Grade 3 Elementary Mathematics Unit Plan

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Title of Unit: A Conceptual Understanding of Multiplication

Relationship of Unit to CCSS-m Standards for Mathematical Practice:

- Reason abstractly and quantitatively.
- Model with mathematics.
- Attend to precision.
- Look for and make use of structure.

Relationship of Unit to CCSS-m Content Standards:

- 3.OA.A.1: Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each.
- 3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Progression of CCSS-m Content Standards Across Grade Bands:

Grade 2
- 2.OA.C.4: *Work with equal groups of objects to gain foundations for multiplication.*
- Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and 5 columns.

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Grade 3
- 3.OA.A.1
- 3.OA.A.3
- 3.OA.B.5

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Grade 4
- 4.OA.A.1: Interpret a multiplication equation as a comparison, e.g., … 35 is 5 times as many as 7 and 7 times as many as 5.
- 4.OA.A.2: Multiply or divide to solve world problems involving multiplicative comparison.

Rationale for Teaching this Unit:

Most students at Chávez enter the 3rd grade already familiar with some of the multiplication facts. This familiarity is limited to understanding multiplication as another way of writing repeated addition sentences. Students may be able to write 5 + 5 + 5 + 5 = 20 as 4 x 5 = 20 and skip count by 5 four times to find the product (e.g., "five… ten… fifteen… twenty"). Indeed, when asked about the nature and purpose of multiplication,

most students respond that multiplication is like “times”; in other words, one must skip count a certain number of times in order to find the product of two factors. In all, the students’ understanding of multiplication is limited to procedural knowledge. Clearly, this is not a deep enough level to claim that the students truly understand the concept of multiplication.

A true conceptual understanding of multiplication would mean that, at the very least, students would be able to explain multiplication as an effective way of expressing real-world equal group situations. Real-world scenarios in which equal groups can be found can be thought of as “special cases,” fundamentally different from scenarios in which there are groups of different quantities. And though these scenarios may be seen as special, they are also quite common; students should develop their facility in recognizing these situations, and understand that multiplication is a unique way to represent them.

Deep conceptual understanding would also require that students understand how using multiplication to represent equal group scenarios is more efficient than using repeated addition. In a repeated addition number sentence, one must count the addends in order to find the number of groups represented. In the case of 5 + 5 + 5 + 5 = 20, one must count the number of 5s to realize there are 4 groups of 5. However, when written as a multiplication sentence, the multiplier represents the number of groups. One must only look at the 4 in 4 x 5 = 20 to know there are 4 groups of 5. Thus, this important component of the equal group scenario is represented in the equation itself.

As a result of these goals for deep comprehension of multiplication, this unit emphasizes the recognition of real-world situations of equal groups, and encourages students to discuss what makes these scenarios special. Embedded in the unit are consistent learning experiences in which students represent real-world situations by writing multiplication sentences, and also interpret multiplication sentences in terms of how they might represent real-world scenarios. Throughout each lesson, students must attend to precision by articulating and discussing the meaning of the multiplier and multiplicand within each multiplication sentence.

In this unit, students begin Lesson 1 making sense of a real-world scenario by discussing unique sets of numbers of children on rides at an amusement park. Here the focus is to recognize the existence of a variety of equal groups in everyday life. In Lesson 2, students learn to write multiplication sentences to represent equal groups, with all of the groups visible in the form of a picture. Careful attention is paid to what each factor represents in the scenario (e.g., number of groups vs. amount in each group). In Lesson 3, students arrange counters in groups to represent multiplication sentences.

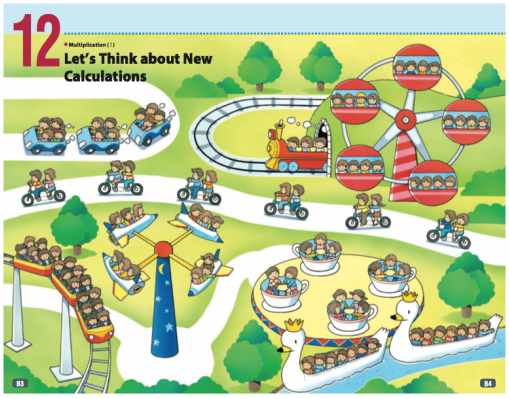
After the first three lessons, students have learned to recognize equal groups scenarios depicted visually and represent them using multiplication sentences. They have also represented multiplication sentences by creating groups of equal amounts of counters. In Lesson 4, students are expected to build upon this foundation by reading story problems and writing multiplication sentences to represent them. They can draw upon their experience of creating equal groups of counters as they draw diagrams of equal groups in

