



National Center and State Collaborative

# **NCSC Math Activities with Scripted Systematic Instruction (MASSI): Elementary Ratio and Proportion**

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National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with significant cognitive disabilities. The project draws on a strong research base to develop an AA-AAS that is built from the ground up on powerful validity arguments linked to clear learning outcomes and defensible assessment results, to complement the work of the Race to the Top Common State Assessment Program (RTTA) consortia.

Our long-term goal is to ensure that students with significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post-secondary options. A well-designed summative assessment alone is insufficient to achieve that goal. Thus, NCSC is developing a full system intended to support educators, which includes formative assessment tools and strategies, professional development on appropriate interim uses of data for progress monitoring, and management systems to ease the burdens of administration and documentation. All partners share a commitment to the research-to-practice focus of the project and the development of a comprehensive model of curriculum, instruction, assessment, and supportive professional development. These supports will improve the alignment of the entire system and strengthen the validity of inferences of the system of assessments.



The contents of this document were developed as part of the National Center and State Collaborative by Julie Thompson, Alicia Saunders, and Diane Browder at University of North Carolina at Charlotte and verified by Amy Lehew, math content expert, under a grant from the Department of Education (PR/Award #: H373X100002, Project Officer, [Susan.Weigert@Ed.gov](mailto:Susan.Weigert@Ed.gov)). However, the contents do not necessarily represent the policy of the U.S. Department of Education and no assumption of endorsement by the Federal government should be made.

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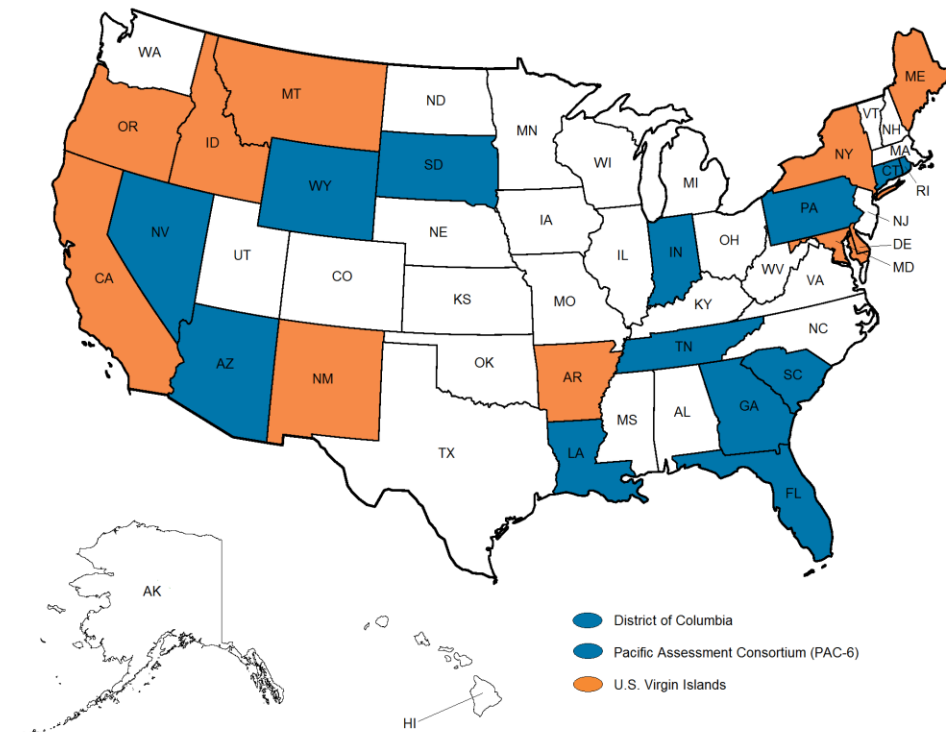


National Center and State Collaborative

NCSC is a collaborative of 15 states and five organizations.

The states include (shown in blue on map): Arizona, Connecticut, District of Columbia, Florida, Georgia, Indiana, Louisiana, Nevada, Pacific Assessment Consortium (PAC-6)<sup>1</sup>, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, and Wyoming.

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\*Core partner states are blue in color and Tier II states are orange in color.

<sup>1</sup> The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).



National Center and State Collaborative

The five partner organizations include: The National Center on Educational Outcomes (NCEO) at the University of Minnesota, The National Center for the Improvement of Educational Assessment (Center for Assessment), The University of North Carolina at Charlotte, The University of Kentucky, and edCount, LLC.



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# **NCSC Math Activities with Scripted Systematic Instruction (MASSI): Elementary Ratio and Proportion**

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July 2013

# MASSI: Math Activities with Scripted Systematic Instruction

## Activity: Going on a Field Trip

**Grade Band:** Grades 3-5

**Concept:** Ratio and Proportion

Common Core State Standard	Core Content Connectors	MASSI OBJECTIVES
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	<b>3<sup>rd</sup></b> 3.NO.2e1 Solve and check one or two-step word problems requiring addition, subtraction, or multiplication with answers up to 100.	Given a word problem with number of groups and total number of students calculate number of students in each group.
3.OA.1 Interpret products of whole numbers, e.g., interpret $5 \times 7$ as the total number of objects in 5 groups of 7 objects each. <i>For example, describe a context in which a total number of objects can be expressed as <math>5 \times 7</math>.</i>	<b>4<sup>th</sup></b> 4.PRF.1d2 Use objects to model multiplication and division situations involving up to 10 groups with up to 5 objects in each group and interpret the results.	Given number of activity buses and number of groups of students in each bus, decide how many students in all are going on the field trip.
5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	<b>5<sup>th</sup></b> 5.NO.2a5 Solve word problems that require multiplication or division.	Solve a variety of multiplication and division word problems using calculator.

**Be sure to provide specific practice to students on the skills that correspond to their grade level.**

**Teaching Materials Included:** Grouping mats, counters for grouping, “all together mat”, “groups of” and “in each” visuals, first/then, and equation graphic organizers, teacher and student word problems, bus visual, base ten counters, base five counters, “count by tens” graphic organizer, “count by fives” graphic organizer

**Other Materials:** Counters, base ten blocks, calculators

**Worksheets:** There are student worksheets to review each component of the lesson

**Assessments:** Progress Monitoring for taking data during the lesson; Skills Test

**TEACHING OVERVIEW:** The first section of the MASSI provides remedial practice on using manipulatives to create an array, combining sets to find total, and using key words to decide what to do with a set. 3<sup>rd</sup> graders will learn to solve a word problem by dividing and check work by multiplying. This is a good review for your 4<sup>th</sup> and 5<sup>th</sup> graders. The 4<sup>th</sup> graders will complete a similar but more advanced problem requiring two digit multiplication and use manipulatives. This is useful for your 3<sup>rd</sup> and 5<sup>th</sup> graders to gain fluency with these concepts and practicing numeracy skills. The 5<sup>th</sup> graders will use knowledge from the previous two problems to solve problems by interpreting whether to divide or multiply and using a calculator to solve. The 3<sup>rd</sup> and 4<sup>th</sup> graders can continue to gain fluency with these concepts and practice numeracy skills.

## SCRIPT FOR LESSON

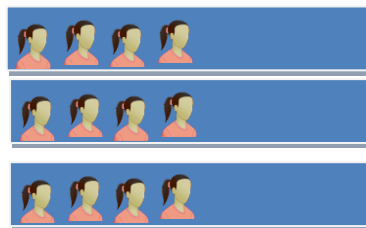
**BUILDING ESSENTIAL UNDERSTANDING: CONCEPT AND SYMBOLS: Create an array by making equal groups.** *(Skip this section for students who understand these relationships and can identify these concepts).*

**INTRODUCE THE ACTIVITY:** Today we are going to plan a field trip to the park. We will need to make sure we are safe when we go. It is important when we go on a field trip that we plan carefully and make sure everyone is with an adult when we go off school grounds.

