TAT2 Task 3: Instructors Manual

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Unit Overview

This is a nine-day (10 hour) unit on an introduction to multiplication. Topics to be covered are, but not limited to, equal groups, arrays, commutative property, and factors that range from 0's to 12's. At the conclusion of this unit, students will be able to have the basic foundations to the introduction of multiplication by identifying strategies to use to become successful in multiplying facts. The intended audience is third grade as an introductory unit and fourth grade as either a refresher unit or as an intervention unit.

Performance Objectives

The following is a list of instructional objectives in this unit plan:

Performance objective #1: *Using 5 pictures of equal grouped objects, students will be able to write 4 out of 5 repeated addition sentences.*

Performance objective #2: *Using pictures of arrays, students will be able to write and solve 4 out of 5 multiplication problems correctly.*

Performance objective #3: *Using commutative property, students will be able to change at least 8 out of 10 multiplications problems into new ones.*

Performance objective #4: *Without assistance, students will be able to solve at least 16 out of 20 multiplication problems correctly with 5 and 10 being factors.*

Performance objective #5: *Working independently, students will be able to solve at least 16 out of 20 multiplication problems correctly with 9 and 7 being factors.*

Performance objective #6: *Without assistance, students will be able to solve at least 16 out of 20 multiplication problems correctly with 0, 1, and 11 being factors.*

Performance objective #7: *Working independently, students will be able to solve at least 16 out of 20 multiplication problems correctly with 4, 6 and 8 being factors.*

Performance objective #8: *Given the opportunity to work in groups, students will be able to decompose and solve at least 8 out of 10 multiplication problems correctly with 12 being a factor*.

Instructional Strategies

In this instructional unit, a variety of strategies will be implemented to be sure that all students are capable of success and to meet the needs of the students. The lessons will begin with pre instructional activities that provide some type of foundation for the lesson that proceeds it. After the pre instructional activity, the lessons begin as a lecture format that provides lots of modeling. The teacher will continue modeling but will also use gradual release of responsibility so students can work on activities either independently or with partners, depending on the activity for the lesson. Each lesson provides ample discussion time between teacher and students as well as peer to peer.

Materials and Resources

Students will need an assortment of supplies and materials in order to become successful in this unit. Each students will need to have a whiteboard, dry erase marker, dry eraser, pencil, and whatever handout that is needed for that day. Students will also need to have counters on certain days to visually see strategies in use. During some lesson, students will need construction paper, glue sticks, scissors and colored pencils. Students will also need to have access to chromebooks to be able to have access to Quizizz, Google Docs, and Google Slides. Students will also need to have access to a smartboard for hands on activities during the unit.

Lesson Plans

Lesson Plan #1 Title: Introduction to Multiplication-Equal Groups (groups of)

Performance Objective: Using 5 pictures of equal groups objects, students will be able to write 4 out of 5 repeated addition sentences.

Resources or Materials Needed:

- Pencil
- White board
- Dry erase marker
- 20 red/white counters
- Glue
- Construction paper
- 3 different pieces of colored paper
- Assessment handout
- Chromebook-Google Slides

Time: 90 minutes

Step 1: Pre-Instructional Activities:

- Students will need to log onto Quizizz to do a quick quiz on equal groups as well as repeated addition as a pre-assessment. Teacher access: https://quizizz.com/admin/quiz/5d8ccbe01ad97e001a223fce (See appendix A)
- Each student will be given 20 red/white counters
- Students asked to take 2 minutes to make however many equal groups they can make with 20 counters.

- Students will share with their partner/group how many equal groups they created and how many is inside each group.

Step 2: Content Presentation:

- Have the students count to 20 forwards and backwards as a class. This will reinforce repeated addition and skip counting that was taught in the 2nd grade. After counting to 20, have students count again forward and backwards while whisper the odd numbers while students say the even numbers in a regular voice. In our last count to 20 as a class, we will be counting to 20 forward and backwards while only saying the even numbers. The teacher will ask the following:
    - What did we just do in the end? (skip count)
    - What did we just skip count by? (2's)
- Present the class 5 multiplication problems (1x1, 2x1, 2x2, 2x3, and 4x4) and explain to the students that multiplication is just a set of equal groups. Starting with 1x1, the teacher will draw a one circle on the board with one star inside the circle. Explain that this is one equal group of one. Next to the equal group on the board, the equation 1x1 will be written. Explain that 1x1 is just one group of one.
    - Repeat with 2x1 and continue with 2x2, 2x3, and 4x4 with students writing their responses on whiteboards and displaying them to the teacher to make sure of comprehension. More multiplication problems can be used if students are struggling.
- Students will need to take 12 counters and create equal groups of two. Student will be prompted to show on their white boards how many groups there were and the size of each group (6 equal groups of 2). Student will then be prompted to write a repeated addition sentence that relates to six equal groups of two. On the front white board, the teacher will

write “6 groups of 2=12”. Students will then be shown the multiplication sentence that relates to six groups of two by writing “6x2=12”.

- Students will be asked to use only 19 counters to create equal groups. Student attempt to create equal groups that total 19. Students will begin to find that they cannot create equal groups. Students will be asked the following:
    - What do I need to add/take away to create equal groups?

Step 3: Learner Participation:

- Students will begin to work on an activity that will require them to create equal groups using pieces of colored paper that they cut.
- Students will write the repeated addition sentence under their equal groups that they created.
- Students will need to create:
    - 3 sections on their construction paper
    - Each section will have a variety of equal groups
    - Each section will include a repeated addition sentence

Step 4: Assessment:

Students will be assessed with a handout that shows five pictures of equal groups of objects from which students will be able to write 4 out of 5 repeated addition sentences. (See appendix B)

Step 5: Follow-Through Activities:

- Students will discuss with their group how repeated addition, skip counting and equal groups all relate to multiplication. They will talk about the importance of equal groups in multiplication.

- Students will log onto Google Classroom and work on digital task cards titled “Ways to Show Multiplication”. Students will work on the first 8 slides as these digital task cards are through Google Slides. Google Slides will be shared as well as provided as a PDF. Sharable link: https://docs.google.com/presentation/d/1tyn4E4EreCMS75tCIZC4uP9Eg1xBcSXqaMzTYJtZ9U0/edit?usp=sharing (See appendix C)

Lesson Plan #2 Title: Introduction to Multiplication-Arrays

Performance Objective: Using pictures of arrays, students will be able to write and solve 4 out of 5 multiplication problems correctly.