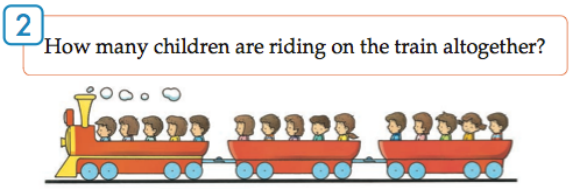
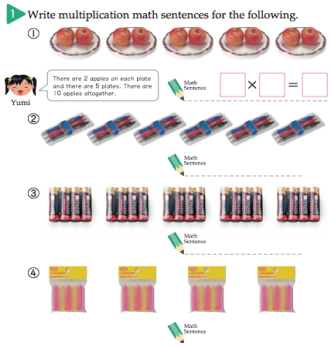
their math journals. In this way, the flow of the unit helps the students transition through the stages of concrete, semi-concrete, and abstract reasoning as they develop their understanding of multiplication.

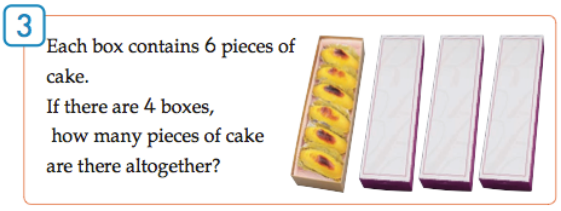
In Lesson 5, students begin to think of multiplication in the context of measuring length, which is a continuous quantity. Instead of only using multiplication sentences to represent equal groups, students now can use multiplication to show multiple units of the same length joined together. Rather than representing groups of equal numbers of discreet objects (or people, etc.), situations of continuous quantity show multiple equal-sized groups or equal-sized lengths, the size of which may not be a whole number. In this way, Lesson 5 provides a foundation for students to understand the multiplication of decimals and fractions in 5th grade. Finally, in Lesson 6, students will find applications of multiplication by finding equal groups of objects in their classroom and at school that could be easily counted using multiplication, and express those quantities using multiplication sentences.

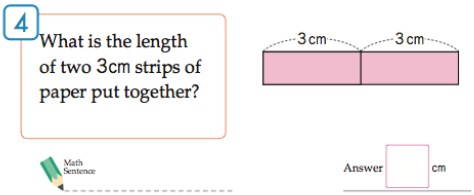
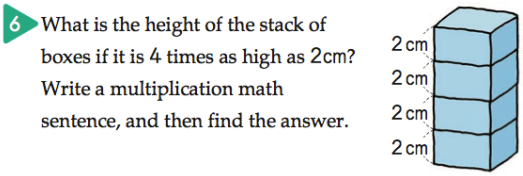
Throughout the remainder of the school year, the students will continue to build procedural fluency based on the concept of multiplication through regular lessons on each set of math facts up to 10. By the end of the year, it is expected that the students will achieve procedural fluency of single digit multiplication facts through the continuation of discourse and problem solving strategies. Their experience with multiplication in 3rd grade will prepare students for 4th grade, when they will further their understanding by interpreting multiplication equations as a comparison between two quantities.

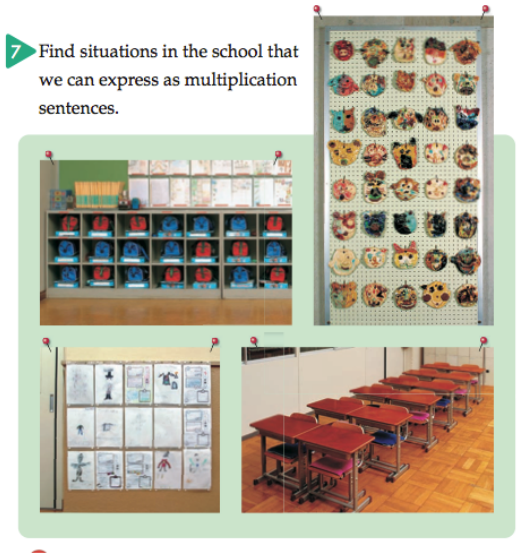
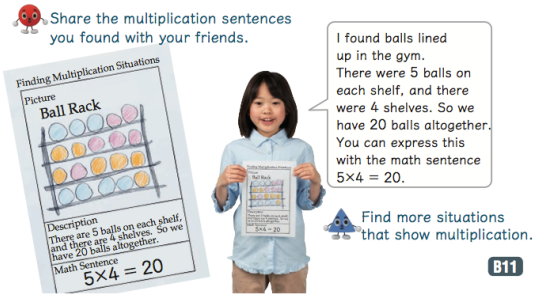
Plan of Unit:

