# Roll and Compare

In this lesson, students will play a game to generate and compare multi-digit numbers. Students will justify and explain their number comparisons based on their place value understanding.

###### NC Mathematics Standards:

**Number and Operations in Base Ten**

**NC.4.NBT.7**  Compare two multi-digit numbers up to and including 100,000 based on the values of the digits in each place, using >, =, and < symbols to record the results of comparisons.

###### Standards for Mathematical Practice:

* + 1. Make sense of problems and persevere in solving them.
		2. Reason abstractly and quantitatively.
		3. Construct viable arguments and critique the reasoning of others.

6. Attend to precision.

###### Student Outcomes:

* I can read and write whole numbers up to 100,000.
* I can compare multi-digit numbers.
* I can explain and justify number comparisons.

###### Materials:

* + - * Recording Sheet (one per student)
			* Ways to generate random numbers (number cubes, digit cards, spinners) – one set per pair of students

###### Advance Preparation:

* + - * Make copies of the Recording Sheet (one per student).
			* Consider how students should be paired or grouped for the lesson.
			* Gather materials (number cubes, digit cards, spinners) to generate random numbers.

###### Directions:

1. Students will roll a number cube 5 times and place the numbers in the place value chart on the recording sheet. The goal is to make the largest possible number.
2. After each player has made a 5-digit number, they will compare the numbers they created using the symbols <, >, =.
3. After choosing the correct symbol, students will explain and record how they know they are correct. Their explanation should include mathematical language about place value and the value of specific digits in each number.
4. Teacher circulates and checks for students’ understanding. The teacher may ask students to read their mathematical expression and their explanation for their answer.
5. If students finish early, they can write their numbers in expanded form.

Example:

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| **Game 1** |
| **Partner 1** | **Partner 2** |
| **Numbers generated:** 4 3 6 1 4 | **Numbers generated:** 2 3 6 1 2 |
| **Largest possible number:** 64,431  | **Largest possible number:** 63,221 |
| **Comparison using <, =, >:**64,431 > 63,221 |
| **Justification:** In the number 63,221, the digit in the thousands place has a value of 3,000. In the number 64,431, the digit in the thousands place has a value of 4,000. Therefore, I know that 63,221 is less than 64,431.  |

###### Questions to Pose:

Before:

* Can you name a number that is larger than 55,786?
* How do you know that your number is larger?

During:

* If the goal is to make the largest number possible, what strategy are you using to make your number?
* Can you explain how you know whose number is bigger?

After:

* As you played the game, what strategies did you use to make the largest number?
* How did you determine which number was larger?
* Consider these two numbers (write 75,982 and 75,992 on the board). Which number is larger? How do you know?

######  Possible Misconceptions/Suggestions:

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|  **Possible Misconceptions** |  **Suggestions** |
| * Student has difficulty making the largest number possible.
* Student incorrectly compares numbers.
 | * Ask student to explain their strategy for creating the largest number. Listen to student’s explanations to determine the misconception. Ask: “Where should we put large digits when making a number?”
* Have students practice with smaller numbers (two-digit, three-digit, four-digit numbers).
* Provide student with a place value chart.
* Have student model numbers with place value blocks.
* Provide student with a place value chart.
* Ask students to explain which is bigger- hundreds thousands or ones? Discuss how place value helps us determine which number is greater.
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**Special Notes:**

* Allow the students to play the game using a different material. For example, if students use number cards (0-9) to generate numbers, they will have a greater range of numbers compared to using a number cube marked 1-6.
* This activity can be adapted to compare decimal numbers.

###### Solutions:

Solutions will vary based on the numbers created.

# Roll and Compare

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| **Game 1** |
| Partner 1 | Partner 2 |
| Numbers generated: | Numbers generated: |
| Largest possible number: | Largest possible number: |
| Comparison using <, =, >: |
| Justification:  |

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| **Game 2** |
| Partner 1 | Partner 2 |
| Numbers generated: | Numbers generated: |
| Largest possible number: | Largest possible number: |
| Comparison using <, =, >: |
| Justification:  |

# Roll and Compare

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| **Game 3** |
| Partner 1 | Partner 2 |
| Numbers generated: | Numbers generated: |
| Largest possible number: | Largest possible number: |
| Comparison using <, =, >: |
| Justification:  |

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| **Game 4** |
| Partner 1 | Partner 2 |
| Numbers generated: | Numbers generated: |
| Largest possible number: | Largest possible number: |
| Comparison using <, =, >: |
| Justification:  |