LESSON PLAN

Subject: Maths

Topic: Verbal problems in Maths

Age of students: 16-18

Language level: B1

Time: 45-60 minutes

Contents aims:
After completing the lesson, the student will be able to:
Describe what algebra is.
Translate verbal problems in equations.
Create his or hers verbal problem and translate it into matematical statement.
Solve simultaneous equations.

Language aims:
After completing the lesson, the student will be able to:
Use new vocabulary within the topics.
Interpret and communicate mathematics in a variety of forms.
Translate everyday problems into mathematical statements.
Explain translation of verbal problems in equations.

Pre-requisites:
Pupils have to know :
Solving equations
Simultaneous equations
Ratio

Materials: Handouts

Procedure steps:

Make copies of the handouts for each learner in the class. Alternatively, you can write the problems on the board so pupils can copy them, or project them on a wall.

Procedure:

1. WARM UP: Give pupils a problem:

There are 2 litres of juice altogether in two bottles. One bottle has 6, 6 dl more than the other. How much juice does each bottle contain?

Talk to students about the task. Can they solve it alone? Tell them to try and solve it in pairs. Observe and give pupils 3 minutes to try to solve the problem.

2. Introduction to verbal mathematics: (10 min)

SAY SOMETHING LIKE: Mathematics is really about solving problems, not just about moving letters and numbers around.

Most real-world problems are stated using words and we need to translate them into mathematical statements.

You need to:

Read the problem carefully

Sketch the situation (a picture is worth a thousand words)

Estimate the solution where possible

Assign letters to the unknown quantities (use x-to mark what you do not know)

Form an equation (or equations)

Solve the equation

Check your solution against your estimate and against the original statements

3. Teacher introduces term ALGEBRA and defines it:

„Simply put, Algebra is about finding the unknown or it is about putting real life problems into equations and then solving them. In the simplest of form, I could say:

I had a handfull of marbles in my pocket when I went out but 3 fell out through a hole in my pocket and I was left with 2. How many did I have at the beginning?

In algebra, this problem would then be converted to:x - 3 = 2" The x replaces the unknown that we are trying to find out.

4. Distribute the handout. Pupils do exercise 1. Brainstorm for other helpful vocabulary pupils might know. Try to find out of they know english words in maths, such as, subtract, multiply, add...

Attachment *:
Classroom handout 1
Assessment grid
Class observations, questions
Teachers will also be collecting information through informal assessment activities. By observing students as they work in groups, asking questions, setting specific activities, and marking students' work

Teachers notes to accompany the handout

Solution 1

Every word problem has an unknown number. In this problem, it is the price of the blouse. Always let x represent the unknown number. That is, let x answer the question.

Let x, then, be how much she spent for the blouse. The problem states that "This" -- that is, $42 -- was $14 less than two times x.

Here is the equation:

$2x - 14 = 42.$

$2x = 42 + 14$ (Lesson 9)

$= 56.$

$x = \frac{56}{2}$

$= 28.$

The blouse cost $28.

Solution 2

Again, let x represent the unknown number that you are asked to find: Let x be the number of girls.

(Although b is not known, it is not what you are asked to find.)

The problem states that "This" -- b -- is three more than four times x:

$4x + 3 = b.$

Therefore,

$4x = b - 3$

$x = \frac{b-3}{4}$

Solution 3

In this problem, we are asked to find two numbers. Therefore, we must let x be one of them. Let x, then, be the first number.

We are told that the other number is 12 more, x + 12.

The problem states that their sum is 84:

word problem = 84

The line over x + 12 is a grouping symbol called a vinculum. It saves us writing parentheses.

We have:

$2x = 84 - 12$

$= 72.$

$x = \frac{72}{2}$

$= 36.$

This is the first number. Therefore the other number is

x + 12 = 36 + 12 = 48.

The sum of 36 + 48 is 84.

Solution 4

Two consecutive numbers are like 8 and 9, or 51 and 52.

Let x, then, be the first number. Then the number after it is x + 1.

The problem states that their sum is 37:

x +(x+1) = 37

$2x = 37 - 1$

$= 36.$

$x = \frac{36}{2}$

$= 18.$

The two numbers are 18 and 19.