Date	Goals	Lesson Description
Mon. 11/3	• Make sense of equal group scenarios. • Consider and discuss the number of groups and the number of children in each group.	**1. Describe the equal group scenarios presented in the picture.** • How are equal groups a "special case"? • What makes the teacup ride different?  **2. Arrange counters in groups to represent the equal groups in the rides.**

		• 6 groups of 2 counters each • Arrange counters to represent another ride and show it to a partner. **3. Write down numbers we would use to represent some of the rides.** • 3 children in each airplane • 4 airplanes • 12 total airplanes
Tues. 11/4	• Understand multiplication as a way to express equal groups. • Understand how to write multiplication sentences to represent equal groups, as seen in a picture. • Explain what each factor means in a multiplication sentence.	**1. Grasp the problem statement.** How many children are riding on the train altogether?  • Repeated addition or multiplication? • How is multiplication more useful and efficient than repeated addition? **2. Practice.**  • Identify the meaning of each factor in the real-world scenario. • Discuss the difference between 3 x 4 and 4 x 3 in last two examples.
Wed. 11/5	• Represent multiplication sentences by arranging counters. • Explain the difference in arrangements between two different multiplication sentences (e.g., 3 x 2 vs. 2 x 3)	**1. Arrange counters to show multiplication expressions.** • Attend to meaning of each factor while arranging counters. • Explain the difference between arrangements of 5 x 2 and 2 x 5.

		3 Think about multiplication using counters. ① Arrange your counters to show the following math sentences. Ⓐ 3×2 Ⓑ 2×3 Ⓒ 5×2 Ⓓ 2×5  **2. Play a game with a partner.** • Draw a card from the deck and arrange the counters to show the expression. • Have your partner tell you what expression you are showing.
Thurs. 11/6	• Draw a diagram and write a number sentence for an equal groups story problem. • Use repeated addition as a strategy of finding the product to a multiplication sentence.	**1. Grasp the problem statement.** Each box contains 6 pieces of cake. If there are 4 boxes, how many pieces of cake are there altogether? Do we have enough for our class?  • Discuss solution methods • Compare repeated addition to multiplication sentence • Understand that counting using multiplication mimics counting by repeated addition (feedback?) **2. Practice.** ①  ②  ③  • Write down a multiplication sentence and find the total number of objects for each situation.

Fri. 11/10	• Write a multiplication sentence to represent many lengths put together. • Use a multiplication sentence to solve story problems using the terminology **"___ times as long"**	**1. Grasp the problem statement.** What is the length of two 3cm strips of paper put together? (Can I change this to a greater number of strips? I'd prefer for the answer to not be something they can just do using mental math, but I may just not understand the logic of this problem statement…)  • Multiplication as a number of strips of equal length ("equal quantity") joined together • "**3 times as much** as an amount is the same as 3 sets of the amount put together" (p. B10). **2. Practice**  • Clarify "4 times as high as 2cm" terminology. • Write multiplication sentences. • Use a visual model to compare the lengths of 8cm to 2cm.

Mon. 11/11	• Express real-life situations using multiplication sentences. • Explain the meaning of each number in the math sentences in terms of what it represents in the situation.	**1. Grasp the problem statement.** Find situations in the school that we can express as multiplication sentences.  7 Find situations in the school that we can express as multiplication sentences. • Describe the situation in writing. • Draw a diagram of the situation. • Write a multiplication sentence and label each number with what it represents. **2. Share your multiplication sentences.**  Share the multiplication sentences you found with your friends. Finding Multiplication Situations Picture Ball Rack Description There are 5 balls on each shelf, and there are 4 shelves. So we have 20 balls altogether. Math Sentence 5×4 = 20 I found balls lined up in the gym. There were 5 balls on each shelf, and there were 4 shelves. So we have 20 balls altogether. You can express this with the math sentence 5×4 = 20. Find more situations that show multiplication. B11 • Describe the situation to a partner and review the multiplication sentence. • Share some with the whole class.

