

Gecko Mathematics

4th Grade Division Module



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La Plata Elementary
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Division Module

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La Plata R-II Elementary

Grade Levels Targeted: 4th

Learning Goals:

- Students will understand the underlying concepts within division.
- Students will apply division strategies to higher level division problems, including multiple digit dividends and divisors, quotients with remainders, and real-life applications.
- Students in sixth grade will further apply division strategies toward division of decimals and fractions.

Outline of Unit:

Day 1	Pre-Assessment
Day 2	Define Division, Real-Life Applications, Use of Manipulatives
Day 3	Parts of a Division Problem, Inverse Operations, & Breaking Apart Arrays
Day 4	Picture Representations & Multiple Representations
Day 5	Post-Assessment

gecKo mathematics. 2008. Edited by Janice Grow-Maienza. Kirksville, MO: Truman State University.

Korean Mathematics, Grades 1-6. (2001) Edited by Janice Grow-Maienza. Kirksville, MO: Truman State University. Translated from Ministry of Education, *Arithmetic, Grades 1-6*. Seoul, Korea. National Textbooks Inc., 1993. With permission of the Korean Ministry of Education.

Description of Unit

This unit was created with the intent to activate beginners' background knowledge of division, and build a firm foundation in which students can apply several strategies to analyze and use division in mathematics. The use of manipulatives and visual strategies will support learners of many styles. Investigating division as separating parts of a whole using real life applications will also carry learning to students.

Applicable MO Grade Level Expectations

Numbers & Operations :

NO2A4 *represent and recognize multiplication and related division using various models, including equal intervals on the number line, equal size groups, distributive property, etc. (DOK 2)

NO2B4 describe the effects of multiplying and dividing whole numbers as well as the relationship between the two operations (DOK 2)

NO3B4 demonstrate fluency with basic number relationships (12X12) of multiplication and related facts (DOK 1)

Leading up to:

NO3C4 apply and describe the strategy used to compute a given multiplication of a 2-digit by 2-digit numbers and related division facts (DOK 2)

Write a word problem about the division expression below.

7. $14 \div 7$

Show your work in the space provided and solve.

8. Mrs. Fanning has two hundred fifty Crayola markers. If twelve students must share these markers, how many can each student have? Will there be any left over? How do you know?

Answer 1: _____

Answer 2: _____

9. Draw two different pictures showing how to divide twenty-four apples into equal groups.

Picture 1

Picture 2

Show your work and solve.

10. $8 \div 2 =$

11. $6 \overline{)60}$

12. $48 \div 4 =$

13. $12 \overline{)36}$

14. $32 \div 4 =$

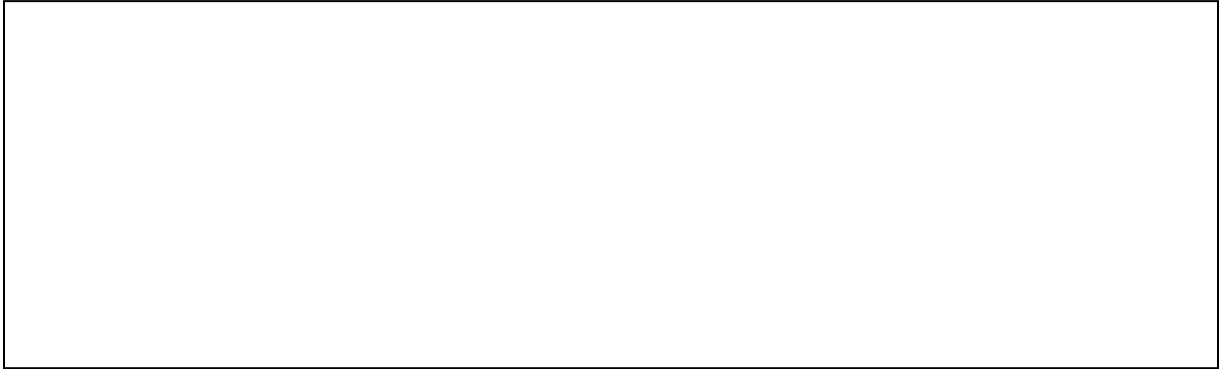
15. $7 \overline{)29}$

16. $408 \div 3 =$

17. $5 \overline{)155}$

Draw pictures in the spaces provided to show how you can solve the problems below. Circle your answer.