Resources or Materials Needed:

- Black construction paper
- Strips of different colored paper
- Small square colored paper
- Glue
- White crayons/colored pencil
- Sharpie
- White board
- Dry erase marker
- 20 red/white counters
- Assessment handout
- Chromebook-Google Slides

Time: 150 minutes (One, 60 minute class period, One, 90 minute class period)

Step 1: Pre-Instructional Activities:

- Each student will be given 20 red/white counters
- Students will be given 3 minutes to use 20 counters to make equal rows
- Students will share how many equal rows they made
- 5-6 students will share out loud how many equal rows they made
- Student will give feedback to students who may have made unequal groups and how to make them equal

Step 2: Content Presentation:

- On the white board, students will be shown multiple pictures of arrays. Important vocabulary words to know to be successful with arrays:
    - Rows
    - Columns
- While presenting arrays, the teacher will define rows as a line of objects going side to side and a column is a line of objects that go up and down. While defining rows that go side to side, the teacher will motion with their arm going side to side and while defining columns, the teacher while motion with their arm going up and down.
- As a class, we will begin to analyze each array individually and discuss how they relate to multiplication. Under the first array, the teacher will write ____x____=____. We will quickly review the previous lesson where multiplication is represented as *groups of.* When looking at the array we will focus on groups and size of groups:
    - Each row is a group
    - The size of each group is how many objects are in each row
- The first array will show 10 rows of 2. I will explain how the first one relates to multiplication.
    - Start off by showing how each row can be represented as repeated addition
        - 2+2+2+2+2+2+2+2+2+2=20
    - There are 10 rows
    - Size of each row is 2

  - Students will be told that multiplication sentences always start will how many groups there are and then the size of the group. For example, in this array there are 10 groups of 2, 10 groups of 2 = 10x2
  - Multiplication equation written under array will 10x2=20
- The second array will show 2 rows of 10. With this array, we will discuss as a class and I will have them show me their answers to questions asked such as:
  - How can I represent this array as repeated addition?
    - Students will show on their white boards 10+10=20
  - How many groups (rows) do we have?
    - Students will show on their white boards the number 2
  - What is the size of each group?
    - Students will show on their white boards the number 10
  - What would be our multiplication sentence?
    - Students will show on their white boards the multiplication equation 2x10=20
- The third array will show 3 rows of 4. With this array, students will use their white boards to show the multiplication sentence of the array. Students should show 3x4=12. Student will then turn and talk with their partners about how they wrote their equation. Possible turn and talk answers:
  - "I saw 3 rows of 4, so that means I should multiply 3x4=12"
  - "There were 3 groups of 4, 3 groups of 4 means 3x4=12"

Step 3: Learner Participation:

- Students will be introduced to an activity that involves arrays. This activity will go into the next day during our math time. Students will be creating and array city that displays their

knowledge on arrays and their connections to multiplication (Bower, K., n.d.). Students will create buildings on their black construction paper using different colors while using small squares of colored paper as their windows. Each building will represent an array with the "windows" being the objects in the array.

- Present small PowerPoint
  - Review of rows and columns
  - Show pictures of finished array cities as expectation
- Array cities should have 3-4 buildings that cover the whole black construction paper
- Each building should have the related multiplication sentence on the bottom of that building; for example, the building shows 5 rows of 3 "windows", the multiplication sentence on the bottom of the building should show 5x3=15.

Step 4: Assessment:

Students will be assessed with by logging into Quizizz that shows five pictures of arrays from which students will be able to pick 4 out of 5 multiplication sentences that represent each array. (See appendix D)

Step 5: Follow-Through Activities:

- As a class, we will do a gallery walk of our array cities. Students will have a chance to talk about their array city and to explain how they got their multiplication sentence.
- To end, students will be given a sticky note and will write one thing that they liked about another student's array city and place it on their work for the students to see later.
  - If one array city project has a sticky note on it than they need to find one that does not have one already on it.

- Students will log onto Google Classroom and work on digital task cards titled “Ways to Show Multiplication”. Students will work on the last 15 slides as these digital task cards are through Google Slides. The last 15 are practice multiplying using arrays and repeated addition. Google Slides will be shared as well as provided as a PDF. (See appendix E)
- **Extension activity**: Students will be given a blank Google Doc that will be shared with students who may have completed the array city early enough to have ample time to be able to create a digital array city while collaborating with other students.

Lesson Plan #3 Title: 2's and 3's as Factors: Commutative Property

Performance Objective: Using commutative property, students will be able to change at least 8 out of 10 multiplications problems into new ones.

Resources or Materials Needed:

- Pencil
- White board
- Dry erase marker
- Template of an array (6 rows of 3)
- 20 red/white counters
- Chromebook

Time: 60 minutes

Step 1: Pre-Instructional Activities:

- Using the 20 red/white counters students will work with partners to create an two arrays:
    - 2 rows of 4
    - 4 rows of 2
- Students will discuss with their partners the following questions:
    - How are these arrays similar?
    - How are the arrays different?
- 4-5 students will share out their answers with the class

Step 2: Content Presentation:

- As a class, we will be working on multiplication fact fluency as well as introducing commutative property at the same time.
- Students will begin to count by 2's forwards and backwards up to 20.
- Students will count by 3's forwards and backwards up to 30.
    - The class will do this multiple times until the class starts to get the hang of skipping count by 3's.

- As a class, we will reviews different types of arrays and discuss the following:
    - What is an array?
    - What is a column?
    - How do we find the multiplication sentence for these arrays?
    - What is the multiplication sentence for this array?
        - Other arrays will be displayed and the same questions will be asked
    - Can we solve these with repeated addition?
- Student will get a template that shows an array that has 6 rows of 3.
    - Cover all rows except one
        - What is our multiplication sentence?
    - Cover all rows except two
        - What is our multiplication sentence?
    - Cover all rows except three
        - What is our multiplication sentence?
    - Cover all rows except four
        - What is our multiplication sentence?
    - Now that we have all rows uncovered, what is our multiplication sentence for this array?
- At this point, we will introduce commutative property.
    - Students will take their template and rotate it to where it now shows 3 rows of 6
        - Turn and talk with partners
            - What changed?
            - Did the total amount change?
            - What is our multiplication sentence now?

- On students white boards, they will show the first multiplication sentence and the new multiplication sentence.
  - What is similar?
- The teacher will explain that commutative property results in the same total but causes the factors to change positions. Example: 6 rows of 3 turned to 3 rows of 6. Our array changed when we turned it on the side, which resulted in our multiplication sentence to change, but the total did not.
  - Practice commutative property with facts such as 3x4, 5x3, 2x7, 2x5
  - 3-4 students will share out what they realize when it comes to commutative property
    - Student comments can be: "You just switch the factors around but keep the total the same"

Step 3: Learner Participation:

- Students will work on a worksheet that consists of students to draw arrays for multiplication problems and draw the arrays in a different way as well as write a new equation for the different array.
- Students will have access to a program called "FasttMath". Students will begin to start working on fact fluency once a day on this program.
  - One lesson is 10 minutes long

Step 4: Assessment:

Students will be assessed with a handout that shows 10 multiplication equations from which students will be able to use commutative property to change 8 out of the 10 equations into new ones. (See appendix F)

Step 5: Follow-Through Activities:

- Students will discuss with their group how commutative property works in multiplication. They will talk about the importance of commutative property and how it relates to multiplication, such as having two of the same factors that can be switched around and still equal the same product.
- Students will use their array city and write the commutative property for each multiplication sentence.

