Multiplication Is Fun!
(and division is delightful!)

Created by
Emily Jacques

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I dedicate this book to all the children and grandchildren of my former students, who will all hopefully have better math teachers than I was to their ancestors. ;)

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Acknowledgements: Many thanks to my husband, Jerry, for helping his hypersensitive-to-light wife with the formatting and some of the graphics in this book.

Thanks to Kevin McLeod, owner of incompetech.com, where he has generously provided any kind of graph paper you want for free for years.

Thanks to the several math-related websites who provided me with things like a multiplication table.

Thanks to all the teachers of all the teacher workshops I attended over my school-teaching career who taught me loads of hands-on math activities. I wish I could remember the name of my Methods And Materials For Math professor, who was the first math teacher to help me *really* understand the Base 10 Number System, as well as a variety of totally awesome multiplication and division algorithms.

Table Of Contents

Note to teachers and parents (IMPORTANT – PLEASE READ!):

I wrote this book so that if a homeschooling parent wanted to, she could use it as a stand-alone curriculum for teaching multiplication and division. If a child is ready to, he can progress through the whole book without stopping.

If you begin with this book with a child under the age of nine or ten, however, chances are good that he may only be able to go so far (say, up to multiplying 12). At the point where the more advanced multiplication and division began to get confusing for him, feel free to take a break from this book and move on to another area of math for a while (such as geometry or measuring).

This book can also be used as part of a remedial math program for older children.

Whichever way you go, I suggest that you have the student(s) spend at least a week working to memorize each set of multiplication facts – 2X, 3X, 4X, etc. The games and puzzles at the beginning of the book will help them do just that in a fun manner. While they are working on memorizing the basic facts, give them word problems that require multiplication and division.

Classroom teachers – if you purchase this book with the intent on using it with the students in your classroom, you have permission to make as many copies of whatever sheets you would like for student use. HOWEVER, I ask that you respect all the hard work I put into producing this book by doing two things for me: first, by not making copies for other teachers. Any other teacher who wishes to use this book must purchase their own copy in order not to infringe on the copyright of this work. Second, please remember to respect the general copyright rules. If you end up teaching a workshop and decide to share any portion of this book with your colleagues, please tell your colleagues the title and author of this book, as well as the fact that they can purchase it from Amazon.

A bit of housekeeping: Whenever I have provided board games or game parts, I strongly suggest that either you or the student, after removing them from this book, glue them onto cardstock or poster board to increase the longevity of the games and pieces. You may also consider taking them to your local office supply store and laminating them.

ONE MORE THING: If you and your child(ren) find this book to be helpful and enjoyable, please take a moment to leave a positive review on the product page at Amazon.com. That way, more parents, teachers, and children who want to make multiplication fun will find this book more easily.

Thanks 1,000 X 1,000!

Emily Jacques
Former elementary school teacher, and homeschooling mom

P.S. – Throughout this book, I will be asking the student to discover various patterns. If they cannot figure it out, ***please do not tell them!*** The reason I do not provide the answers to my questions is that I want the students' brains to grow, for them to learn to think logically. If they can't see a pattern at this point in time, don't worry about it. Give them a few months, then revisit it and see how they do. Please do not take away the opportunity for brain growth in your child(ren)!

It's a fun word. Why? Well, for one thing, it contains *a lot* of other words. Check it out:

multiplication

Find at least 6 three-letter words in the word *multiplication*. Write them here:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Find at least 4 four-letter words:

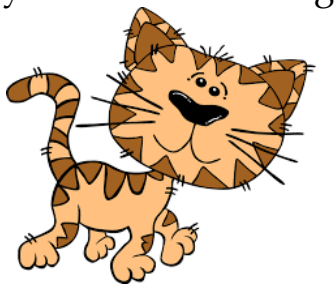
_____ _____ _____

_____ _____ _____

Sure, there are more! You may keep on going until your brain starts to leak, if you want. But when you're ready to get serious with math, turn the page, and get

ready for some FUN!

There are three cats lying in your mother's flowerbed. They each have four legs. How many legs do all those cats have in total?



You can figure that answer out in several ways.

First, you can count the legs by ones: one, two, three, etc.

Second, you can count them by twos. That goes a little more quickly, but it's not the *quickest* way.

