

Division: Booklet 1 - Basic Concepts

Contents

Pre-Assessment: Part 1	i
Pre-Assessment: Part 2.....	ii
Assessment Guide	iv
Concept	1
Number Sentence	2
Monkeys on the Roof	8
Recording	9
Missing Factors	11
Remainders	13
Families of Facts: Patterns	14
Word Problems: Two Formats	19
Post-Assessment	22
Answer Key	24

This booklet is dedicated to Paul Krafel. His dedication and leadership at Chrysalis Charter School has kept the principles of the Farm School alive and flourishing.

Acknowledgments

The knowledge, patience, and dedication of Professor Michael Butler made the UCI Farm Elementary School and this mathematics program possible. Special thanks go to Alysia Krafel and Susan Carpenter, who helped develop much of the math materials based on the teachings, ideas, and insights of Professor Butler.

For many years Farm School teachers, students, parents, and staff have shared their unflinching delight in learning. Thank you for your support and dedication.

The books would never have been completed if the students at Chrysalis Charter School in Redding, California, under the guidance of Alysia and Paul Krafel, hadn't needed them. Thank you for your patience through all of the draft copies.

Susan Carpenter edited, added her wise words, useful suggestions, and helped make the Answer Keys a reality. Káran Founds-Benton contributed her meticulous editing skill and knowledge. Diligent and thorough copy editing was done by Jacqueline Logue.

The cover mandala and many delightful illustrations are by Karen Marie Christa Minns. Other illustrations are by Suki Glenn and ClickArt by T/Maker.

To all of the mathematicians, from antiquity to the present, who discovered the principles of mathematics goes our heartfelt appreciation for your dedication.

All rights reserved.

Patterns in Arithmetic: Division - Booklet 1
Parent/Teacher Guide
©2014 Pattern Press

Printed on recycled paper.



Published by Pattern Press
P.O. Box 2737
Fallbrook, CA 92088
(760)728-3731

ISBN 978-1-935559-01-6


www.patternpress.com
E-mail: Patternpress1@gmail.com

Number Sentence

Purpose The purpose is to develop language associated with division and to develop the division number sentence: $x \div y = z$.

Prerequisites Understanding of multiplication

Materials Number Sentence - Worksheets 1 - 3, pages 5 - 7
Unifix cubes, blocks, or tiles
Cuisenaire Rods are helpful in Session 3.
A large piece of paper or tag board for making a chart, and a pencil

Lesson Session 1 Warm up with a review of number sentences. The teacher builds: 
"What addition problem is this?" "Two plus two plus two."
"Write that as a number sentence." " $2 + 2 + 2 = 6$."
"Say it as a multiplication sentence." "Two times three equals six."
"Write that as a number sentence." " $2 \times 3 = 6$."
"Explain how you get the numbers two, three, and six from the model." "Two are in each stack, there are three stacks, which equals a total of six."

Take out twelve blocks.

"How many even groups of two can you make out of the twelve blocks?" *Give enough time to manipulate the blocks.* "Six."

"How many even groups of three can you make?" "Four."

"How many even groups of four can you make?" "Three."

"How many even groups of five can you make?" "You can't make even groups of five." Or, "Two groups with two left over."

"How many even groups of six can you make?" "Two."

"How many even groups of one can you make?" "Twelve."

"How many even groups of twelve can you make?" "One."

Repeat the same process with nine blocks. Have the student make groups of one, three, and nine.

Take out ten blocks. "Find all the ways to make equal groups from ten blocks. No leftovers are allowed." "One group of ten, two groups of five, five groups of two, and ten groups of one."

If she has difficulty finding all the ways, tell her that there are four ways to group ten. Encourage students working in a group to help each other.

Repeat the same questions a few times using different numbers of blocks.

Worksheets

Number Sentence: Worksheets 1 and 2, pages 5 and 6 Solve Set 1 together.

Problem Set 1

Start with eight blocks.

- How many groups of two can you make?
- How many groups of four can you make?
- How many groups of one can you make?
- How many groups of eight can you make?



Session 2 Materials

This section is better done with cube blocks, tiles, or beans instead of Cuisenaire Rods, because the student can more easily see what is happening to the individual units.

Have the student bring the completed Number Sentence - Worksheet 1 to the lesson.

Warm up by building models of different number sentences. Call attention to your hands. Take two blocks, then add three blocks and push all the blocks together.



"What number sentence goes with what I just did with the blocks?" Repeat the action. " $2 + 3 = 5$. Start with two blocks and add three more to make five."

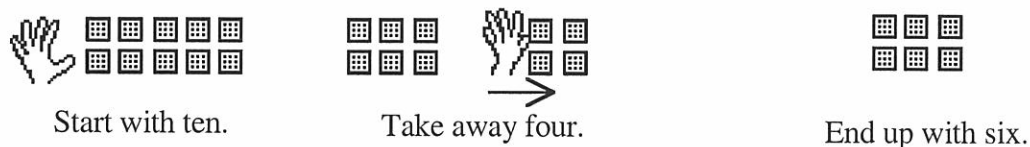
"What number sentence is this?" Put two blocks in a group. Then add three more groups of two blocks.