18. Mrs. Belt loves to shop. She has thirty-two shoes. How many pairs of shoes does she own?



19. Brett bought a pack of gum that had eight pieces in it. He needs it to last him three days. How many pieces of gum can he chew each day before running out? Will there be any left over?



20. Christy made thirty-six brownies and wants to take some to each of her four teachers, principal, and school secretary. How many brownies will each receive?



Day 2

Real Life Applications

- ☆ Students will discuss, create, and apply division to real life situations, emphasizing the importance of its role in authentic situations.
- ☆ Students will practice solving division problems by illustrating the process through the use of manipulatives.
- ☆ Students will engage in discussion and complete the Day 2 worksheet as homework/review.

Day 2- Real Life Applications

1. Mrs. Jones has baked four dozen cookies. If she divides them between her twenty-four students, how many cookies can each student have? Will there be any left over? How do you know? Show your work in the space below.

Answer 1: _____

Answer 2: _____

2. Draw two different pictures showing how to divide twelve oranges into equal groups.

Picture 1

Picture 2

3. Mrs. Smith enjoys shopping for her children. If her daughter has fourteen shoes, how many pairs of shoes does she own in all? Show your work in the space below.

Answer _____

Day 3

Parts of a Division Problem, Inverse Operations & Arrays

- ☆ Review arrays based on previous multiplication module.
- ☆ Explain the three parts of a division problem: divisor, dividend, quotient.
- ☆ Relate inverse operations (multiplication and division) to the term students will know “fact family”. Apply this strategy to arrays and basic facts through 12’s.
- ☆ Complete Day 3 worksheet as homework/review

**Day 3 -Parts of a Division Problem, Inverse Operations,
& Breaking Apart Arrays**

Label the parts of the division problems below.

8 ← _____

1. _____ → 4) 32 ← _____

2. _____ → 55 ÷ 5 = 11 ← _____

↙ _____

Solve the inverse operation for each problem.

3. $9 \times 6 = \underline{\quad}$ $\underline{\quad} \div 6 = 9$

4. $7 \times 8 = \underline{\quad}$ $\underline{\quad} \div 7 = 8$

Write two different number sentences that may be used to divide the arrays shown below.





Day 4

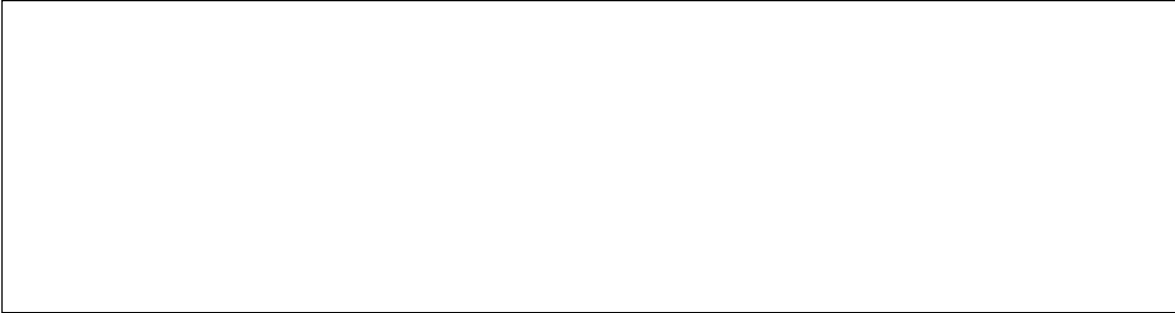
Picture & Multiple Representations

- ☆ Apply basic division to word problems and our multiplication module in picture representation. Students will complete example problems given by the teacher on marker boards individually as the teacher circles the room, checking for comprehension.
- ☆ Students should be able to complete a division problem that has more than one way to find a solution. Multiple Representations will be checked by the teacher as students work independently, ensuring comprehension.
- ☆ Complete Day 4 worksheet as homework/review.

Day 4- Picture Representations & Multiple Representations

Draw pictures in the spaces provided to show how you can solve the problems below.

1. Sarah bought a pack of gum that had ten pieces in it. She needs it to last her five days. How many pieces of gum can she chew each day before running out? Will there be any left over? Circle your answer.