**INTRODUCE PROBLEM:** Before we get started we need to practice making equal groups.

**MODEL THE PROCESS:** The first thing we need to do is decide how many groups. Lay down “grouping mats” from teacher materials as you say, **I will make three groups. One. Two. Three.** Put counters on table (more than you need). **Here are some counters. I want four counters in each group. Count with me as I put four in the first group.** Move counters one at a time as you say, **One. Two. Three. Four. I put 4 in the first group. I need to fill all my groups with four. Count with me as I fill all my groups.** Continue counting as you place each manipulative onto the mat. Repeat until all three mats are full.

**\*\*Note:** Create the array like the visual below so that students can see the relationship between each group as equal. This will also help them learn how to organize data (see Data Analysis MASSI).





**STUDENT PRACTICE: Now it's your turn. Here are five groups.** Place the grouping mats in front of the student and count them out as you do so. **You are going to make five groups of three.** Put counters on the table (more than the student needs). **"Here are some counters."** Use the CONSTANT TIME DELAY script to teach students to sort the items into the correct column.

**\*\*Note:** You may reproduce the counters included or use chips. If students are distracted by the counters, you can laminate the grouping mats and let them use a bingo dotter or marker. If student has PHYSICAL LIMITATIONS create larger grouping mats and counters and prompt her to eye gaze to direct you as you place the counters on the mat. Make sure she indicates for you to stop. OR provide student with a communication device or talking calculator so that he can count along as you place the counters on the mat.

**CHECK AND SCORE**

Step	Teacher Says/Does	Student Response
1.	Point to first group. <b>"Put three counters in each group."</b>	Student places three counters on first group mat.
2.	Wait three seconds. If student does not continue then prompt. <b>"What's next?"</b>	Student places three counters on next group mat.
3.	Wait three seconds. If student does not continue then prompt. <b>"What's next?"</b>	Student places three counters on next group mat.
4.	Wait three seconds. If student does not continue then prompt. <b>"What's next?"</b>	Student places three counters on next group mat.
5.	Wait three seconds. If student does not continue then prompt. <b>"What's next?"</b>	Student places three counters on last group mat.

**Great work making five groups of three!** Keep the array out for use in next part of lesson.

**BUILDING ESSENTIAL UNDERSTANDING: CONCEPT AND SYMBOLS: Combine sets with concrete objects; Using counting to get the answer**

**INTRODUCE PROBLEM:** Now let's combine our sets to see how many we have all together.

**MODEL THE PROCESS:** Present "all together mat." **Here is our all together mat. I want to know how many counters we have all together.** Slide the counters onto the orange section of the mat as you say, **I will slide my counters onto the top of the all-together mat like this. Now I will count to see how many I have all together.** Slide your finger across the black line into the purple section as you say, **I will move my counters across the line as I count. Count with me. One, two, . . .** Move the each counter across the line as you count.



**STUDENT PRACTICE:** Quickly create an array with 3 groups of 5 counters each. (Change the array each time you teach this section.) **Now it is your turn. Here are three groups of five. Use the all together mat to tell me how many counters all together.** Use LEAST



INTRUSIVE PROMPTS script as needed to help students with each step.

**\*\*Note:** If student made marks on group mats instead of using manipulatives, just place the group mats onto the all together mat and then count as described above. For NON-VERBAL students have them use a talking calculator, communication device, or point to numbers on number line to count. Make sure they maintain one to one correspondence as they count. (It may be difficult for them to transition back and forth from touching manipulatives to device/number line so you may consider pointing as they count along.)

#### CHECK AND SCORE

Step	Teacher Says/Does	Student Response
6.	Wait three seconds. If student does not begin then prompt. <b>“Move the counters onto the top of the all together mat.”</b>	Student moves counters onto mat.
7.	Wait three seconds. If student does not begin then prompt, <b>“Count.”</b>	Student counts all counters <b>***Note:</b> Student does not have to slide counters across line receive correct for this step. If they are able to count without losing their place allow them to do so. If not, then prompt them to consistently slide the counters across the line when counting.
8.	<b>“How many all together?”</b>	Student states/identifies total number of counters.

**BUILDING ESSENTIAL UNDERSTANDING: SYMBOLS: Identify what to do with set when given key word** *(Skip this section for students who understand these relationships and can identify these concepts).*

**INTRODUCE PROBLEM:** We have learned how to make sets by grouping and how to combine our sets to find how many we have all together. Now let’s practice following directions by listening for phrases. Hold up the key phrase flash cards as you identify them. The key phrases are, “groups of” and “in each.” When I see “groups of” I know I am going to solve an all together problem. When I see “in each” I know I will solve by dividing the set into groups.

**MODEL THE PROCESS:** Display and read the word problem. **The cafeteria worker is packing carrot sticks for packed lunches for the field trip. She has made 64 groups of 5 carrot sticks. How many carrot sticks does she have in all? My word problem says groups of. I will point to the picture that shows what I do to solve it.** Point to “groups of” picture.



**STUDENT PRACTICE:** Now it’s your turn. Display the word problem and say, **your word problem says: Asha has 3 groups of four daffodil plants in her garden. How many daffodil plants does she have in all.** Use the CONSTANT TIME DELAY script to teach students to point to the “groups of” picture.

CHECK AND SCORE

Step	Teacher Says/Does	Student Response
9.	Display “groups of” picture and unrelated picture card (e.g., pencil). <b>Point to the picture that shows what you do to solve the word problem.</b>	Student points to the “groups of” picture.

**MODEL THE PROCESS:** Now let’s practice with another word problem. Display the word problem. Noah had 16 candy pieces. He put his candy into four groups to share with friends. How many candy pieces were **in each** group? My word problem says, “in each.” I will point to the picture that shows what I do to solve it. Point to “divide sets into groups picture.”



**STUDENT PRACTICE:** Now it’s your turn. Your word problem says: Xavier baked 24 cookies. He put his cookies into four bags to freeze for later. How many cookies were **in each** group? Use the CONSTANT TIME DELAY script to teach students to point to the “in each” picture.

CHECK AND SCORE

Step	Teacher Says/Does	Student Response
10.	Display “in each” picture and unrelated picture card (e.g., car). <b>Point to the picture that shows what you do to solve it.</b>	Student points to “in each” picture.



**STUDENT PRACTICE:** Now listen to me carefully as I read these word problems and tell me what to do to solve them. Use the CONSTANT TIME DELAY script to teach students to point to the correct picture.


CHECK AND SCORE

Step	Teacher Says/Does	Student Response
	***Note: vary the order in which the picture choices are displayed for each step.	
11.	Display word problem. Miles had 6 <b>groups of 3</b> crayons to pass out to the class. How many crayons did he have total? Display “in each”, “groups of”, and unrelated picture and say, <b>Point to the picture that shows what you do to solve it.</b>	Student points to the “groups of” picture.
12.	Shilah collected 16 Pokeman cards. He put his cards into four plastic sleeves to protect them. How many cards were <b>in each</b> sleeve? Display “in each”, “groups of”, and unrelated picture and say, <b>Point to the picture that shows what you do to solve it.</b>	Student points to “in each” picture.
13.	Habiba has 12 porcelain dolls. She keeps them in 3 display cases. How many dolls are <b>in each</b> display case? Display “in each”, “groups of”, and	Student points to “in each” picture.

	unrelated picture and say, <b>Point to the picture that shows what you do to solve it.</b>	
14.	<b>Paula stacked her books into 4 groups of 5 on her bookshelf. How many books does she have in all?</b> Display “in each”, “groups of”, and unrelated picture and say, <b>Point to the picture that shows what you do to solve it.</b>	Student points to the “groups of” picture.