" $2 \times 4 = 8$. You start with two and make it four times."



Take a group of two. Make three more groups of two. End with four groups of two.

"What number sentence is this?" Take ten blocks and remove four.



" $10 - 4 = 6$. Start with ten blocks and take away four and have six blocks left."

"Now we'll change each multiplication number sentence that you did on Worksheet 1 into a division number sentence." Begin with problem A in Set 1.

"How many blocks did you start with?" "Eight."

"What size of group did you make?" "Two in each group."

"How many groups of two did you end up with?" "Four groups." Make sure that she says the word groups and not just four. If she says four ask, **"Four what?"**

"These questions identify the three numbers in the division number sentence.

What is the sign for division?" " \div " Show her this convention if she doesn't know it. Have her draw a few.

To help her grasp the format, make a chart that looks like this:

	\div	$=$
--	--------	-----

"What does the first number of a division number sentence tell you?"



"What you start with." Write that in the first box.

Number Sentence - Worksheet 1

Date _____

Example:

Start with six blocks.

- A. How many groups of three can you make? 2 
- B. How many groups of one can you make? 6 

Problem Set 1

Draw your blocks.

Start with eight blocks.

- A. How many groups of two can you make? _____
- B. How many groups of four can you make? _____
- C. How many groups of one can you make? _____
- D. How many groups of eight can you make? _____

Problem Set 2

Start with nine blocks.

- A. How many groups of three can you make? _____
- B. How many groups of one can you make? _____
- C. How many groups of nine can you make? _____

Problem Set 3

Start with fifteen blocks.

- A. How many groups of three can you make? _____
- B. How many groups of five can you make? _____
- C. How many groups of one can you make? _____
- D. How many groups of fifteen can you make? _____

Number Sentence - Worksheet 3

Date _____

Use Cuisenaire Rods and crayons.

The length of the train 	The length of the car you use 	The number of cars you end up with.
(start with)	(size of group)	(number of groups)

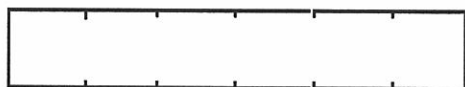
Problem Set 1

How many six centimeter trains can you make? Each train must use only one color. Draw and color each rod train. Then in the big boxes, write the number sentence that goes with that train.

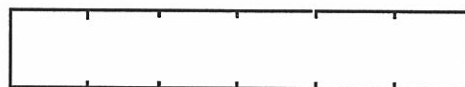
One is done for you.



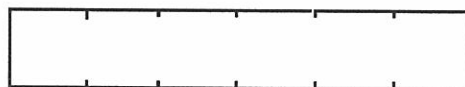
6	\div	$2 = 3$
-----	--------	---------



	\div	$=$
--	--------	-----



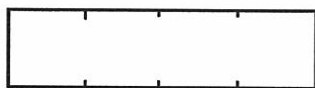
	\div	$=$
--	--------	-----



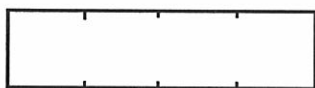
	\div	$=$
--	--------	-----

Problem Set 2

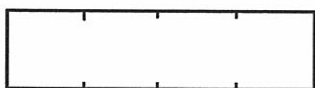
Show all the ways of grouping four blocks.



	\div	$=$
--	--------	-----



	\div	$=$
--	--------	-----



	\div	$=$
--	--------	-----

Monkeys on the Roof

Purpose The purpose of this lesson is to develop a physical model of partitioning a division problem using the division symbol (querel): $\overline{\hspace{1cm}}$
This is the "Guzzinda" method.*

Prerequisites Number Sentence

Materials Monkeys on the Roof - Worksheets 1 - 5, pages 17 - 24
Unifix cubes
Scissors
Paste

Lesson Begin with a few division number sentences such as $12 \div 3 = \underline{\hspace{1cm}}$. Have the student solve the problem with blocks or prove the answers with blocks. Test for understanding of a division sentence.
"What question does $12 \div 3 = \underline{\hspace{1cm}}$ ask?" "How many groups of three are there in twelve."
"Which numeral tells me how many blocks to start with?" "The twelve."
"What does the three tell you?" "The size of the group I am going to make."
"What is the answer?" "Four."
"Four what?" Or, "What does the four stand for?" "Four groups of three (in twelve).

Then take out fifteen blocks and, slowly, make groups of five. While you are doing that, ask, "What problem am I doing?" "Fifteen divided by five." Do several problems like this. Then have each student take the teacher's place and the other students identify the problem they are doing.