Multiplication Lesson 1

[redacted]

Name of Unit: A Conceptual Understanding of Multiplication

Plan of Unit: (Total 6 lessons)

1. Making Sense of Equal Group Scenarios
2. Using Multiplication to Express Equal Group Scenarios
3. Arranging Counters to Represent Multiplication Sentences
4. Solving Multiplication Story Problems
5. Representing Continuous Quantities of Length
6. Applying Multiplication to Equal Group Scenarios at School

Title of Lesson: Making Sense of Equal Group Scenarios

Goals of the Lesson:

- Recognize the unique characteristics of equal group scenarios
- Within an equal group scenario, identify and explain the number of groups and the number of children in each group.

Relationship to the CCSS:

Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*

3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

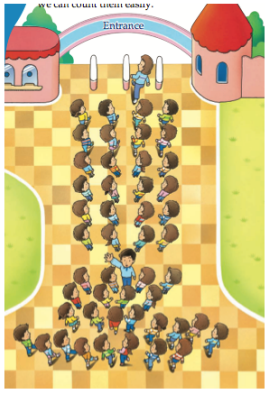
Rationale for Teaching this Lesson:

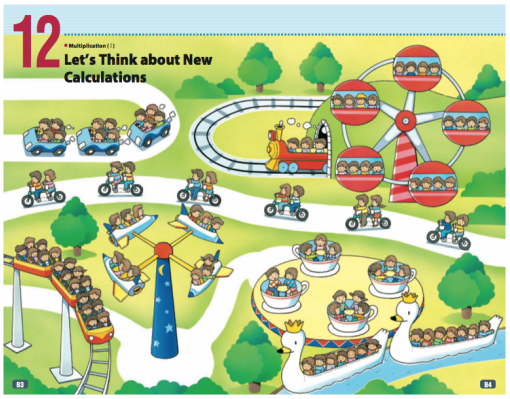
Last year, many students seem to have gained an understanding of how to carry out the procedure of multiplication with simple facts. These students, however, do not recognize the important and unique qualities of equal groups in real-life situations. Furthermore, the students do not have a clear understanding for why using a multiplication sentence would be more useful and efficient to describe an equal group scenario than using a repeated addition sentence.

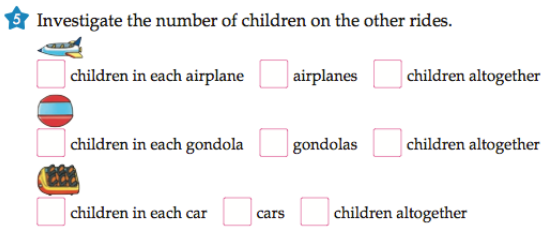
In this lesson, the students begin their investigation of equal group situations by looking at an engaging picture of children at an amusement park. The focus of teaching is not on counting strategies or writing math sentences, but instead on

identifying what makes the equal groups in the picture "special" and how they differ than unequal groups. The students will refer back to this amusement park context throughout the unit as a foundation for investigating equal groups.

Flow of the Lesson:

Teacher's Questions, Student Activities, and Anticipated Reactions	Teacher Support and Things to Remember	Evaluation
1. Hook (5 min.) **Show students p. B2**  **Let's count the number of students in each class. What do you notice?** • There are 24 students in both classes. • The students in the first class are in straight lines. • It is easier to count the first class because you can count by 6. • It is hard to count the students in the second class. **How could the teacher easily count the second class?** • He could ask the students to line up in lines of ___. • He could make groups.	Have the students start a new spread in their math journal and write Multiplication Lesson 1. Remind students we are starting a special new unit so we are taking a break from our usual numbering system in our journal. Encourage the students to articulate why it might be easier/harder to count the students in each class.	How do students support their thinking that it is easier to count the first class?
2. Recognizing equal groups (15 min.) **Let's look at children on rides in the amusement park. Talk with your**	Give students a copy of pages B3-B4 and have them glue into the left side of their journal	If the students begin counting

