Place Value Detectives: Cracking the Code of Numbers!

Your Detective Kit (Materials Needed):

- Printable "Detective Badge" (optional, for fun!)
- "Top Secret" envelope (to hold number clues or challenges)
- Numeral cards (0-9, at least two sets for making two-digit numbers)
- A Place Value Mat (a simple paper or laminated sheet divided into two columns labeled: "Tens" and "Ones")
- Manipulatives for counting tens and ones:
    - **Option 1 (Ideal):** Base-ten blocks (tens rods and ones cubes)
    - **Option 2 (DIY):** LEGO bricks (e.g., small 1x1 or 2x2 bricks for ones, longer 1xN or 2xN bricks that represent 10 small ones in length/volume for tens)
    - **Option 3 (DIY):** Craft sticks and beans (10 beans glued to a craft stick to represent one ten; single beans to represent ones)
    - **Option 4 (DIY):** Straws (single straws for ones; bundles of 10 straws secured with a rubber band for tens)
- Whiteboard or large sheet of paper
- Markers or crayons
- "Case File" (a few sheets of paper for activities or simple worksheets)

Your Mission, Should You Choose to Accept It (Lesson Activities):

Phase 1: Briefing - Becoming a Place Value Detective! (5-10 minutes)

Hello, Detective! Your mission today is to uncover the secrets hidden within numbers. Many numbers are made of smaller parts, just like clues in a mystery. We need to figure out how these parts, called 'tens' and 'ones', work together to tell us how much a number is worth. Are you ready to crack the code?

(Optional: Present the "Detective Badge" to make it official!)

Let's talk about our main clues: Numbers have different 'places' for their digits, and each place has a different value. Today, we're focusing on two very important places: the **Ones Place** (which tells us how many single, individual items we have) and the **Tens Place** (which tells us how many groups of ten items we have).

Phase 2: Examining the Evidence - Meet the Tens and Ones (10-15 minutes)

Every good detective knows their tools! Let's look at ours:

- Show the "ones" manipulatives (single cubes/LEGOs/beans/straws). "This is ONE. It represents a single unit. It lives in the Ones Place on our mat. We can count many of these: 1, 2, 3... all the way up to 9 in the Ones Place house."
- Show the "tens" manipulatives (tens rod/long LEGO/stick of 10 beans/bundle of 10 straws). "This is TEN. It's a special group made of 10 ones! When we have 10 individual ones, they like to bundle up to become ONE TEN. This TEN lives in the Tens Place house, next door to the Ones."
- Practice counting out 10 "ones" manipulatives and then trading them for 1 "ten" manipulative. Repeat this a few times. "It's like trading 10 pennies for one dime! Ten ones become one ten."

Use your Place Value Mat. Start placing "ones" manipulatives in the Ones column, counting as you go. When you reach 10 ones, exclaim, "Time to bundle!" and trade those 10 ones for one "ten" manipulative, placing it in the Tens column.

Phase 3: Gathering Clues - Building Numbers (15-20 minutes)

Now, let's use our Place Value Mat and manipulatives to build some secret numbers!

1. **Clue from HQ (you, the teacher):** "Detective, the first secret number has 1 ten and 3 ones."
2. Guide the student to place one "ten" manipulative in the Tens column and three "ones" manipulatives in the Ones column on their mat.
3. "How much is that altogether? Let's count the tens first (that's 10), then add the ones (11, 12, 13). So, 1 ten and 3 ones make the number 13!" Write "13" on the whiteboard, pointing out that the '1' is in the tens place and the '3' is in the ones place.
4. Repeat with other numbers, varying the tens and ones:
    - Example: 2 tens and 5 ones (Result: 25)
    - Example: 3 tens and 0 ones (Result: 30)
    - Example: 0 tens and 7 ones (Result: 7)
    - Example: 4 tens and 9 ones (Result: 49)
5. **Reverse Detective Work:** Write a two-digit number like "36" on the whiteboard. Say, "Detective, the number is 36. How many tens and how many ones are hiding in this number?" Guide them to identify that the '3' means 3 tens and the '6' means 6 ones. Then, have them build "36" on their place value mat using the manipulatives.

Phase 4: The "Top Secret" Case File Challenge (10-15 minutes)

Detective, you're showing excellent skills! Here are some special cases from the "Top Secret" envelope for you to solve. (Use numeral cards for the student to pick, or have pre-written challenges on slips of paper in the envelope).

On your "Case File" paper (worksheet or blank paper):

1. **Challenge 1: Identify the Suspects.**

    Write down a few two-digit numbers (e.g., 23, 45, 18, 50, 09). Ask the student to draw a circle around the digit in the tens place and a square around the digit in the ones place for each number.

2. **Challenge 2: Sketch the Evidence.**

    Say a number aloud (e.g., "Thirty-two"). Ask the student to draw a representation of that number using simple shapes for tens and ones (e.g., long rectangles for tens, small squares for ones).

    Alternatively, have the student pick a numeral card (e.g., they pick cards showing '5' and '7'). Ask them to form a number (e.g., 57 or 75) and then build it with manipulatives on their mat, and/or draw it.

3. **Challenge 3: What's the Number?**

    On the paper, draw some tens and ones (e.g., 4 long rectangles and 6 small squares). Ask the student to look at your drawing and write down the number it represents (46).

Phase 5: Mission Debrief - Cracking the Code! (5 minutes)

Fantastic work, Detective! You've successfully investigated and understood the code of tens and

ones today!

- Ask: "What does the digit in the tens place tell us about a number?" (It tells us how many groups of ten are in the number.)
- Ask: "What does the digit in the ones place tell us?" (It tells us how many extra single ones are in the number.)
- Ask: "Why is it important for a detective like you to know about tens and ones?" (It helps us understand bigger numbers, count things more easily, and get ready for more complex math missions like adding and subtracting larger numbers!)

Mission accomplished! You are now an official Place Value Detective, an expert in tens and ones!

Extension Activities (If time permits or for future fun):

- **Number Line-Up:** Give the student several numeral cards. Have them build each number with manipulatives and then arrange the numbers in order from smallest to largest.
- **Place Value War:** Using two sets of numeral cards (0-9), each player draws two cards and forms the largest possible two-digit number. They build their number with manipulatives. The player with the larger number wins that round (takes the cards).
- **Greater Than/Less Than Hunt:** Say a number (e.g., "42"). Ask the student to build it, then find/build a number that is GREATER than 42, and one that is LESS than 42. Discuss how they know (comparing tens first, then ones).