The worksheets use a story to demonstrate the use of the division symbol: $\overline{\hspace{1cm}}$

Worksheets Monkeys on the Roof - Worksheets 1 - 5, pages 17 - 24

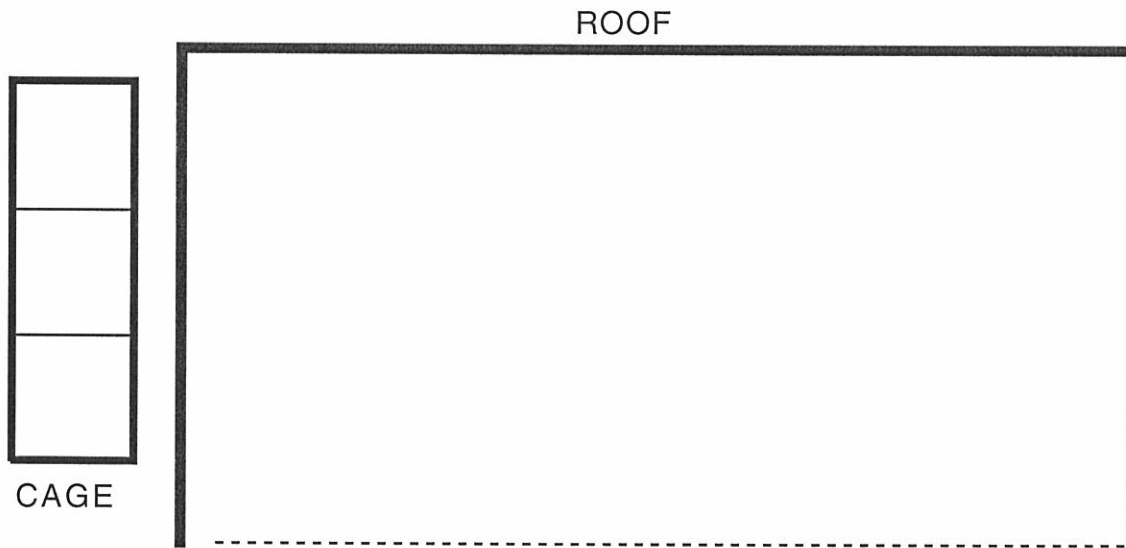
It is essential that you do not skimp on time in this lesson. This concept seems easy and the lesson proceeds smoothly for most students. But an incomplete understanding of what the numbers in a division problem actually mean (number you start with, number of groups or size of group) leads to major conceptual problems later. The mental picture formed in this lesson will be drawn on again and again when you are working with long or difficult problems. It will be important later, when the students have dropped the physical manipulation of the blocks, to review this lesson now and then. It is very easy for students to write numbers on worksheets and forget what the numbers mean.

*Partitioning (Goes Into or Guzzinda): You have twelve cookies. You want to give each of your friends two cookies. How many friends can you give cookies to? $\underline{\hspace{1cm}}$ The number sentence is $12 \div 2 = 6$. This is also called 'goes zin da.' As in two 'goes zin da' twelve how many times?

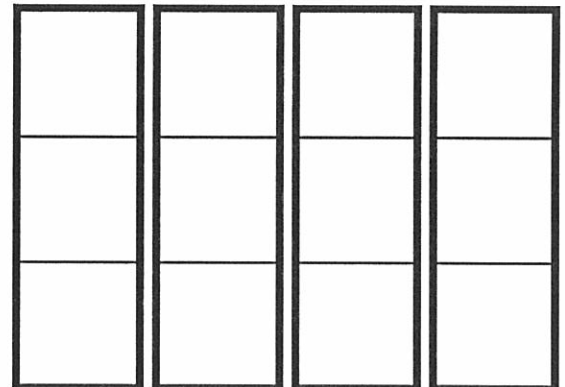
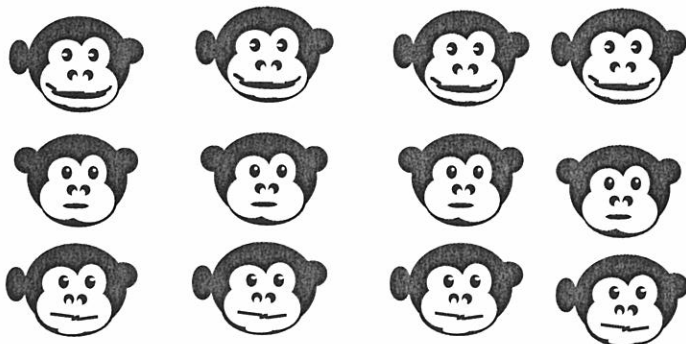
Monkeys on the Roof - Worksheet 1

Date _____

Once upon a time there was a whole batch of baby monkeys who got loose from a zoo and found their way into Mrs. Querel's house. She called the zookeeper, who came over with some cages. The cages looked like little towers with three little doors. The zookeeper went into the house and put three baby monkeys into each cage. Then he called a helicopter to come and pick up the cages. The helicopter pilot wanted the cages on the roof of the house so he could get them easily with his hook. So the zookeeper tossed the cages up on the roof. The pilot grabbed them with a hook and took them all back to the zoo. Mrs. Querel's house was all messed up but empty of baby monkeys. The zookeeper stayed to help clean up the mess.