partners at your table about what you notice.  **Let's share what we noticed as a class.** • I noticed that ___ ride has the same number of children in each car. • Some rides have many groups and some only have a few. • Only 2 children fit on each bike. • 7 children can fit on each boat! • We do not know how many children are on the train. • One teacup has 4 children, and one only has 2 children. **What makes the teacup ride different from all the other rides?** • On all the other rides, the same number of children is in each group. • In the teacups, different cars have different numbers of students. **All the other rides show equal groups. This means that there is the same number of people or objects in each group. We can say each group is equal.**	spread. Remind students the class procedure for gluing neatly and efficiently. Explicitly teach vocabulary when students struggle with certain terms (e.g., the "cars" of a roller coaster, "teacup" ride, etc.) If a student refers to a car, boat, rocket, etc., as a "group," ask the student to explain what they mean to the class. Post definition of "equal groups" so it is visible to the class: ***Equal groups* means there is the same number of objects in each group.**	right away, how are they counting? 1 by 1? Skip-counting? How do students articulate that, for most of the rides, there is the same number of children in each group? Do students respond and add to each other's ideas in conversation? Do students see the teacup ride as different from the other rides? How do they explain this?
3. Arrange counters in equal groups (10 min.)	Remind students of correct procedures for	Do students make groups of

Let's arrange the counters to show how many children are riding the bicycles. Anticipated solutions: • Arrange 6 groups of 2 counters in each group. • Arrange a long row of 12 counters, without any breaks to show groups. **Let's describe what we did. Who can explain it?** **Pick another ride and arrange the counters using equal groups. Explain what you did to a partner.**	using/sharing counters in groups. If a student makes a long row without discreet groups, ask, "How many children fit on each bicycle? How can we show this using the counters?" Invite a student to show the class their work using large magnetic counters on the board. Ask the students to explain what their classmate did using the word "groups" in their explanation. Encourage the students to have their partners identify which ride they arranged without telling them first.	counters? Do students use "equal groups" language when they discuss? (e.g., "There are 6 groups. There are 2 students in each group.")
4. Write numbers to represent number of groups and amount in each group (5 min.) **Let's write down the numbers we would use to represent these situations.** 	Have students paste the note-taking sheet from B5 into the right side of their journal.	Do students understand that one number represents the number of groups and the other represents the number of children in each group?

5. Summary/Reflection (10 min.) <u>Summary:</u> *Equal groups* means there is the same number of people or objects in each group. <u>Reflection:</u> Today I learned/noticed…	Remind students to write the heading for <Summary> before copying the summary. Prompt students to write a reflection, starting with, "Today I learned…" or "Today I noticed…"	Do students' reflections match the goals of the lesson?

Multiplication Lesson 2

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Name of Unit: A Conceptual Understanding of Multiplication

Plan of Unit: (Total 6 lessons)

1. Making Sense of Equal Group Scenarios
2. Using Multiplication to Express Equal Group Scenarios
3. Arranging Counters to Represent Multiplication Sentences
4. Solving Multiplication Story Problems
5. Representing Continuous Quantities of Length
6. Applying Multiplication to Equal Group Scenarios at School

Title of Lesson: Using Multiplication to Express Equal Group Scenarios

Goals of the Lesson:

- Understand multiplication as a way to express equal groups.
- Understand how to write multiplication sentences to represent equal groups, as seen in a picture.
- Explain what each factor means in a multiplication sentence.

Relationship to the CCSS:

Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*

3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

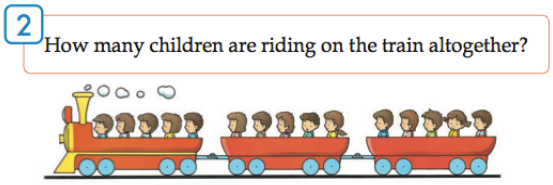
Rationale for Teaching this Lesson:

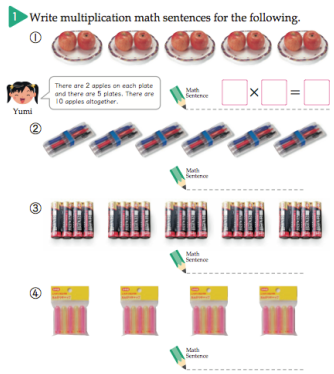
The focus of Lesson 1 was for students to notice the special nature of equal group scenarios. Students spent time describing the rides at the amusement park, including how many groups were on each ride, and how many children were in each group. They also noticed a ride in which the groups were unequal, and discussed how this ride differed from the others.

