Topic Chosen: (Introducing Algebra)
Type 1 Problem

Group Chosen: 1st years

Drafter: Fintan Walsh & Josephine Moore

Delivery of the Lesson by: Fintan Walsh

Title of the Problem: Mary's Age

Brief Description of the Lesson:

The Lesson will be on the topic of Algebra. Students will be given a word problem. They will be required to develop a linear equation and solve this equation to determine mary's age.

Aims of the Lesson:
- Introduce students to the application of algebra to real life problems.
- Formulate an equation from a given work problem
- Use the rules of algebra to solve the problem and find mary's age.

What we want to achieve:

- The use of equations to represent real world problems.

Teaching Sequence

1. Students will given a problem via google classroom.
2. Students will be given ten minutes to individually study the problem.
3. During this time they write an equation for the problem they are given. They solve the equation and find Mary's Age
4. Ask students to explain what variable they used to represent the missing number ask them to explain what the missing number represents. (Remember that they may have a valid reason even if it is different to yours.)
5. Ask students to share the equations they have come up with
6. Ask students did they find mary's age
7. Share solutions.

Resources:

- Tablets
- Google classroom
- Question Problem

Flow of the Unit:

Handbooks would be useful here

Lesson		# of lesson periods
1	● Introduce the students to the concept of a variable (a letter of a symbol used to represent a number)	1 x 40 min.
2	● Introduce students to the rules of algebra	2 x 30 min.
3	● Introduce students to the concept of solving equations	2 x 30 min.
4	● Students will formulate equations from word problems and solve their equations	3 x 30 min. Research study

Flow of the Lesson

Teaching Activity	Points of Consideration
1. Introduction Ask students how an unknown number in an equation is represented	Students may relate unknown numbers as letters or symbols
2. Posing the Task Students will be given a word problem and asked to write an equation to solve the problem	Students may have difficulties picking out important pieces of information from the word problem. That will enable them to write an equation and solve it.
3. Anticipated Student Responses Students will have differing opinions on what the equation to solve the problem will be. It is anticipated students will add 3 twice when trying to find Mary's age	
4. Comparing and Discussing Pick 4 students that have different equations and ask each student to explain the thinking behind their equation , these	

|	
will be shared with the class	
5. Summing up Students will be asked to recap the main the points on a post it	

Evaluation

The lesson will involve two teachers. One teacher will teach the lesson, while the other teacher will carry out observations while the students work on the problem. The teacher carrying out the observation will question students on the reasoning behind their approach and work. Students will be given 3-4 minutes to consider the problem and attempt the problem before any observations are made.

Observation will focus on how students extract information that have been given in the problem. Students will be asked to explain how they arrived at their answers and how they formulated their equations.

Board Plan

The board will be split into four quadrants with four samples of student work to be displayed to the class. Each sample of work will be different to the others. Students will be randomly selected to write their work on the board. Students will then be asked to explain and discuss their work with the class.
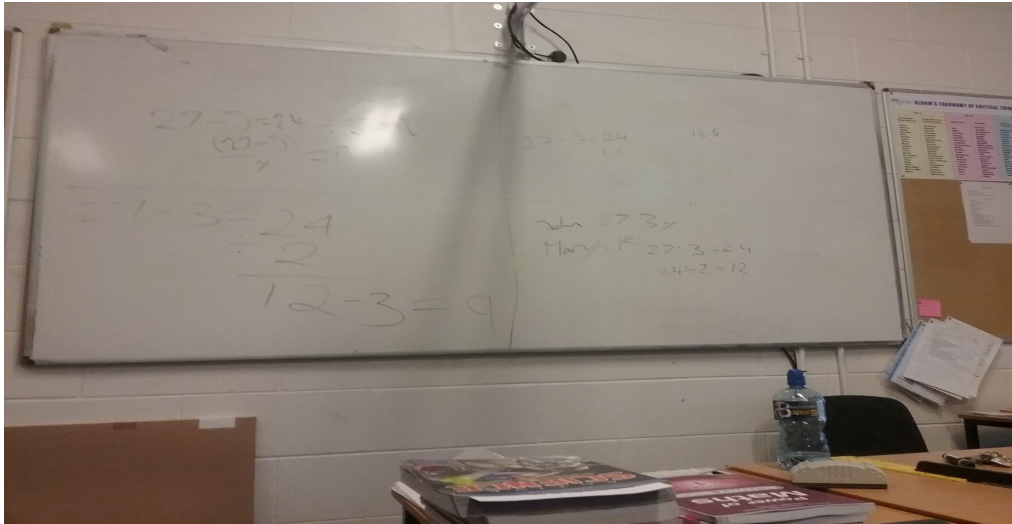
Post-lesson reflection