Cut out the 12 baby monkeys. Put all the baby monkeys into the house. Now cut out a cage. Paste three baby monkeys into each cage and put the cage on the roof. Keep doing that until all those frisky monkeys are in cages on the roof.



Recording

Purpose

The purpose is to record the division number sentence linking the blocks (concrete) with drawings (representational) and numbers (abstract).


Prerequisites

Number Sentence and Monkeys on the Roof

Materials

Division: Recording - Worksheet 1, page 25

Blocks

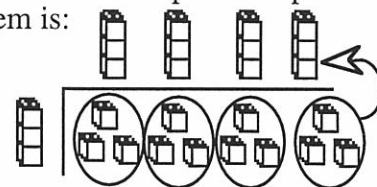
A large drawing of the division symbol (querel) 

Lesson

In this lesson the student builds the block model, then draws a picture representation to record on the worksheet. The first problem is:

Session 1

$$12 \div 3 = ?$$



Session 2

Division: Recording, Worksheet 2 - 4, pages 26 - 28

The student solves it with blocks, adds a picture representation, and records what she is doing on the worksheet. She records it in pictures at each step. Finally she records the numbers on the worksheet.

$$14 \div 2 = 7$$



Notes

Using Worksheet 3 format, continue to practice this lesson for several weeks while you work on other things. Give number sentences with problems that come out evenly. Keep the numbers below thirty-six. Counting blocks past that number becomes burdensome and often inaccurate. Twenty problems per week is usually adequate.

If you are working with a large group, have the students work independently whenever they begin to operate correctly on their own. Students who need help should continue to work with you for as long as they need.

Students will drop the block models whenever they wish to. They usually will ask to do so when they feel ready. After a week or two of practice, if the student has not dropped the blocks independently, give her the challenge of trying to do a division problem without using blocks.

Test for Understanding

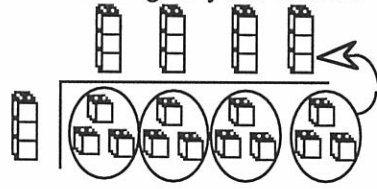
$$\text{divisor} \overline{) \begin{array}{l} \text{quotient} \\ \text{dividend} \end{array}}$$

The basic understanding being worked on in this lesson is the identification of the meaning of the positions of the numbers in a division problem. The numeral under the line, called the *dividend*, is the number of things you start with. It is a counting of single units. The number to the left of the line, called the *divisor*, is an operator. It gives the instruction to make groups of a certain size out of the number of things you start with. The answer, called the *quotient*, is written above the line and represents the number of groups that were made. (The divisor can also be the number of groups and the quotient the size of the groups, but we will not deal with this switch until later.) It is important that the student understands the difference between the number in the dividend and the number in the quotient. The first is a number of individual objects, the second is a number of groups of objects. It is important to have the student clearly articulate these differences in order to establish her level of understanding.

Recording
Worksheet 1

Date _____

Drawing of your blocks



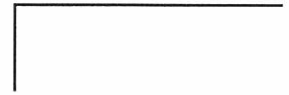
1.

$$12 \div 3 =$$

7.

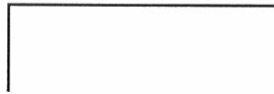
$$18 \div 2 =$$

Drawing of your blocks



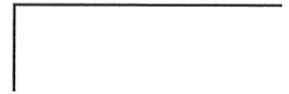
2.

$$12 \div 4 =$$



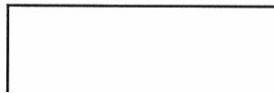
8.

$$18 \div 3 =$$



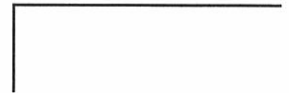
3.

$$12 \div 2 =$$



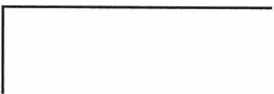
9.

$$18 \div 6 =$$



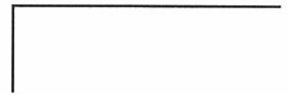
4.

$$12 \div 6 =$$



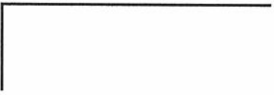
10.

$$18 \div 9 =$$



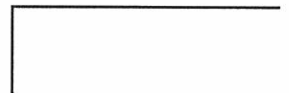
5.

$$15 \div 3 =$$



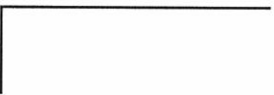
11.

$$8 \div 2 =$$



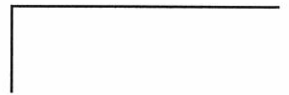
6.

$$15 \div 5 =$$



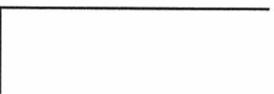
12.

