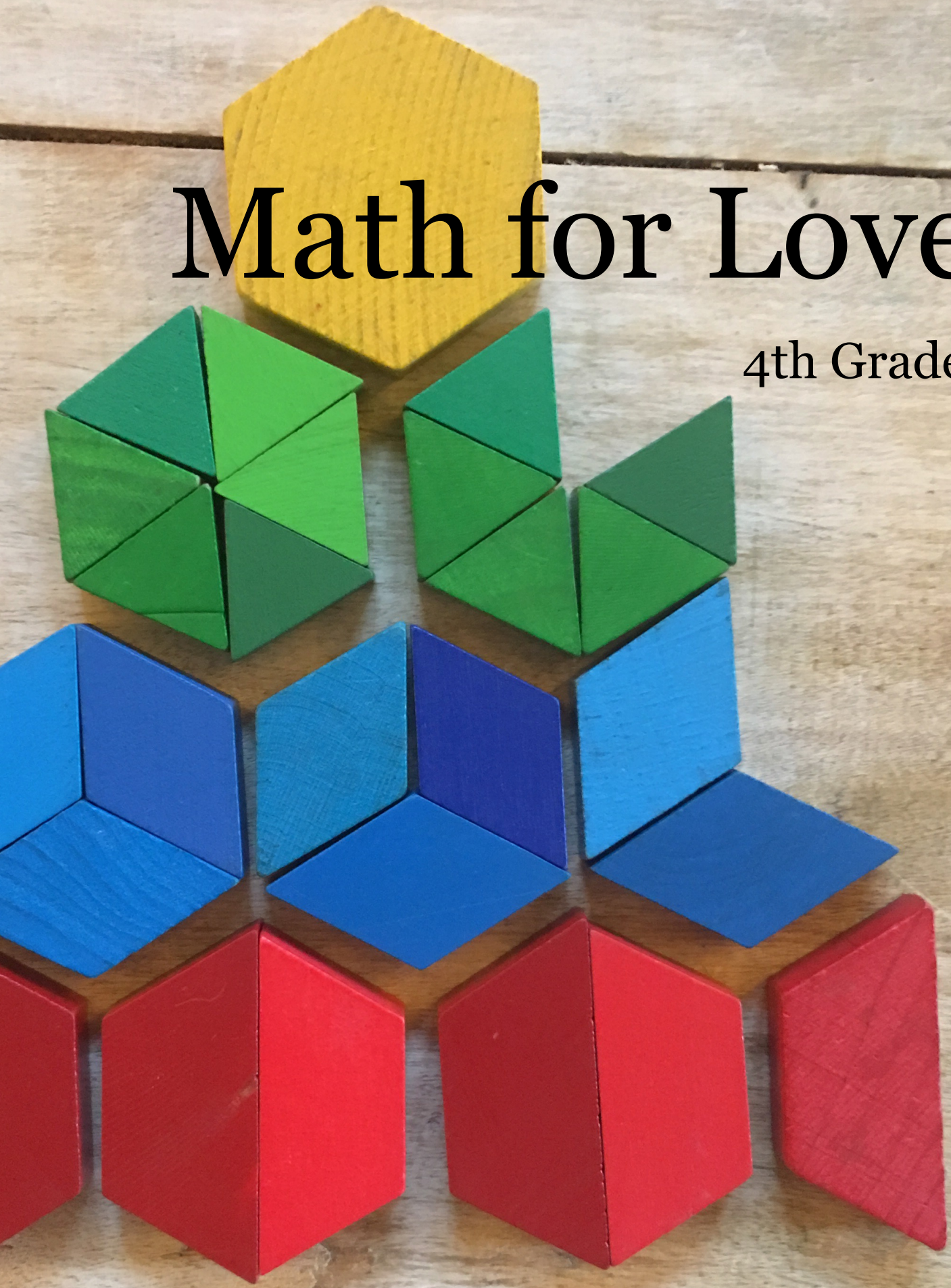
Math for Love

4th Grade



by Dan Finkel & Katherine Cook

Introduction

Welcome to the Math for Love Curriculum! This draft was adapted from a summer program we designed in 2017. The materials are ideal for use in a summer program, or as a supplemental curriculum to provide remediation or enrichment to students.

