

# Mathematics Grade 3

# Extension Projects

## with Investigations

## 2009

These projects are optional and are meant to be a springboard for ideas to enhance the Investigations curriculum. Use them to help your students apply what they have learned each quarter and to expand their math skills. This is just the beginning of this process.

Numbers & Operation	<ul style="list-style-type: none"> <li>• Compare and represent whole numbers up to 10,000, with an emphasis on place value.</li> <li>• Add and subtract multi-digit whole numbers; represent multiplication and division in various ways; solve real-world and mathematical problems using arithmetic.</li> <li>• Understand meanings and uses of fractions in real-world and mathematical situations.</li> </ul>
Algebra	<ul style="list-style-type: none"> <li>• Use single-operation input-output rules to represent patterns and relationships and to solve real-world and mathematical problems.</li> <li>• Use number sentences involving multiplication and division basic facts and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences.</li> </ul>
Geometry & Measurement	<ul style="list-style-type: none"> <li>• Use geometric attributes to describe and create shapes in various contexts.</li> <li>• Understand perimeter as a measurable attribute of real-world and mathematical objects. Use various tools to measure perimeter.</li> <li>• Use time, money and temperature to solve real-world and mathematical problems.</li> </ul>
Data Analysis	<ul style="list-style-type: none"> <li>• Collect, organize, display and interpret data. Use labels and a variety of scales and units in display.</li> </ul>

<b>Grade 3 Quarter 1 Project</b>		<b>Unit 1 Unit 2</b>
<b>Trading Stickers, Combining Coins Surveys and Line Plots</b>		
<b>Strand</b>	<b>MN Benchmark</b>	<b>Benchmark #</b>
Number & Operation	Add and subtract multi-digit numbers, using efficient and generalizable procedures based on knowledge of place value, including standard algorithms.	3.1.2.1
Data Analysis	Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number line plots having a variety of scales. Use appropriate titles, labels and units.	3.4.1.1

## Good interactive websites for data analysis:

<http://www.bbc.co.uk/education/mathsfile/shockwave/games/datapick.html>

<http://www.bbc.co.uk/schools/ks2bitesize/maths/activities/interpretingdata.shtml>

## **Organize Your Data!**

Students will:

- prepare questions and categories for data collection
- collect data by asking questions
- use different of methods to collect and record data (in person or with a survey)
- sort and organize data by using graphic organizers such as lists and charts
- display data in more than one way - graphs, [pictographs](#), [bar graphs](#), and [rank ordering](#)
- make predictions of what would happen if more data was collected
- generate new questions from displayed data
- obtain new information by performing [arithmetic operations](#) on the data

As students learn how to collect, organize, display, and share information in the form of graphs, they develop critical-thinking skills that allow them to make predictions, decisions, and conclusions about their information. Some possible ideas for their project – ages, birthday months, height, numbers of letters in name, favorite colors, animals, sports, foods, etc. Students will have more creative ideas and those questions should be encouraged! This should be a fun and possibly helpful activity. (What is your favorite school lunch? When should we have recess? How long would you like to have quiet reading each day?)

Doing this project with a partner or a small group will bring up more questions/learning than doing this individually. Allow for discussion and collaboration.

After all displays are constructed allow time for students to share their organized data.

Some good questions to ask are:

- Why did you choose this question?
- What appears most/least often?
- What is the difference between \_\_\_\_ and \_\_\_\_?
- What conclusion can we make?
- What predictions can we make?
- What other questions are now raised?

Name: \_\_\_\_\_

## Organize Your Data!

1. Ask a question. You are going to find out something that no one has found out before. How many kids are born in February? How tall are the children in your class? When would be the best time to read? Think about what YOU want to know.

My question:

Some of the predictions about what I think I will find out:

How I will collect my data:

Who will be surveyed:

2. Prepare a way to collect this data. You could ask people individually or create a written survey. Can you think of a better way to get the information you need?

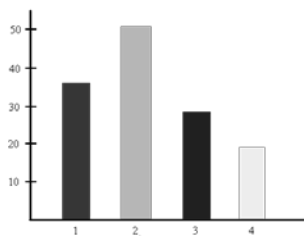
3. Organize your data. Create a table or chart to keep track of your findings.