$$20 \div 4 =$$



Make your own.

$$\underline{\quad} \div \underline{\quad} =$$



Word Problems: Two Formats

Purpose The purpose is to build division story problems with concrete objects (Partitioning, which is also referred to as the Goes Into or Guzzinda method). quotient

Materials Any counter

dividend \div divisor = quotient

start with \div size of the group = number of groups

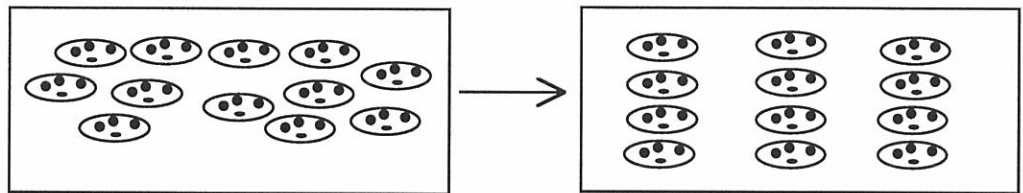
number of groups

size of group

start with

Lesson Have each student take a handful of counters. Read the following story problems while the students act out each story with the manipulatives. After the first story ask the students to explain their way of showing it.

1. "Maria has twelve cookies to share with her friends. Each friend receives four cookies. How many friends can have four cookies?" Three.



2. "John has nine marbles. He wants to give three marbles to each of his friends. How many friends can he give marbles to?" "Three."
3. "Shirley collected twenty seashells at the seashore. She has ten cats. She wants to give three shells each to her cats. How many cats can she give shells to?" Six. "How many shells are left over?" "Two."
4. "George has a flea circus. He has sixteen fleas and some tiny boxes for the fleas to jump into. He wants two fleas to jump into each tiny box. How many tiny boxes will he need?" "Eight."
5. "Lola loves lime lollipops. She has eight lime lollipops. Her mother says she can eat four lime lollipops a day. How many days will Lola be able to eat lime lollipops?" "Two."
6. "Lola decides to eat only two a day. How many days will the lime lollipops last now?" "Four."

"Gus, the bus driver, has sixteen children to take to the zoo. His small blue bus has nine seats. Two children can sit on each seat. How many seats will he need for the children? "Eight." How many seats will be left over?" "One."

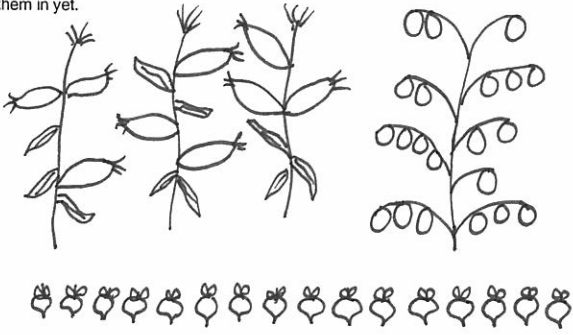
Make up more stories with your students following this format.

Worksheets Word Problems - Worksheets 1 and 2, pages 48 and 49

Division - Book 1

Garden Word Problems - Worksheet 1

Use a pencil to draw a garden scene: 1 tomato plant with 21 tomatoes, 3 corn plants with 3 ears of corn on each plant. Draw 16 small radish plants. Do not color them in yet.



1. Alysia had 21 tomatoes to give away
Color in 21 tomatoes in the picture.
Count out 21 counters.

She put three tomatoes in each basket.
Build it. Put your counters into groups of three.
How many baskets did she fill? 7 baskets.



Draw the baskets.
Draw the tomatoes in each basket.

2. John wanted to give 7 ears of corn away
Color in 7 ears of corn in the picture.

Build it.
He put the ears of corn into two baskets.
But to be fair, each basket had to have the same number of ears in it.
Draw the two baskets in the space to the right.





3

Number Sentences - Worksheet 1

Example:



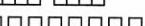

Start with six blocks.

- A. How many groups of three can you make? 2 
B. How many groups of one can you make? 6 

Problem Set 1



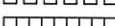
Draw your blocks.

Start with eight blocks.

- A. How many groups of two can you make? 4 
B. How many groups of four can you make? 2 
C. How many groups of one can you make? 8 
D. How many groups of eight can you make? 1 


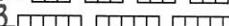
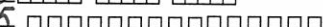
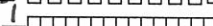
Problem Set 2

Start with nine blocks.

- A. How many groups of three can you make? 3 
B. How many groups of one can you make? 9 
C. How many groups of nine can you make? 1 

Problem Set 3

Start with fifteen blocks.

- A. How many groups of three can you make? 5 
B. How many groups of five can you make? 3 
C. How many groups of one can you make? 15 
D. How many groups of fifteen can you make? 1 

5

Garden Word Problems - Worksheet 2

How many ears of corn went into each basket? 3 ears

Are there any ears left over? yes, 1

3 ears per basket with 1 left

3. A rabbit ate the tops off of half of the radish plants.

If a rabbit ate half of the radishes, how many would be left? 8 radishes would be left.