This may be a good stopping point. There is a generalization worksheet with this level. You can use this for additional guided practice or to send home as homework.

<b>INDEPENDENT PRACTICE: Ratio and Proportion Skills Test</b>	<b>Teacher Says/Does</b>	
	Give each student the <i>Ratio and Proportion Skills Test 1</i> . <b>Read directions for each problem and have student select response. Record whether response is correct or incorrect.</b>	Only provide praise for completing assessment (if student needs encouragement). Do not provide specific praise for correct answers while student is testing.
	<b>NOW</b> <i>Stop the lesson here and repeat tomorrow if student is not yet getting at least 8 independent correct responses. Score responses 1-14 on the Ratio and Proportion Progress Monitoring Sheet if you did not do so while teaching.</i>	<b>NEXT</b> <i>Remember the goal is for students to be able to solve a word problem that requires multiplication and division. Move on to the second half of the lesson to hit the target CCC for this grade level. You can skip this Conceptual Foundation section to move on.</i>

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**3<sup>rd</sup> BUILD A GRADE ALIGNED COMPONENT:** Given number of groups and total number of students, calculate number of students in each group. Check work by multiplying groups times number of students.

**4<sup>th</sup> and 5<sup>th</sup> GRADE BUILD ESSENTIAL UNDERSTANDING:** Build fluency with counting and review single digit multiplication

**INTRODUCE THE ACTIVITY/PROBLEM:** Remember we are learning to plan safely for a field trip. We want to make sure there are enough adults to watch the students when we go on a field trip. We know there are 18 students in Mrs. Winchester’s class and that we will divide each class into three groups. We need to find out how many students will be in each group.

**MODEL THE PROCESS:** My problem says “in each.” I will use my “first then” visual to remind me what to do. Display the “first then” visual (labeled “first then” in teaching materials). **First I need to count out 18 students. I will move each student onto my all-together mat as I count. Count with me.** Put out more counters than needed and count out 18, placing the counters on the mat one at a time as you count. Point to the word problem as you say, **My problem says I need to divide them into three groups. Next I will count out three groups. Count with me.** Lay down three group mats as you count. **Here are three groups. Now I will put counters one at a time into each group.** Put the counters in each group as you say, **I will put one in the first, one in the second group, one in the third, and then start again until all the counters have been put in a group.** Continue putting the counters into the groups one at a time until all the counters have been grouped. **Now all the groups have the same amount. I need to count how many are in a group. Because they are all the same I only need to count one group.** Point to a group and say, **I will count how many are in this group. Count with me.** Point to each counter as you count. **There are six students in each group.**

**STUDENT PRACTICE:** Now it is your turn. Your problem says, “Mrs. Thomas has 12 children. She places the children into 3 groups. How many children are in each group.” Give the students more counters than are needed, the all-together mat, and grouping mats. **You can use these to help you if needed.**

Use LEAST INTRUSIVE PROMPTS script as needed to help students with each step.

\*\*Note: Students with physical impairments may count along as the teacher or peer moves the items onto the graphic organizing mats. Students who are non-verbal may use a talking calculator to count (start with 1 then plus one, press equal for each count), point to a number line, or use another communication device to count and identify the answer.

CHECK AND SCORE

STEP	Teacher Says/Does	Student Response
15.	Wait three seconds. If student does not begin then prompt, <b>“Count out 12 children.”</b>	Student counts out 12 counters
16.	Wait three seconds. If student does not begin then prompt, <b>“Count out 3 groups.”</b>	Student counts out 3 groups
17.	Wait three seconds. If student does not begin then prompt, <b>“Put counters one at a time into each group”</b>	Student divides counters evenly into each group.
18.	<b>How many are in each group?</b>	Student says, “4”.




**Student Practice: Your turn to do one more problem. It says, “Mr. Wen has 16 children. He places the children into 4 groups. How many children are in each group?”** Use LEAST INTRUSIVE PROMPTS script as needed to help students with each step.

CHECK AND SCORE

STEP	Teacher Says/Does	Student Response
19.	Wait three seconds. If student does not begin then prompt, <b>“Count out 16 children.”</b>	Student counts out 16 counters
20.	Wait three seconds. If student does not begin then prompt, <b>“Count out 4 groups.”</b>	Student counts out 4 groups
21.	Wait three seconds. If student does not begin then prompt, <b>“Put counters one at a time into each group”</b>	Student divides counters evenly into each group.
22.	<b>How many are in each group?</b>	Student says, “4”.



This may be a good stopping point. There is a generalization worksheet with this level. You can use this for additional guided practice or to send home as homework.

<b>INDEPENDENT PRACTICE:</b> <b>Ratio and Proportion Skills Test</b>	<b>Teacher Says/Does</b>	
	Give each student the <i>Ratio and Proportion Skills Test 2</i> . <b>Read directions for each problem and have student select response. Record whether response is correct or incorrect.</b>	Only provide praise for completing assessment (if student needs encouragement). Do not provide specific praise for correct answers while student is testing.
	<i>NOW</i> Stop the lesson here and repeat tomorrow if student is not yet getting at least 5 independent correct responses. Score responses 15-22 on the <i>Ratio and Proportion Progress Monitoring Sheet</i> if you did not do so while teaching.	<i>NEXT</i> Remember the goal is for students to be able to solve a variety of multiplication and division word problems. As soon as possible, move into the next portion of the lesson to hit the target CCC for the 4 <sup>th</sup> grade level.

**4<sup>th</sup> BUILD A GRADE ALIGNED COMPONENT:** Given number of activity buses and total number of students, decide how many students go in each bus.

**5<sup>th</sup> BUILD ESSENTIAL UNDERSTANDING:** Build fluency counting by fives and tens and using manipulatives to count.

**INTRODUCE THE ACTIVITY/PROBLEM:** We have been learning about planning safely on a field trip. It is also important that we know how many students are riding on each bus. We count everyone when we leave and when we return to make sure that all students are on the bus and no one has been left behind. We need to find the total number of students riding the bus. Display the problem. Here is my problem, “LaShondra’s class is going to the science museum on a field trip. 4 groups of 5 students get on the bus. How many students in all ride on the bus?”

**MODEL THE PROCESS:** Display more than are needed of base ten unit and base five unit groups and the bus template. Here are some groups. I will use these to represent the students on the bus. Some are groups of 5 and some are groups of 10. Point to 5 in word problem. My problem says “groups of 5” so I will put groups of 5 on the bus. Pick up a group of five and say, This is a group of five. Count with me One, two, three four, five. Point to 4 in the word problem. My problem says I need 4 groups so I will put four groups on the bus. Put one group of five on the bus one at a time as you say, Count with me. One, two, three, four. Display the “count by fives” graphic organizer. “I need to know how many students in all are on the bus. I could count them all one at a time. But it will be faster to count by fives. I can use my “count by fives” counter to help. I will put each group on the counter as I count. Place the groups on one at a time as you say, Five, ten, fifteen, twenty. There are 20 students in all on the bus.



**STUDENT PRACTICE: Now it's your turn.** Display the counters, bus, and "count by" graphic organizers. **Your problem says, Mr. Burton's class left to go to the strawberry farm. 3 groups of 10 students got on the bus. How many students in all were on the bus?** Use LEAST INTRUSIVE PROMPTS script as needed to help students with each step.

