**Destination North Carolina**

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| In this lesson, students apply their knowledge of place value to add whole numbers by planning four day trips to destinations across North Carolina. |

**NC Mathematics Standard:**

 **Number and Operations in Base Ten**

**NC.4.NBT.4** Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.

**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 add multi-digit whole numbers.

**Materials:**

* handout (1 per student)
* paper/pencil
* pictures of various places in North Carolina

**Advance Preparation**:

* Collect pictures of the places students will visit in North Carolina
* Make copies of the student handout

**Special Notes:**

* This lesson is intended to provide students with additional practice with the traditional algorithm for addition. Therefore, this lesson would best be used after students have been taught the traditional algorithm.
* Mileages were taken from Randolph County, North Carolina to various destinations using Google Maps. (You might want to change the mileages and times to fit your location.)

**Launch:**

1. Introduce Problem (10 minutes)

Introduce the context of today’s task by saying: *Today we are going to plan your summer vacation. This summer you and your family will have the opportunity to visit some of North Carolina’s amazing destinations. The following chart shows miles and time from home to your destination. You will be able to take four day trips and select four places you would like to visit.* Show students the chart with the places they have the opportunity to visit. Take time to show students pictures of the various places and discuss what they might do while they visit these places.

Introduce the task by saying: *Your task today is to plan four day trips by choosing four places you would like to visit and figure out the round trip mileage for each trip. You will determine the total mileage for your trips this summer.* If you feel like your students might not understand round trip, spend a few minutes explaining what a round trip is. For example, a round trip to Biltmore would include the travel to Biltmore (Asheville, NC) and a trip back home (Randolph County, NC) or a round trip of 358 miles (179 miles + 179 miles).

**Explore:**

1. Solving the Problem (15 – 20 minutes)

Allow students time to work individually to solve the task. As students work, observe students to see how they are solving the task. Encourage students to show their work for all problems and use the traditional algorithm for addition. Also encourage students to keep their information organized.

 Observe:

* How are students organizing and representing their thinking?
* How do students make sense of the question?
* Do students understand round trip?
* Are students successful in using the traditional algorithm?
* Do you notice a common misconception with the algorithm that you want to include?
* Are students lining up the place values when using the traditional algorithm? For example, making sure that the tens are together. (If students are struggling with this, use graph paper to help them keep their numbers in line.)

Carefully select students to present to the class. You can choose students who have a common misconception or students who modeled the problem and kept track of the places they visited in an organized way. Be sure to choose students that are able to explain their solutions and how they solved the problem. Choose students that can help extend the understanding of adding with the traditional algorithm.

**Discuss:**

1. Discussion of Solutions (20 – 30 minutes)

Bring the group back together and have selected students share their strategies for solving the task. Possible points to address and questions to ask:

* Discuss the understanding of round trip again if needed.
* Discuss misconceptions, whether with student work or by bringing up what you saw.
* Students who solved using the traditional algorithm and can explain using place value how it works.
* Making sure your students are lining up the place values with using the traditional algorithm.

Close the lesson by having each student select one trip and describe their steps (using words and numbers) for calculating the round trip mileage on a piece of paper or notecard. Have students trade with their paper with a partner and double check to be each step is accurate and explained using precise language.

**Evaluation of Student Understanding:**

**Informal Evaluation:**

* Observe students to informally assess the following: Can students add using the traditional algorithm? Are students making sense of the problem (i.e. round trip)? Are students lining up the place value correctly when using the traditional algorithm? What errors are students making as they add the numbers?

**Formal Evaluation/Exit Ticket:**

* For the exit ticket today, use “My Favorite No”.

Example: <https://www.youtube.com/watch?v=srJWx7P6uLE>

* + Give students the following problem: 621 + 79 = \_\_\_\_\_\_ Give students an index card and have them solve the problem using the traditional algorithm. Collect the index cards and separate them between right and wrong. Choose your favorite wrong answer. Rewrite the student’s work including the wrong answer on the board. Begin by discussing what the student did correctly (celebrations). Next, have students analyze what the student did wrong and how we would fix it. Be sure to have students explain why.

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

**Interventions:**

* Suggest that students using graph paper if needed to line up place values.
* Have students only choose two places to visit instead of four.

**Extensions:**

* Have students determine how many hours each round trip will take and how many total hours you will spend traveling this summer.
* Have students investigate which collection of trips would have the greatest or least mileage.
* Have students make connections to multiplication. For example, a trip to Biltmore would be a round trip of 179 miles + 179 miles or two groups of 179 (2 x 179). Relate repeated addition to multiplication.

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| * Students do not understand round trip.
* Students do not line up the place values correctly when adding.
* Regrouping to larger place values.
 | * Introduce the context vocabulary during the launch portion of the lesson so that students understand the vocabulary. Provide students with several examples such as going to the school cafeteria and back.
* Give students graph paper or have students turn lined paper so the lines are vertical to help them line up the place values correctly.
* Be sure students understand why they regroup and what regrouping is. Have students put each number in expanded form and then regroup. Make connections to the traditional algorithm and the place value of the numbers.
* Encourage students to use alternative strategies such as adding up, place value, or compensation or alternative models such as number lines to solve the addition problems.
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**Possible Solutions:**

* Answers will vary. There are many different solutions to this problem, because students are able to choose the four different destinations.

**Destination…North Carolina!**

This summer your family wants to visit some of North Carolina’s amazing destinations. Using the chart below, choose four places you would like to visit. Figure the round trip mileage for each trip. What was your total mileage for the summer?

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| **Destination** | **Miles** | **Time** |
| Biltmore House | 179 miles | 3 hours |
| Linville Caverns | 166 miles | 3 hours |
| Grandfather Mountain | 158 miles | 2 ½ hours |
| Blowing Rock State Park | 146 miles | 2 ½ hours |
| Appalachian State University | 139 miles | 2 hours |
| Jordan Lake State Park | 38 miles | ½ hour |
| NC State Capitol Building | 62 miles | 1 hour |
| University of North Carolina at Chapel Hill | 43 miles | 1 hour |
| Cape Hatteras Lighthouse | 300 miles | 5 hours |
| USS North Carolina Battleship | 190 miles | 3 hours |
| Fort Raleigh State Park | 250 miles | 4 hours |
| Kitty Hawk National Park | 264 miles | 4 ½ hours |
| Bath, NC | 182 miles | 3 hours |