Color the eaten plants brown. Color the ones that are left nice and green. Draw in the rabbit too.

4. Draw in another plant with fruit on it into your garden picture. Write a problem to go along with the picture. Have someone find the answer to your problem.

AWV

Skip count and record to forty-five by threes.

0 3 6 9 12 15 18 21 24 27 30 33 36 39 42

Skip count and record to sixty by fours.

0 4 8 12 16 20 24 28 32 36 40 44 48 52 56

Skip count backwards by twos from thirty and record.

30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0

Skip count backwards by fives from seventy-five and record.

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

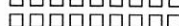
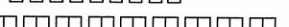
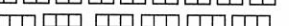
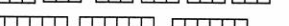
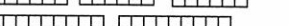
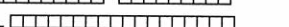
4

Number Sentences - Worksheet 2

Problem Set 4

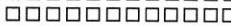
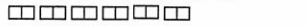
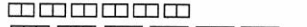
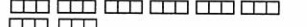

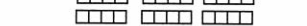
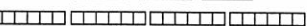
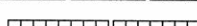
Draw your blocks.

Start with eighteen blocks.

- A. How many groups of one can you make? 18 
B. How many groups of two can you make? 9 
C. How many groups of three can you make? 6 
D. How many groups of six can you make? 3 
E. How many groups of nine can you make? 2 
F. How many groups of eighteen can you make? 1 

Problem Set 5

Start with twenty-four blocks.

- A. How many groups of one can you make? 24 
B. How many groups of two can you make? 12 
C. How many groups of three can you make? 8 
D. How many groups of four can you make? 6 
E. How many groups of six can you make? 4 
F. How many groups of eight can you make? 3 
G. How many groups of twelve can you make? 2 
H. How many groups of twenty-four can you make? 1 

Challenge

With your twenty-four blocks try making other groups. Try groups of five or nine.

What happens? The groups are not equal. There are leftover blocks!

6

Number Sentences - Worksheet 3 OWV

Use Cuisenaire Rods and crayons.

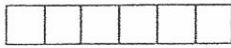
Problem Set 1

How many six centimeter trains can you make? Each train must use only one color. Draw and color each rod train. Then in the big boxes, write the number sentence that goes with that train. One is done for you.

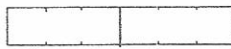
The length of the train.	\div	The length of the car you use	=	The number of cars you end up with.
(start with)		(size of group)		(number of groups)



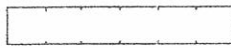
$$6 \div 2 = 3$$



$$6 \div 1 = 6$$



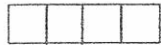
$$6 \div 3 = 2$$



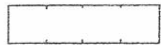
$$6 \div 2 = 3$$

Problem Set 2

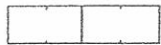
Show all the ways of grouping four blocks.



$$4 \div 1 = 4$$



$$4 \div 4 = 1$$



$$4 \div 2 = 2$$

7

Number Sentences - Worksheet 5 OWV

Take out blocks.

Problem Set 1

Show all the ways of grouping six blocks evenly. Draw a picture of each way below. One way is done for you.

The number you start with.	\div	The size of each group you make.	=	The number of groups you make.
----------------------------	--------	----------------------------------	---	--------------------------------

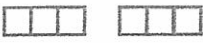
In the boxes below, write the number sentence that goes with each picture.



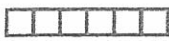
$$6 \div 2 = 3$$



$$6 \div 1 = 6$$



$$6 \div 3 = 2$$



$$6 \div 6 = 1$$

Problem Set 2

Show all the ways of grouping four blocks evenly.



$$4 \div 1 = 4$$



$$4 \div 2 = 2$$



$$4 \div 4 = 1$$

9

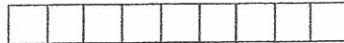
Number Sentences - Worksheet 4 OWV

Use Cuisenaire Rods and crayons.

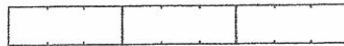
Problem Set 3

$$\boxed{} \div \boxed{} = \boxed{}$$

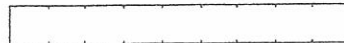
Show all the nine centimeter trains.



$$9 \div 1 = 9$$



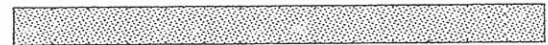
$$9 \div 3 = 3$$



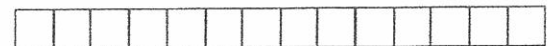
$$9 \div 9 = 1$$

Problem Set 4

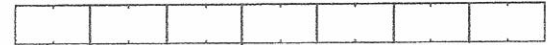
Show all the fourteen centimeter trains. Since you don't have a fourteen rod, choose a color that stands for fourteen and color your one rod train that color. The problem that uses the one fourteen rod is done for you this time. Color it in.



