

# Number Detectives: The Secret Life of Math Families!

## Materials Needed

- Small Manipulatives (10-20 items total): LEGO bricks, counters, buttons, or small toys.
- Paper/Whiteboard and markers/pencils.
- "Fact Family House" template (pre-drawn triangle or house shape with three sections for the numbers).
- Index cards or small pieces of paper (optional, for the "You Do" activity).

## Learning Objectives (The Detective Mission)

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

1. Find the three special numbers that belong together in a "Fact Family" (Part, Part, Whole).
2. Write two secret addition stories and two secret subtraction stories using those three numbers.
3. Explain how adding and subtracting are opposites that help us check our work.

## Phase 1: Introduction (Tell Them What You'll Teach)

### The Secret Agent Hook (5 minutes)

**Educator Talking Points:** "Shhh! Did you know that in math, some numbers are super close friends? They live together in a special 'Fact Family.' These three numbers share four secret math stories that always use addition and subtraction. Today, we are Math Detectives, and our mission is to uncover the four secrets of the Fact Family House!"

### Setting the Stage

**Success Criteria:** We will know we are successful detectives if we can correctly match the three family numbers and write all four math secrets!

## Phase 2: Body (Teach It)

### I Do: Modeling the Number Bond (10 minutes)

#### Concept Introduction: Part, Part, Whole (The Family Members)

#### Step 1: Introducing the Whole.

- (Educator places 8 blocks/counters down.) "This pile of 8 blocks is the 'Whole.' It's the biggest number in our family, and it sits at the top of our house!" (Draw a large triangle or the roof of a house and write the number 8.)

#### Step 2: Splitting the Parts.

- (Educator physically separates the 8 blocks into a group of 5 and a group of 3.) "When we look

inside the house, we find two 'Parts.' We have 5 blocks (Part 1) and 3 blocks (Part 2). These parts stick together to make the Whole." (Write 5 and 3 at the bottom corners of the triangle/house.)

### Step 3: Writing the Addition Secrets.

- "The first two secrets are addition. We put the Parts together to get the Whole.
  - Secret #1:  $5 + 3 = 8$  (Part + Part = Whole)
  - Secret #2:  $3 + 5 = 8$  (We just flip the parts, but the Whole stays the same!)

### Step 4: Writing the Subtraction Secrets.

- "The next two secrets use subtraction. Subtraction always starts with the biggest number, the Whole!
  - Secret #3:  $8 - 5 = 3$  (Whole - Part = Other Part)
  - Secret #4:  $8 - 3 = 5$  (Whole - Other Part = First Part)
- **Formative Check:** "Are addition and subtraction related? Yes! Addition puts the family together, and subtraction takes the family apart!"

## We Do: Guided Practice (Fact Family House Builder) (15 minutes)

### Activity: Building the Family of 7

#### Instructions:

1. **Choose the Whole:** Everyone takes 7 blocks/counters. Write '7' at the top of your own Fact Family House template.
2. **Find the Parts:** (Educator guides the splitting.) "Let's split 7 into two groups. How about 4 and 3? (If using the classroom, allow groups to choose different splits, e.g., 5 and 2.) Write 4 and 3 at the bottom."
3. **Write the Addition Stories:** (Learners write equations while the educator checks.)
  - "What happens when we put the parts together?" ( $4 + 3 = 7$  and  $3 + 4 = 7$ )
4. **Write the Subtraction Stories:** (Emphasize starting with the Whole.)
  - "We start with 7 and take away a part." ( $7 - 4 = 3$  and  $7 - 3 = 4$ )

**Transition:** "Great work! Now that we know how to find the parts and write the stories, it's time for you to become the lead detective and create your own secret families."

## You Do: Independent Application (Create a Fact Family Card) (15 minutes)

### Activity: Fact Family Inventor

#### Instructions:

1. The learner chooses a Whole number between 6 and 10 (e.g., 9).
2. The learner uses their manipulatives to show how that Whole number can be split into two Parts (e.g., 9 splits into 6 and 3).
3. On an index card or paper, the learner draws their Fact Family House, writing the Whole (9) and the Parts (6, 3).
4. The learner writes all four related facts ( $6+3=9$ ,  $3+6=9$ ,  $9-6=3$ ,  $9-3=6$ ).
5. **Peer/Educator Review:** The learner "teaches" their fact family card to the educator (or a partner if in a classroom setting), explaining why all four facts are related.

**Success Criteria Review:** Did you use three numbers? Did you write two addition stories? Did you write two subtraction stories? If yes, MISSION ACCOMPLISHED!

## Phase 3: Conclusion (Tell Them What You Taught)

### Recap and Reflection (5 minutes)

**Educator Talking Points:** "Detectives, let's look at our mission summary. What three numbers made up your family today? (Learner answers: Part, Part, Whole). How many addition stories did you write? (Two). How many subtraction stories? (Two). Remember, addition and subtraction are just two sides of the same coin! If you know  $3 + 4 = 7$ , you instantly know  $7 - 4 = 3$ !"

### Summative Assessment: The Quick Check

Present a new Fact Family (e.g., 2, 8, 10). Ask the learner to verbally state one addition fact and one subtraction fact from this family. This assesses objective 2 and 3 quickly.

## Adaptability and Differentiation

### Scaffolding (For learners needing extra support)

- **Concrete Focus:** Require the use of manipulatives (counters, blocks) for every single problem. They must touch and move the objects to prove the bond before writing the equation.
- **Limit the Whole:** Start with fact families that only use the whole number 5 or 6 until mastery is achieved.
- **Visual Aids:** Use color-coding for the Parts and the Whole in the equations (e.g., always write the Whole number in red).

### Extension (For advanced learners)

- **Larger Numbers:** Challenge the learner to create fact families using Whole numbers up to 20 (e.g., 12, 5, 7).
- **Missing Member:** Introduce a missing addend challenge: Provide two numbers and ask them to find the third family member (e.g., "In this family, we have 4 and 9. Who is the missing Whole? What are the four secrets?").
- **Creative Storytelling:** Ask the learner to write a short story problem (like a word problem) for one of the addition facts and one of the subtraction facts in their fact family.

### Adaptation for Contexts

- **Homeschool/One-on-One:** The "You Do" activity becomes a direct demonstration to the parent/tutor, allowing for immediate feedback and deeper conversation about why the numbers relate.
- **Classroom:** The "You Do" activity can be done in pairs (Think-Pair-Share) where students check each other's four facts. The Fact Family House cards can be hung up as an anchor chart.
- **Training:** This model can be adapted to teach concepts like data relationships or process flow, where the Whole is the final outcome, and the Parts are the inputs, emphasizing how changing one input affects the output.