Post lesson it is evident that students still have misconceptions about linking real world problems and algebra. Students knew how to solve the problem but did not know how to represent the problem in terms of an algebraic equation. This might suggest that more time should have possibly been spent on getting students to formulate equations for real life problems and they solve them.

Observations of the student's work shows students were able to find Mary's age. However students did not appear to write an equation to represent the problem given. Students found Mary's age but did not solve an equation with an unknown variable to do so.

What does the evidence suggest about student thinking such as their misconceptions, difficulties, confusion, insights, surprising ideas, etc.?

The misconception arose with representing Mary's age in terms of an unknown variable or even any variable . A sample of student work below demonstrates a misconception of not being able to relate problem given to an equation . The student
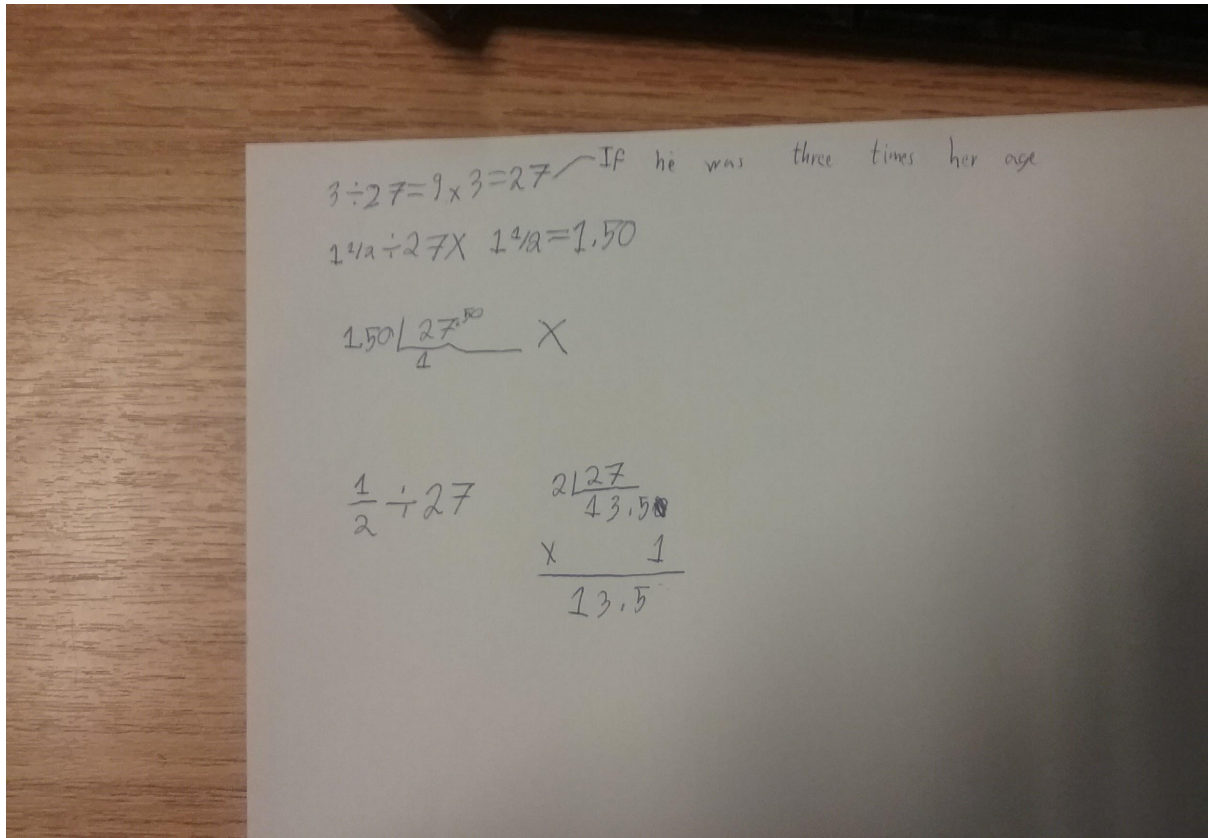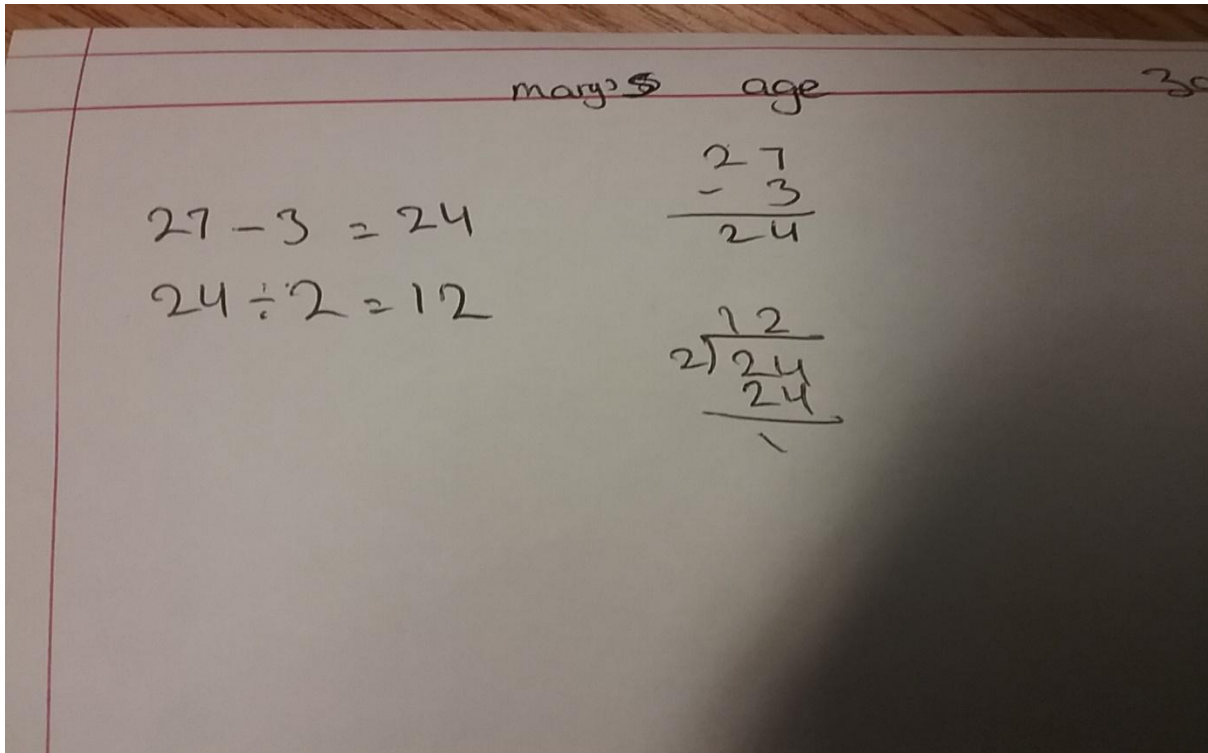