You could say to yourself, "Okay, I know 4+4=8, and 8+4=12." That's a good solution, too.

A fourth way would be to add the legs of each cat. There are three cats, so you would add four, three times. Like this: 4 + 4 + 4.

But the ***EASIEST*** way to solve this problem?

MULTIPLY!

4 x 3 = 12

See that X in between the 4 and the 3? That's called the "times", or "multiplication", sign. We read that number sentence like this: "Four times three equals twelve." That means, when you add 4 together three times (4 + 4 + 4) you get 12.

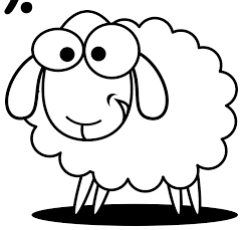
Four (legs) *three times* (because there are three cats) equals twelve.
Get it? Four *times three* equals twelve.

So, what is multiplication?

If 5 X 2 (five times two) = 5 + 5,
and 7 X 4 = 7 + 7 + 7 + 7,
and 9 X 5 = 9 + 9 + 9 + 9 + 9…

what is multiplication? (turn the page for the answer…)

Multiplication is *repeated addition.*



Read the above sentence five times. Now learn it backwards.

Just kidding!

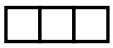
Follow the patterns below to hammer the idea into your head that multiplication is repeated addition.

1 X 1 = 1
1 X 2 = 1 + 1
1 X 3 = 1 + 1 + 1
1 X 4 = 1 + 1 + 1 + 1
1 X 5 =__+__+__+__+__
1 X 6 =
2 X 2 = 2 + 2
2 X 3 = 2 + 2 + 2
2 X 4 =
2 X 5 =
2 X 6 =
2 X 7 =
3 X 2 = 3 + 3
3 X 3 = 3 + 3 + 3
3 X 4 =
3 X 5 =
3 X 6 =
3 X 7 =

And now, for two REALLY COOL ways to practice multiplication…

The first cool way to practice the concept of multiplication is by using number bars. You need graph paper to make the number bars. The last ten pages of this book each contain a blank grid. You will need six of those grids. The other four grids you may use however you like! You're welcome. ;)

Now, you're ready to make the number bars. Out of the first piece of graph paper, cut ten bars that each contain two squares, like this: 

Then, cut ten bars that each contain three squares, like this: 

Finally, cut ten bars that each contain four squares.

From the second sheet of graph paper, cut ten bars that each contain five squares, and five bars that each contain six squares.

From the third sheet, cut five bars that each contain six squares. Then cut ten bars that each contain seven squares.

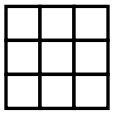
From the other three sheets you will cut ten bars with eight squares each, ten with nine squares each, and ten with ten squares each.

That was a lot of work, right? But you're not quite done. You want all those number bars to last a long time, so what you need next is a big sheet of poster board (or you can use the sides of cereal/cracker/etc. boxes if you have enough saved up). Glue each number bar onto the poster board or cardstock, and cut them out again.

YOU'RE FINISHED! YIPPEE!

Go take a fruit snack break and come back when your hands are well-rested. ☺

Okay, are you ready to practice multiplication? Super! Here's how you do it.

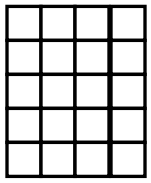
3 X 3 

See that? When you multiply using the number bars, you're going to make rectangles. The first number, or *factor*, in the number sentence (3 X 3) tells you **which** number bar to use – in this case, the 3 bar.

The second factor tells you **how many** 3 bars you need to put down.

To figure out the answer, simply count the little squares in the big rectangle. You should count 9.

Here's another example:

4 X 5 

The first factor, 4, means you're going to use the 4 bar. The second factor, 5, means you're going to put 5 of the 4 bars down together. You will end up with a rectangle that is 4 squares wide and 5 squares long.

What is the *product* of 4 X 5? In other words, how many squares are there inside this rectangle?

The product of 4 X 5 is 20. We write a multiplication number sentence like this:

4 X 5 = 20.

Now I'm going to give you a bunch of other multiplication problems to solve. Use the number bars to figure out the product. Don't worry about writing down the answers right now; this activity is just to help you understand what multiplication is.

