole numbers, and mixed numbers
- V.10 Multiply mixed numbers and whole numbers
- V.11 Multiply mixed numbers
- V.12 Multiply mixed numbers: word problems
- V.13 Multiply three or more mixed numbers, fractions, and/or whole numbers

#### Divide fractions

- W.1 Divide by fractions - with models
- W.2 Reciprocals
- W.3 Divide fractions
- W.4 Estimate quotients when dividing mixed numbers
- W.5 Divide fractions and mixed numbers
- W.6 Divide fractions and mixed numbers: word problems
- W.7 Simplify expressions involving fractions
- W.8 Recipes with fractions and mixed numbers

#### Mixed operations

- X.1 Add, subtract, multiply, and divide whole numbers
- X.2 Add, subtract, multiply, and divide whole numbers: word problems
- X.3 Add, subtract, multiply, and divide integers
- X.4 Add, subtract, multiply, and divide decimals



- X.5 Add, subtract, multiply, and divide decimals: word problems
- X.6 Add, subtract, multiply, and divide fractions and mixed numbers
- X.7 Add, subtract, multiply, and divide fractions and mixed numbers: word problems

#### Measurement

- Y.1 Estimate customary measurements
- Y.2 Estimate metric measurements
- Y.3 Convert and compare customary units
- Y.4 Convert, compare, add, and subtract mixed customary units
- Y.5 Multiply and divide mixed customary units
- Y.6 Customary unit conversions involving fractions and mixed numbers
- Y.7 Convert and compare metric units
- Y.8 Convert between customary and metric systems
- Y.9 Working with temperatures above and below zero
- Y.10 Convert between Celsius and Fahrenheit

#### Geometry

- Z.1 Lines, line segments, and rays
- Z.2 Review of 2- and 3-dimensional figures
- Z.3 Angle review: measure and classify
- Z.4 Estimate angle measurements
- Z.5 Name angles
- Z.6 Complementary and supplementary angles
- Z.7 Transversal of parallel lines
- Z.8 Triangle review
- Z.9 Classify quadrilaterals
- Z.10 Find missing angles and side lengths in triangles and quadrilaterals
- Z.11 Sums of angles in polygons
- Z.12 Parts of a circle
- Z.13 Central angles of circles
- Z.14 Similar and congruent figures
- Z.15 Find side lengths of similar figures

- Z.16 Reflection, rotation, and translation
- Z.17 Translations: graph the image
- Z.18 Reflections: graph the image
- Z.19 Rotations: graph the image
- Z.20 Symmetry
- Z.21 Find lengths and measures of bisected lines and angles
- Z.22 Perimeter
- Z.23 Area
- Z.24 Area of compound figures
- Z.25 Rectangles: relationship between perimeter and area
- Z.26 Compare area and perimeter of two figures
- Z.27 Circles: calculate area, circumference, radius, and diameter
- Z.28 Circles: word problems
- Z.29 Identify polyhedra and count faces, edges, and vertices
- Z.30 Which figure is being described?
- Z.31 Front, side, and top view
- Z.32 Nets of 3-dimensional figures
- Z.33 Volume and surface area

#### Ratios, proportions, and percents

- AA.1 Write a ratio to describe objects in a picture
- AA.2 Ratio tables
- AA.3 Ratios: word problems
- AA.4 Equivalent ratios
- AA.5 Equivalent ratios: word problems
- AA.6 Compare ratios: word problems
- AA.7 Proportions
- AA.8 Unit rates and equivalent rates
- AA.9 Unit rates: word problems
- AA.10 Scale drawings
- AA.11 Convert between percents, fractions, and decimals
- AA.12 Compare percents to each other and to fractions
- AA.13 Compare percents and fractions: word problems
- AA.14 Percents of numbers and money amounts

- AA.15 Percents of numbers: word problems
- AA.16 Percents of numbers - with fractional and decimal percents
- AA.17 Find what percent one number is of another
- AA.18 Find what percent one number is of another: word problems

#### Probability

- BB.1 Combinations
- BB.2 Probability of one event

- BB.3 Make predictions
- BB.4 Probability of opposite, mutually exclusive, and overlapping events
- BB.5 Compound events - find the number of outcomes by counting
- BB.6 Identify dependent and independent events
- BB.7 Probability of dependent and independent events
- BB.8 Factorials
- BB.9 Permutations

## 7<sup>th</sup> Grade Math Skills

#### Number theory

- A.1 Prime or composite
- A.2 Prime factorization
- A.3 Multiplicative inverses
- A.4 Divisibility rules
- A.5 Greatest common factor
- A.6 Least common multiple
- A.7 GCF and LCM: word problems
- A.8 Scientific notation
- A.9 Compare numbers written in scientific notation
- A.10 Classify numbers

#### Decimal numbers

- B.1 Decimal numbers review
- B.2 Compare and order decimals
- B.3 Decimal number lines
- B.4 Round decimals

#### Operations with decimals

- C.1 Add and subtract decimals
- C.2 Add and subtract decimals: word problems
- C.3 Multiply decimals
- C.4 Multiply decimals and whole numbers: word problems
- C.5 Divide decimals
- C.6 Divide decimals by whole numbers: word problems
- C.7 Estimate sums, differences, and products of decimals
- C.8 Add, subtract, multiply, and divide decimals: word problems

- C.9 Multi-step inequalities with decimals
- C.10 Maps with decimal distances
- C.11 Simplify expressions involving decimals

#### Integers

- D.1 Understanding integers
- D.2 Integers on number lines
- D.3 Absolute value and opposite integers
- D.4 Compare and order integers
- D.5 Integer inequalities with absolute values