Example: Favorite animals

dog	IIII	fish	III
cat	II	turtle	I

4. Display your data. After you have your data organized in a table, you are going to display it in at least 2 different ways.

Here are some of your choices:

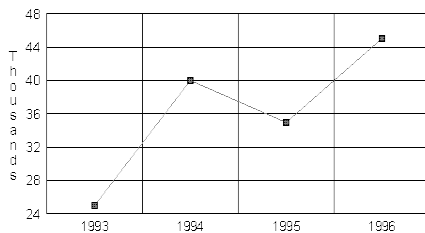


Bar Graph

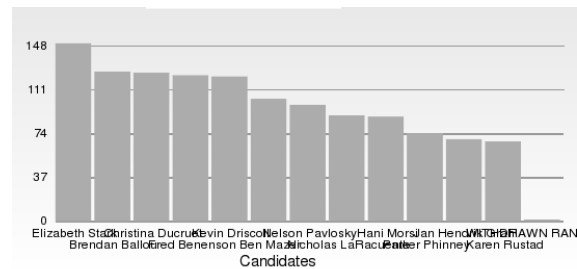
Red Delicious	● ● ● ●
Golden Delicious	● ● ● ● ●
Red Rome	● ● ● ● ● ●
McIntosh	● ● ● ●
Jonathan	● ● ● ● ● ● ● ●

● = 10 apples   ● = 5 apples

Pictographs



Line Graph



Rank Ordering (Most To Least)

😊 If you have a better way to display your data in an organized way, check with your teacher.

5. Create a set of questions to accompany your project. Start easy and then make them more and more difficult. Here are some ideas to get you started:

- Which one appears most often?
- Which one appears least often?
- What is the difference between \_\_\_\_\_ and \_\_\_\_\_?
- What if we added 4 more to \_\_\_\_\_?
- How many more would we need to add to get \_\_\_\_\_ (number) \_\_\_\_\_ (item)?



**Name:** \_\_\_\_\_

## Organize Your Data Question Sheet

Ask 10 questions that can be answered by analyzing your data.

1. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

2. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

3. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

4. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

5. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

6. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

7. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

8. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

9. Question: \_\_\_\_\_

Answer: \_\_\_\_\_

10. Question: \_\_\_\_\_

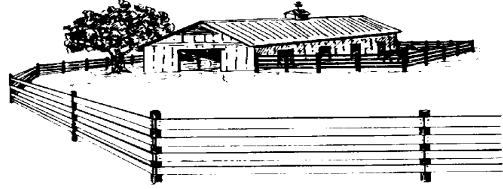
Answer: \_\_\_\_\_

<b>GRADE 3 QUARTER 2 PROJECT</b>		<b>UNIT 3 UNIT 4</b>
<b>COLLECTIONS AND TRAVEL STORIES PERIMETER, ANGLES, AND AREA</b>		
<b>STRAND</b>	<b>MN BENCHMARK</b>	<b>BENCHMARK #</b>
Number & Operation	Use place value to describe whole numbers between 1000 and 10,000 in terms of groups of thousands, hundreds, tens and ones.	3.1.1.2
Number & Operation	Read, write and represent whole numbers up to 10,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives such as bundles of sticks and base 10 blocks.	3.1.1.1
Number & Operation	Compare and order whole numbers up to 10,000.	3.1.1.5
Number & Operation	Add and subtract multi-digit numbers, using efficient and generalizable procedures based on knowledge of place value, including standard algorithms.	3.1.2.1
Number & Operation	Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Assess the reasonableness of results based on the context. Use various strategies, including the use of a calculator and the relationship between addition and subtraction, to check for accuracy.	3.1.2.2
Geometry and Measurement	Find the perimeter of a polygon by adding the lengths of the sides.	3.3.2.2
Geometry and Measurement	Recognize and predict the position and orientation of a shape after a single flip, slide or turn.	V.A.2
Geometry and Measurement	Identify lines of symmetry in geometric shapes.	V.A.1
Geometry and Measurement	Measure distances around objects.	3.3.2.3



## Out in the Barnyard!

Farmer Faye has hired you to order and buy all the fencing she needs for her new farm. She needs several fenced in areas for her animals and also all the way around the farm to keep the neighbors cows off their property. You are in charge of how much fencing each area will need and how much it will cost.



