**Summer Vacation**

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| In this lesson, students explore the relationship between addition and subtraction by solving distance problems with a vacation context. |

**NC Mathematics Standard(s):**

**Number and Operations in Base Ten**

**NC.3.NBT.2** Add and subtract whole numbers up to and including 1,000.

* Use estimation strategies to assess reasonableness of answers.
* Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems.
* Use expanded form to decompose numbers and then find sums and differences.

**Standards for Mathematical Practice:**

1. Makes sense and perseveres in solving problems

2. Reasons abstractly and quantitatively.

4. Models with mathematics.

6. Attends to precision.

**Student Outcomes:**

* I can make a reasonable estimate of the distance using multi-digit numbers and/or a number line.
* I can use place value strategies (including expanded form) to add and subtract multi-digit numbers.

**Math Language:**

**What words or phrases do I expect students to talk about during this lesson?**

* **distance**
* **difference**
* **How much farther?**
* **strategies**
* **decompose**
* **expanded form**
* **open number line**

**Materials:**

* North Carolina roadmap (online or paper)
* Activity Sheet
* Choice of manipulatives
* Chart Paper

**Advance Preparation**:

* Identify a destination within NC that students are familiar with, and lookup the distance from your home city/town.

**Launch:**

1. Traveling from Home (10 min)

* Display the roadmap of NC and have students locate and mark your home city or town.
* Discuss the destination that you have previously looked up and mark it on the map.
* Ask if they know the term that describes how far it is from one destination to the next. Discuss the term distance, and show it by drawing a line from home to the destination.
* Model the distance using an open number line, labeling home as “0” and the destination with the distance.
* Locate another destination farther or closer than your original one, and label it on the map.
* Ask students to estimate the distance, then show where it would go on the number line. Teacher will need to look up the actual distance and label on the number line.

**Explore:**

1. Travel Stories (20 min)

* Explain that they will be solving more travel stories on their own (or with partners).
* Distribute Activity Sheet and remind students to show their work using strategies that make sense to them.
* During the activity, circulate among students and take note of the strategies that they are using to solve the problems: adding by breaking apart, subtracting by adding to, or taking from. (Questions 3 and 5 will be discussed whole group.)
* Based on observation, select and sequence student strategies for discussion.
* If students are struggling with an entry point, ask them if there is a way to put the information from the table into a different model that shows distance. (number line)

**Discuss:**

1. Discussion of Travel Stories (25 min)

* Discuss question 3 from the Activity Sheet by having pre-selected students share their solution strategies. (If no one uses a number line to model their solution, then the teacher should pose the question, “How could we represent this on a number line?” Record strategies on chart paper.
* Discuss question 5 from the Activity Sheet by having pre-selected students share their solution strategies, prompting the use of a number line if not present. Add any new strategies to chart paper..
* Ask the question, “How does the relationship between addition and subtraction help you solve this problem?”

**Evaluation of Student Understanding**

Informal Evaluation: Observational assessment during activity.

* What strategies do students use to solve the problems?
* Can they use multiples of 100s and tens as landmark numbers when adding up or subtracting back?
* Do they add or subtract multiples of 10 at a time, or do they add or subtract 10 each time?
* Are they able to represent the distance problems with an equation and/or model such as a number line?

**Formal Evaluation/Exit Ticket**

Students solve original Traveling from Home problem from Launch. Students compare to estimate.

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

**Intervention:**

* Students may need to model the problems with number lines, base ten blocks, or drawings.

**Extension:**

* Additional problem - How many miles from the farthest city north to the farthest city south?
* Students can plan a vacation from their home destination, creating a plan for stops with number of miles left to reach destination after each stop.

**Possible Misconceptions/Suggestions:**

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| --- | --- |
| **Possible Misconceptions** | **Suggestions** |
| Using incorrect operation.  Not understanding starting location as zero. | Have students model the action of the problem with visual representations.  Model distance on a number line, labeling destinations. |

**Possible Solutions:**

Question #3

|  |  |
| --- | --- |
| Adding Up  (one possibility) | Taking From  (one possibility) |
| 278 + ? = 503  278 + 100 = 378  378 + 100 = 478  478 + 22 = 500  500 + 3 = 503  100+100+22+3 = 225 | 503 - 278= ?  503 - 3 = 500  500 - 200 = 300  300 - 70 = 230  230 - 5 = 225 |