Lesson Plan #4 Title: 5's and 10's as Factors

Performance Objective: Without assistance, students will be able to solve at least 16 out of 20 multiplication problems correctly with 5 and 10 being factors.

Resources or Materials Needed:

- Pencil
- White board
- PowerPoint of 5's and 10's chant
- Dry erase marker
- 100 snap cubes
- Chromebook

Time: 60 minutes

Step 1: Pre-Instructional Activities:

- As a class, students will be chanting to skip count by 5's and 10's using a PowerPoint that will be shown to the students
    - Teacher will model the chant for 5's with no real melody
    - Class will do the chant for 5's a few times
    - Teacher will model the chant for 10's with the melody of Ring Around the Rosie
    - Class will do the chant for 10's

Step 2: Content Presentation:

- As a class, we will be working on multiplication fact fluency
- Students will begin to count by 5's forwards and backwards up to 50.
- Students will count by 10's's forwards and backwards up to 100.
    - The class will do this multiple times until the class starts to get the hang of skipping count by 5's and 10's.

- Students will be in groups of two and be given 100 snap cubes. Each group of snap cubes will be in groups of 10, snapped together, creating a column or "tower". Students will then organize the cubes in 2 groups of 10.
    - What is the multiplication sentence?
- Students will then create 4 groups of 5 while the original 2 groups of 10 is still on the table.
    - What is the multiplication sentence?
    - When putting the groups of five above the group of ten, what do you notice?
        - Student responses could be: "I noticed that the 5's matched up to the 10's at certain points" or "The 5's are similar to the 10's as the 10's are just the 5's but doubled".
- As a class, students will create a number line that start at 0 and skip count by 5's. Students will do the same with 10's, except, students will have the number line below the 5's number line.
    - What do we notice about these number lines?
    - Students may confirm their own thoughts on the two factors from previous discussion or other students may see the connection.
    - To further solidify their thoughts, we will skip count by 5 four times to 20 and skip count 10 two times to 20 to show the similarities and the relationship.
- As a class, we will practice solving these factors using arrays that consist of 5's and 10's.

Step 3: Learner Participation:

- Students will work on a worksheet that consists of students to draw arrays for multiplication problems and draw the arrays in a different way as well as write a new equation for the different array.

- Students will play a game on the computer using Quizizz. During this time, students will be playing a couple games that last a couple minutes solving multiplication problems consisting of 5's and 10's as factors.
    - One game will only have 10's as factors-Teacher access at: https://quizizz.com/admin/quiz/5a522d8fff63c8100024833b
    - Another game will only have 5's as factors- Teacher access at: https://quizizz.com/admin/quiz/5a2ac997c68a9f1000f015af

Step 4: Assessment:

Students will be assessed with Quizizz. During this time, students will be instructed to do this quiz as an assessment and to try their best at picking the best answer for the equation. They will have 20 questions to work through to which they will need to have 16 out of the 20 correct. (See appendix G)

- Teacher access: https://quizizz.com/admin/quiz/5d8cc76c7c08cd001a7e8d4c

Step 5: Follow-Through Activities:

- Students will discuss with their group how 5's and 10's are related and how knowing your 5's can help you understand knowing your 10's.

Lesson Plan #5 Title: 9's and 7's as Factors

Performance Objective: Working independently, students will be able to solve at least 16 out of 20 multiplication problems correctly with 9 and 7 being factors.

Resources or Materials Needed:

- Pencil
- White board
- PowerPoint of 9's and 7's chant
- Dry erase marker
- Tape Diagram
- Chromebook

Time: 60-90 minutes

Step 1: Pre-Instructional Activities:

- As a class, students will be chanting to skip count by 9's and 7's using a PowerPoint that will be shown to the students
    - Teacher will model the chant for 9's to the melody of Twinkle Twinkle Little Star
    - Class will do the chant for 9's a few times
    - Teacher will model the chant for 7's with the melody of London Bridge is Falling Down
    - Class will do the chant for 7's a few times

Step 2: Content Presentation:

- As a class, we will be working on solving 9 and 7 factors. To start, we will focus of strategies that will help us solve 9 facts.
- To begin, we will start by solving 9 x 5.
    - Students solve 9 x 5 by either skip counting or using a number line.
    - If I can solve 9 x 5 does that mean I can solve 5 x 9?

        - Student comments could be: “Yes, because we can just use commutative property that we learned a couple days ago where one multiplication sentence has the same answer when the factors are switched.”

- As a class, we will discuss how 10’s are easier to solve than solving multiplication facts by 9. Students will probably struggle to solve 9’s but solving 10’s are easy as students are apt to add a zero to whatever factor is being multiplied by 10.
    - Why is it easier to solve equations that have 10 as a factor?
        - Student comments could be: “We know that whatever factor that is multiplied by 10, you just add a zero” or “We already know our 10’s facts”
- Students will now be handed out a tape diagram that shows 10 boxes. Students will then be prompted to write 8 in each box. Students will be asked how many 8’s are within the tape diagram. The teacher will ask students how many eights are in 10 x 8, cross 1 eight, and then asked how many eights are in 9 x 8.
    - What did we do to get 9 x 8?
    - Response: “We took away an 8”
    - Students will then be shown that we originally had 10 x 8 and subtracted 1 x 8.
        - 9 x 8= (10 x 8) – (1 x 8)
        - 10 x 8 = 80 – 8
        - Students work with a partner to use the same strategy on 9 x 7, 9 x 6, 9 x 9
- Next, we will be working to solve factors that have 7. Students will be working with 7 as a number bond by separating the 7 to 5 and 2. As a class, students should understand their 5’s to which, doing multiplication involving 5’s should come easy. Students will practice on equations with a factor being 5. Once students have ample time reviewing their 5 facts we

will then go into the other number in the number bond, 2. Students will then review their two's. After some time, the class will come together to work on solving 7's.

- As a class, we will discuss how to solve 7 x 6.
  - Using our number bond strategy for 7's using 5 and 2, we will first solve 7 x 6 by solving 5 x 6, then 2 x 6. Using the answers from both equations, we will add them giving the answer to 7 x 6.
  - Practice using this strategy on 7 x 4, 7 x 8, 7 x 9

Step 3: Learner Participation:

- Students will play a game on the computer using Quizizz. During this time, students will be playing a couple games that last a couple minutes solving multiplication problems consisting of 9's and 7's as factors.
  - One game will only have 9's as factors
  - Another game will only have 7's as factors

Step 4: Assessment:

Students will be assessed with Quizizz. During this time, students will be instructed to do this quiz as an assessment and to try their best at picking the best answer for the equation. They will have 20 questions to work through to which they will need to have 16 out of the 20 correct. (See appendix H)

Step 5: Follow-Through Activities:

- Along with the strategy for 9's, another strategy will be introduced. Students in third grade still have the tendency to use their fingers to count, so using this, students will enjoy the quickness of using their fingers to solve their 9 facts with other single digit factors. Having both hands held up with palms facing out, students will count the factor they are multiplying

9 by on the fingers starting on the left pinky. If I was to do 9 x 7 I would count starting on my pinky work my way right until I got to 7, then with that finger down, count the fingers left to the finger down which would give me 6 and then the fingers to the right of the finger down and have 3, leaving with 63 as my answer.