Be resourceful! Think about which animals you Farmer Jill want on her farm and how many different rectangles of fencing will be needed.


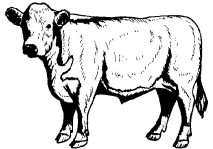


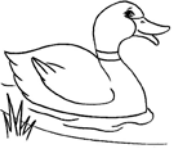
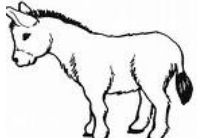
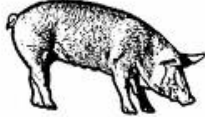
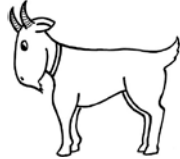

Students will:

1. Make a list of animals Farmer Faye will have on her farm.
  2. Rank order them from which animal needs the most amount of space to live to the one which will need the least.
  3. Sketch a drawing of Farmer Faye's barnyard, including where to place the animals and where the fences will be. Several copies of the graph paper can be cut and pasted together if needed.
  4. Figure out how much fencing will be needed for each animal pen. Remember to add the fence that goes all the way around the farm!
  5. Add all of the perimeters together to get the total amount of fencing needed.
  6. Contact a local home improvement store, look in advertisements, or online to find the price of fencing. Use a calculator to figure out how much it would cost Farmer Faye to have all the fencing she needs.
- Website for perimeter: <http://www.funbrain.com/cgi-bin/getskill.cgi>
  - Place Value Game: <http://education.ilab.org/placevalue/gamepage.html>

Name \_\_\_\_\_

## Out In the Barnyard!

Possible animals:

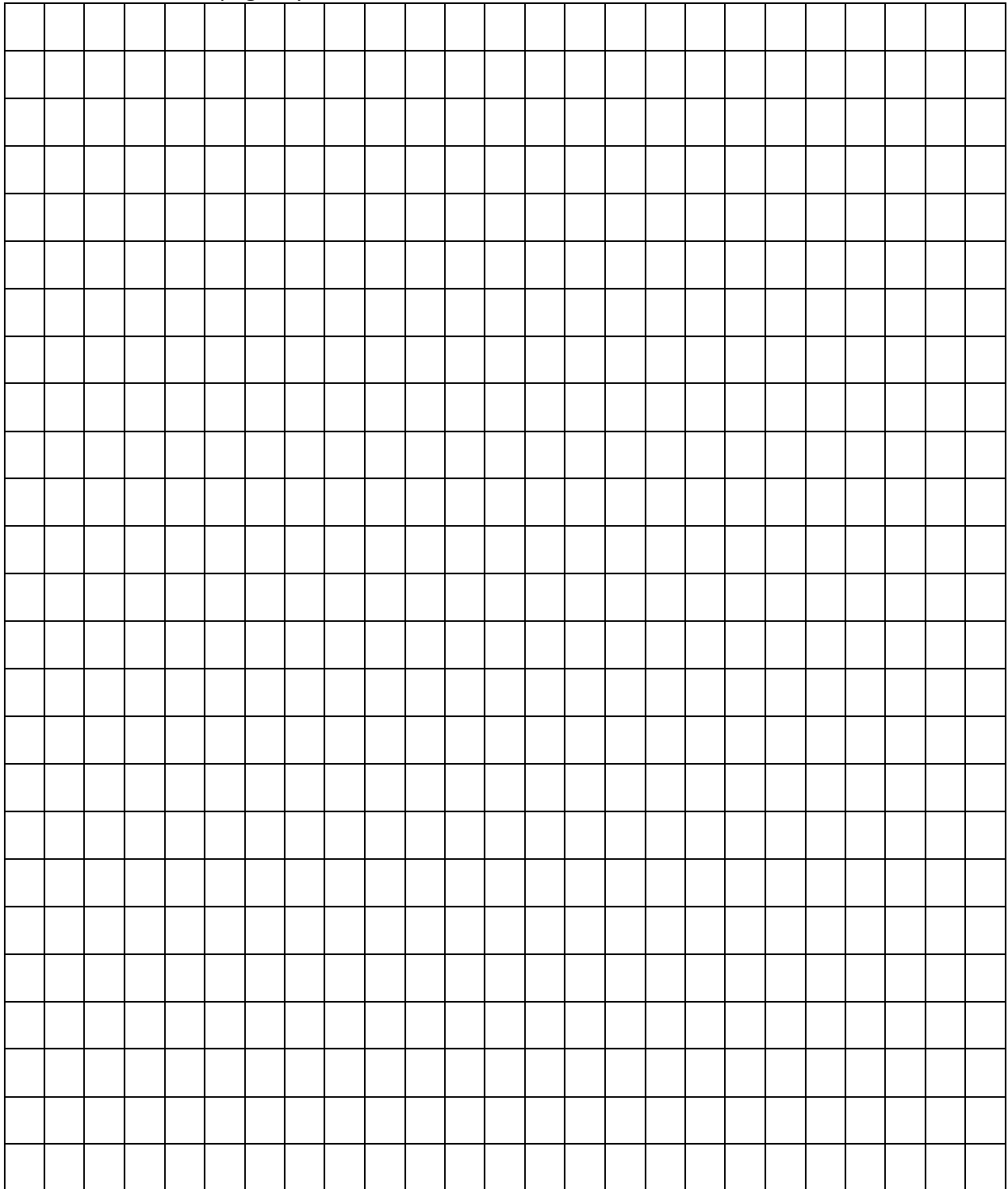
<b>horses</b> 	<b>cows</b> 	<b>llamas</b> 
<b>Geese</b> 	<b>turkeys</b>	<b>sheep</b>
<b>ducks</b> 	<b>donkeys</b> 	<b>pigs</b> 
<b>goats</b> 	<b>chickens</b> 	<b>Any others?</b>