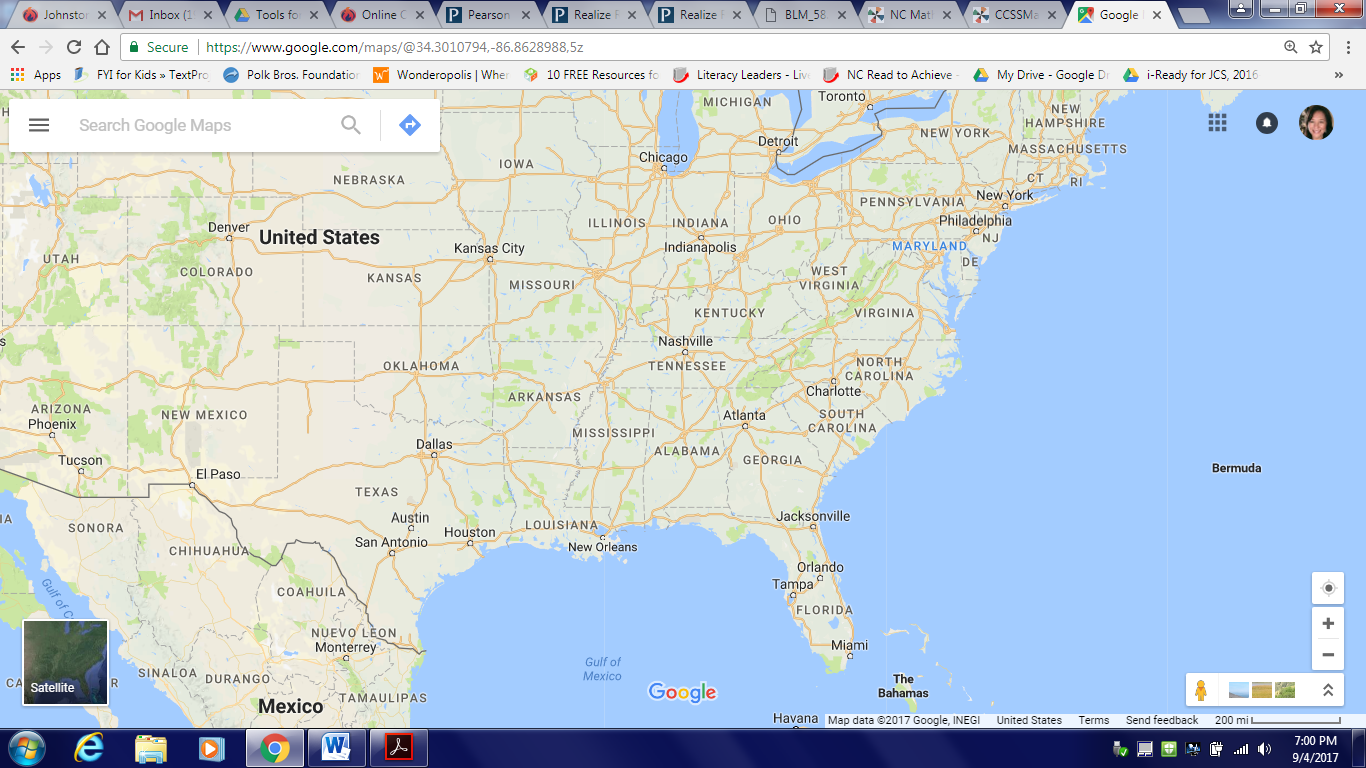
Question #5a

|  |  |
| --- | --- |
| Decomposing and Adding by Place Value  (one possibility) | Adding one number in parts  (one possibility) |
| 181 + 224 = ?  100 + 200 = 300  80 + 20 = 100  1 + 4 = 5  300 + 100 + 5 = 405 | 224 + 181 = ?  224 + 100 = 324  324 + 80 = 404  404 + 1 = 405 |

Question #5b

|  |  |  |
| --- | --- | --- |
| Adding Up  (one possibility) | Taking From  (one possibility) | Changing The Numbers  (one possibility) |
| 405 + ? = 595  405 + 100 = 505  505 + 90 = 595  100 + 90 = 190 | 595 - 405 = ?  595 - 400 = 195  195 - 5 = 190 | 595 - 405 = ?  (595 +5) - (405+5) = ?  600 - 410 = ?  600 - 400 = 200  200 - 10 = 190 |

**Activity Sheet**

**Your family wants to plan a vacation by traveling on Interstate 95. They aren’t sure whether they want to travel north or south. Use the following table to answer the questions below.**

|  |  |  |
| --- | --- | --- |
| **Destination** | **Direction** | **Distance from Raleigh NC** |
| **Orlando, Florida** | **South** | **595 miles** |
| **New York, NY** | **North** | **502 miles** |
| **Washington, DC** | **North** | **278 miles** |
| **Myrtle Beach, SC** | **South** | **181 miles** |
| **Richmond, VA** | **North** | **170 miles** |

**Solve the following problems. Show your solutions.**

**1. Which destination is the farthest? Which destination is the closest? How do you know?**

**2. Which two cities are about the same distance from Raleigh? Explain your answer.**

**3. How much farther is the distance from Raleigh to New York than the distance from Raleigh to Washington?**

**4. If you started at Raleigh then traveled to Richmond, how much farther would you have to go to get to Washington?**

**5. Your family decides to vacation in Orlando, Florida. After stopping at Myrtle Beach, you drive 224 more miles to spend the night in the city of Savannah, Georgia.**

**a. How many miles did you travel that day?**

**b. How many more miles will you have to drive until you reach Orlando?**