2. Draw three different pictures showing how to divide forty-eight marbles into equal groups.

Picture 1



Picture 2



Picture 3



Show your work in the space provided and solve.

8. Mrs. Fanning has two hundred fifty Crayola markers. If ten students must share these markers, how many can each student have? Will there be any left over? How do you know?

Answer 1: _____

Answer 2: _____

9. Draw two different pictures showing how to divide thirty-two into equal groups.

Picture 1

Picture 2

Show your work and solve.

10. $4 \div 2 =$

11. $5 \overline{)60}$

12. $48 \div 8 =$

13. $6 \overline{)36}$

14. $18 \div 4 =$

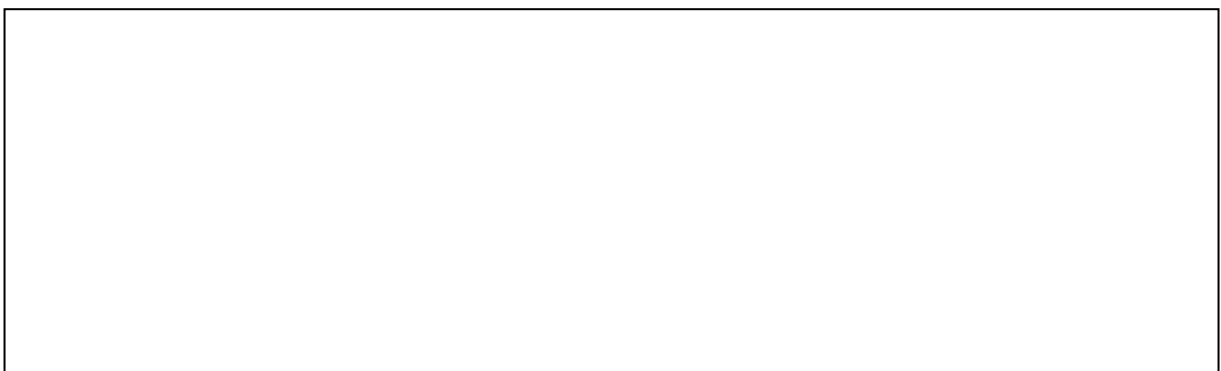
15. $7 \overline{)32}$

16. $804 \div 3 =$

17. $5 \overline{)195}$

Draw pictures in the spaces provided to show how you can solve the problems below. Circle your answer.

18. Mrs. Belt loves to shop. She has twenty-four shoes. How many pairs of shoes does she own?



19. Brett bought a pack of gum that had twelve pieces in it. He needs it to last him four days. How many pieces of gum can he chew each day before running out? Will there be any left over?



20. Christy made twenty brownies and wants to take some to each of her four teachers, principal, and school secretary. How many brownies will each receive?



Results and Analysis of the Division Module

Out of the thirteen students I have this school year, eleven participated in the Division Module. This is because two students require special assistance with our special education teacher due to low mathematics ability levels. The following data is organized in numerical order which serves as a confidential manner of reporting results.

1) No Data- Special Education Services in Math

2) Pre-Assessment Score- 71%

Difficulties were carelessness among basic facts, inattention to arrays, and difficulty on word problems where showing work to support an answer were concerned. Student often exhibits difficulty taking time on assignments to complete them with quality effort, as well as difficulty with basic multiplication facts up to 12.

Post-Assessment Score- 96%

He/she showed improvement in taking time on assessment per a pep talk prior to completing and showed improvement in arrays and word problem answering.

3) No Data- Special Education Services in Math

4) Pre-Assessment Score- 52%

Difficulties were, largely in part, based on this student's reading abilities. This student struggled with the array questions as well.

Post-Assessment Score- 88%

After seeing the difficulty he/she had on the word problems I read and rephrased the post assessment to him/her and saw a distinct difference in comprehension of what was being asked. Arrays were comprehended much better on this assessment where dividing them into equal parts was concerned.

5) Pre-Assessment Score- 63%

Difficulties were partially due to a lack of control over seizures. This student had not been diagnosed at this time and was not on a medication regimen to help his/her attention span or seizure condition. This was not diagnosed until the end of 3rd quarter. He/she did struggle with basic facts and understanding what the word problems were asking.