- Practice with different factors

Lesson Plan #6 Title: 0's, 1's and 11's as Factors

Performance Objective: Without assistance, students will be able to solve at least 16 out of 20 multiplication problems correctly with 0, 1, and 11 being factors.

Resources or Materials Needed:

- White board
- Dry erase marker
- Assessment handout

Time: 30 minutes

Step 1: Pre-Instructional Activities:

- As a class, students will be reviewing "groups of" but this time, we will be focusing on 0's, 1's and 11's. On the students whiteboards, students will need to make 4 circles. In each circle, there will be nothing in them equaling to 4 groups of 0 that equals 0.
    - Students will make any number of circles on their whiteboards and write a multiplication sentence that represents their groups. Examples students may come up with could be could be 8 x 0, 4 x 0, 2 x 0, and many more.
- On the white board, we will be doing the same thing as 0's but besides having our size in each group be 0, it will be 1 and then we will be doing the same thing with 11.

Step 2: Content Presentation:

- Utilizing our knowledge from our pre-instruction activities, we will continue to practice making groups of with factors of 0, 1, and 11.
    - Student will practice making different groups with the size being either 0, 1 or 11 and have partners practice writing multiplication problems using their whiteboards.
- Discuss with students about the facts 0, 1, and 11. Possible questions to ask:
    - What did we notice with our 0 facts?
        - Student comments: "Anything that you multiply by 0 is just going to be zero"

- What did we notice with our 1 facts?
    - Student comments: “When multiplying anything with 1, you get that number. For example, if you take 8 groups of 1, you’ll still get a product of 8. Even if you do 8 x 1 or 1 x 8, it will still be 8.

Step 3: Learner Participation:

- Students will continue to practice writing multiplication problems with 0, 1 and 11’s as one of the factors.

Step 4: Assessment:

During this time, students will be instructed to do this quiz as an assessment and to try their best at picking the best answer for the equation. They will have 20 questions to work through to which they will need to have 16 out of the 20 correct. (See Appendix K)

Step 5: Follow-Through Activities:

There will be no follow through activities for this lesson

Lesson Plan #7 Title: 4's and 6's and 8 as Factors

Performance Objective: Working independently, students will be able to solve at least 16 out of 20 multiplication problems correctly with 4, 6 and 8 being factors.

Resources or Materials Needed:

- Pencil
- White board
- PowerPoint of 4's, 6's and 8's chant
- Dry erase marker
- Chromebook

Time: 60 minutes

Step 1: Pre-Instructional Activities:

- As a class, students will be chanting to skip count by 4's, 6's and 8's using a PowerPoint that will be shown to the students
    - Teacher will model the chant for 4's to the melody of Dashing Through the Snow
    - Class will do the chant for 4's a couple times
    - Teacher will model the chant for 6's with the melody of Happy Birthday
    - Class will do the chant for 6's a few times
    - Teacher will model the chant for 8's with the melody of Row, Row, Row Your Boat
    - Class will do the chant for 8's a few times

Step 2: Content Presentation:

- As a class, we will be working on solving 4, 6 and 8 factors. To start, we will focus of strategies that will help us solve 4 facts.
- To begin, I will create a number line that skips by 2's and a number line below the 2's skipping by 4.
    - As a class, we will skip count by 2's using the number line and do the same with 4's

        - While skipping count by 2's, I will ask the students what the multiplication sentence will be for each skip. For example, the first skip, 2, would be 1 x 2 as it is the first group of 2's. Then as we move on, students will notice the multiplication facts go start counting up. For example, 1 x 2, 2 x 2, 3 x 2, 4 x 2, and so on. The same thing will be done for the 4's.

- After skipping count and writing down multiplications sentences for each "jump" in the skipping count activity, the teacher will ask some questions to help facilitate a discussion based on the relationship between the 2's and 4's. Questions that can be asked:
    - What do you notice about the 2's and 4's?
        - Student comments: "When you skip count by 2's two times, you get 4, that's when the 4's number line starts".
    - What do you see when I double my answer for 2's?
        - Student comments: "When you double your 2's, I see that those number relate to the 4's multiplication problems".
- Have students practice multiplying 2's by another factor and doubling it and then multiply that fact by 4 and compare answers. For instance, students multiply 2 x 8=16, double 16 to get 32 and then multiply 4 x 8 and you get 32.
- Now we will be moving onto the 6's. With the 6's, we do the same thing as we did with the 2's and the 4's but this time, we work with 3's and 6's.
    - Follow the same directions for 2's and 4's but use 3's and 6's
    - Questions will be the same
    - Practice: Students follow same practice as above with 2's and 4's
- Next, we will be working to solve 8's. The 8's are a special number because we can work with a couple different factors to help us better understand the relationship between the 8's

and our 2's and 4's. First, to use our 2's to help solve our 8's we look at the Double, Double, Double strategy. Students will pick a factor to multiply by 8, for example, 8 will be used to multiply by 8, 8 x 8. What we do first is use that factor and multiply it by 2 (our first double) and get 16. Then we double 16 (second double) and get 32, then we double 32 (third and last double) and get 64. If we did this right, that means 8 x 8=64.

  - Students practice this with partners using their whiteboard while choosing different factors while the original example is on the board.

- As a class, we will begin looking at another strategy to help solve our 8's. To begin, I will create a number line that skips by 4's and a number line below the 4's skipping by 8.
  - As a class, we will skip count by 4's using the number line and do the same with 8's
    - While skipping count by 4's, I will ask the students what the multiplication sentence will be for each skip. For example, the first skip, 4, would be 1 x 4 as it is the first group of 4's. Then as we move on, students will notice the multiplication facts go start counting up. For example, 1 x 4, 2 x 4, 3 x 4, 4 x 4, and so on. The same thing will be done for the 8's.
- After skipping count and writing down multiplications sentences for each "jump" in the skipping count activity, the teacher will ask some questions to help facilitate a discussion based on the relationship between the 4's and 8's. Questions that can be asked:
  - What do you notice about the 4's and 8's?
    - Student comments: "When you skip count by 4's two times, you get 8, that's when the 8's number line starts".
  - What do you see when I double my answer for 4's?
    - Student comments: "When you double your 4's, I see that those number relate to the 8's multiplication problems".