<b>Animal List</b>	<b>Rank</b> 1 = needs least amount of space 2 = needs next amount of space etc.

Name: \_\_\_\_\_

## Out In the Barnyard Sketch

Use more than one page if you need to.



= \_\_\_\_\_

(How many feet? Yards? Meters?)

Name: \_\_\_\_\_

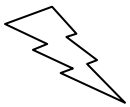
### Out in the Barnyard Perimeters

animal	side one	side two	side three	side four	perimeter

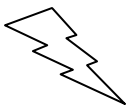
Total perimeter \_\_\_\_\_

Fencing costs \_\_\_\_\_

Length of fence X cost = \$ \_\_\_\_\_ total



**Challenge #1 - How much would each animal's fence cost?**



**Challenge #2 – What is the AREA of each animal's area and the total area of Farmer Faye's farm?**

<b>GRADE 3 QUARTER 3</b>		<b>UNIT 5 UNIT 6</b>
<b>EQUAL GROUPS STORIES, TABLES, AND GRAPHS</b>		
<b>STRAND</b>	<b>MN BENCHMARK (2007)</b>	<b>BENCHMARK #</b>
Number & Operation	Use repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.	3.1.2.3
Number & Operation	Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems.	3.1.2.4
Number & Operation	Use strategies and algorithms based on knowledge of place value and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number. Strategies may include mental strategies, partial products, the standard algorithm, and the commutative, associative, and distributive properties.	3.1.2.5
Algebra	Understand how to interpret number sentences involving multiplication and division basic facts and unknown. Create real-world situations to represent number sentences.	3.3.2.1
Algebra	Use multiplication and division facts to represent a given problem situation using a number sentence. Use number sense and multiplication and division basic facts to find values for the unknowns that make the number sentence true.	3.2.2.2
Algebra	Create, describe, and apply single-operation input output rules involving addition, subtraction and multiplication to solve problems in various contexts.	3.2.1.1
Geometry and Measurement	Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.	3.3.3.4
Data Analysis	Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number line plots having a variety of scales. Use appropriate titles, labels and units.	3.4.1.1

Websites for a variety of multiplication practice:

- [http://www.multiplication.com/internet\\_games.htm](http://www.multiplication.com/internet_games.htm)
- <http://www.gamequarium.com/multiplication.html>

## Cell Phone Multiplication

**You'll need a calculator.**

Idea taken from [www.makeitreallearning.com](http://www.makeitreallearning.com)

In 2008, Verizon Wireless offered the following cell phone plans to their customers.

