

3rd Grade Math: Using Front-End Estimation

Lesson Objective:

By the end of this lesson, students will:

- Understand the concept of front-end estimation.
- Use front-end estimation to estimate sums and differences.
- Apply front-end estimation to solve real-world problems.

1. Introduction to Estimation

What is Estimation?

- Estimation is a way of finding an approximate answer that is close to the exact number but simpler to calculate.
- We use estimation in everyday life, like when we're shopping or planning time.

What is Front-End Estimation?

- Front-end estimation is a specific type of estimation where we focus on the **front digits** (the leftmost digits) of the numbers to make quick estimates.

2. How Front-End Estimation Works

Steps for Front-End Estimation:

1. **Look at the Front Digits:**
 - Focus on the largest place value (the digit on the left) of each number.
 - Example: For 478, the front digit is **4** (which represents 400).
2. **Adjust the Remaining Digits:**
 - After focusing on the front digits, you round the rest of the number or drop them to make an estimate.
 - Example: 478 becomes **400** using front-end estimation.
3. **Add or Subtract Using the Estimated Values:**
 - Use the front-end values to make an estimate of the sum or difference.
 - Example: If you are adding 478 and 532, you use **400 + 500** to estimate the sum as **900**.

3. Front-End Estimation with Addition

Example 1:

- Problem: $246 + 392$
 - Front digits: 200 and 300
 - Front-end estimate: $200 + 300 = 500$

Example 2:

- Problem: $523 + 678$
 - Front digits: 500 and 600
 - Front-end estimate: $500 + 600 = \mathbf{1,100}$

4. Front-End Estimation with Subtraction

Example 1:

- Problem: $865 - 427$
 - Front digits: 800 and 400
 - Front-end estimate: $800 - 400 = \mathbf{400}$

Example 2:

- Problem: $735 - 128$
 - Front digits: 700 and 100
 - Front-end estimate: $700 - 100 = \mathbf{600}$

5. Real-World Application of Front-End Estimation

Scenario 1: Grocery Shopping

- You have \$50 and you want to estimate the total cost of some items:
 - A box of cereal costs \$4.75.
 - A gallon of milk costs \$3.29.
 - A loaf of bread costs \$2.49.

Using front-end estimation:

- Cereal ≈ 4
- Milk ≈ 3
- Bread ≈ 2

$$\text{Total} \approx 4 + 3 + 2 = \mathbf{9}$$

Scenario 2: Traveling

- You are planning a road trip and want to estimate the total distance you'll drive:
 - From home to the first stop: 356 miles.
 - From the first stop to the second stop: 483 miles.

Using front-end estimation:

- $356 \approx 300$

○ $483 \approx 400$

Total $\approx 300 + 400 = \mathbf{700 \text{ miles}}$

6. Practice Problems

Activity 1: Front-End Estimation for Addition

Estimate the sum using front-end estimation:

1. $462 + 389$
2. $527 + 642$
3. $219 + 374$
4. $843 + 256$
5. $631 + 489$

Activity 2: Front-End Estimation for Subtraction

Estimate the difference using front-end estimation:

1. $685 - 439$
2. $927 - 588$
3. $764 - 321$
4. $543 - 267$
5. $899 - 472$

Activity 3: Real-World Estimation

Estimate the total cost of these items using front-end estimation:

1. A bike costs \$129, a helmet costs \$42, and a backpack costs \$65.
2. A pair of shoes costs \$58, a jacket costs \$89, and a hat costs \$15.

7. Wrap-Up

Key Takeaways:

- Front-end estimation focuses on the most important digits (the leftmost digits).
- It's a quick way to estimate sums and differences without needing exact answers.
- Front-end estimation is helpful in real-life situations like shopping, traveling, and budgeting.

Exit Question: Can you estimate the sum of 562 and 748 using front-end estimation?