#### Operations with integers

- E.1 Integer addition and subtraction rules
- E.2 Add and subtract integers using counters
- E.3 Add and subtract integers
- E.4 Complete addition and subtraction sentences with integers
- E.5 Add and subtract integers: word problems
- E.6 Integer multiplication and division rules
- E.7 Multiply and divide integers
- E.8 Complete multiplication and division sentences with integers
- E.9 Simplify expressions involving integers

#### Fractions and mixed numbers

- F.1 Equivalent fractions

- F.2 Simplify fractions
- F.3 Understanding fractions
- F.4 Least common denominator
- F.5 Compare and order fractions
- F.6 Compare fractions: word problems
- F.7 Convert between mixed numbers and improper fractions
- F.8 Compare mixed numbers and improper fractions
- F.9 Round mixed numbers

#### Operations with fractions

- G.1 Add and subtract fractions
- G.2 Add and subtract fractions: word problems
- G.3 Add and subtract mixed numbers
- G.4 Add and subtract mixed numbers: word problems
- G.5 Inequalities with addition and subtraction of fractions and mixed numbers
- G.6 Estimate sums and differences of mixed numbers
- G.7 Multiply fractions
- G.8 Multiply fractions and whole numbers
- G.9 Multiply mixed numbers
- G.10 Multiply fractions and mixed numbers: word problems
- G.11 Divide fractions
- G.12 Divide mixed numbers
- G.13 Divide fractions and mixed numbers: word problems
- G.14 Estimate products and quotients of fractions and mixed numbers
- G.15 Add, subtract, multiply, and divide fractions and mixed numbers: word problems
- G.16 Maps with fractional distances

#### Rational numbers

- H.1 Identify rational numbers
- H.2 Convert between decimals and fractions or mixed numbers
- H.3 Absolute value of rational numbers
- H.4 Compare rational numbers
- H.5 Put rational numbers in order

- H.6 Add and subtract rational numbers
- H.7 Multiply and divide rational numbers

#### Exponents and square roots

- I.1 Understanding exponents
- I.2 Evaluate exponents
- I.3 Exponents: solve for the variable
- I.4 Exponents with negative bases
- I.5 Exponents with decimal and fractional bases
- I.6 Understanding negative exponents
- I.7 Evaluate negative exponents
- I.8 Simplify expressions involving exponents
- I.9 Square roots of perfect squares
- I.10 Estimate square roots

#### Ratios and proportions

- J.1 Understanding ratios
- J.2 Equivalent ratios
- J.3 Equivalent ratios: word problems
- J.4 Compare ratios: word problems
- J.5 Unit rates
- J.6 Do the ratios form a proportion?
- J.7 Do the ratios form a proportion: word problems
- J.8 Solve proportions
- J.9 Solve proportions: word problems
- J.10 Estimate population size using proportions
- J.11 Rate of change
- J.12 Constant rate of change
- J.13 Scale drawings and scale factors

#### Percents

- K.1 What percentage is illustrated?
- K.2 Convert between percents, fractions, and decimals
- K.3 Compare percents to fractions and decimals
- K.4 Estimate percents of numbers
- K.5 Percents of numbers and money amounts
- K.6 Percents of numbers: word problems
- K.7 Solve percent equations

- K.8 Solve percent equations: word problems
- K.9 Percent of change
- K.10 Percent of change: word problems

#### Consumer math

- L.1 Add, subtract, multiply, and divide money amounts: word problems
- L.2 Price lists
- L.3 Unit prices
- L.4 Unit prices with unit conversions
- L.5 Unit prices: find the total price
- L.6 Percent of a number: tax, discount, and more
- L.7 Find the percent: tax, discount, and more
- L.8 Sale prices: find the original price
- L.9 Multi-step problems with percents
- L.10 Estimate tips
- L.11 Simple interest
- L.12 Compound interest

#### Problem solving and estimation

- M.1 Estimate to solve word problems
- M.2 Multi-step word problems
- M.3 Guess-and-check word problems
- M.4 Use Venn diagrams to solve problems
- M.5 Find the number of each type of coin
- M.6 Elapsed time word problems

#### Measurement

- N.1 Estimate customary measurements
- N.2 Estimate metric measurements
- N.3 Compare and convert customary units
- N.4 Mixed customary units
- N.5 Compare and convert metric units
- N.6 Convert between customary and metric systems
- N.7 Precision
- N.8 Celsius and Fahrenheit temperatures

#### Charts and graphs

- O.1 Interpret tables
- O.2 Interpret line plots
- O.3 Create line plots

- O.4 Interpret stem-and-leaf plots
- O.5 Interpret bar graphs
- O.6 Create bar graphs
- O.7 Interpret histograms
- O.8 Create histograms
- O.9 Create frequency charts
- O.10 Interpret circle graphs
- O.11 Circle graphs and central angles
- O.12 Interpret line graphs
- O.13 Create line graphs
- O.14 Interpret box-and-whisker plots
- O.15 Scatter plots
- O.16 Choose the best type of graph

#### Geometry

- P.1 Lines, line segments, and rays
- P.2 Parallel, perpendicular, intersecting
- P.3 Name, measure, and classify angles
- P.4 Identify complementary, supplementary, vertical, adjacent, and congruent angles
- P.5 Find measures of complementary, supplementary, vertical, and adjacent angles
- P.6 Transversal of parallel lines
- P.7 Classify triangles
- P.8 Classify quadrilaterals
- P.9 Find missing angles in triangles and quadrilaterals
- P.10 Identify and classify polygons
- P.11 Interior angles of polygons
- P.12 Similar and congruent figures
- P.13 Similar figures: side lengths and angle measures
- P.14 Similar figures and indirect measurement
- P.15 Congruent figures: side lengths and angle measures
- P.16 Congruence statements and corresponding parts
- P.17 Perimeter
- P.18 Area of rectangles and parallelograms
- P.19 Area of triangles and trapezoids
- P.20 Area and perimeter: word problems