(Source: [www.verizon.com](http://www.verizon.com))

Plan	Anytime minutes	Monthly fee	Charge for extra minutes
A	450 minutes	\$40	45 ¢
B	900 minutes	\$60	40 ¢
C	1350 minutes	\$80	30 ¢

Come up with the best plan for the following customers. Show your work and explain WHY it is the best plan. Use your skills of multiplying and adding to figure out which one is the least expensive for each customer.

Example:

Joe averages 460 minutes per month.

Plan A -  $\$40 + (10 \times 45\text{¢})$  or  $\$40 + \$4.50 = \$44.50$

Plan B - \$60 per month

Plan A

would be the least expensive because \$44.50 is less than \$60.

Name: \_\_\_\_\_

## Cell Phone Multiplication

Plan	Anytime minutes	Monthly fee	Charge for extra minutes
A	450 minutes	\$40	45 ¢
B	900 minutes	\$60	40 ¢
C	1350 minutes	\$80	30 ¢

**You'll need a calculator!**

**Show your work and explain WHY it is the best plan.**



1. Sierra uses 595 minutes per month.

2. Marco uses 1,022 minutes per month.

3. Frank uses 1,256 minutes per month.

4. Chelisa uses 835 minutes per month.

Name: \_\_\_\_\_

## Cell Phone Multiplication

Now make up your own plan.

Plan	Anytime minutes	Monthly fee	Charge for extra minutes
A		\$ .00	¢
B		\$ .00	¢
C		\$ .00	¢

Show your work and explain WHY it is the best plan.

1. \_\_\_\_\_ uses \_\_\_\_\_ minutes per month.  
name number

2. \_\_\_\_\_ uses \_\_\_\_\_ minutes per month.  
name number

3. \_\_\_\_\_ uses \_\_\_\_\_ minutes per month.  
name number



Create your own “*Do You Want to Be a Millionaire?*” game using your knowledge of multiplication facts.

Materials:

- card stock paper cut into cards
- markers
- white board or paper
- calculator
- playing pieces

1. Come up with 25 multiplication problems and answers.
2. Write them on the chart and come up with three other answers
3. Make cards with the equations without the correct answers.
4. Give your opponent a problem and four possible answers.
5. If they get the product correct, they move up the millionaire chart. If they get it wrong, they stay where they are (or it goes to the next person if there are more than two players).

**“Do You Want to Be a Millionaire?”**

**ONE MILLION DOLLARS!**

**\$500,000**

**\$250,000**

**\$125,000**

**\$64,000**

**\$32,000**

**\$16,000**

**\$8000**

**\$4000**

**\$2000**

**\$1000**

**\$500**

**\$300**

**\$200**

**\$100**



<b>GRADE 3 QUARTER 4</b>		<b>UNIT 7 UNIT 8 UNIT 9</b>
<b>FINDING FAIR SHARES HOW MANY HUNDREDS? HOW MANY MILES? SOLIDS AND BOXES</b>		
<b>STRAND</b>	<b>MN BENCHMARK (2007)</b>	<b>BENCHMARK #</b>
Number & Operation	Add and subtract multi-digit numbers, using efficient and generalizable procedures based on knowledge of place value, including standard algorithms.	3.1.2.1
Number & Operation	Use addition and subtraction to solve real-world problems involving whole numbers. Assess the reasonableness of results based on the context. Use various strategies, including the use of a calculator and the relationship between addition and subtraction, to check for accuracy..	3.1.2.2
Number & Operation	Read and write fractions with words and symbols. Recognize that fractions can be used to represent parts of a whole, parts of a set, points on a number line, or distances on a number line.	3.1.3.1
Number & Operation	Order and compare unit fractions and fractions with like denominators by using models and an understanding of the concept of numerator and denominator.	3.1.3.3
Number & Operation	Find 1000 more or 1000 less than any given four-digit number. Find 100 more or 100 less than a given four digit number.	3.3.1.3
Number & Operation	Use strategies and algorithms based on knowledge of place value and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number. Strategies may include mental strategies, partial products, the standard algorithm, and the commutative, associative, and distributive properties.	3.1.2.5
Geometry and Measurement	V.B.2 Identify common two- and three-dimensional shapes that are components of more complex shapes.	V.B.2
Geometry and Measurement	Tell time to the minute, using digital and analog clocks. Determine elapsed time to the minute.	3.3.3.1
Geometry and Measurement	Know relationships among units of time.	3.3.3.2

<b>GRADE 3 QUARTER 4</b>	<b>PROJECT #1 PURPOSE: NUMBER SENSE MULTIPLICATION/DIVISION</b>
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## **A Multiplication and Division Book for Kids**

These activities can be done as a class, small group, individually, with a partner, or a team.

