**Shopping for School Supplies**

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| This is lesson focuses on supporting students’ conceptual understanding of multiplication. This lesson also provides opportunities for teachers to emphasize the importance of showing work and communicating about mathematical ideas in mathematics.  |

**NC Mathematics Standards:**

**Operations and Algebraic Thinking**

**Represent and solve problems involving multiplication and division.**

**NC.3.OA.1** For products of whole numbers with two factors up to and including 10:

* Interpret the factors as representing the number of equal groups and the number of objects in each group.
* Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.

**Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.

4. Model with mathematics.

6. Attend to precision.

**Student Outcomes:**

* I can make connections between repeated addition and multiplication.
* I can collaborate with my classmates to explore a mathematical task.

**Math Language:**

* Even
* Multiple
* Odd

**Materials:**

* Paper, pencil
* multi-link (pop) cubes
* What Do You See? Images, activity sheets

**Advance Preparation**:

* Gather materials

**Launch:**

1. What Do You See? and Task Introduction (10-12 minutes)

Display the images in “What Do You See?” (below) one at a time. For each image show the image for 2 seconds then remove it. Ask students to draw a picture of what they think they saw. Show the image again for 5 seconds and have students edit their drawing. Ask students to describe the picture with others at their table. Bring the class together and ask:

* “How many dots do you see?”
* “How did you find the number of dots?”
* “Did anyone see groups of dots?”
* What are some equations we can write for this picture?”

Pass out the activity sheet. Say to the class, “One of the things that mathematicians do is work together to solve problems. Today you are going to solve some problems about school supplies.”

**Explore:**

1. Working Together to Solve Problems (15-20 minutes)

Pair students up and make sure students have access to the activity sheet and multi-link (pop) cubes. Observe students and pose questions to check understanding as students consider how much erasers and journals (the first two tables on their recording sheet) costs.

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| **Observation** | **Questions to Ask** |
| Students have difficulty representing the various problems.  | * “How could you use your cubes to show what that looks like?”
 |
| Students have difficulty thinking of the situations or their representations as groups.  | * “How have you arranged your cubes?”
* “How many cubes are in each group?”
* “How many groups of cubes do we have?”
 |
| Students have difficulty writing the addition equation or multiplication expression. | * “How can you use addition to represent how your groups of cubes?”
* “How would you explain your picture in terms of the number of groups and number of cubes in each group?”
 |
| Students complete the task with no difficulty. | * “What patterns do you notice in your table?”
* “How can the addition equation help us determine the multiplication equation?”
 |

**Discuss:**

1. Class Discussion of Task (15 minutes)

Once students have completed at least the erasers (or erasers and journals) part of the task, bring students together to discuss the first two tasks (they need their activity sheets).

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| **Sample Questions** | **Possible Responses or Talk Frames** |
| What strategies did you use to explore this task? | * “I made groups of all of my cubes and I counted them each time.”
* “I was adding a group of 2 erasers each time, so I just added 2 more cubes and I knew my total was 2 more.”
 |
| What did you notice as you did this task? | * “I kept making groups. When I looked back at the table I noticed that the erasers kept increasing.”
* “When I looked at the table I noticed that the number of erasers kept increasing by two.”
 |
| How many packages will I need to buy in order to have 10 erasers? How do you know?  | * “I looked at the chart. When I buy 5 packages I have ten erasers.”
* “I need 5 packages. When I add up 5 2’s I get 10.”
* “I need 5 packages. I know that 2 x 5 equals 10.”
 |

Say, “Think about what we did today. Can you help me finish the sentence “Mathematicians are people who work together to \_\_\_\_\_\_.”

Ask students, “Why was it important for you to show your work on these problems?”

Tell students, “Mathematicians show their work and communicate their strategies to others.”

**Additional Activities:**

These activities can either be done by everyone in the class or as part of centers/math workshop.

 **School Supply Shopping**

Students can work individually or in pairs to complete the rest of the activity sheet.

 **Making Groups**

Students get 16 cubes. Students need to arrange the 16 cubes into equal groups as many different ways as they can. They should record drawings and written explanations in their math journal or on paper.

Modifications: Students can repeat with 12 cubes, 20 cubes, or 24 cubes.

**Close to 100**

 Students need number cards and either a recording sheet or their math journal.