Goals of the Curriculum

The goals of the program are two-fold:

- Improve student conceptual understanding of mathematics, while exercising skills and fluency
- Give everyone an opportunity to have fun and enjoy math

This curriculum spends ample time exploring conceptual models, giving students opportunities to work concretely and pictorial while making connections to abstract reasoning.

Program Values

The goals of this curriculum are to strengthen student understanding and deepen their enjoyment of math. The values of the program help work toward those goals:

- Students should play, with both games and ideas
- Students should have hands-on experiences, exploring math with manipulatives
- Students should experience math as a meaningful, compelling activity, with multiple ways to approach solving a problem, representing a situation, and developing a strategy.
- Students should have time to think deeply about mathematics.

In short, this curriculum is designed to help you build a classroom where students are *doing math* and *thinking math*.

Teacher's Responsibility

As a teacher in the program, you are tasked with establishing a healthy and dynamic classroom environment where these values are expressed. Your responsibilities are:

1. **Engagement**. Create an classroom where your students spend the bulk of their class time actively engaged in mathematical play and problem-solving.
2. **Differentiation**. Help students encounter problems, games, and activities of the right level of difficulty to create engagement.
3. **Thinking**. Get students thinking as soon as possible every day, and help keep them *productively stuck*, actively working to understand and make meaning in a situation they don't yet fully understand.

4. **Positive Environment**. Help the classroom be a place where students trust themselves, their teacher, and each other, and can make mistakes, ask questions, and grow.

The curriculum is designed to help you in these tasks, and your students and you will get the most out of the summer if you tackle these responsibilities head on. Here are some concrete ideas on how to go about it.

★ **Ask students questions rather than telling them answers**
Rather than telling them whether their answers are correct or not, ask them what they did to solve the problem. Ask them what they think the answer is and why. Invite them to share their thinking with you and their classmates.

★ **Model how to play games, and teach how to win and lose**
Students can sometimes get really attached to winning, and take their wins and losses as deeper signs about themselves. It's best to get ahead of this right away. Talk about how the players of a game are working together to learn about the game, and every loss is a chance to get more information about how to win. Rather than thinking about the other player as your rival, think of them as your collaborator, there to help you learn.

★ **Avoid what doesn't involve math; get students into actual, active thinking situations about mathematics as fast as you can**
Our goal is to make the most of classroom time, and avoid things that use up too much time without much gain in mathematical understanding. Start class right away with a Number Talk or opening game (see the Warm Up in the daily plan). Use the Math Games and Movement Breaks from Appendix 1 for transitions between stations. Establish the classroom as a place where we all are committed to working on improving our understanding of math.

★ **Have a *growth mindset* classroom**
Some of your students will believe that they are just bad at math. They will think this is an unchangeable personality trait. These students have what is known as 'fixed mindset' about math. The truth is that every student can succeed in mathematics, regardless of how they've done in the past. Convey to your students, early and often, that math is something you learn to be good at, not something you just know; how making and learning from mistakes is the key to improving; and how everyone can be good at math if they put in the time and the energy.

★ **Embrace mistakes**
One important way to encourage growth mindset is to embrace mistakes. They are a natural part of learning, and even more than that, they actually help us learn more and help us remember what we've already learned. Model for your students how to make mistakes, and how to use mistakes productively.

★ **Give your students *time* to think and explore**
Remember that many of the students in the program are here because they weren't given enough time to establish solid conceptual models. We are going to protect their time to develop those models in the summer. Make sure you don't push them too fast to drop the blocks or pictures. If you need to take more time on some lessons and don't make it through everything that's fine; this curriculum is built to give you more than you might need. Also note that a central place in the curriculum where the students practice fluency is in the games, and the goal is for the practice and experience of growing mastery to be tied to the experience of playing.

★ **Give your students the right amount of struggle**
We want the students to be 'productively stuck', i.e. we want them to be working on material they haven't mastered yet but not material that is so hard they can't get started. Most of the lessons in the curriculum start easy, so make sure everyone is able to begin, and help students break down problems if necessary. However, don't offer so much help that you take away their opportunity to learn. Learning happens when we are trying to do something we know how to begin and don't know how to finish. Keep in mind that many students in this program will be more familiar with the "stuck" part, so try to start them with successes, and then slowly move them toward greater problem-solving stamina.

★ **Value play**
It's easy to feel like students have to suffer to learn math. In fact, the opposite is true. Approach math in a playful way, and you'll see students more willing to struggle and persevere, more willing to take risks and learn from mistakes, and more able to absorb new ideas and put them into practice.