In Lesson 2, students learn to write multiplication sentences to represent the types of equal group scenarios they discussed in the previous lesson. Students should be able to understand that these equal group cases are unique, yet quite common; as a

result, we use multiplication as a way of expressing them. Another important focus of the lesson is the usefulness and efficiency of multiplication. Rather than counting up the number of addends in a repeated addition sentence, one must only look at the value of the multiplier in a multiplication sentence to find the total number of groups.

Flow of the Lesson:

Teacher's Questions, Student Activities, and Anticipated Reactions	**Teacher Support and Things to Remember**	**Evaluation**
1. Hook (5 min.) **I will arrange some counters to represent one of the amusement park rides. Which ride am I showing?** • You are showing the roller coaster. I see 3 groups. Each group has 6 counters. **Let's revisit some reflections from yesterday's lesson. Listen to what your classmates learned about equal groups.**	Encourage students to use the vocabulary of equal groups in their explanations. After a few examples, build tension by asking students how they would arrange counters to represent the train passing through the tunnel.	Can students easily identify the ride represented by the counters? Can they explain their thinking? Do students seem interested in each other's reflections?
2. Today's Problem (10 min.) **How many children are riding on the train altogether?**  Anticipated Responses: • Counting one at a time • Represent using tally marks • 5 + 5 + 5 = 15 • 3 groups of 5 children • 3 x 5 = 15 • 5 x 3 = 15	Highlight the idea that we now know information that we did not have when looking at the amusement park picture yesterday. If students write a multiplication sentence, ask them to also write a note about what each number means in the sentence.	How do students represent their thinking in their journal? Does their thinking show that they are aware of the usefulness of equal groups in the process of counting?
3. Comparison and Discussion (15 min.)	It may be a good idea	Do students

Who would like to share their method with the class? <u>Solution methods to present:</u> • 5 + 5 + 5 = 15 (repeated addition) • 3 x 5 = 15 (multiplication sentence, if known by some students) **We can express the situation using a multiplication sentence, 3 x 5 = 15.** **What does each number in the sentence represent?** • 3, the number of cars. • 5, the number of children in a car. • 15, the number of children altogether. **What makes these two number sentences different? Which is better to use? Why?**	to choose a student who can explain the response, **3 x 5 = 15.** However, do not choose a student who wrote 5 x 3 = 15. As discussion flows, write **3 groups of 5,** visible for the class to see, alongside **3 x 5 = 15.** During discussion, annotate the meaning of each number of the multiplication sentence (e.g., "number of groups"). Highlight the efficiency of the multiplication sentence (e.g., "The 3 tells us the number of cars on the train. We don't need to count how many 5s we see."	seem attentive to their classmates' ideas? How many students are participating? How many can articulate what each number means in the sentence?
4. Practice (10 min) **Let's write multiplication sentences for these pictures.**  	Continually ask students to explain what each factor represents in the picture. Ensure all students write multiplier first, multiplicand second. Ask students why the number sentences for examples 3 and 4 are different even though there are 20 objects in both situations.	Do students seem to understand the difference between examples 3 and 4?
5. Summary/Reflection (10 min.)	For reflection, prompt students to revisit the	Do students use multiplication

<u>Summary:</u> We can use a multiplication sentence to easily show equal groups. <u>Reflection:</u> (Write a multiplication sentence to represent a ride from page B3-B4. Describe how you did this.)	amusement park picture. Have them write down a multiplication sentence to represent one of the rides and write an explanation of their number sentence.	sentences or repeated addition sentences?

Multiplication Lesson 3

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Name of Unit: A Conceptual Understanding of Multiplication

Plan of Unit: (Total 6 lessons)

1. Making Sense of Equal Group Scenarios
2. Using Multiplication to Express Equal Group Scenarios
3. Arranging Counters to Represent Multiplication Sentences
4. Solving Multiplication Story Problems
5. Representing Continuous Quantities of Length
6. Applying Multiplication to Equal Group Scenarios at School

Title of Lesson: Arranging Counters to Represent Multiplication Sentences

Goals of the Lesson:

- Interpret multiplication sentences by representing them through an arrangement of counters.
- Explain the difference in arrangements between two different multiplication sentences (e.g., 3 x 2 vs. 2 x 3).