- P.21 Parts of a circle
- P.22 Circles: calculate area, circumference, radius, and diameter
- P.23 Circles: word problems
- P.24 Find lengths and measures of bisected lines and angles
- P.25 Front, side, and top view
- P.26 Names and bases of 3-dimensional figures
- P.27 Nets of 3-dimensional figures
- P.28 Surface area
- P.29 Volume
- P.30 Perimeter, area, and volume: changes in scale

#### Transformations

- Q.1 Identify reflections, rotations, and translations
- Q.2 Translations: graph the image
- Q.3 Translations: find the coordinates
- Q.4 Reflections: graph the image
- Q.5 Reflections: find the coordinates
- Q.6 Rotations: graph the image
- Q.7 Rotations: find the coordinates
- Q.8 Symmetry

#### Pythagorean theorem

- R.1 Pythagorean theorem: find the length of the hypotenuse
- R.2 Pythagorean theorem: find the missing leg length
- R.3 Pythagorean theorem: word problems
- R.4 Converse of the Pythagorean theorem: is it a right triangle?

#### Coordinate graphs

- S.1 Points on coordinate graphs
- S.2 Quadrants and axes
- S.3 Coordinate graphs as maps

#### Number sequences

- T.1 Identify arithmetic and geometric sequences
- T.2 Arithmetic sequences
- T.3 Geometric sequences
- T.4 Number sequences: mixed review
- T.5 Number sequences: word problems

- T.6 Evaluate variable expressions for number sequences
- T.7 Write variable expressions for arithmetic sequences

#### Variable expressions

- U.1 Write variable expressions
- U.2 Evaluate single-variable expressions
- U.4 Evaluate multi-variable expressions
- U.5 Evaluate variable expressions for numerators and denominators
- U.6 Add and subtract like terms

#### Single-variable equations

- V.1 Does x satisfy the equation?
- V.2 Model and solve equations using algebra tiles
- V.3 Solve one-step linear equations
- V.4 Solve two-step linear equations
- V.5 Solve equations involving like terms

#### Inequalities

- W.1 Inequalities on number lines
- W.2 Solutions to variable inequalities
- W.3 Graph inequalities on number lines
- W.4 Solve one-step linear inequalities
- W.5 Graph solutions to one-step linear inequalities
- W.6 Solve two-step linear inequalities
- W.7 Graph solutions to two-step linear inequalities

#### Linear functions

- X.1 Identify proportional relationships
- X.2 Find the constant of variation
- X.3 Does (x, y) satisfy the equation?
- X.4 Evaluate a function
- X.5 Complete a function table
- X.6 Write a rule for a function table
- X.7 Find points on a function graph
- X.8 Graph a line from a function table
- X.9 Graph a line from an equation
- X.10 Linear function word problems
- X.11 Find the slope of a graph
- X.12 Find slope from two points
- X.13 Find slope from an equation

- X.14 Graph a line using slope
- X.15 Identify linear and nonlinear functions

#### Properties

- Y.1 Properties of addition and multiplication
- Y.2 Distributive property
- Y.3 Simplify variable expressions using properties
- Y.4 Solve equations using properties

#### Probability

- Z.1 Probability of simple events
- Z.2 Probability of opposite, mutually exclusive, and overlapping events
- Z.3 Experimental probability
- Z.4 Make predictions
- Z.5 Compound events: find the number of outcomes
- Z.6 Identify independent and dependent events

- Z.7 Probability of independent and dependent events
- Z.8 Factorials
- Z.9 Permutations
- Z.10 Counting principle
- Z.11 Combination and permutation notation

#### Statistics

- AA.1 Calculate mean, median, mode, and range
- AA.2 Interpret charts to find mean, median, mode, and range
- AA.3 Mean, median, mode, and range: find the missing number
- AA.4 Changes in mean, median, mode, and range
- AA.5 Identify representative, random, and biased samples

## 8<sup>th</sup> Grade Math Skills

#### Number theory

- A.1 Factors
- A.2 Divisibility rules
- A.3 Prime or composite
- A.4 Prime factorization
- A.5 Greatest common factor
- A.6 Least common multiple
- A.7 GCF and LCM: word problems
- A.8 Classify numbers

#### Integers

- B.1 Integers on number lines
- B.2 Absolute value and opposite integers
- B.3 Compare and order integers
- B.4 Integer inequalities with absolute values

#### Operations with integers

- C.1 Integer addition and subtraction rules
- C.2 Add and subtract integers using counters
- C.3 Add and subtract integers

- C.4 Add and subtract three or more integers
- C.5 Add and subtract integers: word problems
- C.6 Integer multiplication and division rules
- C.7 Multiply and divide integers
- C.8 Simplify expressions involving integers and absolute values
- C.9 Evaluate variable expressions with integers and absolute values

#### Rational numbers

- D.1 Identify rational and irrational numbers
- D.2 Simplify fractions
- D.3 Least common denominator
- D.4 Round decimals and mixed numbers
- D.5 Absolute value of rational numbers
- D.6 Convert between decimals and fractions or mixed numbers
- D.7 Compare rational numbers
- D.8 Put rational numbers in order

## Operations with rational numbers

- E.1 Reciprocals and multiplicative inverses
- E.2 Add and subtract rational numbers
- E.3 Add and subtract rational numbers: word problems
- E.4 Multiply and divide rational numbers
- E.5 Multiply and divide rational numbers: word problems
- E.6 Simplify expressions involving rational numbers
- E.7 Evaluate variable expressions involving rational numbers