**\*\*Note:** If you teach this section several times in a row, change the amount of groups and number in each group to ensure the students are not memorizing but correctly displaying the skills needed to solve the problems.

**CHECK AND SCORE**

STEP	Teacher Says/Does	Student Response
23.	Wait three seconds. If student does not begin then prompt, <b>"Find the groups of ten."</b>	Selects groups of ten.
24.	Wait three seconds. If student does not begin then prompt, <b>"Count out 3 groups."</b>	Counts out three groups of ten.
25.	Wait three seconds. If student does not begin then prompt, <b>"Count by 10 to find the answer."</b>	Counts by tens to 30.
26.	<b>How many students in all rode the bus?</b>	Says or indicates 30.




**Student Practice: Your turn to do one more problem.** It says, **"Collingswood Elementary students went on a field trip to the grocery store. 6 groups of 5 rode on the bus. How many students in all rode the bus?"** Use LEAST INTRUSIVE PROMPTS script as needed to help students with each step.

**CHECK AND SCORE**

STEP	Teacher Says/Does	Student Response
27.	Wait three seconds. If student does not begin then prompt, <b>"Find the groups of five."</b>	Selects groups of five.
28.	Wait three seconds. If student does not begin then prompt, <b>"Count out 6 groups."</b>	Counts out 6 groups of five.
29.	Wait three seconds. If student does not begin then prompt, <b>"Count by 5 to find the answer."</b>	Counts by 5 to 30.
30.	<b>How many students in all rode the bus?</b>	Says or indicates 30.



This may be a good stopping point. There is a generalization worksheet with this level. You can use this for additional guided practice or to send home as homework.

<b>INDEPENDENT PRACTICE:</b> <b>Ratio and Proportion Skills Test</b>	<b>Teacher Says/Does</b>	
	Give each student the <i>Ratio and Proportion Skills Test 3</i> . <b>Read directions for each problem and have student select response. Record whether response is correct or incorrect.</b>	Only provide praise for completing assessment (if student needs encouragement). Do not provide specific praise for correct answers while student is testing.
	<i>NOW</i> Stop the lesson here and repeat tomorrow if student is not yet getting at least 5 independent correct responses. Score responses 23-30 on the <i>Ratio and Proportion Progress Monitoring Sheet</i> if you did not do so while teaching.	<i>NEXT</i> Remember the goal is for students to be able to solve a variety of multiplication and division word problems. As soon as possible, move on to the next portion of the lesson to hit the target CCC for the 5 <sup>th</sup> grade level.

## 5<sup>th</sup> BUILD A GRADE ALIGNED COMPONENT: Solve a variety of multiplication and division word problems using calculator.

**INTRODUCE ACTIVITY/PROBLEM:** We have been learning about keeping count of students in order to be safe on a field trip. We counted by ones, fives, and tens to solve our problems. Another way to solve our problems is to use a calculator. We have to learn how to read our problem to decide how to solve it.

**MODEL THE PROCESS:** Display “groups of” and “in each” equation graphic organizers. Here are two graphic organizers that show the equations I can use to solve my problems. Point to “groups of” graphic organizer. **When my problem says “groups of” I can use this to help me solve the problem.** Point to “in each” graphic organizer. **When my problem says “in each” I can use this to help me solve the problem.** First let’s practice solving a “groups of” problem. Display the problem. **My problem says, “Mrs. Trask had 4 groups of 7 children in her class. How many students did she have in all?”** Point to “groups of” in problem. **My problem says, “groups of” so I will use the “groups of” equation to solve my problem.** Point to groups of equation as you say, **This equation says blank times blank equals. First I need to write the numbers from my problem in the blanks.** Point to the word problem. **My problem says “4 groups of 7”.** Write 4 in the first blank as you say, **I will write 4 in the first blank.** Write 7 in the second blank. **I will write 7 in the second blank.** Display the calculator. **Now I need to enter the equation into my calculator.** Point to each part of the equation before pushing on the calculator. **Watch me as I enter it into the calculator. 4. Times. 7. Equals.** Point to the solution in the window on the calculator. **My calculator says 28. 4 times 7 equals 28.** Write 28 as you say, **I will write 28 at the end of my equation. Mrs. Trask had 28 students in all.**

\*\*\*Note: The order that the students put the numbers in this equation does not matter. It may help to teach them to put the first number first etc., but it is important that they do not become rigid with this because in the “in each” equations they must always put the bigger number first and it may show up in varying places in the word problem.





**STUDENT PRACTICE: Now it's your turn.** Display student problem. **Your problem says, 6 groups of 4 students rode the bus to the zoo. How many students rode to the zoo?** Give student "groups of" equation graphic organizer and calculator. **You may use these tools to solve the problem.** Use CONSTANT TIME DELAY as needed to help students with each step of the equation.

\*\*\*Notes:

- Some calculators have a button that says "enter" instead of "=". If so, teach students to press the "enter" button when the equation tells them to "=".
- You may want to laminate the equation graphic organizers so that the students can use wipe off markers to fill them in when working on problems.
- Students who are unable to write or press the buttons on the calculator may dictate, gaze, gesture, or point to the numbers an where to place them in the equation.

#### CHECK AND SCORE

Step	Teacher Says/Does	Student Response
31.	Wait three seconds. If student does not begin then point to number in equation and say, " <b>Write 6.</b> "	Writes/Indicates first number on equation.
32.	Wait three seconds. If student does not begin then point to number in equation and say, " <b>Write 4.</b> "	Writes/Indicates second number on equation.
33.	Wait three seconds. If student does not begin then point to 6 on calculator and say, " <b>Press 6.</b> "	Pushes/indicates first number on calculator.
34.	Wait three seconds. If student does not begin then point to "x" on calculator and say, " <b>Press times.</b> "	Pushes/indicates "x" on calculator.
35.	Wait three seconds. If student does not begin then point to 4 on calculator and say, " <b>Press 4.</b> "	Pushes/indicates second number on calculator.
36.	Wait three seconds. If student does not begin then point to equals or enter on calculator and say, " <b>Press equals (enter).</b> "	Pushes/indicates equals (enter) on calculator.
37.	Wait three seconds. If student does not begin then point to 24 in window on calculator and say, " <b>Write 24.</b> "	Writes/indicates answer.

**MODEL THE PROCESS: Now, let's practice solving an "in each" problem.** Display the problem. **My problem says, "Mr. Sidman put 5 students in each group. He had 30 students total. How many groups did he make?"** Point to "in each" in problem. **My problem says, "in each" so I will use the "in each" equation to solve my problem.** Point to "in each" equation as you say, **This equation says blank divided by blank equals.** **First I need to write the numbers from my problem in the blanks. Watch carefully.** Point to the first blank. **I have to write the bigger number**

here. Point to the second blank. **I write the smaller number here.** Point to the word problem. **My problem has number 5 and number 30. 30 is the bigger number.** Write 30 in the first blank as you say, **I will write 30 in the first blank.** Point to 5. **5 is the smaller number.** Write 5 in the second blank. **I will write 5 in the second blank.** Display the calculator. **Now I need to enter the equation into my calculator.** Point to each part of the equation before pushing on the calculator. **Watch me as I enter it into the calculator. 30. First I push 3 then I push 0. Divided by. 5. Equals.** Point to the solution in the window on the calculator. **My calculator says 6. 30 divided by 5 equals 6.** Write 6 as you say, **I will write 6 at the end of my equation. Mr. Sidman made 6 groups.**



\*\*\*Note: You may need to provide practice with students in selecting bigger (or greater) numbers. Use CONSTANT TIME DELAY script to teach this skill.