Solution5

Let x be the smaller number.

Then the larger number is 10 more: x + 10.

The problem states:

2x + 3(x + 10)　　=　　　55.

　　　That implies

2x + 3x + 30　　=　　　55.　Lesson 14.

5x　　=　　　55 − 30 = 25.

x　　=　　　5.

That's the smaller number.　The larger number is 10 more:　15.

Solution 6

Again, we are asked to find more than one number.　We must begin by letting x be how much the first person gets.

Then the second gets twice as much, 2x.

And the third gets $5 less than that, 2x − 5.

Their sum is $80:

word problem

5x　　=　　　80 + 5

x　　=　　　$\frac{85}{5}$

　　=　　　17.

This is how much the first person gets.　Therefore the second gets

2x　　=　　　34.

　　And the third gets

2x − 5　=　　　29.

The sum of 17, 34, and 29 is in fact 80.

Solution 7

First, an even number is a multiple of 2:　2, 4, 6, 8, and so on. It is conventional in algebra to represent an even number as 2n, where, by calling the variable 'n,' it is understood that n will take whole number values:　n = 1, 2, 3, 4, and so on.

An odd number is 1 more (or 1 less) than an even number. And so we represent an odd number as 2n + 1.

Let 2n + 1, then, be the first odd number. Then the next one will be 2 more -- it will be 2n + 3.　The problem states that their sum is 52:

2n + 1 + 2n + 3 =　　　52.

We will now solve that equation for n, and then replace the solution in 2n + 1 to find the first odd number.　We have:

4n + 4　=　　　52

4n　=　　　48

n　=　　　12.

Therefore the first odd number is　2· 12 + 1 = 25.　And so the next one is 27.　Their sum is 52.

Solution 8

Here is the equation.

x + (x+1) +(x+1+3)=15.50

3x+5=15.50, x=3.50

Here is the solution:

$3.50,　$4.50,　$7.50.

LEVEL 2:

1. Let the 3 integers be (n-2), n and (n+2)

Sum of 1st and 3rd = n-2+n+2=2n

9 times second = 9n

So the equation is 5 (2n)= 9n+16

or

10n=9n+16

n=16

2.　You need to define the amount of sales (x);

300+20%x=200+25%x; 100=5%x

X=2000, So now you need to plug in the number into Tom's or Alison's compensation which is 700 for either of them

HANDOUT 1

MATCH THE WORDS AND THEIR DEFINITIONS:

a) the sum

1. following each other continuously

b) consecutive

2. (of whole numbers such as 3 and 5) having one left over as a remainder when divided by two.

c) to divide (v)

3. find how many times (a number) contains another. "36 divided by 2 equals 18"

d) odd number

4. a number that is divisible by two without a remainder

e) even number

5. the total amount resulting from the addition of two or more numbers, amounts, or items.

TRANSLATE INTO MATHEMATICAL PROBLEMS AND SOLVE:

1. Jane spent $42 for shoes. This was $14 less than twice what she spent for a blouse. How much was the blouse?

2. There are 15 boys in the class. This is three more than four times the number of girls. How many girls are in the class?

3. The sum of two numbers is 84, and one of them is 12 more than the other. What are the two numbers?

4. The sum of two consecutive numbers is 37. What are they?

5. One number is 10 more than another. The sum of twice the smaller plus three times the larger, is 55. What are the two numbers?

6. Divide $80 among three people so that the second will have twice as much as the first, and the third will have $5 less than the second.

7. Odd numbers. The sum of two consecutive odd numbers is 52. What are the two odd numbers?

8. Divide $15.20 among three people so that the second will have one dollar more than the first, and the third will have $3 more than the second.

LEVEL 2:

1. Find three consecutive even integers such that 5 times the sum of the first and the third is 16 greater than 9 times the second

2. Tom and Alison are both salespeople. Tom's weekly compensation consists of $300 plus 20 percent of his sales. Alison's weekly compensation consists of $200 plus 25 percent of her sales. If they both had the same amount of sales and the same compensation for a particular week, what was that compensation, in dollars?

MINI Project
Try to create your own verbal problem!