## Exponents and roots

- F.1 Understanding exponents
- F.2 Evaluate exponents
- F.3 Exponents: solve for the variable
- F.4 Exponents with negative bases
- F.5 Exponents with decimal and fractional bases
- F.6 Understanding negative exponents
- F.7 Evaluate negative exponents
- F.8 Multiplication with exponents
- F.9 Division with exponents
- F.10 Multiplication and division with exponents
- F.11 Power rule
- F.12 Simplify expressions involving exponents
- F.13 Square roots of perfect squares
- F.14 Positive and negative square roots
- F.15 Estimate positive and negative square roots
- F.16 Relationship between squares and square roots
- F.17 Evaluate variable expressions involving squares and square roots
- F.18 Cube roots of perfect cubes
- F.19 Estimate cube roots

## Scientific notation

- G.1 Convert between standard and scientific notation
- G.2 Compare numbers written in scientific notation

- G.3 Multiply numbers written in scientific notation
- G.4 Divide numbers written in scientific notation

## Ratios and proportions

- H.1 Understanding ratios
- H.2 Equivalent ratios
- H.3 Equivalent ratios: word problems
- H.4 Compare ratios: word problems
- H.5 Unit rates
- H.6 Do the ratios form a proportion?
- H.7 Do the ratios form a proportion: word problems
- H.8 Solve proportions
- H.9 Solve proportions: word problems
- H.10 Estimate population size using proportions
- H.11 Rate of change
- H.12 Constant rate of change
- H.13 Scale drawings and scale factors

## Proportional relationships

- I.1 Identify proportional relationships
- I.2 Find the constant of variation: graphs
- I.3 Find the constant of variation: word problems
- I.4 Graph a proportional relationship
- I.5 Write an equation for a proportional relationship
- I.6 Proportional relationships: word problems

## Percents

- J.1 Convert between percents, fractions, and decimals
- J.2 Compare percents to fractions and decimals
- J.3 Find what percent one number is of another
- J.4 Find what percent one number is of another: word problems
- J.5 Estimate percents of numbers
- J.6 Percents of numbers and money amounts
- J.7 Percents of numbers: word problems
- J.8 Compare percents of numbers

- J.9 Solve percent equations
- J.10 Percent of change
- J.11 Percent of change: word problems

#### Consumer math

- K.1 Price lists
- K.2 Unit prices
- K.3 Unit prices with unit conversions
- K.4 Unit prices: find the total price
- K.5 Percent of a number: tax, discount, and more
- K.6 Find the percent: tax, discount, and more
- K.7 Sale prices: find the original price
- K.8 Multi-step problems with percents
- K.9 Estimate tips
- K.10 Simple interest
- K.11 Compound interest

#### Measurement

- L.1 Convert rates and measurements: customary units
- L.2 Convert rates and measurements: metric units
- L.3 Mixed customary units
- L.4 Convert between customary and metric systems
- L.5 Precision
- L.6 Convert between Celsius and Fahrenheit

#### Problem solving

- M.1 Multi-step word problems
- M.2 Guess-and-check word problems
- M.3 Use Venn diagrams to solve problems
- M.4 Elapsed time word problems

#### Charts and graphs

- N.1 Interpret tables
- N.2 Interpret bar graphs
- N.3 Create bar graphs
- N.4 Interpret line graphs
- N.5 Create line graphs
- N.6 Interpret line plots
- N.7 Create line plots
- N.8 Interpret stem-and-leaf plots
- N.9 Interpret histograms
- N.10 Create histograms

- N.11 Create frequency charts
- N.12 Interpret box-and-whisker plots
- N.13 Scatter plots
- N.14 Interpret circle graphs
- N.15 Circle graphs and central angles
- N.16 Choose the best type of graph

#### Pythagorean theorem

- O.1 Pythagorean theorem: find the length of the hypotenuse
- O.2 Pythagorean theorem: find the missing leg length
- O.3 Pythagorean theorem: find the perimeter
- O.4 Pythagorean theorem: word problems
- O.5 Converse of the Pythagorean theorem: is it a right triangle?

#### Coordinate graphs

- P.1 Points on coordinate graphs
- P.2 Quadrants and axes
- P.3 Coordinate graphs as maps
- P.4 Distance between two points

#### Geometry

- Q.1 Identify complementary, supplementary, vertical, adjacent, and congruent angles
- Q.2 Find measures of complementary, supplementary, vertical, and adjacent angles
- Q.3 Transversal of parallel lines
- Q.4 Classify triangles
- Q.5 Classify quadrilaterals
- Q.6 Find missing angles in triangles and quadrilaterals
- Q.7 Identify and classify polygons
- Q.8 Interior angles of polygons
- Q.9 Similar and congruent figures
- Q.10 Similar figures: side lengths and angle measures
- Q.11 Congruent figures: side lengths and angle measures
- Q.12 Congruence statements and corresponding parts
- Q.13 Congruent triangles: SSS, SAS, and ASA



- Q.14 Perimeter
- Q.15 Area
- Q.16 Area and perimeter: word problems
- Q.17 Parts of a circle
- Q.18 Circles: calculate area, circumference, radius, and diameter
- Q.19 Circles: word problems
- Q.20 Find lengths and measures of bisected lines and angles
- Q.21 Front, side, and top view
- Q.22 Base plans
- Q.23 Names and parts of 3-dimensional figures
- Q.24 Nets of 3-dimensional figures
- Q.25 Surface area of prisms and cylinders
- Q.26 Surface area of pyramids and cones
- Q.27 Volume of prisms and cylinders
- Q.28 Volume of pyramids and cones
- Q.29 Volume and surface area of spheres
- Q.30 Similar solids
- Q.31 Volume and surface area of similar solids
- Q.32 Perimeter, area, and volume: changes in scale

