

Math Detectives: The Case of the Traveling Tens!

Materials Needed:

- Paper and pencil
- "Place Value Mat" (a piece of paper with three columns drawn and labeled: "Hundreds," "Tens," and "Ones")
- "Number Evidence" (at least 30 small, identical items for "ones" and 10 items for "tens"):
 - **Option 1 (Best):** Base-10 blocks (single cubes for ones, rods for tens).
 - **Option 2 (DIY):** LEGO bricks (single 1x1 bricks for ones, stacks of 10 bricks for tens).
 - **Option 3 (Snack Time!):** Small crackers/raisins for ones, and pretzel sticks for tens.
- A bowl or cup to hold the "Number Evidence"
- Problem Cards: Index cards with simple 2-digit addition and subtraction problems written on them. (e.g., $28+14$, $45+27$, $52-25$, $31-19$)

Learning Objectives:

By the end of this lesson, Pratyush will be able to:

- **Explain** the concept of "carrying over" in addition using physical objects.
- **Demonstrate** how to "borrow" from the tens place to solve subtraction problems.
- **Solve** 2-digit addition and subtraction problems that require carrying and borrowing with confidence.

Lesson Activities

Part 1: The Briefing - Welcome, Detective Pratyush! (5 minutes)

"Good morning, Detective Pratyush! We have a special case today called 'The Case of the Traveling Tens.' It involves some mysterious rules about numbers. To crack this case, we need to understand how numbers live together in their houses."

"Let's look at our Place Value Mat. Think of these columns as houses. There's the **Ones House**, the **Tens House**, and the **Hundreds House**. There's a very important rule in Number City: **Only 9 'ones' can live in the Ones House at a time.** If a 10th one tries to move in, they have to bundle up into a group of 10 and move next door to the Tens House! Let's investigate."

Part 2: The First Clue - Carrying Over (Addition) (15 minutes)

1. **Set up the Scene:** Let's investigate the problem $27 + 15$.
 - Ask Pratyush to represent the number 27 on the Place Value Mat using the "Number Evidence." He should place 2 tens and 7 ones in the correct houses (columns).
 - Next, ask him to add 15 to the mat. He'll add 1 ten and 5 ones.
2. **Investigate the Ones House:** "Detective, count the evidence in the Ones House. How many are there?" (He should count 12). "Oh no! That's more than 9! The rule is broken! What do we need to do?"
3. **The "Carry Over" Move:** Guide him to "bundle up" 10 of the ones and trade them for one "ten" piece. He then moves, or "**carries**," that new ten piece over to the Tens House.

4. **Solve the Case:** "Excellent work! Now, how many are left in the Ones House?" (2). "And how many are now in the Tens House altogether?" ($1+2+1 = 4$). "So, Detective Pratyush, what is $27 + 15$?" (42).
5. **Practice:** Use a few more addition problem cards (like $28+14$) and have him solve them using the mat and "Number Evidence," explaining the "carry over" step out loud each time.

Part 3: The Second Clue - Borrowing (Subtraction) (15 minutes)

"Great job, Detective! Now for the second part of our case. Sometimes, we don't have enough ones to take away, and we need to get some help from the house next door. This is called 'borrowing'."

1. **Set up the Scene:** Let's investigate the problem **42 - 17**.
 - Have Pratyush build the number 42 on the mat (4 tens, 2 ones).
2. **Identify the Problem:** "The problem says we need to take away 17. That means we need to take away 7 ones. Look at the Ones House. Do we have enough ones to take away 7?" (No, we only have 2).
3. **The "Borrowing" Move:** "We need more ones! Let's knock on the door of the Tens House. We can ask to '**borrow**' one of the tens."
 - Guide Pratyush to take one "ten" piece from the Tens column and trade it for 10 "one" pieces. He should move these 10 new ones into the Ones House.
4. **Re-evaluate the Scene:** "Quick, Detective, let's see what we have now. How many tens are left in the Tens House?" (3). "And how many ones are now in the Ones House?" ($10 + 2 = 12$). "Did the total number change? (No, 3 tens and 12 ones is still 42!). Now, can we take away 7 ones?" (Yes!).
5. **Solve the Case:** Have him physically remove 7 ones from the Ones House (leaving 5) and 1 ten from the Tens House (leaving 2). "What is our final answer, Detective?" (25).
6. **Practice:** Use the subtraction problem cards (like $52-25$) to practice the "borrowing" step.

Part 4: Case Closed - The Detective's Report (10 minutes)

To officially close the case, Detective Pratyush needs to file his report. On a clean sheet of paper, give him two final "mystery problems" to solve—one addition and one subtraction.

- **Challenge 1:** $56 + 29$
- **Challenge 2:** $63 - 38$

He can use the mat and evidence if he needs to, but encourage him to also write the problem down and show the little "1" he carried over or the markings for what he borrowed, just like a real detective taking notes!

Assessment & Reinforcement

- **Observation:** Watch as Pratyush works. Is he able to explain the "why" behind carrying and borrowing? Does he say things like, "I have too many ones, so I need to trade for a ten"? or "I don't have enough ones, so I'm borrowing from the tens"?
 - **The Detective's Report:** Check his final two problems for accuracy. If he makes a mistake, use the manipulatives to walk through the problem together and find where the clue was missed.
 - **Follow-up Game:** Keep the problem cards and Place Value Mat handy. You can play a quick game of "Solve It!" over the next few days for a few minutes at a time to keep the skills sharp.
-

Extension & Support

- **For Extra Support:** If Pratyush is struggling, focus only on carrying for one day, and borrowing for another. Use the story of the "Number Houses" and their rules heavily, as the narrative makes the abstract concept more concrete.
- **For an Extra Challenge:** Introduce 3-digit numbers! Show him how you can carry from the tens to the hundreds house, or borrow from the hundreds to help the tens. You can also challenge him to write a short story problem for you to solve called "The Case of the Missing Cookies," which requires carrying or borrowing.