**Place Value and Arrow Cards**

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| In this lesson, students explore making numbers with place value materials and arrow cards to develop the concept that the digits of a number represent amounts of tens and ones.  |

**NC Mathematics Standard(s):**

**Understand place value.**

**NC.1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones.

• Unitize by making a ten from a collection of ten ones.

• Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

• Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or

nine tens, with 0 ones.

**Additional/Supporting Standards: Understand place value.**

**NC.1.NBT.3** Compare two two-digit numbers based on the value of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

**Standards for Mathematical Practice**

1. Reason abstractly and quantitatively.
2. Construct viable arguments and critique the reasoning of others.
3. Model with mathematics.
4. Use appropriate tools strategically.
5. Attend to precision.
6. Look for make use of structure.

**Student Outcomes:**

* I understand the quantities to 99.
* I understand that the two digits of a two-digit number represent amounts of tens and ones.
* I can unitize a collection of 10 objects.
* I can model the values of tens and ones for a given two-digit number.
* I can explain in words the values of two- digit numbers.

**Materials:**

* Arrow cards
* Place value materials (Unifix cubes, pop cubes, mini-ten frames)
* White wipe-off boards

**Advance Preparation**:

* This task would be done after many experiences with various place value materials.
* Reproduce Arrow cards.
* Arrow cards are a set of place value cards with an “arrow” on the right side. Students can organize the cards horizontally or vertically to represent numbers in expanded form
* (27 = 20 + 7). The cards can overlap cards and line up the arrows to form multi-digit numbers.
* Prepare a list of names for working pairs of students.

**Directions:**

1. Assess students’ prior knowledge of place value by asking the questions below in the section, Questions: Before.
2. Pair the students and then have students to explore the various ways to sort the set of arrow cards. Students may sort the Arrow cards based on the numbers without using place value. Some students may sort by the counting order of numbers (0-10). Another way students may sort is counting by 10’s.
3. Next, ask students to show you the numbers 1 and 10. The students work with their partners to show the numbers with the Arrow cards, the place value materials (Unifix cubes, pop cubes, mini-ten frames) and write the numbers on their white wipe-off boards. (See questions below.)
4. As students work, these are questions you may ask to monitor their learning: How many tens are there in this number and how do you know that? How many ones are there in this number and how do you know that?

How are the two numbers similar and different and how do you know that? What is the value of each digit in both numbers?

1. Continue this activity with different numbers such as 2 and 20.

**Questions to Pose:**

Before:

1. Show me a train of 10. Tell me what you know about the number 10. (If the student says 10 you would want to ask follow-up questions so you will know if the student is counting by ones or recognizing the cubes as a unit of 10.)

During:

1. What is the quantity (value) of the number in the tens place?
2. What is the quantity (value) of the number in the ones place?
3. How are the two numbers similar and different and how do you know that?
4. What is the value of each digit in both numbers?
5. Look at a 2-digit number. How do you know how many ones and tens there are in the number?

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| Students cannot identify the quantity (value) of the numbers in the tens place. | Have students use Unifix cubes or pop cubes to compose and decompose numbers so students can visually see the quantity of the numbers. Have students use number lines to compare the relationships between the numbers such as 1 and 10. |

**Special Notes:**

This task needs to be repeated often for students to develop place value understanding.

**Solutions:** NA