#### Transformations

- R.1 Identify reflections, rotations, and translations
- R.2 Translations: graph the image
- R.3 Translations: find the coordinates
- R.4 Reflections: graph the image
- R.5 Reflections: find the coordinates
- R.6 Rotations: graph the image
- R.7 Rotations: find the coordinates
- R.8 Dilations: graph the image
- R.9 Dilations: find the coordinates
- R.10 Dilations: scale factor and classification
- R.11 Symmetry

#### Number sequences

- S.1 Identify arithmetic and geometric sequences

- S.2 Arithmetic sequences
- S.3 Geometric sequences
- S.4 Number sequences: mixed review
- S.5 Number sequences: word problems
- S.6 Evaluate variable expressions for number sequences
- S.7 Write variable expressions for arithmetic sequences

#### Variable expressions

- T.1 Write variable expressions
- T.2 Write variable expressions to represent diagrams
- T.3 Identify terms and coefficients
- T.4 Evaluate single-variable expressions
- T.5 Evaluate multi-variable expressions
- T.6 Add and subtract like terms
- T.7 Simplify variable expressions

#### Single-variable equations

- U.1 Does x satisfy the equation?
- U.2 Model and solve equations using algebra tiles
- U.3 Write and solve equations that represent diagrams
- U.4 Solve one-step linear equations
- U.5 Solve two-step linear equations
- U.6 Solve equations involving squares and square roots
- U.7 Solve multi-step equations
- U.8 Solve equations involving like terms
- U.9 Identities and equations with no solutions

#### Linear functions

- V.1 Does (x, y) satisfy the linear equation?
- V.2 Evaluate a linear function
- V.3 Complete a function table
- V.4 Write a rule for a function table
- V.5 Find points on a function graph
- V.6 Graph a line from a function table
- V.7 Graph a line from an equation
- V.8 Linear function word problems
- V.9 Find the slope of a graph
- V.10 Find slope from two points
- V.11 Find slope from an equation

- V.12 Graph a line using slope
- V.13 Slopes of parallel and perpendicular lines

#### Nonlinear functions

- W.1 Identify linear and nonlinear functions
- W.2 Does (x, y) satisfy a nonlinear equation?
- W.3 Evaluate a nonlinear function

#### Inequalities

- X.1 Inequalities on number lines
- X.2 Solutions to variable inequalities
- X.3 Graph inequalities on number lines
- X.4 Solve one-step linear inequalities
- X.5 Graph solutions to one-step linear inequalities
- X.6 Solve two-step linear inequalities
- X.7 Graph solutions to two-step linear inequalities
- X.8 Solve advanced linear inequalities
- X.9 Graph solutions to advanced linear inequalities

#### Systems of linear equations

- Y.1 Is (x, y) a solution to the system of equations?
- Y.2 Solve a system of equations by graphing
- Y.3 Solve a system of equations by graphing: word problems
- Y.4 Find the number of solutions to a system of equations by graphing
- Y.5 Find the number of solutions to a system of equations
- Y.6 Classify a system of equations by graphing
- Y.7 Classify a system of equations
- Y.8 Solve a system of equations using substitution
- Y.9 Solve a system of equations using substitution: word problems
- Y.10 Solve a system of equations using elimination
- Y.11 Solve a system of equations using elimination: word problems

#### Monomials and polynomials

- Z.1 Identify monomials
- Z.2 Model polynomials with algebra tiles
- Z.3 Add and subtract polynomials using algebra tiles
- Z.4 Add and subtract polynomials
- Z.5 Add polynomials to find perimeter
- Z.6 Multiply monomials
- Z.7 Divide monomials
- Z.8 Multiply and divide monomials
- Z.9 Powers of monomials
- Z.10 Square and cube roots of monomials
- Z.11 Multiply polynomials using algebra tiles
- Z.12 Multiply polynomials
- Z.13 Multiply polynomials to find area

#### Properties

- AA.1 Properties of addition and multiplication
- AA.2 Distributive property
- AA.3 Simplify variable expressions using properties
- AA.4 Properties of equality

#### Probability

- BB.1 Probability of simple events
- BB.2 Probability of opposite, mutually exclusive, and overlapping events
- BB.3 Experimental probability
- BB.4 Make predictions
- BB.5 Compound events: find the number of outcomes
- BB.6 Identify independent and dependent events
- BB.7 Probability of independent and dependent events
- BB.8 Factorials
- BB.9 Permutations
- BB.10 Counting principle
- BB.11 Combination and permutation notation

#### Statistics

- CC.1 Calculate mean, median, mode, and range

- CC.2 Interpret charts to find mean, median, mode, and range
- CC.3 Mean, median, mode, and range: find the missing number

- CC.4 Changes in mean, median, mode, and range
- CC.5 Quartiles
- CC.6 Identify representative, random, and biased samples

## Algebra Skills (HS)

### Numbers

- A.1 Classify numbers
- A.2 Compare and order rational numbers
- A.3 Absolute value and opposites
- A.4 Number lines
- A.5 Convert between decimals and fractions
- A.6 Square roots
- A.7 Cube roots

### Operations

- B.1 Add, subtract, multiply, and divide integers
- B.2 Order of operations with integers
- B.3 Evaluate variable expressions involving integers
- B.4 Add and subtract rational numbers
- B.5 Multiply and divide rational numbers
- B.6 Order of operations with rational numbers
- B.7 Evaluate variable expressions involving rational numbers

### Ratios and proportions

- C.1 Identify equivalent ratios
- C.2 Equivalent ratios: fill in the missing number
- C.3 Unit rates
- C.4 Unit prices
- C.5 Solve proportions
- C.6 Solve proportions: word problems
- C.7 Scale drawings and scale factors

### Percents

- D.1 Convert between percents, fractions, and decimals
- D.2 Solve percent equations
- D.3 Percent word problems
- D.4 Percent of change

- D.5 Percent of change: word problems
- D.6 Percent of a number: tax, discount, and more
- D.7 Find the percent: tax, discount, and more
- D.8 Multi-step problems with percents