**STUDENT PRACTICE: Now it's your turn.** Display student problem. **Your problem says, Mrs. Donovan has 18 students. She places 6 students in each group. How many groups in all?** Give student "in each" equation graphic organizer and calculator. **You may use these tools to solve the problem.** Use CONSTANT TIME DELAY script as needed to help students with each step of the equation.

#### CHECK AND SCORE

Step	Teacher Says/Does	Student Response
38.	Wait three seconds. If student does not begin then point to number in equation and say, <b>"The bigger number is 18. Write 18."</b>	Writes/Indicates bigger number in first blank on equation.
39.	Wait three seconds. If student does not begin then point to number in equation and say, <b>"The smaller number is 6. Write 6."</b>	Writes/Indicates smaller number in second blank on equation.
40.	Wait three seconds. If student does not begin then point to 1 then 8 on calculator and say, <b>"Press 1 then press 8."</b>	Pushes/indicates bigger number on calculator.
41.	Wait three seconds. If student does not begin then point to "+" on calculator and say, <b>"Press divided by."</b>	Pushes/indicates "+" on calculator.
42.	Wait three seconds. If student does not begin then point to 6 on calculator and say, <b>"Press 6."</b>	Pushes/indicates smaller number on calculator.
43.	Wait three seconds. If student does not begin then point to equals or enter on calculator and say, <b>"Press equals (enter)."</b>	Pushes/indicates equals (enter) on calculator.
44.	Wait three seconds. If student does not begin then point to 24 in window on calculator and say, <b>"Write 3."</b>	Writes/indicates answer.



This is the end of the lesson. There is a generalization worksheet with this level. You can use this for additional guided practice or to send home as homework.

<b>INDEPENDENT PRACTICE: Ratio and Proportion Skills Test</b>	<b>Teacher Says/Does</b>	
	Give student the <i>Ratio and Proportion Skills Test: Conversion of Units of Measure and Area</i> . Read directions for each problem and have student select response. Record whether response is correct or incorrect.	Only provide praise for completing assessment (if student needs encouragement). Do not provide specific praise for correct answers while student is testing.

**Troubleshooting and Data-Based Decision Making for Ratio and Proportion Skills Test:**

If student is unable to complete any items on the ratio and proportion test independently and correctly, go back and teach one problem step-by-step.

**MASSI CULMINATING ACTIVITY:** Have the students work with you to plan a field trip including student assignments to groups and chaperones. Then take the field trip!

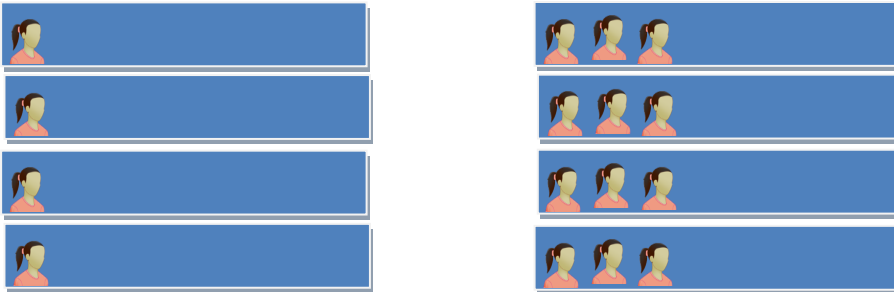
**BUILD TOWARDS FULL GRADE LEVEL COMPETENCE**

Here are ideas to build competence towards the full grade level competence using this same activity. See the unit plan and talk with the general education teacher for more ideas.

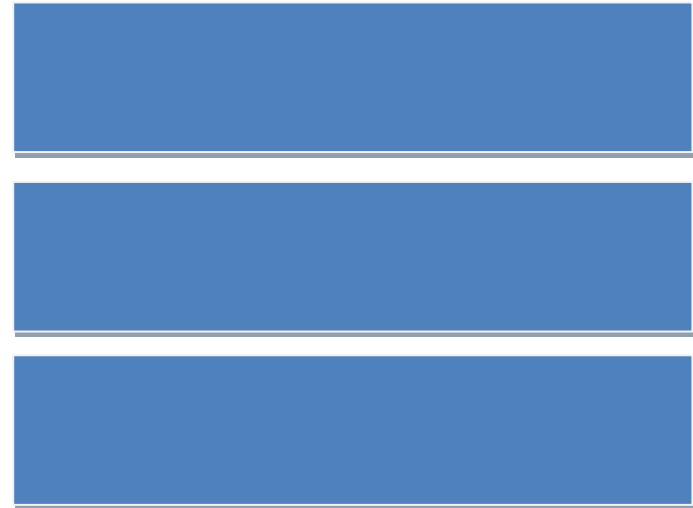
<b>Component</b>	<b>Activity</b>	<b>What Student Does</b>	<b>Generalization/ Fluency</b>
Check word problems	Identify opposite operations (opposite of multiply is divide, etc.) to check work completed in this lesson.	Uses opposite operation to check work. Students will need be able to identify which numbers to enter into opposite equation.	Complete problems not related to field trips. Use manipulatives to show how to check work. Complete word problems related to other themes and real world applications.
Use four digit dividends and two digit divisors	Solve word problems related to whole grade levels or whole school attending a field trip.	Similar to word problems completed in lessons but must use manipulatives in larger sets, count by larger sets (e.g., 100s), use calculator to enter four digit dividends and two digit divisors.	Complete word problems related to other themes and real world applications.

## Worksheet 1 Generalization: Essential Understandings

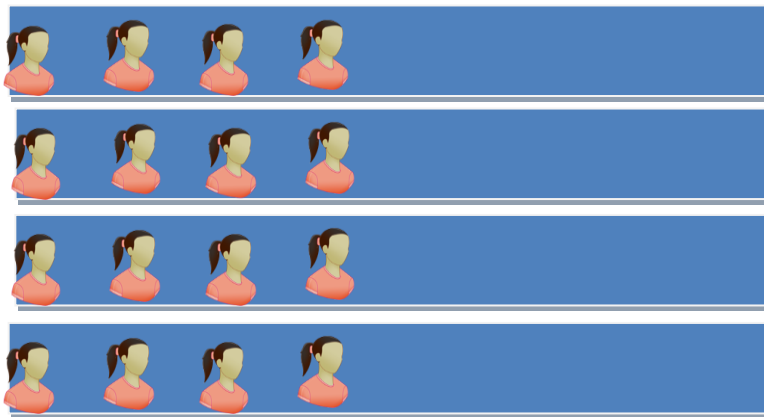
1. Below are two sets of counters. Both have 4 groups. Circle the set that has 3 in each group.



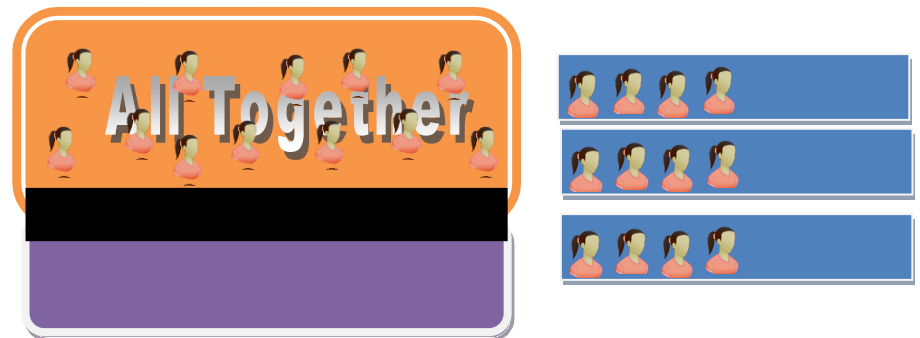
2. Below are 3 groups. Draw 4 circles (or glue 4 counters) in each group.