Other Notes and Best Practices

If you use this curriculum as a standalone for a summer program or other intervention, here are some ideas to help get the most out of it.

★ **Math Games and Movement Breaks**
Check out the math-based movement breaks in Appendix 1. These are great to mix in as breaks between activities.

★ **Folder for Worksheets**
Give each student a folder where they can keep their worksheets. If they finish another activity early, they can turn back to their unfinished worksheets and finish them.

★ **Choice Time**
Provide a structure for Choice Time like putting up the choices on a white board and having students put their names at the games or activities they want to try that day. Ideally, they should choose an activity that is right for them, and then stick with it for at least half of Choice Time.

★ **Number Talk Images and other warm ups**
For the Number Talks that require images, see Appendix 2. You can project these images to your class, or, where possible, create physical versions of them with magnetic ten frames or other blocks. Physical versions are sometimes preferable, since students can manipulate the blocks directly.

Index of Lessons, Chronological

Index of Lessons, Alphabetical

Day 1

Goals

1. Establish class norms and community.
2. Explore strategy and probability while strengthening multiplication skills.
3. Learn and play a series of math games.

Part 1

Opener

Introduction, name games (i.e., Mingle), class agreements.

Warm Up

Don't Break The Bank (tens and ones). Play a few rounds. If students have ideas about strategy you can have a brief class discussion to develop them, but there is no need to push students to develop a formal strategy.

Pre-Assessment

Exploration

Pig

Part 2

Warm Up

Number Talks

Game

Blockout

Story Problems

The Ant and the Grasshopper

Game

Salute

Wrap Up

Mingle
Opening Game or Station Break

Mingle is a quick name game you can play on the first day of class. You can also return to its more mathematical versions later in the course as a station break.

How to play

The teacher calls out a number (i.e., 3), and the students get themselves into groups of that size (or as near as possible to that size as possible) as quickly as they can. It might be impossible for everyone to get in a group every time, but each new number gives everyone another chance.

Once they are in groups, students can each learn each other's names. Then the teacher calls out a new number.

In the basic game, just call out single numbers. Once students get the idea, you can call out addition or subtraction problems (i.e., "get into groups of 7-4").

Tips for the classroom

1. Call the adults in or out of the game depending on the number of students you have and what numbers you call, in order to give everyone at least one other person to have in their group.

2. Keep the game moving quickly to keep the energy up.

3. Don't forget to call out a group of 1 and a group of however many students are in the entire class at some point in the game.

4. For future games, once everyone knows each other's names, you can can lead an optional skip-count with the class by counting the students in the class by group size (i.e., 3, 6, 9, ...).

Don’t Break the Bank!

tens and ones

Topics: Addition and subtraction to 100, estimation
Materials: One 6-sided dice, plus pencil and paper OR ten frames and counters OR base 10 blocks—rods and cubes.
Common Core: 1.NBT.1, 1.NBT.2, 1.NBT.3, 1.NBT.4, 1.NBT.5, 2.NBT.5, 2.NBT.6, MP1, MP6, MP7

How close can you get to 100 without going over?

Why we love Don’t Break the Bank

There are many variations of this game, and almost all are great. This is the best one to start with. The game connects counting tens and ones to making 100, and has the perfect amount of choice and estimation involved to make the game compelling. Fun for everyone, this is a great game to return to in stations or choice time. While kids may break the bank their first few games, they’ll inevitably start estimating and choosing good strategies for themselves. The deeper thinking is almost inevitable.

The Launch

Don’t Break the Bank (tens and ones) launches best from inside a station, where all the students can try the game out right away.
The teacher (or a student) rolls the die. Whatever number it lands on, each player can choose to take that many tens or that many ones. The best way to introduce this game is to use a manipulative: use ten frames for tens and single counters for ones; or use Base 10 blocks. The game ends after the die has been rolled seven times. with each player choosing whether each number gets them a ten or a one as they go.
The winner is the person who comes as close as possible to reaching 99 without going over. If they hit 100 or higher, they have “Broken the Bank” and lost that round.

Prompts and Questions

- Where are you going to put that digit?
- What number are you hoping I’ll roll?
- Show me (or your neighbor) how you added up your tens and ones.

