|  |
| --- |
| The purpose of this lesson is to provide an opportunity for students to solve a subtraction problem that requires regrouping. It explores the idea of decomposing numbers through regrouping. Ideally, this lesson should span over 2-3 days to allow students time to fully explore this critical concept. |

**NC Mathematics Standard(s):**

 **Number and Operations Base Ten**

 **NC.NBT.5** Demonstrate fluency with addition and subtraction, within 100, by:

* Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
* Comparing addition and subtraction strategies, and explaining why they work.
* Selecting an appropriate strategy in order to efficiently compute sums and differences

**Standards for Mathematical Practice:**

1. Reason abstractly and quantitatively.
2. Construct viable arguments and critique the reasoning of others.
3. Use appropriate tools strategically.
4. Attend to precision.

**Student Outcomes:**

* I can understand that numbers can be decomposed (broken apart) in different ways.
* I can solve subtraction problems using place value strategies when decomposition is required.

**Math Language:**

Expect to hear phrases like: I traded a ten for 10 ones, I exchanged a ten for ones, I added the ones to my new ten. I decomposed this addend…so that I could subtract, I broke apart

**Materials:**

* Anchor chart
* Base ten blocks (at least 4 tens and 20 ones per pair)
* Task sheet

**Advanced Preparation:**

* Experiences with base ten blocks to solve problems.
* Experiences with subtraction as a take away in problems that do not involve decomposing a ten.

**Launch 1:**

**Present the problem:** Lilly has a rod (10) and 7 ones. She needs to take away 9 ones.  She doesn’t think she can do it. Do you think she can?  How could she?

How could you use your place value blocks to show your thinking?

**Explore 1:**

Allow students time to experiment independently with the idea of trading. Students will share their thinking with a partner. As students work, look for student strategies that model correct decomposition. Notice whether students are removing the ten when it is traded for ones

**Discuss 1:**

A student may do something similar to the model below:

|  |  |
| --- | --- |
| **Step 1:** Build 17 with one ten and seven ones. |  |
| **Step 2:** Trade the tens rod for 10 unit cubes.  |   |
| **Step 3:** Add the traded tens with the 7 tens you already had. | 17**+****=** |
| **Step 4:** Subtract 9 ones from 17 ones. How many do you have left? |   |

**Ask:** How does trading/exchanging help Lilly solve the problem?

* Possible response: Lilly now has 17 ones and can easily take away 9 ones.

**Ask:** How would you describe what happened to the ten?

* **Discuss** with students that trading the 10 involved decomposing the ten into 10 ones.

Give students additional practice with other problems that require regrouping. Base ten blocks should still be available for students to use. Note that with problems b and c, students will have 2 tens, but only need to decompose one. Make sure students are removing the decomposed ten and placing it back in the tens pile so that it doesn’t become a part of the solution.

1. 13 – 4
2. 23- 5
3. 20 – 11

Also, look for students who are modeling 20 with 2 tens and 11 with a ten and a one, instead of using 11 ones.

* Check problems **a** and **b** for accuracy as you monitor. Coach students, if necessary. Select student solutions for problem **c** to discuss.
	+ How can we represent the breaking apart of 20? (1 ten and 10 ones or 10 + 10).
	+ How did this decomposing help us solve the problem?

**Launch 2**

**Introduce the task**: Jane got $35 for her birthday. She spent $19.00 on Shopkins (or any other popular toy). How much money does she have now?

**Explore 2:**

 Allow student pairs time to solve the task. As students work, observe students to see how they are solving the task.

* How are students organizing and representing their thinking?
* How are students exchanging or trading to solve the problem?
* How are students decomposing their numbers?
* What vocabulary are students using as they solve the task?

As you monitor, select and sequence solutions to present during discussion, notice if students are using place ten blocks or if they are beginning to decompose without them? Remember, your goal is to compare strategies so look for samples where you can make comparisons.

* Some students may use base ten blocks to accurately decompose. For example, 35 is decomposed into 2 tens and 15 ones or 20 + 15. Do the blocks accurately represent the decomposition and the removal of 1 ten and 9 ones leaving 16.
* Some students may be making connections without the blocks. They may be decomposing and reordering to solve. For example, 35 in broken into 20 + 15 and 19 is broken into 10 + 9. Student then reorders to subtract: 20 -10= 10 and 15 – 9= 6. The final answer is found by adding 10 + 6 = 16.

**Discuss 2:**

Bring the class back together with preselected student strategies to share. Relate the exchange made in the problem to the decomposition of the number using the following questions:

* How was 35 decomposed when I exchanged a tens rod for 10 ones? (20 + 15) Make sure that students understand that when they decompose the total is still 35.
* How did decomposing (breaking apart) this number help solve the problem?
* How are these strategies similar? How are they different? ***The strategies are similar because both decomposed 52 into 40 + 12 and took seven from 12. They are different in the way students represented the decomposition.***

**Evaluation of Student Understanding**

**Informal Evaluation:**

Observe and monitor students as they solve the problem. How are they making sense of the problem? Are students using mathematical vocabulary appropriately as they explain how they regrouped? Do students understand that regrouping is breaking apart numbers?

**Formal Evaluation/Exit Ticket:**

Display the problems 52 – 27 and 24 – 13 on the board. Ask: Which problem requires exchanging to able to solve? Why do you think as you do?

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

**Intervention:**

Students struggling should have repeated practice with exchanging tens for ones with smaller numbers. Consider using Unifix cubes so that students physically take apart the ten and move them to the ones pile. Have students name the decomposed number. For example, 23 would become one ten and 13 ones.

**Extension:**

For students exchanging tens for ones easily and correctly solving, pose a problem such as 138 – 43. Can students transfer their learning to see that we need to exchange a hundred for 10 tens.

**Possible Misconceptions/Suggestions:**

|  |  |
| --- | --- |
| **Possible Misconceptions** | **Suggestions** |
| * Students may not take away the ten when it is traded for needed ones, resulting in them including the ten in the final solution.
* Students may confuse the value of the blocks as they are counting.
 | * Encourage students to physically put the ten back in the tens pile, away from the workspace.
* Review the value of each of the place ten blocks as they are counting. Recount as many time as necessary.
 |

**Possible Solutions:** Distributed through the lesson.