ESTIMATION OF NUMBERS

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Subject

Mathematics

Prepared By

[Instructor Name]

Grade Level

3

Overview

This lesson plan covers teaching content for;

1. Making estimation of numbers to the nearest tens.
2. Making estimations of the sum of numbers to the nearest hundreds
3. Estimating the product of two numbers
4. Word problems on estimation of numbers

Objectives

Students should be able to;

1. Make an estimation of a sum or product of numbers.
2. How to estimate a sum to the nearest tenth
3. How to estimate a sum to the hundred
4. Estimate the products of two numbers.

Guided Practice

Day 2/ Lesson 2: 20 Mins

How to estimate a sum to the nearest tenth

1. We round the summands to the nearest tenth.
   Remember: If the number ends in 0, 1, 2, 3 or 4, we round down

Activity Starter/Instruction

1. On the board, draw a number line divided into ten. At either end draw a box.
2. Ask pupils to copy this number line onto a sheet of paper in ink.
3. On the board write a 2-digit whole number that is not a multiple of ten (for example 68).
4. Ask pupils between which two multiples of ten this number lies (60 and 70).
5. Write these multiples of ten in the boxes on the number line, the smaller on the left and the larger on the right.
6. Ask a pupil to draw a labelled arrow on the number line to show where the number 68 belongs.
7. Write another 2-digit number on the board and ask your pupils to show it in the same way on the number line they have drawn.
8. Repeat several times, and then extend to 3-digit whole numbers

Teacher Guide

Day 1/ Lesson 1: 10 Mins

1. Ask the students, "Do you know what estimating a sum can help us with?".
2. When we have to do an operation mentally, often we do not need the exact result but an estimate of the outcome.
3. Other times, after we have done an operation on paper and want to verify that the amount we got is reasonable, an estimate of the sum also helps us. It is quite useful, right?
4. Tell the students that today, we will show you some very simple steps to learn how to estimate a sum

Materials Required

- White Board
- Blank sheets
- Pencils
- Ink

Additional Resources

- https://www.smartickmethod.com/blog/math/operat thinking/addition-and-subtraction/estimate-a-sum/
- https://za.pearson.com/content/dam/region-growth/ africa/TeacherResourceMaterial/9781447978411_ngr
- https://www.homeschoolmath.net/teaching/md/estir

Additional Notes

2. If the number ends in 5, 6, 7, 8 or 9, we round up estimate
3. We add the rounded numbers
4. We then look at the total amount of rounding. three things can happen:
5. If we've rounded one amount up and one down, the sum we have obtained is a correct estimation
6. If both summands have been rounded up and the amount of rounding is greater than 5, we subtract 10 from the estimate
7. If both summands have been rounded down and the amount of rounding is greater than 5, we add 10 to the estimate.

Example:
Estimate 32 + 66
Round the summands $32 \cong 30$ $66 \cong 70$.
Add the rounded numbers
$30 + 70 = 100$
Since we rounded a number down and another up, our estimate is correct.

1. To estimate a sum to the hundred, we will take the same steps with some changes:
2. We round the summands to the nearest hundred.
3. We add the rounded numbers, then we look at the total amount of rounding.
4. If we've rounded one value up and one down, the sum we have obtained is a correct estimation
5. If both summands have been rounded up and the amount of rounding is greater than 50, we subtract 100 from the estimate
6. If both summands have been rounded down and the amount of rounding is greater than 50, we must add 100 to the estimate.
7. For example, Estimate 156 + 243
8. Round the summands to the nearest hundreds

$156 \cong 200$ $243 \cong 200$

9. Add the rounded numbers: $200 + 200 = 400$

Since we rounded a number up and the another down, our estimate is correct.

10. If we were to estimate $77 + 263$, we round up both number

$\therefore 77 \cong 100$ and $263 \cong 300$.

Adding both estimates, we have: $100 + 300 = 400$.

11. Since we rounded up both numbers, we have to subtract 100 from our estimate. This gives

$400 - 100 = 300$.

Therefore, our estimate is 300.

1. To estimate, students round two and three-digit numbers before multiplying, but this rounding can be done in several different ways.
2. To estimate the result of multiplication (product), round the numbers to some close numbers that you can easily multiply mentally.
3. One method of estimation is to round all factors to the biggest digit (place value) they have.
4. (This is somewhat of a crude method but serves as a starting point in learning estimation.)
5. For example, estimate 365×24. Round 365 to the nearest hundred, and 24 to the nearest ten. So $365 \approx 400$, and $24 \approx 20$. Then $365 \times 24 \approx 400 \times 20 = 8000$. This way the multiplication is easy to do since it is only a matter of a single digit (4) times a single digit (2), and tagging zeros to the end (000).

Estimation	In reality:
133×27	133
$\approx 100 \times 30$	x 27 .
$= 3000$	931
	2660
	3591

6. One purpose of estimation is to catch gross errors in calculations. For example, if you estimate the result to be 5000, and you calculate it to be 354, you know something is wrong since you're way off.

Assessment Activity

Assessment Activity

1. Ask the students to solve these questions on Estimation of sum of numbers to the nearest tens
   - 76 + 84
   - 281 + 34
   - 124 + 421
2. Ask the students to solve these questions on Estimation of sum of numbers to the nearest hundreds
   - 324 + 422
   - 184 + 128
3. Go round the class to ensure the students answer the questions correctly.
4. Assist them when needed and review their answers.

Assessment Activity

Estimate the products by rounding the factors to the biggest place value.

1. 770×33

   $\approx$ ____ $\times$ ___ = ____

2. 88×99

   $\approx$ ____ $\times$ ___ = ____

3. 486×21

   $\approx$ ____ $\times$ ___ = ____

Summary

Review and Closing

1. Have a class discussion about rounding.
2. Why would we sometimes want to round numbers off?
3. Ask your class to come up with some practical ideas.
4. Here are some suggestions: Sometimes we want to know rough numbers only, and not specifics.
5. When we shop for a few items, and want to keep a running total in our heads, it is much easier to round each price off to the nearest 10, for example, and then add the rounded off figure to the running total.

Review and Closing

Challenge your class by asking them questions like:

1. "When buying material or paint, we round our estimate up, not down. Why?" (It is better to have some material or paint left over, rather than not having enough.)
2. "When we have a fixed amount to spend, and want to make sure that we have enough money to pay for the items we choose, would we round the individual prices up or down? Why?" (We would rather have money left over than not have enough money to pay for our purchases.)