### Measurement

- E.1 Convert rates and measurements: customary units
- E.2 Convert rates and measurements: metric units
- E.3 Unit prices with unit conversions
- E.4 Precision
- E.5 Greatest possible error
- E.6 Minimum and maximum area and volume
- E.7 Percent error
- E.8 Percent error: area and volume

### Geometry

- F.1 Perimeter
- F.2 Area
- F.3 Volume
- F.4 Surface area
- F.5 Similar figures: side lengths and angle measures
- F.6 Similar triangles and indirect measurement
- F.7 Dilations and scale factors
- F.8 Area and perimeter of similar figures
- F.9 Similar solids
- F.10 Volume and surface area of similar solids
- F.11 Perimeter, area, and volume: changes in scale
- F.12 Pythagorean theorem
- F.13 Pythagorean theorem: word problems

- F.14 Converse of the Pythagorean theorem: is it a right triangle?
  - F.15 Special right triangles
- Coordinate graphs
- G.1 Coordinate graph review
  - G.2 Midpoints
  - G.3 Distance between two points
- Properties
- H.1 Properties of addition and multiplication
  - H.2 Distributive property
  - H.3 Simplify variable expressions using properties
  - H.4 Properties of equality
- Variable expressions and equations
- I.1 Write variable expressions
  - I.2 Simplify variable expressions involving like terms and the distributive property
  - I.3 Write variable equations
  - I.4 Does x satisfy the equation?
  - I.5 Find solutions from a replacement set
  - I.6 Solve equations using order of operations
- Solve equations
- J.1 Model and solve equations using algebra tiles
  - J.2 Write and solve equations that represent diagrams
  - J.3 Solve one-step linear equations
  - J.4 Solve two-step linear equations
  - J.5 Solve advanced linear equations
  - J.6 Solve equations with variables on both sides
  - J.7 Identities and equations with no solutions
  - J.8 Solve linear equations: word problems
  - J.9 Solve linear equations: mixed review
- Single-variable inequalities
- K.1 Graph inequalities
  - K.2 Write inequalities from graphs
  - K.3 Identify solutions to inequalities
  - K.4 Solve one-step linear inequalities: addition and subtraction
  - K.5 Solve one-step linear inequalities: multiplication and division
  - K.6 Solve one-step linear inequalities
  - K.7 Graph solutions to one-step linear inequalities
  - K.8 Solve two-step linear inequalities
  - K.9 Graph solutions to two-step linear inequalities
  - K.10 Solve advanced linear inequalities
  - K.11 Graph solutions to advanced linear inequalities
  - K.12 Graph compound inequalities
  - K.13 Write compound inequalities from graphs
  - K.14 Solve compound inequalities
  - K.15 Graph solutions to compound inequalities
- Absolute value equations and inequalities
- L.1 Solve absolute value equations
  - L.2 Graph solutions to absolute value equations
  - L.3 Solve absolute value inequalities
  - L.4 Graph solutions to absolute value inequalities
- Matrices
- M.1 Matrix vocabulary
  - M.2 Matrix operation rules
  - M.3 Add and subtract matrices
  - M.4 Multiply a matrix by a scalar
  - M.5 Multiply two matrices
- Charts and graphs
- N.1 Interpret bar graphs, line graphs, and histograms
  - N.2 Create bar graphs, line graphs, and histograms
  - N.3 Circle graphs
  - N.4 Interpret stem-and-leaf plots
  - N.5 Interpret box-and-whisker plots
  - N.6 Interpret a scatter plot
  - N.7 Scatter plots: line of best fit
- Problem solving
- O.1 Word problems: mixed review
  - O.2 Word problems with money

- O.3 Consecutive integer problems
- O.4 Rate of travel: word problems
- O.5 Weighted averages: word problems

#### Number sequences

- P.1 Identify arithmetic and geometric sequences
- P.2 Arithmetic sequences
- P.3 Geometric sequences
- P.4 Evaluate variable expressions for number sequences
- P.5 Write variable expressions for arithmetic sequences
- P.6 Write variable expressions for geometric sequences
- P.7 Number sequences: mixed review

#### Relations and functions

- Q.1 Relations: convert between tables, graphs, mappings, and lists of points
- Q.2 Domain and range of relations
- Q.3 Identify independent and dependent variables
- Q.4 Identify functions
- Q.5 Identify functions: vertical line test
- Q.6 Complete a function table
- Q.7 Evaluate function rules I
- Q.9 Graph a function
- Q.10 Write a function rule: word problems
- Q.11 Find points on a function graph
- Q.12 Write a rule for a function table

#### Direct and inverse variation

- R.1 Identify proportional relationships
- R.2 Find the constant of variation
- R.3 Graph a proportional relationship
- R.4 Write direct variation equations
- R.5 Write and solve direct variation equations
- R.6 Identify direct variation and inverse variation
- R.7 Write inverse variation equations
- R.8 Write and solve inverse variation equations

#### Linear functions

- S.1 Identify linear functions
- S.2 Find the slope of a graph

- S.3 Find slope from two points
- S.4 Slope-intercept form: find slope and y-intercept
- S.5 Slope-intercept form: graph an equation
- S.6 Slope-intercept form: write an equation from a graph
- S.7 Slope-intercept form: write an equation
- S.8 Linear function word problems
- S.9 Write equations in standard form
- S.10 Standard form: find x- and y-intercepts
- S.11 Standard form: graph an equation
- S.12 Equations of horizontal and vertical lines
- S.13 Graph a horizontal or vertical line
- S.14 Point-slope form: graph an equation
- S.15 Point-slope form: write an equation from a graph
- S.16 Point-slope form: write an equation
- S.17 Slopes of parallel and perpendicular lines
- S.18 Write an equation for a parallel or perpendicular line

#### Linear inequalities

- T.1 Does (x, y) satisfy the inequality?
- T.2 Linear inequalities: solve for y
- T.3 Graph a linear inequality in two variables
- T.4 Linear inequalities: word problems
- T.5 Is (x, y) a solution to the system of inequalities?