Post-Assessment Score- 86%

This student was given extended time in a quiet area to take the test. It is my belief that had this been administered after his/her diagnosis he/she would have done better than a 23% increase from the Pre-Assessment.

6) Pre-Assessment Score- 76%

Difficulties were mostly due to this student's work ethic and lack of multiplication fact fluency.

Post-Assessment Score- 88%

This student also had a pep talk prior to completing this assessment. His/Her lack of care and desire to do well often influence his/her grades.

7) Pre-Assessment Score- 91%

Difficulties were mostly due to a lack of experience with division. I saw potential in his/her comprehension as the work was more developed than other peers'.

Post-Assessment Score- 100%

This student is typically an A student, so I was not surprised to see such amazing results on this assessment. He/She was meticulous in showing his/her work on the word problems.

8) Pre-Assessment Score- 89%

The difficulties noted were those that had to do with showing work on word problems and the process of any multiple step problems. This student is usually an A student and growth was expected for the post-assessment.

Post-Assessment Score- 98%

This student showed a great deal of improvement in backing up his/her answers and showing the process taken to find answers.

9) Pre-Assessment Score- 87%

Difficulties were partially due to this student's attention span. He/She has a great deal of difficulty focusing on one task for a lengthy amount of time, and he/she often feels confident enough to rush through work.

Post-Assessment Score- 98%

This student improved his/her score because he/she was given a separate area to work in, limiting distractions. I also had him/her get up and get a drink and stretch mid-way through the assessment. His/Her math skills showed improvement as a result, especially where the word problems were concerned. He/She showed work and was able to depict answers through the use of pictures more effectively.

10) Pre-Assessment Score- 60%

This student's difficulties were mostly because he/she has no confidence and asked many questions that I said I would not answer during the pre-assessment. He/She was discouraged, but I assured that with no grade attached it was not a serious concern, and that this assessment was mostly for me as the teacher to see what my class needed the most help with. He/She froze on the word problems, mostly because he/she has a lower level of reading comprehension.

Post-Assessment Score- 81%

This student was given the post-assessment with student number 4 where I read the test aloud and rephrased the questions. He/She worked hard and did ask a few questions which I clarified. His/Her attitude was more positive going into the test knowing it would be read and rephrased aloud.

11) Pre-Assessment Score- 59%

This student likes to play helpless. Unfortunately there have been many issues with this during the school year. An accurate picture of his/her ability has not easily been determined due to an inconsistent lack of effort. He/She does not have multiplication skills mastered, which also greatly factors in to how poorly he/she did. This student usually responds to a great deal of praise, so that is the direction I went with my one-on-one instruction with her during this module.

Post-Assessment Score- 87%

This student completed the post-assessment with our Math Interventionist who sat with him/her one-on-one and monitored his/her attention. She wouldn't allow the student to slack off and asked him/her to redo several problems, praising the work done.

12) Pre-Assessment Score- 51%

This student really struggles in math in general. He/She puts up a brick wall when something isn't easy for him/her. This student also had to complete certain work in ISS. Even after trying to review it with him/her I felt that a lack of care was invested on the student's part.

Post-Assessment Score- 72%

This score is accurate for this student's average achievement level. He/She did try on this

assessment and had a pleasant attitude when it was administered. I believe that reteaching certain concepts benefitted him/her at a later date.

13) Pre-Assessment Score- 79%

This student is a teacher pleaser and wants to do his/her best to make me and his/her mother happy. Difficulties included arrays, word problem clarification, and showing work effectively to support answers, even if answers were incorrect.

Post-Assessment Score- 87%

This student and I discussed how to improve showing work effectively and I saw a great amount of detail on the post-assessment. The word problems were much clearer to grade and the array questions were easier to grade due to his/her better comprehension.

This class is often a struggle where classroom management and instruction are concerned. They are a group of very different individuals, several of whom require more academic attention and discipline than others. Some have very little work ethic, which does not allow a person to actually determine their level of comprehension easily. Many visual aids and manipulative were used during instruction of this module, which I am certain assisted the students in grasping concepts such as arrays and drawing pictures to help show and explanation for their work. When teaching this in the future I plan to make accommodations for lower-level readers automatically so that the pre-test isn't as inaccurate in measuring math skills.