- Have students practice multiplying 4's by another factor and doubling it and then multiply that fact by 8 and compare answers. For instance, students multiply 4 x 8=32, double 32 to get 64 and then multiply 8 x 8 and you get 64.

Step 3: Learner Participation:

- Students will play a game called Do the D's (See Appendix I)

Step 4: Assessment:

During this time, students will be instructed to do this quiz as an assessment and to try their best at picking the best answer for the equation. They will have 20 questions to work through to which they will need to have 16 out of the 20 correct. (See Appendix J)

Step 5: Follow-Through Activities:

- Students will have the opportunity to continue playing the Do the D's game.

Lesson Plan #8 Title: 12's as Factors

Performance Objective: Given the opportunity to work in groups, students will be able to decompose and solve at least 8 out of 10 multiplication problems correctly with 12 being a factor.

Resources or Materials Needed:

- White board
- Skip counting Power Point Slides-10's and 2's
- Dry erase marker
- 12's worksheet for assessment
- Chromebook

Time: 60 minutes

Step 1: Pre-Instructional Activities:

- As a class, students will be chanting to skip count by 2's, and 10's using a PowerPoint that will be shown to the students
    - Chant 2's to the melody of "Skip to my Lou my Darling"
    - Chant 10's to the melody of "Ring Around the Rosies"

Step 2: Content Presentation:

- Utilizing our knowledge from previous lessons we will begin by discussing our 2's
    - How do would we go about solving multiplication sentences that have a factor of 2?
        - Student comments: "Well, remembering with what we did a couple days ago with 2's and playing the game "Do the D's", we know that whenever we multiply by 2 we just double that number".
    - If we multiply anything by 2, would it be safe to assume that doubling that factor would solve our multiplication equation?
        - Student comments: "Yes, because whenever you multiply anything by 2, you have to double that number".

- In lesson 4, we discussed ways to solve our multiplication facts that had 10's in it. What was a takeaway that we had from that lesson?
    - Student comments: "One thing that we took away from that lesson was that anything that you multiply by 10, you just add a zero to that factor. For example, 4 x 10 would be 40. We just added a 0 to the 4"
- Today we will be utilizing our strategy of solving our 2's and 10's to solve multiplication equations that have 12 as a factor. On our whiteboards, write down the 5 x 12. (Students will write 5 x 12). Once we have this multiplication equation written down, let's decompose 12. Decomposing is when we break down a number, like what we will be doing with 12. We will now break 12 down as 10 and 2. On our board, we can see that we have 5 x 12 that now looks like 5 x 12 with 10 and 2 written under 12. With this, we can rewrite our multiplication sentence by making 2 new ones. 5 x 2 and 5 x 10. This will make solving 5 x 12 easier than trying to solve it on its own. Solving 5 x 2 we get 10 and solving 5 x 10 we get 50. If we add our products together, we will get 60. So, 5 x 12 is 60. We can easily work this out not only on paper, but also in our heads if we know our 2's and 10's facts. Let's work on doing this strategy of decomposing 12 by multiplying 12 with other factors.
    - Students will practice on whiteboards by decomposing 12 with a series of factors. Factors could include any number between 1-9.

Step 3: Learner Participation:

- At this time, students will continue practicing decomposing 12 with other factors as stated above. Students will get to utilize their group to help each other and to help those who may be struggling.

Step 4: Assessment:

During this time, students will be instructed to do this quiz as an assessment and to try their best at picking the best answer for the equation. With this, students will be able to work with heir group to solve equations. Students are encouraged to talk to one another. They will have 10 questions to work through to which they will need to have 8 out of the 10 correct. (See Appendix L)

Step 5: Follow-Through Activities:

There will be no follow through activities for this lesson as 12's are not a required standard for students to achieve in 3rd grade.

Appendix A

QUIZIZZ

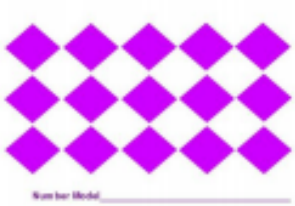
Equal Groups and Arrays

12 Questions

NAME : _____

CLASS : _____

DATE : _____

1. 

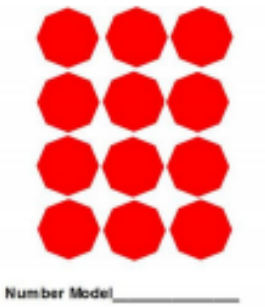
Select the correct number model with the rectangular array

☐ a) 5+5+5=15

☐ b) 3+3+3=9

☐ c) 3+3+3+3+3=15

☐ d) 5+5+5+5+5=30

2. 

Number Model_____

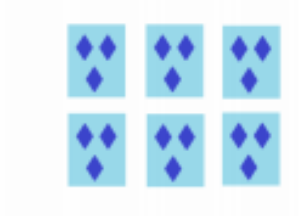
Select the multiplication equation to match the array.

☐ a) 3+3+3+3=12

☐ b) 4+4+4=12

☐ c) 4 x 3 = 12

☐ d) 4+4+4+4=16

3. 

Select the multiplication sentence for the follow example:

☐ a) 3 x 8 = 24

☐ b) 6 x 5 = 30

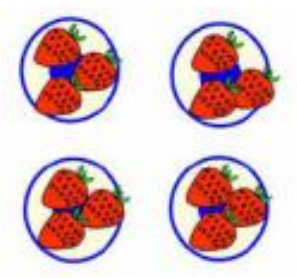
☐ c) 2 x 9 = 18

☐ d) 6 x 3= 18

4. What is another way of saying 4 + 4 + 4?

☐ a) 3 groups of 4

☐ b) 4 groups of 4

5. 

What is the repeated addition sentence?

☐ a) 3+3+3+3=12

☐ b) 4+4+4=12

6. 

What multiplication sentence matches the picture?

☐ a) 5 x 5 = 15

☐ b) 5 x 3 = 15

☐ c) 3 x 5 = 15

☐ d) 3 x 3 = 9

7. 

Choose the repeated addition number sentence with the correct answer to match the equal groups.

☐ a) 6 + 6 + 6 = 20

☐ b) 6 x 6 = 36

☐ c) 6 + 6 + 6 = 18

☐ d) 3 + 3 + 3 + 3 + 3 + 3 = 18

8. 

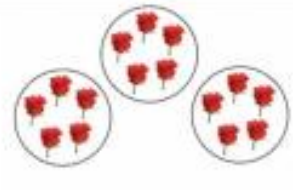
What multiplication equation matches the picture?