#### Systems of linear equations

- U.1 Is (x, y) a solution to the system of equations?
- U.2 Solve a system of equations by graphing
- U.3 Solve a system of equations by graphing: word problems
- U.4 Find the number of solutions to a system of equations by graphing

- U.5 Find the number of solutions to a system of equations
- U.6 Classify a system of equations by graphing
- U.7 Classify a system of equations
- U.8 Solve a system of equations using substitution
- U.9 Solve a system of equations using substitution: word problems
- U.10 Solve a system of equations using elimination
- U.11 Solve a system of equations using elimination: word problems
- U.12 Solve a system of equations using augmented matrices
- U.13 Solve a system of equations using augmented matrices: word problems
- U.14 Solve a system of equations using any method
- U.15 Solve a system of equations using any method: word problems

#### Exponents

- V.1 Exponents with integer bases
- V.2 Exponents with decimal and fractional bases
- V.3 Negative exponents
- V.4 Multiplication with exponents
- V.5 Division with exponents
- V.6 Multiplication and division with exponents
- V.7 Power rule
- V.8 Simplify expressions involving exponents

#### Scientific notation

- W.1 Convert between standard and scientific notation
- W.2 Compare numbers written in scientific notation
- W.3 Multiply numbers written in scientific notation
- W.4 Divide numbers written in scientific notation

#### Exponential functions

- X.1 Evaluate an exponential function

- X.2 Match exponential functions and graphs
- X.3 Exponential growth and decay: word problems

#### Monomials

- Y.1 Identify monomials
- Y.2 Multiply monomials
- Y.3 Divide monomials
- Y.4 Multiply and divide monomials
- Y.5 Powers of monomials

#### Polynomials

- Z.1 Polynomial vocabulary
- Z.2 Model polynomials with algebra tiles
- Z.3 Add and subtract polynomials using algebra tiles
- Z.4 Add and subtract polynomials
- Z.5 Add polynomials to find perimeter
- Z.6 Multiply a polynomial by a monomial
- Z.7 Multiply two polynomials using algebra tiles
- Z.8 Multiply two binomials
- Z.9 Multiply two binomials: special cases
- Z.10 Multiply polynomials

#### Factoring

- AA.1 GCF of monomials
- AA.2 Factor out a monomial
- AA.3 Factor quadratics with leading coefficient 1
- AA.4 Factor quadratics with other leading coefficients
- AA.5 Factor quadratics: special cases
- AA.6 Factor by grouping
- AA.7 Factor polynomials

#### Quadratic equations

- BB.1 Characteristics of quadratic functions
- BB.2 Complete a function table: quadratic functions
- BB.3 Solve a quadratic equation using square roots
- BB.4 Solve an equation using the zero product property

- BB.5 Solve a quadratic equation by factoring
- BB.6 Complete the square
- BB.7 Solve a quadratic equation by completing the square
- BB.8 Solve a quadratic equation using the quadratic formula
- BB.9 Using the discriminant

Functions: linear, quadratic, exponential

- CC.1 Identify linear, quadratic, and exponential functions from graphs
- CC.2 Identify linear, quadratic, and exponential functions from tables
- CC.3 Write linear, quadratic, and exponential functions

Absolute value functions

- DD.1 Complete a function table: absolute value functions
- DD.2 Domain and range of absolute value functions
- DD.3 Graph an absolute value function

Radical expressions

- EE.1 Simplify radical expressions
- EE.2 Simplify radical expressions by rationalizing the denominator
- EE.3 Multiply radical expressions
- EE.4 Add and subtract radical expressions
- EE.5 Simplify radical expressions using the distributive property
- EE.6 Simplify radical expressions: mixed review

Radical functions and equations

- FF.1 Evaluate a radical function
- FF.2 Domain and range of radical functions

- FF.3 Solve radical equations

Rational functions and expressions

- GG.1 Rational functions: asymptotes and excluded values
- GG.2 Simplify complex fractions
- GG.3 Simplify rational expressions
- GG.4 Multiply and divide rational expressions
- GG.5 Divide polynomials
- GG.6 Add and subtract rational expressions
- GG.7 Solve rational equations

Logic

- HH.1 Identify hypotheses and conclusions
- HH.2 Counterexamples

Probability

- II.1 Theoretical probability
- II.2 Experimental probability
- II.3 Compound events: find the number of outcomes
- II.4 Identify independent and dependent events
- II.5 Probability of independent and dependent events
- II.6 Permutations
- II.7 Counting principle
- II.8 Permutation and combination notation

Statistics

- JJ.1 Mean, median, mode, and range
- JJ.2 Quartiles
- JJ.3 Identifying biased samples
- JJ.4 Mean absolute deviation
- JJ.5 Variance and standard deviation

## Geometry Math Skills (HS)

Algebra review

- A.1 Ratios and proportions
- A.2 Scale maps and drawings
- A.3 Properties of exponents
- A.4 Simplify radical expressions
- A.5 Write variable expressions and equations

- A.6 Solve linear equations
- A.7 Solve linear inequalities
- A.8 Solve systems of linear equations
- A.9 Solve quadratic equations

Points, lines, and segments

- B.1 Lines, line segments, and rays

- B.2 Lengths of segments on number lines
- B.3 Additive property of length
- B.4 Midpoints
- B.5 Congruent line segments
- B.6 Perpendicular Bisector Theorem
- B.7 Midpoint formula
- B.8 Distance formula