3. Below are 4 sets of 4. How many in all? (You may use manipulatives if needed to solve this problem.)



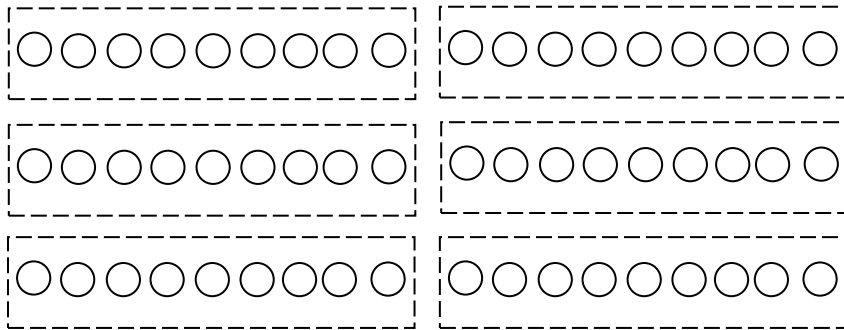
4. Circle the picture that tells how to solve this problem: Tiberius had 4 groups of 5 pencils. How many pencils did he have all together?



## Worksheet 2 Generalization: 3<sup>rd</sup> Grade Aligned Component

For each problem, trace correct number of groups. Divide total number evenly by coloring in the dots one at a time into each group. Then circle correct answer.

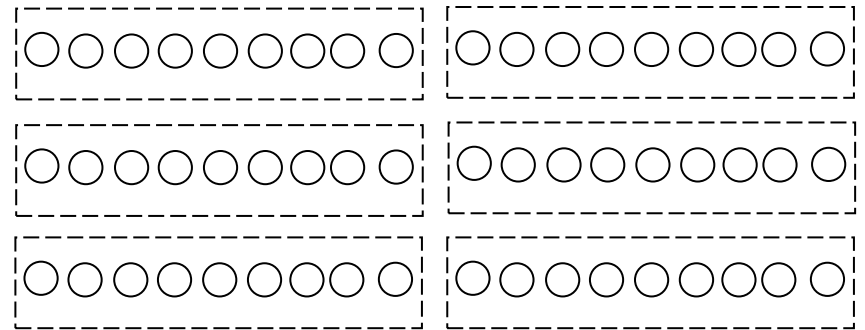
Mrs. Charles had 12 students. She divided the students into 3 groups. How many students were in each group?



Answer

5      4      7

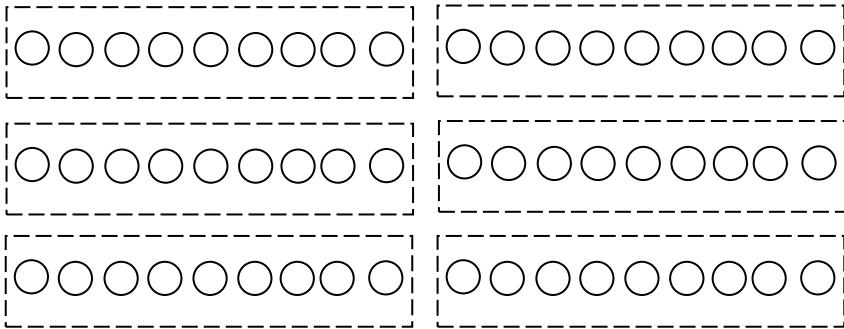
Mr. Vine has 15 students. He put the students into 5 groups. How many students are in each group?



Answer

3      10      5

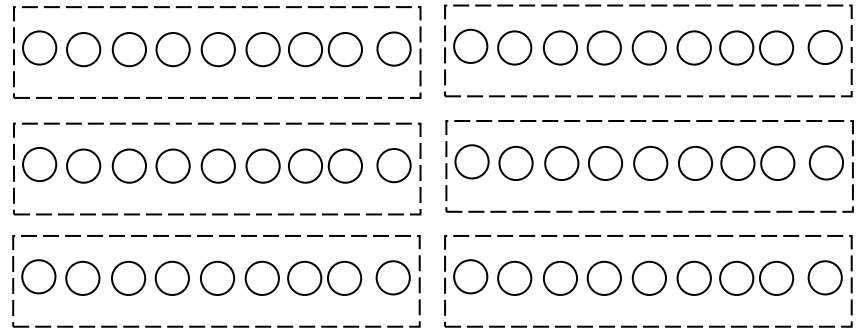
Mrs. Perry put her students into 4 groups. She has 8 students.  
How many students were in each group?



Answer

2      4      12

Mrs. Curtis divided the students into two groups. She has 14 students in all. How many students did she put in each group?



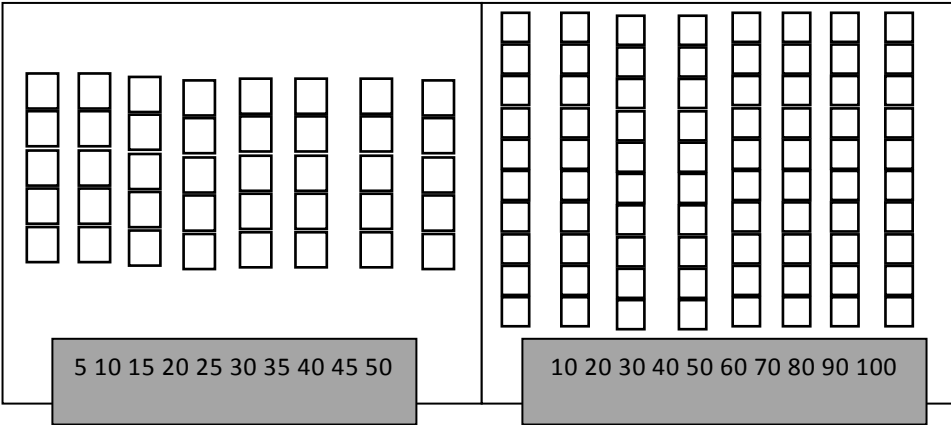
Answer

6      7      8

# Worksheet 3 Generalization: 4<sup>th</sup> Grade Aligned Component

For each problem choose the correct size groups and color the number of groups. Then circle the answer.

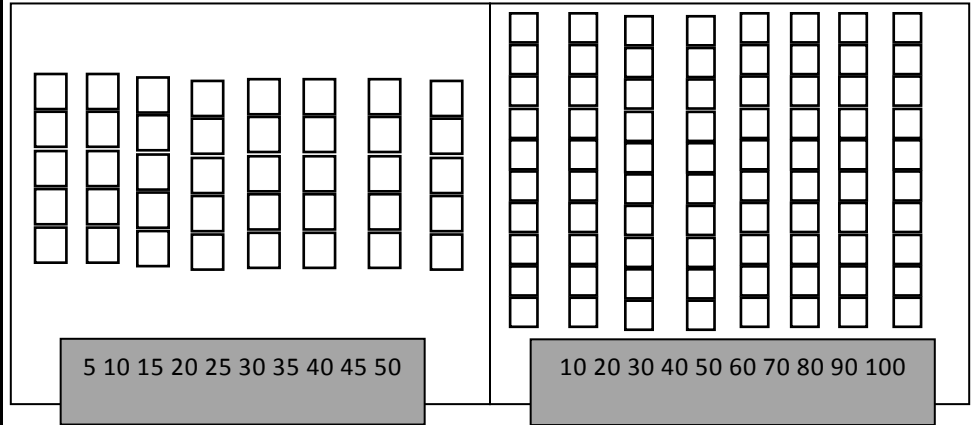
3 groups of 5 students got on the bus. How many in all are on the bus?