Relationship to the CCSS:

Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*

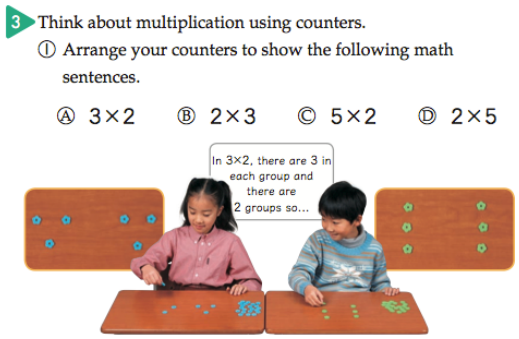
3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Rationale for Teaching this Lesson:

In Lessons 1 and 2, students learned to identify real-world equal group scenarios and express them using multiplication sentences. In Lesson 3, students learn the reverse process. They read a multiplication expression and arrange counters to create a context for the expression. By arranging equal groups of counters, the students solidify their knowledge of the multiplier and the multiplicand. For example, students should be able to explain why they arranged 5 x 2 as five groups with two counters in each group, as opposed to two groups of five. Students also play a game in which they make their partner identify the multiplication expression

they arranged with their counters. This gives students the opportunity to practice using precise terminology in conversation with their classmates.

Flow of the Lesson:

Teacher's Questions, Student Activities, and Anticipated Reactions	Teacher Support and Things to Remember	Evaluation
1. Hook (5 min.) **Yesterday, I read [student name]'s reflection. She wrote this sentence to represent a ride at the amusement park. Which ride does this show?**	Continue to ground the learning in the original context of the equal groups of the amusement park.	Did most students write correct multiplication sentences in their reflections?
2. Today's Problem (10 min.) **Let's arrange counters to show some multiplication expressions.**  Anticipated Responses: *Example: 3 x 2* • Makes a group of 3 and a group of 2. • Makes 2 groups of 3 • Makes 3 groups of 2 • Shows 2 groups of 3 *and* 3 groups of 2 and claims they are both equal. • Creates an array (separation of groups is not visible)	Make an example visible on the board, so students are ready to work independently. Show how to copy down the arrangement into the math journal, alongside the multiplication expression, so students have a record of their thinking. If a student shows a group of 3 and a group of 2, remind the student that we are not adding 3 and 2 together, but rather multiplying. Encourage students to refer back to yesterday's journal notes to remember what each factor represents.	Do students readily begin the task or is there confusion? Do students show an understanding of how the arrangements of 3 x 2 and 2 x 3 differ and why? Can students explain the thinking behind their arrangements?
3. Comparison and Discussion (10 min.)	Use one color for the	Are most

Who would like to share their method with the class? <u>Solution methods to present:</u> • Correct arrangements for each of the four examples. **What is similar about each number sentence? What is different?** • The first two both make 12. • The third and fourth both make 10. • 3 x 2 and 2 x 3 both make 12 but the groups are different for each.	first two multiplication expressions and a different color for the next two. Encourage students to explain their thinking to the class by identifying what each factor represents. Give students opportunities to ask each other questions or explain back their reasoning to the presenting student.	students eager to share their methods, or explain another student's ideas?
4. Partner Activity (15 min.) **Let's play a game: Make an arrangement. Then see if your partner knows your multiplication sentence.** 	Hand out a stack of 10 cards with multiplication expressions on them. Explain that students should take turns drawing from the top of the deck. Have students write down their partner's multiplication sentence in their math journal to more clearly see if their answer is correct or not.	Do students write the correct multiplication sentence for each arrangement? Do students count by the groups or do they still count by one?
5. Summary/Reflection (5 min.) <u>Summary:</u> TBD <u>Reflection:</u> Today I learned/noticed…	Encourage students to use precise terminology in their reflection (e.g., *groups, number in each group, total number of counters*).	Do students use precise language in their reflection?

Multiplication Lesson 4

[redacted]

Name of Unit: A Conceptual Understanding of Multiplication

Plan of Unit: (Total 6 lessons)

1. Making Sense of Equal Group Scenarios
2. Using Multiplication to Express Equal Group Scenarios
3. Arranging Counters to Represent Multiplication Sentences
4. Solving Multiplication Story Problems
5. Representing Continuous Quantities of Length
6. Applying Multiplication to Equal Group Scenarios at School

Title of Lesson: Solving Multiplication Story Problems

Goals of the Lesson:

- Draw a diagram and write a number sentence for an equal groups story problem.
- Understand that we can count using repeated addition as a strategy of finding the product to a multiplication sentence.