2 X 2	6 X 1	9 X 2	4 X 3	3 X 7	8 X 6	(Feel free to make up your own multiplication problems using the number bars.)
5 X 3	2 X 4	6 X 4	3 X 6	8 X 5	7 X 6	

Okay, now you know the first REALLY COOL way to practice multiplication.

Here's the second way. You need:

- string, and
- a tiled floor (either real tile, or wood or linoleum tiles)

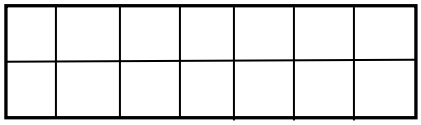
Let's call this activity, "Walk The Tiles."

To prepare for it, you need to cut 40 pieces of string that are the exact length of one floor tile.

The object is to mark out a rectangular **area** of the floor using the string, then count the tiles you mark off by walking on one tile at a time inside the rectangle.

Let's say you want to figure out what 7 X 2 is. Take seven pieces of string and lay them along the edge of seven floor tiles to form a straight line. Then take two pieces of string and lay them along the edge of two floor tiles, straight down from the end of the first of the seven strings you laid down. Here's what I mean:

Finish forming the rectangle by placing seven more strings to make the bottom side, and two more to make the last side. It will look something like this:



Now you have a rectangle that is 7 floor tiles long by 2 floor tiles wide.

What is 7 X 2? Count the tiles inside the rectangle as you walk on them (careful not to knock the string askew!). You should count 14 floor tiles.

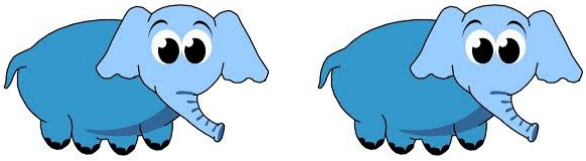
All right, time to get started. Grab a partner to work with you and work out some multiplication problems using the string and the floor.

Try starting easy with problems like 1 X 2 and 2 X 3. Then work your way up to larger rectangles like 5 X 9 and 7 X 7. **HAVE FUN!** ☺

Multiplying ZERO

PSST! I have a question for you. Come a little closer…that's better.

Now, listen carefully. If I put two elephants in your bedroom, ZERO TIMES, how many elephants would there be?



I hope you answered **ZERO**. I did it zero times, so there can't be any elephants, right?

How about if I put 5 elephants in your bedroom zero times? How many elephants would there be then?

What about ten? I'm going to put TEN elephants in your bedroom ZERO times. How many elephants will be in your bedroom?

Watch out – I'm going to get REALLY CRAZY. What if I put 100 elephants in your bedroom zero times?

That's right – the answer would still be zero! If I'm putting any number of elephants ZERO times, there won't be any elephants, right?

And that's how easy it is to multiply zero.

Any number times zero equals zero.

Two elephants zero times = 2 X 0 = 0.

100 elephants zero times = 100 X 0 = 0.

To get used to that idea, follow the pattern below and fill in the missing numbers.

4 X 0 = 0

5 X 0 = 0

6 X 0 = 0

7 X 0 =____

8 X 0 =_____

9 X 0 =_____

10 X 0 =_____

11 X_____ = 0

12 X 0 = ____

25 X 0 = ____

67 X ____ = 0

92 X ____ = 0

23,572 X 0 = ____

MOST EXCELLENT!

You've got the rule for multiplying zero, right? What is it?

Any number times zero equals zero.

You can't get much simpler than that…unless you're talking about multiplying one. Let's do that next!

Multiplying One

Remind me again what multiplication means?

Multiplication is repeated addition.

All right then, so tell me the answer to this multiplication problem: 1 X 8 =

What that means is that we are adding 8 just one time. That's 8 + … uh, well, just 8, right? Because if we wrote down 8 + 8, that would be 8 *two* times. But we want to multiply it just *one* time.

Here's another way to look at it. Grab one of those eight bars you made a couple of pages ago. You know, a strip of paper that has eight little squares on it. Put the bar down one time. How many little squares are there?

You're right, eight! If we put eight squares down, one time, then we have eight squares.

1 X 8 = 8

Say you have five puppies in a kennel. You put that one kennel with five puppies on the kitchen floor. How many puppies are there?

Yep, five! 1 X 5 = 5

How about if I give you a dozen eggs, just one time? A dozen is twelve. So we're talking 12 X 1 = ??