The Wrap

A good thing to go over in the wrap is to really drive home how to add tens and ones when you have a bunch of them. Specifically, you pick one type to add first (usually the tens) and then add on the others. You can do this by putting all the tens into one pile and counting them, or by adding them (3 tens plus 2 tens plus 2 more tens is 7 tens, or seventy). Then treat the ones (I had 6 ones, plus 3 ones, plus 4 ones, plus 1 one, which is 14 ones. And that’s the same as 1 ten and 4 ones. So that’s 7 tens plus 1 ten plus 4 ones. And that makes 8 tens and 4 ones, or 84.)

It can also be nice to discuss strategy. What did students do to try to win the game?

Tips for the Classroom

1. Set up different piles for tens and ones to mimic the place value system. Tens can go in a neat pile on the left, and ones in a pile on the right.
2. Experiment with playing with fewer or more rolls than 7. (Decide at the beginning of the game.) Or try out different types of dice. How do these changes affect your strategy?

Pig

Topics: Probability, strategy, addition, estimation
Materials: One 6-sided die, pencil and paper
Common Core: 1.OA.A.1, 1.OA.A.2, 1.NBT.C.4, 2.OA.B.2, 2.NBT.B.5, 2.NBT.B.6

Roll the dice and collect points. You can go as long as you want, but roll the wrong number and you lose all your points from that turn!

Why We Love Pig

Pig is easy to learn and gives students lots of addition practice. Pig is also mathematically rich. Students get to articulate and defend strategies, and get practice with addition in a complex task.

The Launch

Invite a volunteer to play a demonstration game. Make sure you take lots of risks, and let the students give you "thumbs up/down" if they think you should keep rolling. If students aren't comfortable adding up all the numbers they roll by hand, have them take tiles or other counters to one spot when it is their turn, and another spot (with ten frames or a hundred chart) as their "bank."

How to Play

Pig is a game for 2 to 6 players. Players take turns rolling a die as many times as they like. If a roll is a 2, 3, 4, 5, or 6, the player adds that many points to their score for the turn. A player may choose to end their turn at any time and "bank" their points. If a player rolls a 1, they lose all their unbanked points and their turn is over.

Beginner Game: The first player to score 50 or more points wins.
Advanced Game: The first player to score 100 or more points wins.

Prompts and Questions

- How long are you waiting before you stop rolling?
- Do you have a strategy?
- Before you roll again, tell me how many points you already have for this turn.
- What's the best way to add those numbers up?

The Wrap

The question of strategy is a fascinating one for Pig. What strategies are students using? Does strategy even matter? Let students share their ideas for strategies, and discuss which ones they think are better or worse, and why.

Tips for the classroom

1. Demonstrate the game a couple times with the whole group. Solicit advice about when you (the teacher) should stop rolling on your turn. Students can give you a thumbs up if they think you should continue rolling, and a thumbs down if they think you should stop.

2. For students who are less confident with addition, use tens frames and counters or a hundreds chart to keep track of the score. For example, students get to pick counters up as they roll. If they stop before they roll a one, then they transfer those counters to their tens frames. Fill up 5 ten frames to win.

3. Remind students that they will lose games and win games, and each loss can be a chance to re-examine how they are playing. It's hard to lose all your points, but it will happen to everyone!

4. As kids play each other, circulate through the room and ask them about their strategies. It's ok for students simply to play, but there's an opportunity to probe deeper into the workings of chance and the strategy of the game too.

5. Homework: Have students teach Pig to someone at home and play.

Number Talks

Topics: Mental math, numerical fluency; argument & critique
Materials: White board or projector
Common Core: Variable, and especially MP3

This mental math routine creates powerful positive habits for students.

Why We Love Number Talks

Number talks don't replace other instruction, but they are a powerful complement to it. They get all students involved, help them strengthen fluency, intuition, and mental math strategies, improve students' ability to explain and critique solutions, and allow teachers a valuable window into their students' thinking. A well-run number talk is an excellent example of Common Core Math Practices 1, 2, 3, 6, 7, and 8.

How Number Talks Work

If you implement one type of activity into your class routine, Number Talks might be the most bang for your buck.

In many ways, they're familiar. The teacher writes a simple problem down on the board, and students solve it mentally. The difference is that the students aren't just looking for the answer: *they're trying to find as many different ways to solve the problem as they can*.