tried to represent Mary's age by using the letter x. However the student was not able to make the connection to x being the age and Mary,s age as 2x.
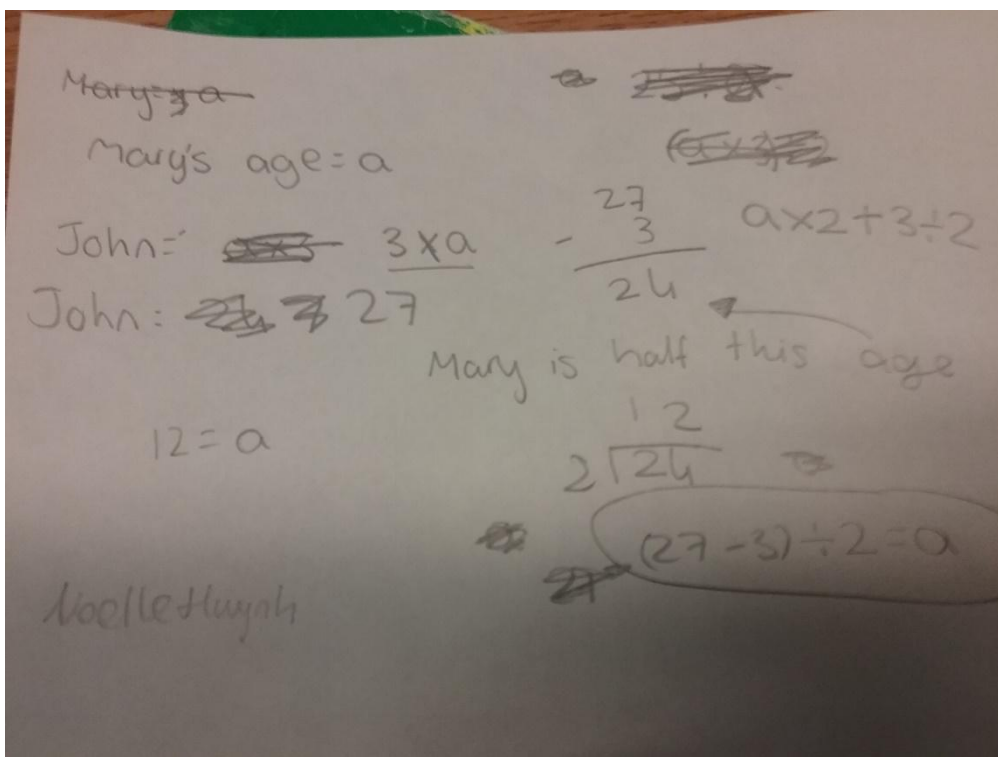Another misconception that has become evident was the statement in the problem in" 3 years' time". This statement seemed to throw some students. Some students subtracted 3 twice as is shown in the picture below. The wording of the problem may be to blame for this