☐ a) 4 x 2 = 8

☐ b) 4 x 4 = 8

☐ c) 2 x 4 = 8

☐ d) 2 x 2 = 8

9.  What multiplication equation matches the picture?

☐ a) 3 x 5 = 10
☐ b) 3 x 5 = 15
☐ c) 5 x 3 = 15
☐ d) 5 x 5 = 15

10.  Which equation matches this array?

☐ a) 5 x 3 = 15
☐ b) 3 x 5 = 15
☐ c) 4 x 3 = 12
☐ d) 3 x 4 = 12

11.  Which equation matches this array?

☐ a) 4 x 7 = 28
☐ b) 7 x 4 = 28
☐ c) 4 x 8 = 32
☐ d) 8 x 4 = 32

12. An array is...

☐ a) A group of shapes put into rows and columns.
☐ b) A flower
☐ c) A pony
☐ d) A unicorn

Answer Key

1.	a	4.	a	7.	c	10.	a
2.	c	5.	a	8.	c	11.	a
3.	d	6.	c	9.	b	12.	a

Appendix B

Arrays Assessment

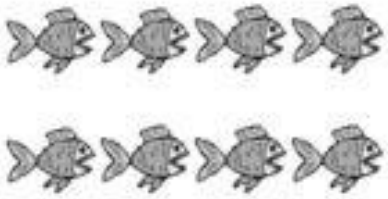
Name:_____

Directions: Write a multiplication sentence that represents the follow arrays.

1.

_____X_____=_____

2.



_____X_____=_____

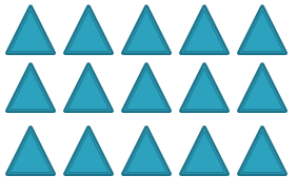
3.

_____X_____=_____

4.

_____X_____=_____

5.



_____X_____=_____

Total Correct:_____/5

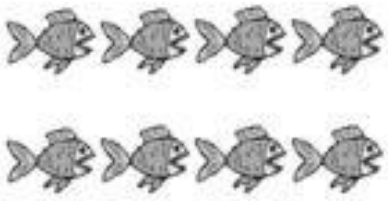
Name:_____Answer Key_____

Directions: Write a multiplication sentence that represents the follow arrays.

1.

__2__X__6__=__8___

2.



__2__X__4__=__8__

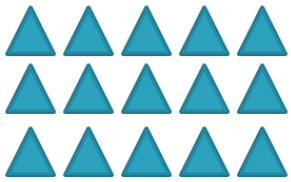
3.

__3___X__7__=__21___

4.

__3__X__4__=__12_

5.

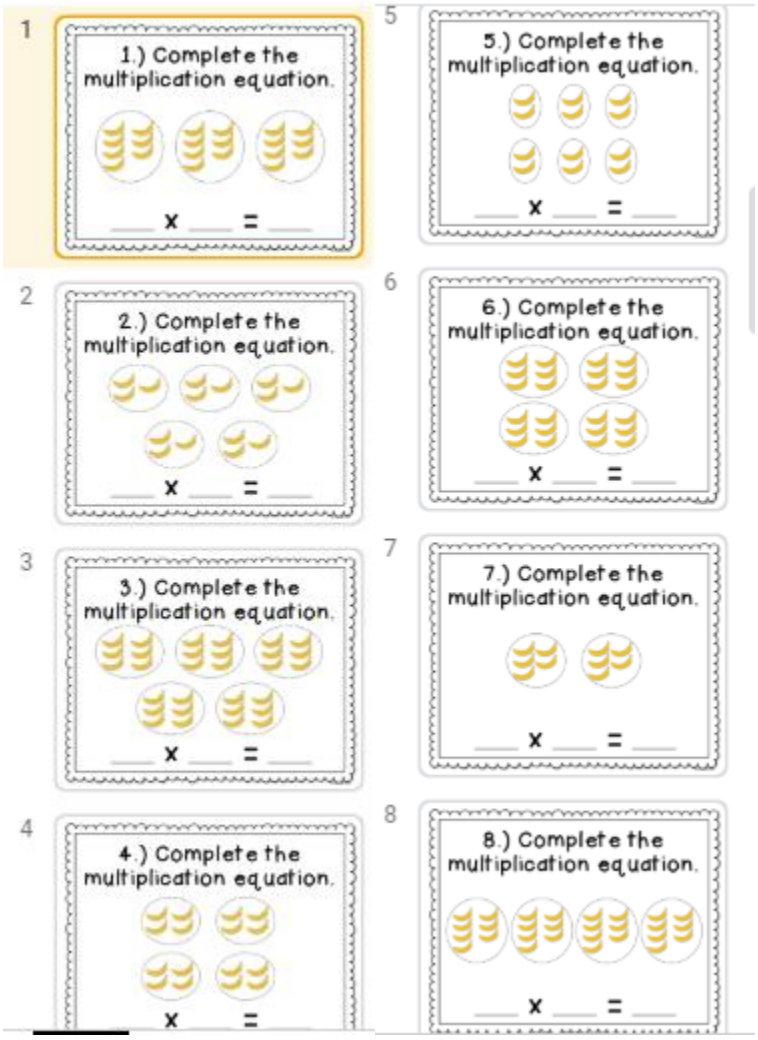


__3__X__5__=__15__

Total Correct:_____/5

4+/5=Proficient

Appendix C


1
1.) Complete the multiplication equation.
___ x ___ = ___
2
2.) Complete the multiplication equation.
___ x ___ = ___
3
3.) Complete the multiplication equation.
___ x ___ = ___
4
4.) Complete the multiplication equation.
___ x ___ = ___
5
5.) Complete the multiplication equation.
___ x ___ = ___
6
6.) Complete the multiplication equation.
___ x ___ = ___
7
7.) Complete the multiplication equation.
___ x ___ = ___
8
8.) Complete the multiplication equation.
___ x ___ = ___

Appendix D

QUIZIZZ

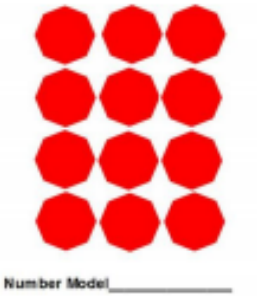
Arrays

5 Questions

NAME : _____

CLASS : _____

DATE : _____

1. 

Number Model_____

Select the multiplication equation to match the array.

- ☐ a) 3+3+3+3=12
- ☐ b) 4+4+4=12
- ☐ c) 4 x 3 = 12
- ☐ d) 4+4+4+4=16

2. 

Select the multiplication sentence for the follow example:

- ☐ a) 3 x 8 = 24
- ☐ b) 6 x 5 = 30
- ☐ c) 2 x 9 = 18
- ☐ d) 6 x 3= 18

3. 

What multiplication sentence matches the picture?

- ☐ a) 5 x 5 = 15
- ☐ b) 5 x 3 = 15
- ☐ c) 3 x 5 = 15
- ☐ d) 3 x 3 = 9

4. 

Which equation matches this array?

- ☐ a) 5 x 3 = 15
- ☐ b) 3 x 5 = 15
- ☐ c) 4 x 3 = 12
- ☐ d) 3 x 4 = 12

5. 

Which equation matches this array?