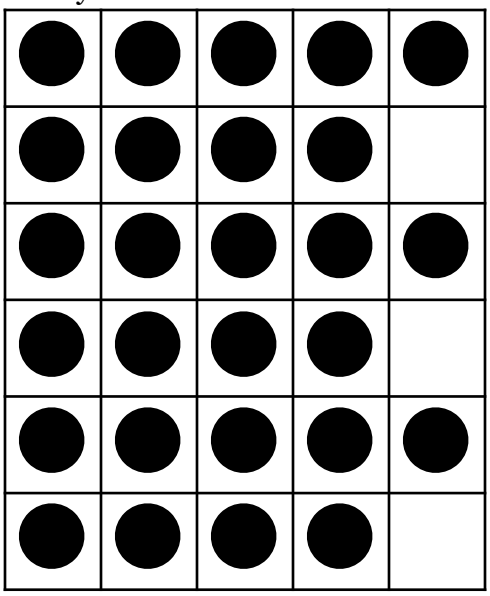
The key elements to number talks are a de-emphasis on speed and right answers and an added emphasis on process and communication. Here's how they work:

1. **The teacher writes a problem on the board.** For 3rd/4th grade, this problem could be to count a collection of dots, or do an arithmetic problem simple enough to handle mentally.
2. **Students mentally solve the problem**. They show the teacher whether they have the answer by (quietly) giving a thumbs up at their chest. This prevents a small batch of quick students from shutting everyone else down. If students can come up with a second way to solve the problem, they hold up a second finger at their chest. This means that everyone can keep thinking about the problem even after they have the answer.
3. **Students share their answers**. After enough time has passed that everyone or nearly everyone has a solution, the teacher asks students what their solution are. She writes down all solutions; none are given preferential treatment, and she doesn't say whether they are right or wrong.
4. **Students explain their thinking**. Once all solutions are written down, the teacher asks students to explain how they got their solution. Students explain (from their seat) while the teacher writes the steps they describe on the board.

5. **Discussion and consensus**. Ideally, by the end of the discussion, the class should have a list of 3-6 different approaches to the problem, plus a consensus as to what the correct answer is.
6. **Followup**. If time permits, the teacher has the option to ask a followup questions that builds on the last.

Example Number Talk
[Note: this Number Talk is not necessarily the Number Talk you'll do on any given day. It's just a good example.]

Teacher: Time for our morning Number Talk. I'm going to put up an picture, and you can tell me how many dots you see in it. Remember that your job is to figure out as many different ways to count as you can.



(A student starts waving his arm in the air.) When you have the answer, show me with a thumb at your chest. (The student puts his arm down and holds up a thumb.) If you have one way to count the dots, see if you can find another. Show me by holding up two fingers instead of one.

(She waits for 30 seconds. Several students are holding up two or more fingers, though many have just a thumb. The teacher is noting to see if anyone hasn't solved the problem—this is a great opportunity for formative assessment. Finally, she begins calling on students for their answers, starting with those who have only one solution.)

Teacher: Lucy?
Lucy: 27. (Teacher writes 27 on the board.)
Teacher: Charles?
Charles: 28 (Teacher writes 28 on the board.)
Teacher: Michelle?

Michelle: 27.
Teacher: So you agree with 27. Did anyone get a number that is not 27 or 28? (No one has any.) Who would like to explain how they got their answer? Tyrone?
(The teacher records what the students write as they explain.)
Tyrone: There's 5 and 4 at the top, so that's 9. And then that's repeated, so you times 3.
Teacher: Ah, I see. You're saying you have 9 dots here, since 5 + 4 = 9 [teacher circles those dots, write the equation beside them]. And then we have three groups of 9 [circles these other groups of 9] so that's 3 groups of 9, which is 3 x 9. And what's that?
Tyrone: 27.
Teacher: And is that just a fact you know?
Tyrone: Yeah.
Teacher: Okay! Anyone else have a strategy to share?
Sarah: I saw 3 fives. That's 15. And then there are 3 fours. That's 12. And 15 + 12 = 27. [Teacher writes this down.]
Charles: I'd like to change my answer. I think it's 27.
Teacher: Thanks for letting us know, Charles! You can always change your mind. What convinced you the answer was 27?
Charles: Well, what Sarah and Tyrone said looked right. Also, I realized I didn't subtract all the dots I needed to.
Teacher: How were you approaching the problem?
Charles: If you filled in the missing spaces, it's just an array. And that's 5 times 6, which is 30. And then you just take away 3. But I forgot to take them all away.
Teacher: I see! So if you imagined the whole array filled in, and that's a 5 by 6 array [writing on the board], but then you need to take away the three that aren't there, so that's 5 x 6 - 3. Which comes to 27 again. That's seems like a powerful way to approach the problem. I'm glad you shared that with us. Even though you got the wrong answer the first time you tried it, I'm going to remember that technique of looking for the array and then taking away the dots I don't have.