Mary is 9

27-3=24

÷ 2

12-3 = 9
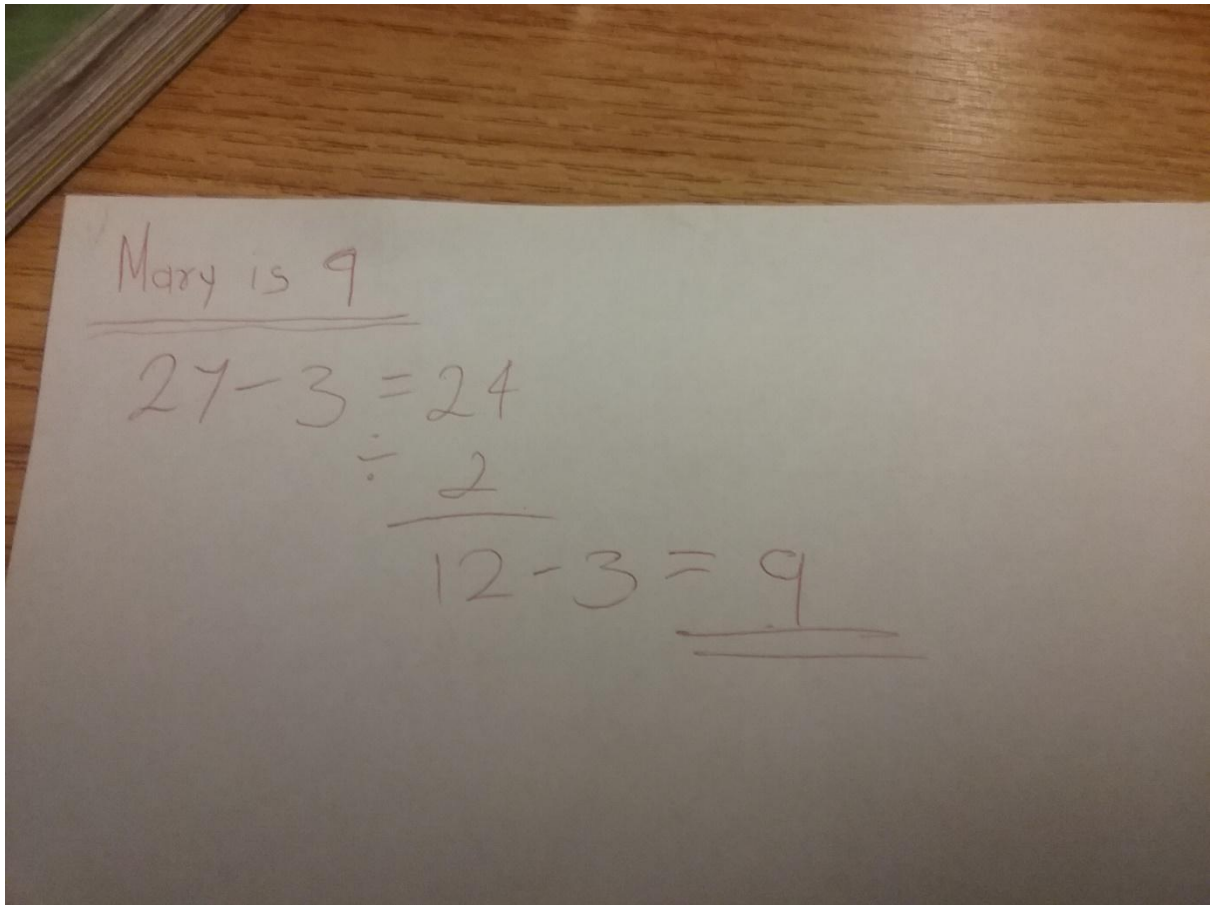
 However even though students did not make an algebraic representation of Mary's age some students followed the correct process to find Mary's age. Some students were able to work backwards by subtracting 3 and then dividing by 2 to find her age. This is shown in the 2 images below.

mary's age

$$27 - 3 = 24$$
$$24 \div 2 = 12$$

$$
\begin{array}{r}
27 \\
-\ 3 \\
\hline
24
\end{array}
$$

$$
\begin{array}{r}
12 \\
2\overline{)24} \\
24 \\
\hline
\end{array}
$$

The sample of the students work above shows the process that the student followed. The student recognised they must work backwards to solve the problem they were able to recognise that they needed to subtract 3 and divide by 2 in order to solve the problem. One student was able to derive

Mary = a

Mary's age = a

John = 3 x a

John : 27

12 = a

Noelle Huynh

$$
\begin{array}{r}
27 \\
-\ 3 \\
\hline
24
\end{array}
$$

a x 2 + 3 ÷ 2

Mary is half this age

$$
\begin{array}{r}
12 \\
2\overline{)24}
\end{array}
$$

$$(27 - 3) \div 2 = a$$

an equation to represent and then solve the problem as shown above. Overall it was felt that students did not achieve the primary learning intention of representing the problem as an

equation.

Post lesson if the lesson was to be delivered again more attention would be paid to the wording of the lesson to ensure that there would be no ambiguity about how students understand the question. They appeared to have been thrown off by the mention of '3 years time' twice in the problem. Based on this lesson it also became apparent that a lack of understanding of how to link real word problems back to simple equations has emerged.

Conclusion:

The lesson was intended to get students writing an equation to represent a real world problem. This intention was only met by one student with the majority of the students who took part in the lesson not writing an equation to solve the problem. In light of this the majority of the students were able to get the correct answer to the problem by working backwards based on the information given. The wording of the problem did cause some confusion for the majority of students. A change in the wording may have resulted in more finding the right answer.