- ☐ a) 4 x 7 = 28
- ☐ b) 7 x 4 = 28
- ☐ c) 4 x 8 = 32
- ☐ d) 8 x 4 = 32

Answer Key

1. c
2. d
3. c
4. a
5. a

Appendix E

13

13.) Complete the multiplication equation.

___ x ___ = ___

14

14.) Complete the multiplication equation.

___ x ___ = ___

15

15.) Complete the multiplication equation.

___ x ___ = ___

16

16.) Complete the multiplication equation.

___ x ___ = ___

17

17.) Complete the multiplication equation.

4+4+4+4

___ x ___ = ___

18

18.) Complete the multiplication equation.

2+2+2+2+2+2

___ x ___ = ___

19

19.) Complete the multiplication equation.

7+7+7

___ x ___ = ___

20

20.) Complete the multiplication equation.

5+5

___ x ___ = ___

21

21.) Complete the multiplication equation.

6+6+6+6

___ x ___ = ___

22

22.) Complete the multiplication equation.

3+3+3+3+3

___ x ___ = ___

23

23.) Complete the multiplication equation.

6+6+6+6+6

___ x ___ = ___

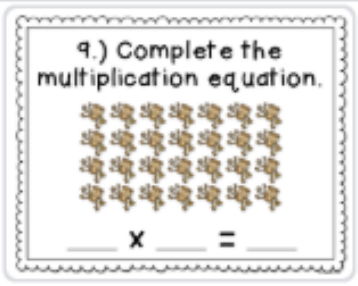
24

24.) Complete the multiplication equation.

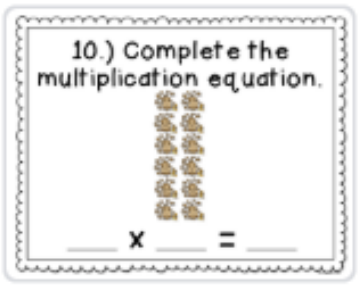
7+7+7+7

___ x ___ = ___

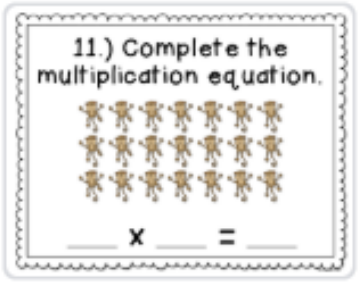
9


9.) Complete the multiplication equation.
___ x ___ = ___

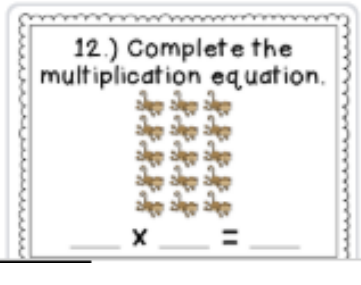
10


10.) Complete the multiplication equation.
___ x ___ = ___

11


11.) Complete the multiplication equation.
___ x ___ = ___

12


12.) Complete the multiplication equation.
___ x ___ = ___

Appendix F

Commutative Property Assessment

Name:_____

Directions: Using commutative property, change the multiplication into a new one.

1. 5 x 10	2. 6 x 3	3. 9 x 8	4. 9 x 9	5. 2 x 5
6. 7 x 8	7. 5 x 5	8. 5 x 4	9. 7 x 6	10. 10 x 5

Total Correct:_____/10

Commutative Property Assessment

Name:_____Answer Key_____

Directions: Using commutative property, change the multiplication into a new one.

1. 5 x 10 10 x 5	2. 6 x 3 3 x 6	3. 9 x 8 8 x 9	4. 9 x 9 9 x 9	5. 2 x 5 5 x 2
6. 7 x 8 8 x 7	7. 5 x 5 5 x 5	8. 5 x 4 4 x 5	9. 7 x 6 6 x 7	10. 10 x 5 5 x 10

Total Correct:_____/10

8+/10=Proficient

Appendix G

QUIZIZZ

5's and 10's facts

20 Questions

NAME : _____

CLASS : _____

DATE : _____

1. 10 x 5

☐ a) 50 ☐ b) 20

☐ c) 15 ☐ d) 30

2. 5 x 7

☐ a) 30 ☐ b) 35

☐ c) 50 ☐ d) 12

3. 9 x 10

☐ a) 20 ☐ b) 19

☐ c) 90 ☐ d) 99

4. 5 x 9

☐ a) 45 ☐ b) 40

☐ c) 30 ☐ d) 25

5. 2 x 10

☐ a) 12 ☐ b) 15

☐ c) 20 ☐ d) 30

6. 3 x 5

☐ a) 10 ☐ b) 8

☐ c) 15 ☐ d) 20

7. 3 x 10

☐ a) 30 ☐ b) 40

☐ c) 50 ☐ d) 13

8. 10 x 10

- ☐ a) 70
- ☐ b) 80
- ☐ c) 90
- ☐ d) 100

9. 5 x 5

- ☐ a) 15
- ☐ b) 20
- ☐ c) 25
- ☐ d) 10

10. 1 x 10

- ☐ a) 11
- ☐ b) 10
- ☐ c) 9
- ☐ d) 20

11. 5 x 1

- ☐ a) 5
- ☐ b) 10
- ☐ c) 15
- ☐ d) 6

12. 10 x 0

- ☐ a) 10
- ☐ b) 0
- ☐ c) 11
- ☐ d) 12

13. 7 x 10

- ☐ a) 70
- ☐ b) 80
- ☐ c) 90
- ☐ d) 17

14. 5 x 8

- ☐ a) 13
- ☐ b) 20
- ☐ c) 35
- ☐ d) 40

15. 8 x 10

- ☐ a) 90
- ☐ b) 80
- ☐ c) 18
- ☐ d) 17

16. 10 x 3

- ☐ a) 20
- ☐ b) 30
- ☐ c) 10
- ☐ d) 13

17. 3 x 10

- ☐ a) 30
- ☐ b) 20
- ☐ c) 13
- ☐ d) 40

18. 6 x 5

- ☐ a) 30
- ☐ b) 35
- ☐ c) 11
- ☐ d) 12

19. 10 x 6

- ☐ a) 60
- ☐ b) 20
- ☐ c) 16
- ☐ d) 70

20. 5 x 6

- ☐ a) 35
- ☐ b) 30
- ☐ c) 20
- ☐ d) 25

Answer Key

1.	a	6.	c	11.	a	16.	b
2.	b	7.	a	12.	b	17.	a
3.	c	8.	d	13.	a	18.	a
4.	a	9.	c	14.	d	19.	a
5.	c	10.	b	15.	b	20.	b