Yes! 12 X 1 = 12.

Get the picture? What's the rule for multiplying one? (*Give me an answer before you read it on the next page, or I'll have to come to your house and tickle you!)*

Here's the rule for multiplying one:

any number times one equals that same number.

Follow the pattern below to drive that rule into your head.

1 X 1 = 1	1 X 4 =____	1 X____ = 15
1 X 2 = 2	1 X 5 =____	1 X____ = 31
1 X 3 = 3	1 X 6 =____	1 X____ = 76

1 X 5,678,214 =_____

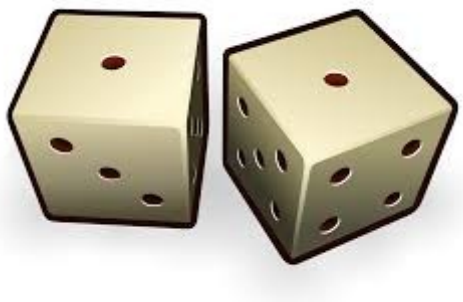
Say the rule for multiplying 1 with me again:

any number times one equals that same number.

Just for the fun of it – what's the rule for multiplying zero?

Awesome! If you think you've got the rules for multiplying 0 and 1 down, let's move on to the part you've been waiting for:

THE GAMES!



Oh, wait, hold on one second. You don't know all the basic multiplication facts by heart yet, do you? Okay, no problem. I've got that covered.

On the next page is what people commonly call the "Times Table." A *real* mathematician calls it the "Multiplication Table", or "Multiplication Chart." You can use that table to figure out the answer to any of the basic multiplication facts through twelve.

Here's how it works. Say you want to know the product of 5 X 6. Put your index finger of your right hand on the 5 on the very top row of the table. Put your other index finger on the 6 that is down the very first *column.* Run your right finger straight down from the 5 as you run your left finger straight across from the 6.

They will meet at the number 30. And that's your answer. The product of the two factors 5 and 6 is 30. 5 X 6 = 30

So when you're playing the games and need to figure out an answer, just use the Multiplication Table and

ROCK ON, DUDE! ☺

Multiplication Table

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Multiplying Two

Remember what multiplication is?

What? I can't hear you!

There you go!

Multiplication is repeated addition.

So then, what's another way to say 2 X 3?

2 X 3 = 3 + 3. Which equals…6! Right!

2 X 4 = 4 + 4 = …..what? Yes! Eight!

2 X 5 = 5 + 5 = _____

2 X 6 = 6 + 6 = _____

2 X 7 = 7 + 7 = _____

2 X 8 = ___+___= _____

2 X 9 = ___+___= _____

What do you notice about multiplying a number by two? (HINT: I'm looking for something about the addends in those addition problems…)

Did you say that the X2 problems are the same as addition doubles? Great job! Knowing that, you can probably play the very first multiplication game without even using the Multiplication Table.

NOTE: Starting with the X3 game and through the X9 game, after each game there will be a puzzle to help you memorize the facts for that number. Carefully cut out the puzzle page, then cut the pieces out on the dark line. Glue each piece separately onto poster board, cardstock, or chipboard (the cardboard that cereal boxes are made of), then cut out those pieces. As you re-assemble the puzzle pieces, say the multiplication fact you are putting together, along with the answer.

Times Two Slapjack

This game is not for the faint of heart. Or, shall I say, the slow-handed.

Players: 2

Materials needed:

- A deck of cards
- A very fast hand

Objective: To collect as many cards as you can

How to play

#1. Remove any jokers from the deck, or assign a number value to them. Queens and kings are worth 11.

#2. Shuffle the deck of cards and place it face down between the two players.

#3. First player draws a card and puts it face up *without* looking at it as he draws.

#4. Both players must multiply the number on the card by two in their heads.

#5. Whoever gets the product first slaps his hand over the card while saying the answer. If both players say the product simultaneously, whoever slaps the card first wins the round.

#6. The first player to say the product and slap the card gets to keep the card.

#7. The second player draws a card as the first player did. Repeat steps 4 – 5.

#8. Players take turns drawing each card.

#9. When a jack is drawn, no multiplication problem needs to be done. Whoever slaps the jack first gets to keep it.

#10. Play until all the cards in the stack are gone.