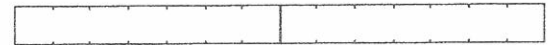
$$14 \div 14 = 1$$



$$14 \div 1 = 14$$



$$14 \div 2 = 7$$



$$14 \div 7 = 2$$

8

Number Sentences - Worksheet 6 OWV

Problem Set 3

Show all the ways to group ten blocks evenly. Draw a picture of each way.



$$10 \div 1 = 10$$



$$10 \div 2 = 5$$



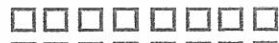
$$10 \div 5 = 2$$



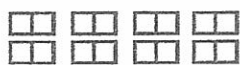
$$10 \div 10 = 1$$

Problem Set 4

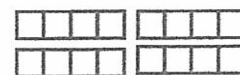
Show all the ways to group sixteen blocks evenly. Draw a picture of each way.



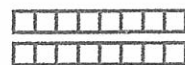
$$16 \div 1 = 16$$



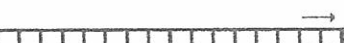
$$16 \div 2 = 8$$



$$16 \div 4 = 4$$



$$16 \div 8 = 2$$



$$16 \div 16 = 1$$

10

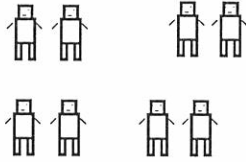
Number Sentences - Worksheet 11

4. Eddie had eight robots.
He gave two robots to each person at his party.
How many people were at Eddie's party?

Draw your pictures here.

$$8 \div 2 = 4$$

Number sentence



5. You have ten fingers.
You have five fingers on each hand.
How many hands do you have?

$$10 \div 5 = 2$$

Number sentence



6. If you had twenty fingers with five fingers on each hand, then how many hands would you have?

$$20 \div 5 = 4$$

Number sentence



7. Make your own. *AWV*

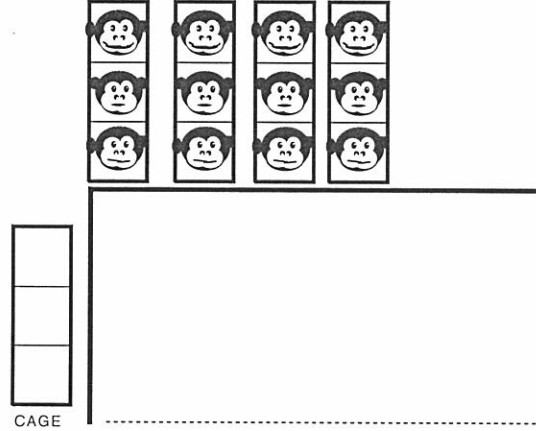
$$\square \div \square = \square$$

Number sentence

15

Monkeys on the Roof - Worksheet 1

Once upon a time there was a whole batch of baby monkeys who got loose from a zoo and found their way into Mrs. Quere's house. She called the zookeeper, who came over with some cages. The cages looked like little towers with three little doors. The zookeeper went into the house and put three baby monkeys into each cage. Then he called a helicopter to come and pick up the cages. The helicopter pilot wanted the cages on the roof of the house so he could get them easily with his hook. So the zookeeper tossed the cages up on the roof. The pilot grabbed them with a hook and took them all back to the zoo. Mrs. Quere's house was all messed up but empty of baby monkeys. The zookeeper stayed to help clean up the mess.

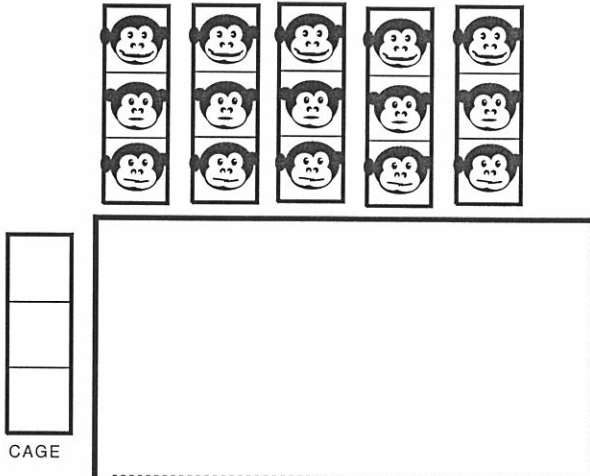


Cut out the 12 baby monkeys. Put all the baby monkeys into the house. Now cut out a cage. Paste three baby monkeys into each cage and put the cage on the roof. Keep doing that until all those frisky monkeys are in cages on the roof.

17

Monkeys on the Roof - Worksheet 2

Oh no! The baby monkeys came back! This time they brought their friends too.
Now there are 15 monkeys. How many cages will the zookeeper need this time?

