



Lesson M2.3

3 Digit Place Value

In this lesson, students will explore ways to make three digit numbers given three digits. Students will use the point of view thinking strategy as they evaluate the digits they select and determine how they can create a larger number in comparison to another number.

For information about place value in our base-ten number system see the *Math Matters* book (p. 25-30).

CCSS.MATH.CONTENT.2.NBT.A.1

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.

Standards for Mathematical Practice

MP5. Use appropriate tools strategically.
MP7. Look for and make use of structure.

Time Frame: ~ 60 minutes

To allow students to investigate the concepts in this lesson fully, it may take more than one class period. If the lesson will extend across two class periods, a good place to pause the lesson is after the **Explain** section. When restarting the lesson, be sure to start with a brief review of what students discovered during the Explain section of the lesson before moving into the Elaborate/Extend section.

Materials

0-9 Dice (3 per pair)
3-Digit Number Handout (Explore)
Make a Larger Number recording sheet (one per student)
Create the Target Number recording sheet (one per student)
0-9 Digit Cards (1 set per pair of students)

Engage

Display the following image of “57” for all students to see. Ask students to think about the number being represented, and different ways they can represent it.



After students have time to think, instruct them to share their thinking with a partner.

Call on 2-4 students to share their thoughts with the whole group. Highlight the differences in thinking, explaining that there are many ways to represent a number.

Explore

Students will work with a partner to compare three-digit numbers that they create by rolling three 0-9 digit dice. Provide each student with the 3-Digit Number handout and three 0-9 digit dice.

Explain the task to the students:

- Each student in the pair will roll the three dice, determine the largest three-digit number they can form from the digits rolled, and record the digits on the three-digit number handout.
- Students then will compare their number with their partner. Have the students decide which number is bigger. Tell students they need to prove how they know which number is bigger. (They can draw or write an explanation.)
- Students will repeat this task four times and mark each turn on the record sheet.



Look For

- Students who are able to provide more than one explanation (creative)
- Students who articulate clear explanations (communicative)

Explain

Bring students together and have pairs share their numbers and explanations. You may have students show their ideas using a document camera so all students can see them. Draw students' attention to different explanations or representations.

Some questions that could be asked to facilitate this discussion are:

- How did you decide which partner had the larger number?

- If our task was to find the smaller number instead of larger, how would this change our point of view on what strategy to use?

Highlight ideas that provide different representations or how students represented their numbers to show how they proved that the number was either larger or smaller than their partners.

Look For

- Students who are able to provide more than one explanation (creative)
- Students who articulate clear explanations (communicative)

Elaborate/Extend

Tell students that they are going to continue exploring 3-digit numbers in the next task.

Target Task

Pass out three 0-9 dice and one set of 0-9 digit cards to each pair of students. Also provide one Make a Larger Number recording sheet to each student.

Explain the task to the students:

- The pair will roll the 3 dice once and determine the smallest three-digit number that can be made from the digits rolled. Each student should record this number on the Make a Larger Number Recording sheet. This will be the Starting Number.
- Students next shuffle the pile of 0-9 digit cards and take turns selecting one card at a time until each student has 3 digit cards.
- Students take turns making numbers from the three digits they selected that are larger than the Starting Number. Students should record each number they create that is larger than the Starting Number. The student who can make more numbers that are larger than the Starting Number wins that round.
- *Example round:* Students roll the dice and get the digits 6, 5, and 2. They write the number 256 on the recording sheet. Students take turns selecting cards. Student A gets the cards 4, 9, and 1, and Student B gets the cards 7, 3, and 5.
 - Student A writes 491
 - Student B writes 735
 - Student A writes 941
 - Student B writes 357
 - Student A writes 419
 - Student B writes 537
 - Student A writes 914
 - Student B writes 573
 - Student A passes (no more larger numbers)
 - Student B writes 753 and wins the round.

- Students can repeat the game for several rounds.

Extend the Task

For students who were engaged in one of the high potential behaviors or who demonstrated advanced understanding of the concept in the Explore/Explain sections of the lesson, this target task can be extended in this way:

- Have the students roll the three 0-9 dice and determine the largest three-digit number that can be made from the digits rolled.
- From the shuffled pile of digit cards, students will select 5 cards each. (There will be no digit cards left in the pile.) Alternatively, if students are working in groups of 3, provide each student with a set of 0-9 digit cards, and students will shuffle the cards and select the top five digit cards to use for that round.
- Students will use their digit cards to create an addition equation that will result in a sum that is as close to the three-digit number they rolled as possible. The student in the pair with the closest sum to the target three-digit number wins that round. Note that the students could create addition equations that could have two or more addends, use at least 4 (but not all 5) of their digit cards, or have addends with different numbers of digits (ex. A 3-digit number + a 1-digit number + a 1-digit number).
- *Example game round:* Students roll the dice and get the digits 4, 6, and 3. They write the number 346 on the Create the Target Number sheet. Students select their cards; Student A has 2, 3, 5, 7, and 8, and Student B has 1, 4, 6, 9, and 0.
 - Student A arranges cards to create this equation: $325+7+8 = 340$
 - Student B arranges cards to create this equation: $196+40 = 236$
 - Student A wins the round.

For a further extension of this, you could allow students to use addition and subtraction operations in their equations.

Scaffolding and Support

Consider offering manipulatives to support struggling students
Use any classroom support anchor charts/posters about place value to support students' thinking.

If students seem to need more support with coming up with a way to represent their number, consider asking the following questions to prompt student thinking:

- How can you use the manipulatives to help you show your number?
- What picture can you draw that might help you?

- What do you know about this number?

 **Look For**

- Students who apply strategies from previous lessons (strategic)
- Students who are able to come up with several different numbers (creative and resourceful)
- Students who continue to persevere through the task (resilient)
- Students who are able to come up with multiple numbers with their digits (Strategic)
- Students who articulate clear explanations (communicative)

Evaluate

Bring the students to the discussion area and complete one round of the Target Task as a class. (Roll the 3 dice to create the Starting Number, have each student select 3 digit cards to work with, and have them each try to create the largest number they can that is larger than the Starting Number).

Have students share out their largest numbers and determine who was able to create the largest number. Facilitate a discussion about how the students' point of view (or different digits they selected) influenced the outcome, or the largest number they could make. Encourage students to talk about ways to compare their numbers. Record these ideas on chart paper.

Or, you could do one round of the Extend the Task with the whole class and then facilitate a discussion about how the students' point of view influenced the ways they arranged the digits in their addition equations.

3-Digit Number Handout (Explore)

Name: _____

Date: _____

Roll the 3 dice and create the largest number you can. Compare your number with your partner.

Discuss who has the larger number.

	Hundreds	Tens	Ones	I had the larger number (Y/N)
Turn 1				
Explanation or Representation				
Turn 2				
Explanation or Representation				
Turn 3				
Explanation or Representation				
Turn 4				
Explanation or Representation				

Make a Larger Number (Target Task)

Name: _____

Date: _____

Record the Starting Number and all the larger numbers you can create with your digit cards.

Starting Number	Larger numbers I can make with my digit cards

Create the Target Number (Extend the Task)

Name: _____

Date: _____

Record the Target Number and the addition equation you created with the closest sum.

Target Number	Addition Equation with the closest sum to the Target Number

0

1

2

3

4

5

6

7

8

9