Answer

5      10      15

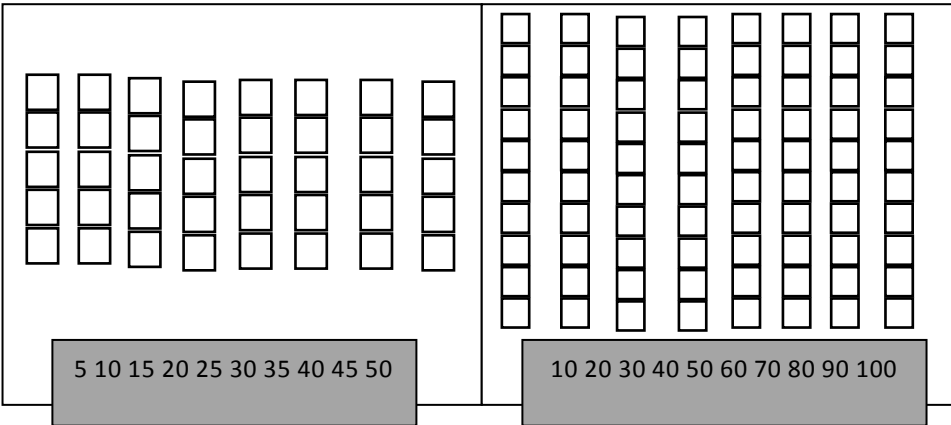
4 groups of 10 students rode the bus. How many in all rode the bus?



Answer

40      45      50

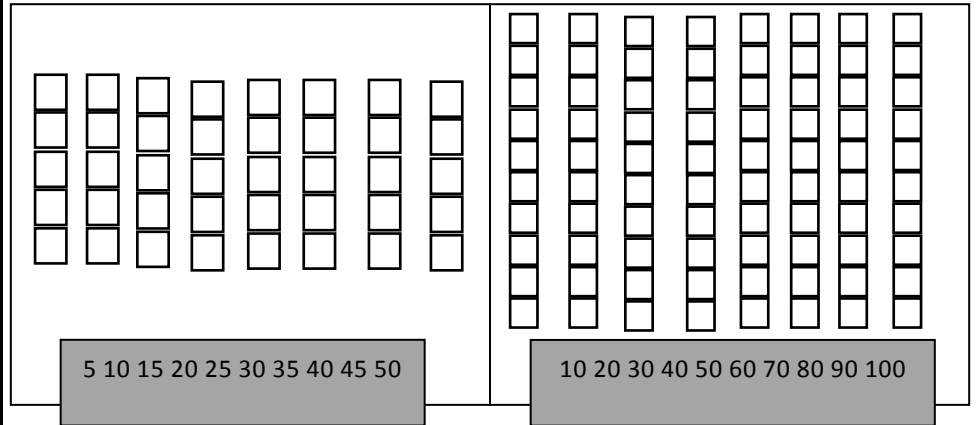
6 groups of 10 went to the zoo. How many went all together?



Answer

55      60      65

8 groups of 5 walked to the supermarket. How many walked in all?



Answer

20      30      40

## Worksheet 4 Generalization: 5<sup>th</sup> Grade Aligned Component

Use the equation graphic organizers and a calculator to help you solve the problems.

Groups of

→  $\square \times \square =$

In each

→  $\begin{array}{c} \square \\ \text{Big} \\ \text{number} \end{array} \div \begin{array}{c} \square \\ \text{Small} \\ \text{number} \end{array} =$

1. Mr. Winkler had 20 students. He divided them into 4 groups. How many students were in each group?

2. Mrs. Snell took 7 groups of 4 on a trip to the science museum. How many students in all went to the museum?



3. Mrs. Burton told 4 groups of 10 to ride on the first bus. How many students rode on the first bus?

4. The principal divided the students from Mrs. Jessup's class into 3 groups. There were 27 students. How many students were in each group?

**Materials: Grouping Mats:**

**Group**

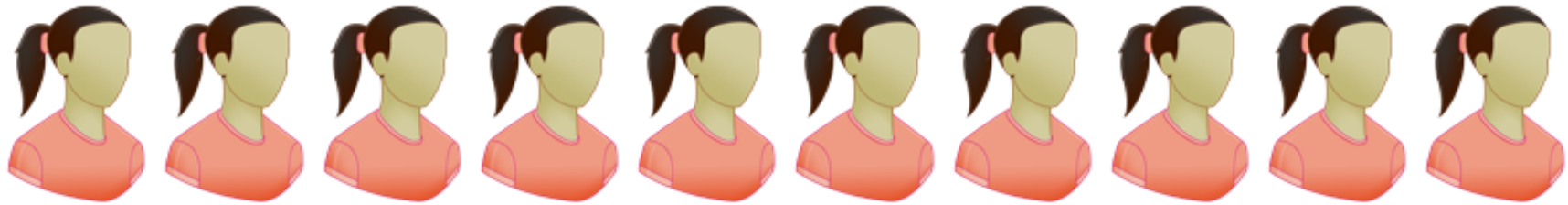
**Group**

**Group**

**Group**

## Pictures for grouping

(You will need to make at least two copies of this page to ensure you have enough counters)



All Together

# Groups Of

# In Each

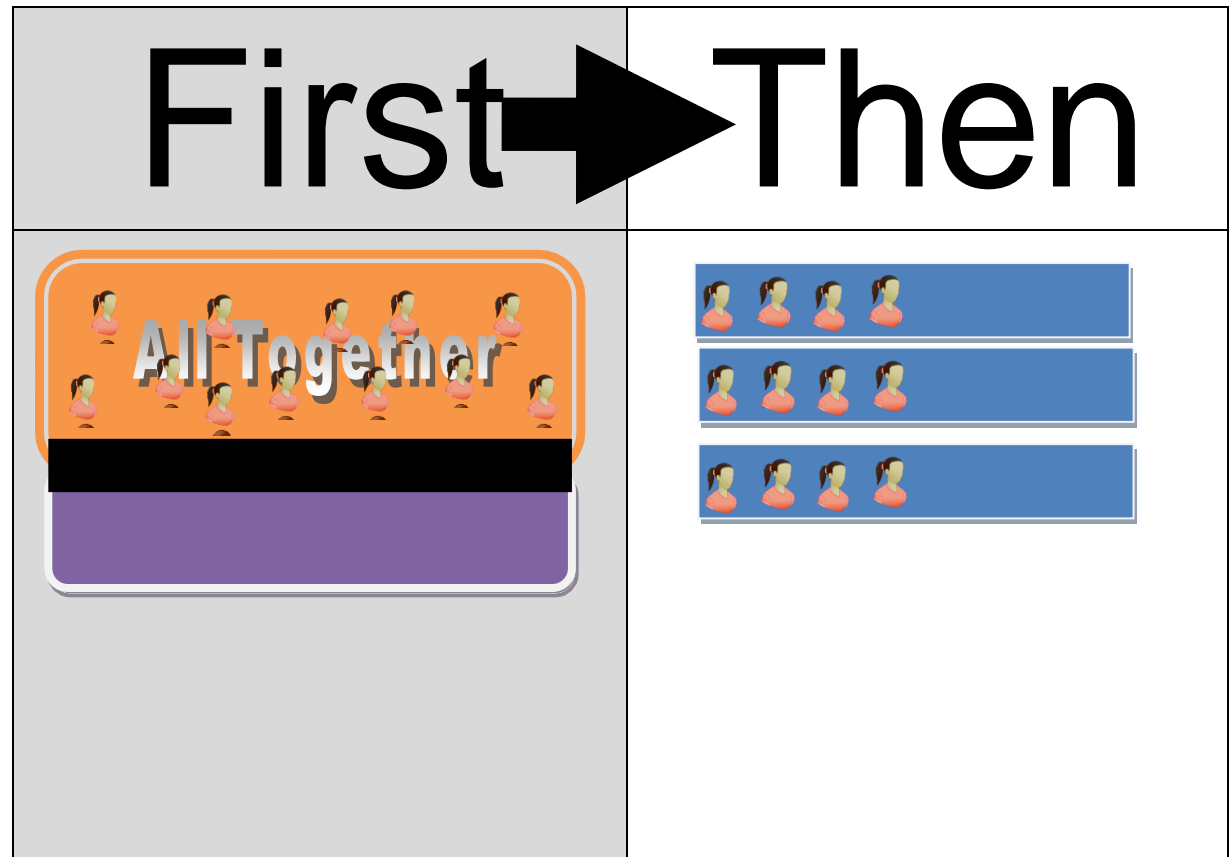
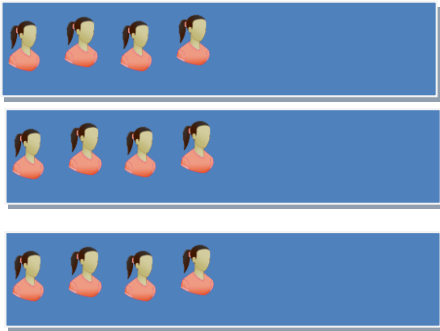
“Groups of” Visuals:



# First Then



“In Each” Visuals:



Essential Understandings Word Problems:  
Teacher Demonstration

The cafeteria worker is packing carrot sticks for packed lunches for the field trip. She has made 64 **groups of** 5 carrot sticks. How many carrot sticks does she have in all?

Noah had 16 candy pieces. He put his candy into four groups to share with friends. How many candy pieces were **in each** group?

Student Practice:

Your word problem says: Asha has 3 **groups of** four daffodil plants in her garden. How many daffodil plants does she have in all?

Xavier baked 24 cookies. He put his cookies into four bags to freeze for later. How many cookies were **in each** group?

Miles had 6 **groups of** 3 crayons to pass out to the class. How many crayons did he have total?

Shilah collected 16 Pokeman cards. He put his cards into four plastic sleeves to protect them. How many cards were **in each** sleeve?

Habiba has 12 porcelain dolls. She keeps them in 3 display cases. How many dolls are **in each** display case?

Paula stacked her books into 4 **groups of** 5 on her bookshelf. How many books does she have in all?



### Third Grade Aligned Word Problems

Teacher demonstration:

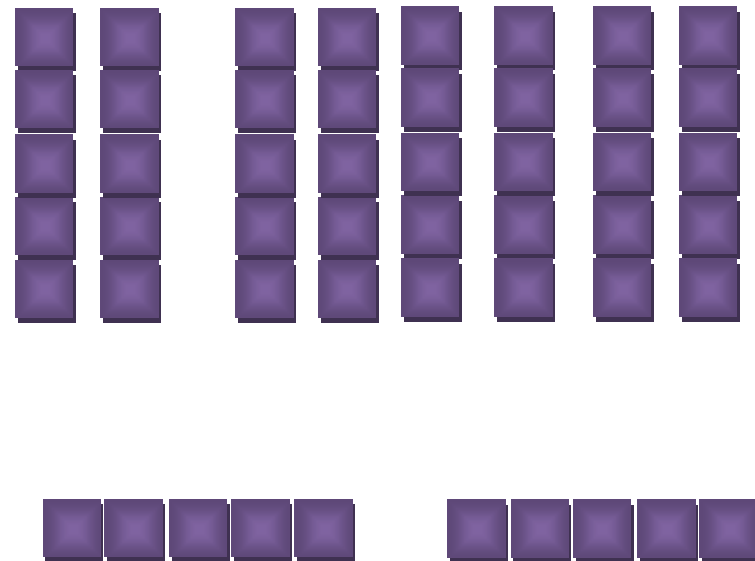
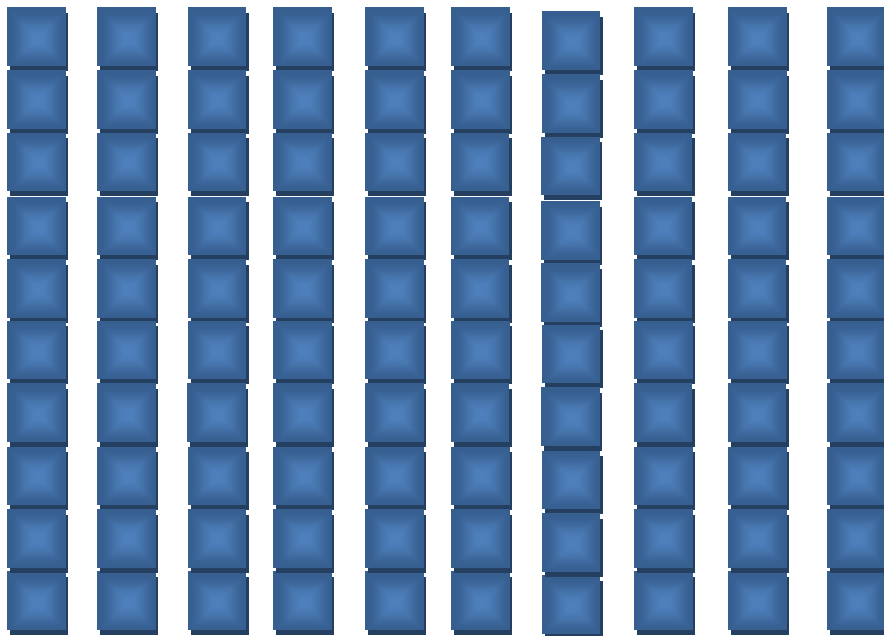
**We know there are 18 students are in Mrs. Winchester's class and that we will divide each class into three groups. We need to find out how many students will be in each group.**

Student Practice:

**Mrs. Thomas has 12 children. She places the children into 3 groups. How many children are in each group?**

Student Practice Cont:

**Mr. Wen has 16 children. He places the children into 4 groups. How many children are in each group?**



**“Count by Tens” Graphic Organizer**

10	20	30	40	50	60	70	80	90	100

**“Count by Fives” Graphic Organizer**

<b>5</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>

4<sup>th</sup> grade Aligned Component:  
Teacher Demonstration:

Student Practice:

LaShondra's class is going to the science museum on a field trip. 4 groups of 5 students get on the bus. How many students in all will ride on the bus?

Mr. Burton's class left to go to the strawberry farm. 3 groups of 10 students got on the bus. How many students in all were on the bus?

Groups of



$$\square \times \square =$$

In each



$$\begin{array}{c} \square \\ \hline \square \end{array} =$$

Big number                      Small number

**5<sup>th</sup> grade Aligned Component:**

**Teacher Demonstration:**

**Student Practice:**

**Mrs. Trask had 4 groups of 7 children in her class. How many students did she have in all?**

**6 groups of students rode the bus to the zoo. How many students rode to the zoo?**

**Mr. Sidman put 5 students in each group. How many groups did he make?**

**Mrs. Donovan has 18 students. She places 6 students in each group. How many groups in all?**