Teacher: I see that there are still more hands up, but hang on to your ideas. I'm going to show you one more problem, and you can see if you can use your counting method to count the dots. You can also use one of the methods we saw in this talk.

Prompts and Questions

- Who would like to defend this answer?
- I don't quite follow. Do you mean I should count this group first?
- How did you do that/know that?
- Does anyone else think they can explain what Shawn is saying?
- Turn to the person next to you and explain how you counted.

Tips for the Classroom

1. Start with questions that are accessible to everyone
2. Students will be looking to see if you indicate what the right answer is. Don't favor right answers over wrong ones. Make sure that the explanations are what matters.
3. Make sure you emphasize the Number Talk protocol—hands at chests rather than waving in the air, for example. This will pay off, and you can use it in other places.
4. Give students constructive language to use in the discussion, like, "I respectfully disagree, because…" and "I agree with _____, because…"
5. Always keep the environment safe and positive.
6. Don't worry if you don't reach total consensus on every problem. Sometimes a student will need more time to process. You can move on when it feels like it is time.
7. Number Talks can sprawl if you're not careful. Doing short (5 - 10 minute) Number Talks regularly is more powerful than long ones infrequently.

Resources

Find more specific Number Talks and variations like Unit Chats, Array Chats, and Fraction Talks at:

- http://mathforlove.com/lesson/number-talks
- http://visiblethinking.weebly.com/daily-routines.html

Blockout

Topics: Multiplication, area, strategy, addition.
Materials: Crayons or colored pencils, Blockout game sheet
Common Core: 3.OA.A.1, 3.OA.C.7, 3.MD.C.6, 3.MD.C.7

Roll the dice and shade in a rectangle. How can you claim the most space on the board?

Why We Love Blockout

This is one of those rare games that reinforces both the skill of multiplication and the visual model that makes sense of it. Blockout can be played competitively or collaboratively, and is a wonderful game to introduce or reinforce the concepts behind multiplication.

The Launch

Take a volunteer and demonstrate the first several turns of a game of Blockout. Players choose colors, then take turns rolling the dice, and shading in a rectangle given by the dice rolls. If you roll a 2 and a 5, you can shade in a 2 by 5 (or 5 by 2) rectangle. No one can shade in a square that has already been colored. If there is no room to fit the rectangle you rolled on the board, you pass. If all players pass in a row, the game is over. Players get a point for each square they have colored in at the end of the game.

Students can play in groups of 2-4, though 2 is preferable. It is also possible to play individually or collaboratively. For a collaborative or solitaire game, players roll and try to cooperatively fill up as much of the board as possible. If every player must pass in a row, the game is over. The fewer the number of leftover squares, the better the game.

Prompts and Questions

- How many points does that roll give you?
- Who's ahead?
- What roll are you hoping to get this turn?

The Wrap

Discuss how students counted up their rolls. With a roll of 5 and 4, how would they have counted up the number of squares in their rectangle? (I.e., counting by 5s? counting by 4? Other strategies?) Discuss other possible rolls, and how they're counted. How many points to you get for rolling 6 and 6?

Tips for the Classroom

1. For the first time playing, students can play as above. For subsequent games, show students how to track their points as they go. For example, they can write 2 x 5 = 10 inside the 2 by 5 rectangle, and know that they have 10 points for that turn. This connects the game to multiplication without feeling to academic right away.

2. Once students are comfortable writing equations in the rectangles, you can abstract one step further and introduce the scoring sheet.

Blockout

For 2 players.

Rules. Players take turns rolling two dice, and drawing a rectangle on the game board with side lengths given by the two numbers they rolled. For example, if you rolled a 3 and a 6, you would draw a 3 by 6 rectangle, placed horizontally or vertically on the board.

Your rectangle cannot intersect or be contained in any previously drawn rectangles. If you cannot add a rectangle to the board on your turn, pass the dice to the next player. If all players pass in a row, the game is over. So Player 1 doesn't get too great an advantage, their first rectangle must be drawn in the corner. After that, rectangles may be drawn in any open spot.

