

# OPEN SENTENCES

## Subject

Mathematics

## Overview

This lesson plan covers teaching content for;

1. Solving open sentences by performing arithmetic operations.

## Prepared By

[Instructor Name]

## Grade Level

5

## Objectives

Students should be able to;

1. Find the missing number in open sentences.
2. Use letters to represent boxes and find the missing numbers that the letters represents in open sentences.
3. Use letters to represent the missing numbers in quantitative aptitude problems and find their values.

## Activity Starter/Instruction

1. Just like an English sentence, in mathematics a sentence says something:

- English:

The sun is shining.  
Hawaii is in the Pacific Ocean.

- Mathematics:

$3 + 3 = 6$   
10 is an even number

2. Open: A sentence is open when it is **not known** if it is true or false.  
Closed: A closed sentence is **always true** (or **always false**).

3. 8 is an even number – is closed (it is always true)  
9 is an even number – is closed (it is always false)  
n is an even number – is open (could be true or false, depending on the value of n)

4. In the last example:

If n was 4 the sentence would be true,  
If n was 5 the sentence will be false, etc...

5. But we didn't say what value n has, so "n is an even number" may be true or false. So it is open.

## Teacher Guide

### Day 1/ Lesson 1: 20mins

1. Write  $8 + 4 = 5 + 7$
2.  $5 = 4 + 1$
3.  $6 \times 0 = 6$
4. Let pupil read it aloud, tell if it is true or false, and explain why.
5. Tell pupils to write examples of arithmetic equations that were true and some that were false.
6. Draw two columns on the board, one for true mathematical sentences, and the second for false mathematical sentences.
7. Call on a pupil to read one of their mathematical sentences, and not say if it is true or false. Other students will decide if it is true or false.
8. If it is true, write it in the true column, if it is false, write in the false column. Continue with other pupils.

## Materials Required

- White board
- Marker

## Additional Resources

- [https://mathsolutions.com/ms\\_classroom\\_lessons/tr](https://mathsolutions.com/ms_classroom_lessons/tr)
- <http://www.algebra-class.com/open-sentences.html>
- <http://www.mathinterventions.org/files/uploads/Solv>
- <https://www.vocabulary.com/articles/lessons/using-k>
- <https://www.math-only-math.com/equations.html>
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## Additional Notes

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6. An open sentence can be either true or false depending on what values are used.

7. The value we don't know is called **variable** (also called an **unknown**).

8. In this example of an open sentence,  $x$  is a variable:  $x + 3 = 8$ . Also,  $w + q = 2$ ,  $w$  and  $q$  are also variables.

### Guided Practice

#### Day 2/ Lesson 2: 15 Mins

- Find the solution of the equation if the replacement set is (0, 11, 12, 13, 14, 15)  
 $3x - 7 = 29$
  - We may decide that the particular value is the solution, if it satisfies the given equation.
  - $X = 10$   
 $3(10) - 7 = 29$   
 $30 - 7 = 29$   
 $23 \neq 29$  (False)  
10 is not the solution of the given equation.
  - $X = 11$   
 $3(11) - 7 = 29$   
 $33 - 7 = 29$   
 $26 \neq 29$  (False)
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### Guided Practice

#### Day 3/ Lesson 3: 20mins

- When Ted got home from his waiter job, he multiplied his hourly wage by the 6 hours he worked that day. Then he added the \$66 he made in tips and found he had earned \$81.90. How much does Ted make per hour?
  - Starting with some number, if Ted multiply it by 6 and then add 66, He will get 81.9. What number did Ted start with?
  - Solve for  $x$ :
  - $x * 6 + 66 = 81.90$
  - Most teachers and predict that students will have more difficulty correctly solving the story or word problem than the equation.
  - Teacher should explain this expectation by saying that a student needs to read the verbal problems (story and word) and then translate them into the equation.
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11 is not the solution of the given equation.		
5. $X = 12$ $3(12) - 7 = 29$ $36 - 7 = 29$ $29 = 29$ (True)		
6. 12 is the solution to the given equation.		

### Summary

Ask for volunteers to differentiate between a closed sentence and an open sentence.

### Assessment Activity

Pupils have to understand how to interpret stories to make an equation

### Assessment Activity

Assess if students can:

1. Solve open sentences correctly.