Students will:




- Understand that division means equal groups.
- Understand the multiplication is repeatedly counting by the same number over and over.
- Create a children’s book demonstrating all of the multiples for the numbers 1 – 12.
- Show the meaning of multiplication and division in a very clear way.

Your task is to create a 24 page children’s book using the multiples of 1 – 12. 12 pages will show multiplication. 12 pages will show division. Your book needs to have your best quality work and should be very clear to a student that is younger than you are.


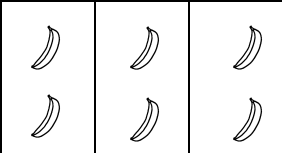
Here is a sample of your cover and your title page.

<p style="text-align: center;"><b>Multiplication and Division</b></p> <p style="text-align: center;">Written and illustrated by</p> <p style="text-align: center;">_____</p>
--

Here is a sample page for multiplication.

The number	Multiplication
3	 1 2 3      4 5 6      7 8 9      10 11 12
$1 \times 3 = 3$ $7 \times 3 = 21$ $2 \times 3 = 6$ $8 \times 3 = 24$ $3 \times 3 = 9$ $9 \times 3 = 27$ $4 \times 3 = 12$ $10 \times 3 = 30$ $5 \times 3 = 15$ $11 \times 3 = 33$ $6 \times 3 = 18$ $12 \times 3 = 36$	 13 14 15    16 17 18    19 20 21    22 23 24
	 25 26 27    28 29 30    31 32 33    34 35 36

Here is the beginning of a sample page for division.

The number	Division
3	
$3 \div 3 = 1$	$6 \div 3 = 2$
	
$15 \div 3 = 5$ (continue diagrams)	$18 \div 3 = 6$
$27 \div 3 = 9$	$30 \div 3 = 10$
$9 \div 3 = 3$	$12 \div 3 = 4$
$21 \div 3 = 7$	$24 \div 3 = 8$
$33 \div 3 = 11$	$36 \div 3 = 12$

Number line website - <http://www.funbrain.com/linejump/index.html>

Interview 10 adults. Ask them a question that involves numbers. Think of something that makes them think a little bit. Some examples might be:

- How long have you been working at your job?
- How old were you when you learned to drive?
- How many light switches are in your house?
- How many miles away do you live from where you were born?
- Any others you can think of...

Record your data here:

My question that can be answered with a number:

--

Data:

<b>Person</b>	<b>Answer to the question</b>

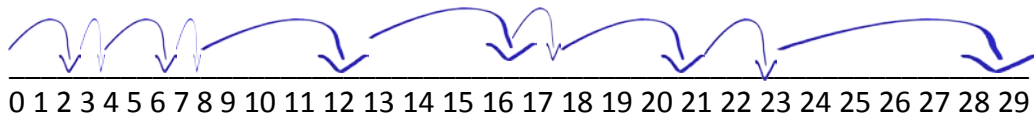
Now add all the answers together and show it on a number line. Take the data you collected and put it on the number line with arrows showing the jumps for each response. Use a 12" X 18" and a straight edge to make your number line. Depending on your question, your number line may be much longer than the sample below. It may make more sense to count by fives or tens on your number line. Be sure your numbers are evenly spread apart and your work is your very best quality! 😊

Here is a sample:

Question: How many TVs do you have in your house?

Data:

Person	Answer to the question
Jack	2
Franco	1
Mrs. Jackson	3
Uncle Jim	1
Francesca	4
Deon	4
Lisa	1
Mr. Powell	3
Gretchen	2
David	5



**26** is the total number of TVs the 10 adults had.

Now it's your turn. Think of a good question and find 10 adults to ask. It could be very interesting what you discover!