Players get a point for each square they've drawn a rectangle around. For example, a 3 by 4 rectangle is worth 12 points. Whoever boxes the most squares wins.

Player 1 Start Here											

Blockout Scoring Sheet

Turn	Player 1 Equation	Player 1 Score	Player 2 Equation	Player 2 Score
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

The Ant and the Grasshopper

Winter was coming, and the Ant started to prepare. Every day for a week, it saved 3 tiny seeds.

At the end of the week, the Ant passed the Grasshopper. “Silly ant!” said the Grasshopper. “You work all day, when you could be having fun!” And the Grasshopper laughed and pointed at the ant.

In the second week, the Ant worked even harder. It saved 4 tiny seeds every day. But when the Ant passed the Grasshopper at the end of the week, the Grasshopper laughed and pointed, saying, “Silly Ant!”

In the third week, the Ant worked *even harder*. It save 6 tiny seeds every day. But when the Ant passed the Grasshopper at the end of the week, the Grasshopper laughed and pointed, saying, “Silly Ant!”

Then winter came. The Grasshopper had nothing to eat. It went to the Ant’s hill, and asked if the Ant had any extra seeds for it to eat. And do you know what the Ant said?

“Silly Grasshopper!”

The Ant and the Grasshopper: Questions

Answer the questions below. Defend your answers using the story.
Use scratch paper and draw pictures as necessary.

1. How many seeds did the Ant save in the first week?

2. How many seeds did the Ant save in the second week?

3. How many seeds did the Ant save in the third week?

4. How many seeds did the Ant save in all?

5. Winter lasts for 90 days, and the Ant eats one seed every day. Does the ant have enough food for the winter?

6. Do you think the Ant should give the Grasshopper any seeds? If so, how many?

7. Bonus: If the ant saved 6 seeds every week for 5 weeks in a row, how many seeds would that be in all?

Salute

Topics: Multiplication, division
Materials: Cards or index cards with numbers from 1 through 10
Common Core: 3.OA.4, 3.OA.7

What number is on your card?

Why We Love Salute

Salute is a fun and active game, and a great way to practice multiplication facts. Perfect as a warm up or as an option for Choice Time.

The Launch

(3-player version) Demonstrate how to play the game by choosing two volunteers. Give them each a card to hold up on their forehead, pointing out. Make sure they don't get to see their own card! Then tell them what the product of their cards is. Once they hear the product, each student tries to figure out what their own card is.

Example.
Student 1 has a 4 on their forehead; Student 2 has a 5. The teacher tells them that the product of their numbers is 20. Student 1 looks at Student 2's number and thinks, "What do I have if they have a 5, and the product is 20? It must be 4, since 5 x 4 = 20." Similarly, Student 2 looks at Student 1's number, and figures out what her number must be.

Continue taking volunteers and letting them play in front of the class, or distribute the cards and let students play in groups of three.

The 2-player version requires that each player get a card, and a shared card is put up between them. Then each player tells the other the product of their number and the shared card between them.

Prompts and Questions

- Do you have a five? Do you have something larger or smaller than five?

Tips for the Classroom

1. While it's easy to focus on speed with Salute, it's usually better for students to play more collaboratively. Downplay speed as an important part of the game.
2. Make more cards and remove others to focus on specific multiplication problems that are especially relevant, i.e., play with numbers 6 - 12 when working on "harder" problems, or play with 2 - 6 when students are just learning to multiply.

Day 2

Goals

1. Introduce models for understanding the meaning of fractions.
2. Explore representations of fractions.
3. Play games to practice multiplication and arithmetic.

Part 1

Warm Up

Number Talk

Exploration

Cuisenaire Rod Multiplication

Game

Odd Pig Out
Downlevel: let students use a multiplication table.
Uplevel: Use ten-sided dice.

Part 2

Warm Up

Don't Break the Bank

Game

Prime Climb
Note: you may not have enough games for everyone to play at once. If that's the case, choose volunteers to play a demonstration game until the rules are clear, and let students know that Prime Climb will be an option during Choice Time in the future.

Exploration

Pattern Block Multiplication

Choice Time

Salute; Odd Pig Out; Prime Climb; Challenge Problems

Wrap Up

Question: suppose the light green Cuisenaire rod equals 6.
Figure out what all the other rods are equal to.
Give students solve, then let them show their work on a document camera, and convince the classroom why their approach makes sense.