 Directions:

* 1. Students play with partners or in groups of 3. Each student gets 8 cards.
	2. They use 4 of their cards to make 2 2-digit numbers that will add up to 100 or as close to it as possible.
	3. Their score is their difference from 100. For example, if they had a sum of 106 then their score would be 6.
	4. Students get new cards so they always start with 8.
	5. Students continue to play. The lowest score wins.

**Evaluation of Student Understanding:**

**Informal Evaluation:**

* Observe students and ask questions as they Explore the task. Make note of specific strategies to have certain students share during the Discuss phase of the lesson.

**Formal Evaluation:**

* Students’ work on the activity sheet can be collected for a formal evaluation.
* If you need an exit ticket you can pose the following: There are 2 pieces of bread on each sandwich. How many pieces of bread are on 4 sandwiches?

**Meeting the Needs of the Range of Learners:**

**Interventions:**

* For students who struggle writing the equations pose questions to help them make a connection between their representations with cubes to the equations.

**Extensions:**

* This lesson provides a conceptual foundation of skip counting by 2’s, 4’s, 5’s, and 10’s. Students may explore packages of different sizes (e.g., 3’s and 6’s) afterwards.

**Possible Misconceptions/Suggestions:**

|  |  |
| --- | --- |
| **Possible Errors****and Misconceptions** | **Suggestions** |
| Students have difficulty representing the various problems.  | * “How could you use your cubes to show what that looks like?”
 |
| Students have difficulty thinking of the situations or their representations as groups.  | * “How have you arranged your cubes?”
* “How many cubes are in each group?”
* “How many groups of cubes do we have?”
 |
| Students have difficulty writing the addition equation or multiplication expression. | * “How can you use addition to represent how your groups of cubes?”
* “How would you explain your picture in terms of the number of groups and number of cubes in each group?”
 |

**Special Notes:**

* The What Do You See? Activity can be done at various times during the unit or cluster to launch a lesson.
* The Additional Activities can be done at various times during the year.

**What Do You See?**

 Image A





Image B



Image C



Image D



**Shopping for School Supplies**

Miguel and Briana go shopping for school supplies at the store. Help them find out how many of each they would buy. Use your cubes to help you make pictures.

Erasers come in packages of 2.

|  |  |  |
| --- | --- | --- |
| **Packages** | **Addition Equation** | **Explanation & Multiplication Equation** |
| 1 |  | 1 group of 2 equals 2, 1 x 2 = 2  |
| 2 | 2 + 2 = 4  | 2 groups of 2 equals 4, 2 x 2 = 4  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

Journals come in packages of 4

|  |  |  |
| --- | --- | --- |
| **Packages** | **Addition Equation** | **Explanation & Multiplication Equation** |
| 1 |  | 1 group of 4 equals 4, 1 x 4 = 4  |
| 2 | 4 + 4 = 8  | 2 groups of 4 equals 8, 2 x 4 = 8  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

Folders come in packages of 5.

|  |  |  |
| --- | --- | --- |
| **Packages** | **Addition Equation** | **Explanation & Multiplication Equation** |
| 1 |  | 1 group of 5 equals 5, 1 x 5 =5  |
| 2 | 5 + 5 = 10 | 2 groups of 5 equals 10, 2 x 5 = 10  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

Pencils come in packages of 10.

|  |  |  |
| --- | --- | --- |
| **Packages** | **Addition Equation** | **Explanation & Multiplication Equation** |
| 1 |  | 1 group of 10 equals 10, 1 x 10 = 10 |
| 2 | 10 + 10 = 20 | 2 groups of 10 equals 20, 2 x 10 = 20  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

Number Cards Page 1 of 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **0** | **1** | **2** |
| **3** | **4** | **5** | **3** | **4** | **5** |
| **6** | **7** | **8** | **6** | **7** | **8** |
| **9** | **0** | **1** | **9** | **0** | **1** |
| **2** | **3** | **4** | **2** | **3** | **4** |

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5** | **6** | **7** | **5** | **6** | **7** |
| **8** | **9** | **0** | **8** | **9** | **0** |
| **1** | **2** | **3** | **1** | **2** | **3** |
| **4** | **5** | **6** | **4** | **5** | **6** |
| **7** | **8** | **9** | **7** | **8** | **9** |