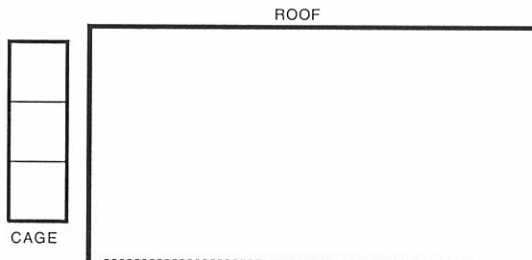


Cut out the 15 baby monkeys. Put all the baby monkeys into the house. Now cut out a cage. Paste three baby monkeys into each cage and put the cage on the roof. Keep doing that until all those frisky monkeys are in cages on the roof.

19

Monkeys on the Roof - Worksheet 3

Use Unifix cubes. These will stand for the monkeys. To put them in cages, snap them together in groups of three and put them on the roof. Record how many cages are on the roof.



Cage Size	Number of Monkeys in the house	Number of Cages on the Roof
3	18	6 Cages
3	24	8 Cages
3	21	7 Cages
3	30	10 Cages
3	9	3 Cages
3	27	9 Cages
3	33	11 Cages

21

Families of Facts: Practice - Worksheet 1

Use only the three numbers in the box to make four number sentences.



3 15 5	8 24 3	7 28 4
$3 \times 5 = 15$	$8 \times 3 = 24$	$4 \times 7 = 28$
$5 \times 3 = 15$	$3 \times 8 = 24$	$7 \times 4 = 28$
$15 \div 3 = 5$	$24 \div 8 = 3$	$28 \div 4 = 7$
$15 \div 5 = 3$	$24 \div 3 = 8$	$28 \div 7 = 4$

30 6 5	9 54 6	AWV
$6 \times 5 = 30$	$9 \times 6 = 54$	$\circ \times \circ = \circ$
$5 \times 6 = 30$	$6 \times 9 = 54$	$\circ \times \circ = \circ$
$30 \div 6 = 5$	$54 \div 9 = 6$	$\circ \div \circ = \circ$
$30 \div 5 = 6$	$54 \div 6 = 9$	$\circ \div \circ = \circ$

21 7 3		
$7 \times 3 = 21$	$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$	$21 \div 7 = 3$
$3 \times 7 = 21$	$\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$	$21 \div 3 = \circ$

Word Problems - Worksheet 1



Use counters to prove your answer. Show how you did the problem. Draw a picture and write a number sentence.

1. You have 15 bubble gum balls in a bag. You want to give 3 gum balls to each friend. How many friends can you give gum to? 5 friends

$15 \div 3 = 5$

2. Of the 15 gum balls, 4 are white and 7 are green gum balls. The rest are yellow. How many yellow gum balls? 4 yellow gum balls

$4 + 7 = 11$ $15 - 11 = 4$

3. You have 20 rats. You are going to give 4 rats per classroom to different classrooms. How many rooms will get rats? 5 rooms

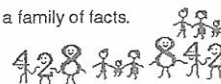
$20 \div 4 = 5$

4. If there were 28 students all together and you wanted to divide the students into four groups, how many students would be in each group? 7 students

$28 \div 4 = 7$

Families of Facts: Practice - Worksheet 2

Fill in the blank space with a number that creates a family of facts. Use only the three numbers in the box to make four number sentences.



4 36 9	4 32 8	7 42 6
$4 \times 9 = 36$	$8 \times 4 = 32$	$6 \times 7 = 42$
$9 \times 4 = 36$	$4 \times 8 = 32$	$7 \times 6 = 42$
$36 \div 4 = 9$	$32 \div 8 = 4$	$42 \div 6 = 7$
$36 \div 9 = 4$	$32 \div 4 = 8$	$42 \div 7 = 6$

35 5 7	24 12 2	AWV
$5 \times 7 = 35$	$12 \times 2 = 24$	$\circ \times \circ = \circ$
$7 \times 5 = 35$	$2 \times 12 = 24$	$\circ \times \circ = \circ$
$35 \div 5 = 7$	$24 \div 12 = 2$	$\circ \div \circ = \circ$
$35 \div 7 = 5$	$24 \div 2 = 12$	$\circ \div \circ = \circ$

Example: $24 \ 48 \ 2$

$24 \times 2 = 48$

$2 \times 24 = 48$

$48 \div 24 = 2$

$48 \div 2 = 24$

Word Problems - Worksheet 2



5. If each of the 28 students get 3 cookies each, how many cookies will you need for each group? Remember, there are four groups. In problem 4, you figured out how many students in each group. Each group will need 21 cookies. All together, you will need a total of how many cookies? 147 cookies

$21 + 21 + 21 + 21 + 21 + 21 + 21 = 147$

6. You have 6 pet rabbits. Each rabbit had 8 babies. How many baby rabbits in all? 48 baby rabbits

$6 \times 8 = 48$

Challenge.

7. One half of the baby rabbits were white and brown. One fourth were brown one fourth were white. How many were white and brown? 24 rabbits

How many were brown? 12 rabbits How many were white? 12 rabbits

$48 \div 2 = 24$

$48 \div 4 = 12$

$48 \div 4 = 12$