Appendix H

Quizizz

7's and 9's multiplication facts

20 Questions

NAME : _____

CLASS : _____

DATE : _____

1. 9 x 4

☐ a) 30 ☐ b) 36

☐ c) 42 ☐ d) 80

2. 9 x 3

☐ a) 18 ☐ b) 27

☐ c) 26 ☐ d) 25

3. 9 x 9

☐ a) 90 ☐ b) 72

☐ c) 80 ☐ d) 81

4. 9 x 6

☐ a) 48 ☐ b) 54

☐ c) 45 ☐ d) 52

5. 9 x 2

☐ a) 9 ☐ b) 17

☐ c) 18 ☐ d) 27

6. 9 x 1

☐ a) 1 ☐ b) 9

☐ c) 0 ☐ d) 19

7. 9 x 10

☐ a) 9 ☐ b) 10

☐ c) 90 ☐ d) 99

8. 7 x 3

☐ a) 20 ☐ b) 21

☐ c) 14 ☐ d) 7

9. 8 x 7

- ☐ a) 56
- ☐ b) 54
- ☐ c) 64
- ☐ d) 60

10. 9 x 8

- ☐ a) 89
- ☐ b) 80
- ☐ c) 73
- ☐ d) 72

11. 7 x 5

- ☐ a) 40
- ☐ b) 35
- ☐ c) 49
- ☐ d) 25

12. 8 x 9

- ☐ a) 27
- ☐ b) 26
- ☐ c) 72
- ☐ d) 54

13. 9 x 7

- ☐ a) 60
- ☐ b) 62
- ☐ c) 63
- ☐ d) 70

14. 9 x 6

- ☐ a) 54
- ☐ b) 48

15. 6 x 7

- ☐ a) 49
- ☐ b) 35
- ☐ c) 42
- ☐ d) 41

16. 9 x 5

- ☐ a) 50
- ☐ b) 40
- ☐ c) 45
- ☐ d) 36

17. 7 x 1

- ☐ a) 14
- ☐ b) 21
- ☐ c) 1
- ☐ d) 7

18. 7 x 4

- ☐ a) 24
- ☐ b) 8
- ☐ c) 35
- ☐ d) 28

19. 7 x 10

- ☐ a) 7
- ☐ b) 10
- ☐ c) 70
- ☐ d) 60

20. 6 x 9

- ☐ a) 54
- ☐ b) 45
- ☐ c) 42
- ☐ d) 48

Answer Key

1.	b	6.	b	11.	b	16.	c
2.	b	7.	c	12.	c	17.	d
3.	d	8.	b	13.	c	18.	d
4.	b	9.	a	14.	a	19.	c
5.	c	10.	d	15.	c	20.	a

Appendix I

The Doubling Strategy for Multiplication

ORIGO EDUCATION

Do the Ds

24	56	20	
16	48	32	
40	20	28	
64	12	24	

Materials:

Each group of students will need

- *Do the Ds* game board
- 2 blank cubes, marked as follows:
  - Write "double double" or "DD" on three faces, write "double double double" or "DDD" on the remaining three faces on one cube
  - Write 3, 4, 5, 6, 7, 8 on the other cube.

Each player will need

- 4 transparent counters (a different color for each player)

Directions (2-4 players):

- The first player rolls the two cubes.
- The player follows the instruction, doubling the number, two or three times. Example: *Lily rolls "4" and "DDD". She thinks double 4 is 8, double 8 is 16, double 16 is 32. 4 multiplied by 8 is 32.*
- The player claims the answer on the game board by covering it with a counter. If an answer is unavailable, the player misses a turn.
- Each of the other players has a turn.
- The first player to place all four counters on the game board is the winner.

Appendix J

Name _____

Date _____

4, 6 and 8's

1. 4 x 8 = ___
2. 8 x 9 = ___
3. 6 x 4 = ___
4. 8 x 10 = ___
5. 4 x 3 = ___
6. 6 x 1 = ___
7. 8 x 2 = ___
8. 6 x 5 = ___
9. 4 x 6 = ___
10. 4 x 7 = ___
11. 8 x 6 = ___
12. 6 x 3 = ___
13. 6 x 4 = ___
14. 8 x 9 = ___
15. 4 x 5 = ___
16. 6 x 10 = ___
17. 8 x 1 = ___
18. 4 x 2 = ___
19. 4 x 7 = ___
20. 8 x 8 = ___

Name

Date

4, 6 and 8's

1. 4 x 8 = 32
2. 8 x 9 = 72
3. 6 x 4 = 24
4. 8 x 10 = 80
5. 4 x 3 = 12
6. 6 x 1 = 6
7. 8 x 2 = 16
8. 6 x 5 = 30
9. 4 x 6 = 24
10. 4 x 7 = 28
11. 8 x 6 = 48
12. 6 x 3 = 18
13. 6 x 4 = 24
14. 8 x 9 = 72
15. 4 x 5 = 20
16. 6 x 10 = 60
17. 8 x 1 = 8
18. 4 x 2 = 8
19. 4 x 7 = 28
20. 8 x 8 = 64

Appendix K

Name _____

Date _____

0, 1, 11's

1. 0 x 2 = ___
2. 1 x 4 = ___
3. 11 x 6 = ___
4. 1 x 7 = ___
5. 11 x 3 = ___
6. 0 x 8 = ___
7. 0 x 9 = ___
8. 11 x 5 = ___
9. 1 x 1 = ___
10. 1 x 4 = ___
11. 11 x 3 = ___
12. 0 x 1 = ___
13. 1 x 2 = ___
14. 11 x 5 = ___
15. 0 x 7 = ___
16. 0 x 6 = ___
17. 11 x 8 = ___
18. 1 x 9 = ___
19. 0 x 3 = ___
20. 1 x 4 = ___

Name

Date

0, 1, 11's

1. 0 x 2 = 0
2. 1 x 4 = 4
3. 11 x 6 = 66
4. 1 x 7 = 7
5. 11 x 3 = 33
6. 0 x 8 = 0
7. 0 x 9 = 0
8. 11 x 5 = 55
9. 1 x 1 = 1
10. 1 x 4 = 4
11. 11 x 3 = 33
12. 0 x 1 = 0
13. 1 x 2 = 2
14. 11 x 5 = 55
15. 0 x 7 = 0
16. 0 x 6 = 0
17. 11 x 8 = 88
18. 1 x 9 = 9
19. 0 x 3 = 0
20. 1 x 4 = 4

Appendix L

Name

Date

12's

1. 12 x 8 = ___
2. 12 x 6 = ___
3. 12 x 9 = ___
4. 12 x 7 = ___
5. 12 x 1 = ___
6. 12 x 2 = ___
7. 12 x 3 = ___
8. 12 x 4 = ___
9. 12 x 5 = ___
10. 12 x 3 = ___

Name

Date

12's

1. 12 x 8 = 96
2. 12 x 6 = 72
3. 12 x 9 = 108
4. 12 x 7 = 84
5. 12 x 1 = 12
6. 12 x 2 = 24
7. 12 x 3 = 36
8. 12 x 4 = 48
9. 12 x 5 = 60
10. 12 x 3 = 36