Relationship to the CCSS:

Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*

3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

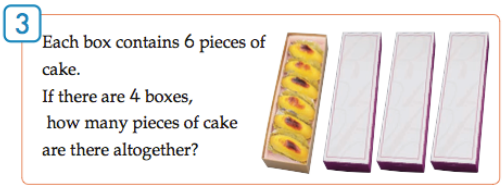
Rationale for Teaching this Lesson:

The first three lessons of the unit build a foundation for students to be able to: 1) recognize real-world equal group scenarios, 2) represent these scenarios with multiplication sentences, and 3) take a multiplication expression and create a context for it by arranging counters into equal groups. In Lesson 4, students read a story problem, then draw a diagram and write a multiplication sentence to find the total number of objects in the scenario.

Prior to this lesson, students are were able to see equal groups visually in a picture, or were able to manipulate counters to form equal groups. Lesson 4, then, represents an increase in sophistication, since students will be using multiplication

without these concrete tools. Drawing a diagram in their math journals will be helpful for some students to maintain a semi-concrete approach to the concept. Regardless, the focus for this lesson is for students to represent the real-world scenario using multiplication (4 x 6 = 24), and for students to understand that finding the product is related to finding the sum of a repeated addition sentence (6 + 6 + 6 + 6 = 24).

Flow of the Lesson:

Teacher's Questions, Student Activities, and Anticipated Reactions	**Teacher Support and Things to Remember**	**Evaluation**
1. Hook (5 min.) **Let's make an arrangement of counters to show 2 x 7. How can we do this?** **Let's read some of your classmates' reflections from yesterday's lesson.**	Ask for a student to explain while the teacher moves the magnetic counters on the board. Read reflections that use precise terminology.	Do most students seem eager and able to explain?
2. Today's Problem (10 min.) **Each box contains 6 pieces of cake. If there are 4 boxes, how many pieces of cake are there altogether? Is there enough for our whole class?**  Anticipated Responses: • 6 + 6 + 6 + 6 = 24 • 12 + 12 = 24 (or other arrangements of numbers that add up to 24) • 6 x 4 = 24 • 4 x 6 = 24	Build tension by asking if we will have enough pieces of cake for the whole class. After presenting the problem, ask students what methods they will use in their journal. Encourage students to draw a diagram in their notebook as well as a number sentence. If students write a number sentence that does not fit the situation (e.g., 12 + 12 = 24), encourage them to identify how many groups there are in the	Do students use multiplication or repeated addition in their journals? Do students use other number sentences that don't fit the situation? If so, can they explain their reasoning?

	situation.	
3. Comparison and Discussion (15 min.) **Who would like to share their method with the class?** <u>Solution methods to present:</u> • 6 + 6 + 6 + 6 = 24 • 6 x 4 = 24 (incorrect) • 4 x 6 = 24 Feedback? **Which responses make sense? Which are most useful for this situation? Why?** • Repeated addition and 4 x 6 = 24 make sense. • 6 x 4 = 24 does not fit this situation because that would mean there are 6 boxes of cake. • 4 x 6 = 24 is more useful because we can see that there are 4 boxes. **Do we have enough?** • Yes, because we have 6 groups of 4 students, so we have 24 students. • Enough for the students, but not enough for the teacher. • We would need another box to get 1 more piece of cake for the teacher.	Encourage students to use a loud voice while presenting. After each student presents, allow time for other students to comment or ask clarifying questions. During discussion, ask questions that get at two points: 1) Which responses <u>accurately show the arrangement</u> of groups? 2) Which response is the most <u>useful and efficient</u> way of representing the arrangement?	Can students explain that 6 x 4 represents a different equal group scenario and is not correct for this one? Do students see why multiplication is favorable over repeated addition?
4. Practice (10 min.) **Write down a multiplication sentence to represent each situation.** ①  ②  ③ 	Rather than showing all of the groups, show an example of one group and give information explaining how many groups there are (similar to problem statement). Encourage students to draw a diagram and write a multiplication sentence.	Do students write correct multiplication sentences? Do students who previously used repeated addition now switch to multiplication?

	Check work after adequate time is given. If a student has an incorrect answer, encourage him to cross it out using one line and write the correct multiplication sentence alongside it.	
5. Summary/Reflection (10 min.) <u>Summary:</u> The answer for 4 x 6 can be found by calculating 6 + 6 + 6 + 6. <u>Reflection:</u> Today I learned/noticed…	Encourage students to write a reflection, with the prompt, "Today I learned…"	Do students' reflections refer to the key points of the lesson?