#### Angles

- C.1 Angle vocabulary
- C.2 Angle measures
- C.3 Identify complementary, supplementary, vertical, adjacent, and congruent angles
- C.4 Find measures of complementary, supplementary, vertical, and adjacent angles
- C.5 Angle bisectors

#### Parallel and perpendicular lines

- D.1 Identify parallel, perpendicular, and skew lines and planes
- D.2 Transversals: name angle pairs
- D.3 Transversals of parallel lines: find angle measures

#### Lines in the coordinate plane

- E.1 Coordinate plane review
- E.2 Slopes of lines
- E.3 Graph a linear equation
- E.4 Equations of lines
- E.5 Slopes of parallel and perpendicular lines
- E.6 Equations of parallel and perpendicular lines

#### Introduction to triangles

- F.1 Classify triangles
- F.2 Triangle Angle-Sum Theorem
- F.3 Exterior Angle Theorem

#### Two-dimensional figures

- G.1 Polygon vocabulary
- G.2 Interior angles of polygons
- G.3 Exterior angles of polygons
- G.4 Review: interior and exterior angles of polygons

#### Three-dimensional figures

- H.1 Three-dimensional figure vocabulary
- H.2 Parts of three-dimensional figures
- H.3 Nets and drawings of three-dimensional figures

#### Logic

- I.1 Identify hypotheses and conclusions
- I.2 Counterexamples
- I.3 Truth tables
- I.4 Truth values
- I.5 Conditionals
- I.6 Negations
- I.7 Converses, inverses, and contrapositives
- I.8 Biconditionals

#### Introduction to congruent figures

- J.1 Congruence statements and corresponding parts
- J.2 Solve problems involving corresponding parts
- J.3 Identify congruent figures

#### Congruent triangles

- K.1 SSS and SAS Theorems
- K.2 ASA and AAS Theorems
- K.3 SSS, SAS, ASA, and AAS Theorems
- K.4 Congruency in isosceles and equilateral triangles
- K.5 Hypotenuse-Leg Theorem

#### Transformations

- L.1 Translations: graph the image
- L.2 Translations: find the coordinates
- L.3 Reflections: graph the image
- L.4 Reflections: find the coordinates
- L.5 Rotate polygons about a point
- L.6 Rotations: graph the image
- L.7 Rotations: find the coordinates
- L.8 Classify congruence transformations
- L.9 Compositions of congruence transformations: graph the image
- L.10 Transformations that carry a polygon onto itself
- L.11 Congruence transformations: mixed review
- L.12 Dilations: graph the image



- L.13 Dilations: find the coordinates
- L.14 Dilations: scale factor and classification
- L.15 Dilations and parallel lines

#### Triangles

- M.1 Midsegments of triangles
- M.2 Triangles and bisectors
- M.3 Identify medians, altitudes, angle bisectors, and perpendicular bisectors
- M.4 Triangle Inequality Theorem

#### Quadrilaterals

- N.1 Classify quadrilaterals
- N.2 Properties of parallelograms
- N.3 Proving a quadrilateral is a parallelogram
- N.4 Properties of rhombuses
- N.5 Properties of squares and rectangles
- N.6 Properties of trapezoids
- N.7 Properties of kites
- N.8 Review: properties of quadrilaterals

#### Symmetry

- O.1 Line symmetry
- O.2 Rotational symmetry

#### Similarity

- P.1 Identify similar figures
- P.2 Similarity ratios
- P.3 Similarity statements
- P.4 Side lengths and angle measures in similar figures
- P.5 Similar triangles and indirect measurement
- P.6 Perimeters of similar figures
- P.7 Similarity rules for triangles
- P.8 Similar triangles and similarity transformations
- P.9 Similarity of circles
- P.10 Triangle Proportionality Theorem
- P.11 Areas of similar figures

#### Right triangles

- Q.1 Pythagorean Theorem
- Q.2 Converse of the Pythagorean theorem
- Q.3 Pythagorean Inequality Theorems
- Q.4 Special right triangles

#### Area and perimeter

- R.1 Perimeter
- R.2 Area of rectangles and squares
- R.3 Area of parallelograms and triangles
- R.4 Area of trapezoids
- R.5 Area and perimeter in the coordinate plane
- R.7 Area and circumference of circles
- R.8 Area of compound figures
- R.9 Area and perimeter of similar figures
- R.10 Area and perimeter mixed review

#### Surface area and volume

- S.1 Introduction to surface area and volume
- S.2 Surface area of prisms and cylinders
- S.3 Surface area of pyramids and cones
- S.4 Volume of prisms and cylinders
- S.5 Volume of pyramids and cones
- S.6 Surface area and volume of spheres
- S.7 Introduction to similar solids
- S.8 Surface area and volume of similar solids
- S.9 Surface area and volume review

#### Circles

- T.1 Parts of a circle
- T.2 Central angles
- T.3 Arc measure and arc length
- T.4 Area of sectors
- T.5 Circle measurements: mixed review
- T.6 Arcs and chords
- T.7 Tangent lines
- T.8 Perimeter of polygons with an inscribed circle
- T.9 Inscribed angles
- T.10 Angles in inscribed right triangles
- T.11 Angles in inscribed quadrilaterals

#### Measurement

- U.1 Convert rates and measurements: customary units
- U.2 Convert rates and measurements: metric units

- U.3 Convert square and cubic units of length
- U.4 Precision
- U.5 Greatest possible error
- U.6 Minimum and maximum area and volume
- U.7 Percent error
- U.8 Percent error: area and volume

Probability

- V.1 Theoretical and experimental probability
- V.2 Compound events: find the number of outcomes
- V.3 Independent and dependent events
- V.4 Permutations
- V.5 Counting principle
- V.6 Permutation and combination notation
- V.7 Geometric probability



